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Contagion Effects of Bank Failures: Evidence from Capital Markets*

This study uses capital market data to analyze the three largest bank failures in U.S. history in an attempt to detect "contagion" effects on the performance of the banking industry and the economy as a whole. The analysis indicates that when the failure of a large bank is caused primarily by problems specific to the bank, such as fraud, no contagion effects are observed. When the failure of a large bank is caused by problems whose revelation is correlated across banks, the observed fall in prices of solvent bank stocks may be interpreted as investors' response to a common type of unfavorable signal, rather than a contagion effect.

I. Introduction

It is often suggested that the "contagion" effect of bank failure is one of the main reasons for bank regulation (e.g., Meltzer 1967; Benston 1973; Burns 1974). In this view, bankruptcy of a single bank, especially a large bank, may cause the loss of public confidence in the banking system as a whole and is thus likely to set off runs on other banks. This, in turn, causes losses to banks and their stockholders and disrupts the monetary system and the general economic stability. Other writers, however, argue that the deposit insurance provided by the Federal Deposit Insurance Corporation (FDIC), together with the FDIC practice of assisting the merger of a failed with a solvent bank (purchase assumption) in practically all cases of large bank failures,[1] eliminate almost entirely the danger of losses for all depositors, thereby greatly reducing the probability of bank run (Kreps and Wacht 1971; Black, Miller, and Posner 1978). It follows that the major losses from a bank failure would be incurred by the FDIC, and thus the main reason for bank regulation is to limit FDIC's risk exposure.

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1. Nine of the 10 largest U.S. bank failures as of December 31, 1977, have been absorbed by other banks. For details, see Sinkey (1979), p. 16.

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This study analyzes the three largest bank failures in U.S. history in an attempt to detect contagion effects on the performance of the banking industry and the economy as a whole. For this purpose, the study examines the possible relation between the specific cause of each failure and any contagion effect. Capital market data are used to measure abnormal performance of solvent bank groups of different size, in the periods surrounding each bankruptcy date, as a result of unanticipated unfavorable information related to each bank failure.[2]

II. Characteristics of Bank Failures and the Contagion Effect

Since the early 1970s there has been a significant increase in the number of bank failures in the United States.[3] In the 27-year period from 1946 to 1972, only 97 insured banks failed as compared with 44 failures during the 5-year period from 1973 to 1977. Of those 44 failures, 28 occurred in the 1975–76 period alone.[4] More than that, the size of failed banks has increased significantly. From 1934 to 1972, the average insured bank that failed had total deposits of only $2 million, and the largest had total deposits of $93 million. In comparison, eight of the 10 largest U.S. bank failures as of December 31, 1977 occurred since 1973 (Sinkey 1979, ch. 1). Among those failures, the largest three were those of Franklin National Bank of New York (FNB), with total deposits of $1.4 billion at the failure date; United States National Bank of San Diego (USNB), with $932 million; and Hamilton National Bank of Chattanooga (HNB), with $336 million. Since it is expected that, ceteris paribus, the larger the failing bank, the more pronounced any contagion effect, this study analyzes possible contagion effects of these three largest bank failures.

Bank failures may have a contagion effect that can be compared to the "domino" effect; regardless of the cause of bank failure, its effect would spill over to other banks, too. This will be referred to as the "pure" contagion effect. However, in order to empirically detect any pure contagion effect, one must consider the degree to which the arrival of adverse information related to a certain bank failure is correlated across banks. Previous studies suggest two major causes for recent bank failures: fraud and internal irregularities; and losses due to

2. The study assumes that capital markets are efficient; i.e., all publicly available information is immediately conveyed through security prices. Several studies provided evidence that the markets for actively traded bank securities are efficient (see Pettway 1976, 1980; Murphy 1979; and Pettway and Sinkey 1980).

3. A failed bank is one whose operations are suspended by supervising banking authorities because of financial difficulties.

4. The source of these data is FDIC Annual Reports, various years. A similar trend is observed in the U.S. economy in general. The number of companies filing for bankruptcy increased from an annual rate of about 11,000 to 17,000 until 1973, to about 35,000 in 1976, according to U.S. Bankruptcy Court filings.

risky loans and investments (Benston 1973, pp. 39–40; Hill 1975). A distinction should be made, however, between risky activities that are typical of many banks in the industry, and those that are specific to a certain bank. This study assumes that revelations about fraud or losses caused by specific risky investments are uncorrelated across banks. Thus, a negative reaction of the banking industry to a bank failure caused by such problems is considered to be a pure contagion effect. On the other hand, if a bank failure is caused by problems whose revelation is correlated across banks, a negative reaction of the banking industry may not necessarily be considered as a pure contagion effect. It may simply reflect a response to a common type of bad signal.

Of the three largest bank failures, USNB's and HNB's appear to have been caused by activities specific to those banks. The failure of USNB has been attributed to fraud and internal irregularities (Sinkey 1979, p. 232); HNB's failure was precipitated by illegal channeling of risky real estate loans from Hamilton Mortgage Corporation, a subsidiary of the holding company of HNB, back to HNB (Sinkey 1979, p. 205). The failure of FNB, in contrast, was caused primarily by certain losses whose revelation was correlated across banks. Specifically, FNB's failure reflected the heavy losses resulting from risky foreign exchange transactions (Rose 1974). Similar losses seemed to have afflicted a fair number of other banks, both in the United States and in Europe during that period (Rose 1974). Thus, the revelation about Franklin's problems might have been considered a signal of financial crisis in the international banking system.[5]

III. Methodology and Estimation Procedure

A. Critical Events Preceding Each Bank Failure

In order to determine whether bank failures have a contagion effect, one must first detect the dates when critical events preceding the failure became publicly available. In efficient capital markets, a failing firm would sustain a large stock price drop at that point of time in which investors observe a substantial solvency deterioration signal. If this unanticipated unfavorable information has a contagion effect, it should immediately be reflected in the stock prices of other solvent

5. The international banking operations of the U.S. banking industry expanded rapidly during the first half of the 1970s. Between the end of 1970 and 1974, the number of U.S. banks with overseas branches increased by 58%, and total assets of foreign branches of U.S. banks increased from $46.5 billion to $151.9 billion. Moreover, these assets, which represented about 8% of the total assets of all U.S. banks at the end of 1970, increased to about 17% by the end of 1974 (Johnston 1977). The significant expansion of international activities exposed the banks involved to the risks associated with international banking (for an extended discussion on this subject and on the international banking crisis of 1974, see Dean and Giddy [1981]).

TABLE 1 Chronological List of Events Related to Bank Failures

Date of Event	Weeks to Failure	Event
		U.S. National Bank of San Diego (USNB)
5.24.73	*FW* − 21	Comptroller of Currency forces C. Arnholt Smith to resign presidency and board chairmanship of USNB.
10.01.73	*FW* − 2	USNB omits third quarter dividend.
10.18.73	*FW* − 0	USNB closed by Comptroller of Currency; with FDIC's financial assistance, USNB's deposits and "clean" assets assumed by Crocker National Bank of San Francisco.
		Franklin National Bank (FNB)
5.10.74	*FW* − 22	FNB announces it will not pay regular second quarter dividend; sizable foreign exchange losses.
5.13.74	*FW* − 21	FNB announces $14 million foreign exchange losses; FNB's stock trading suspended.
6.27.74	*FW* − 15	In surprise move, West German authorities require Bankhaus (I.D.) Herstatt KG liquidated; losses in foreign currency trade cited.*
6.28.74	*FW* − 15	Herstatt puts "overindebtedness" at $156 million; some markets are disrupted.*
10.08.74	*FW* − 0	The FDIC finally arranges Franklin's takeover (by deposit assumption) and the bank is closed.
		Hamilton National Bank (HNB)
9.19.75	*FW* − 21	HNB omits dividend.
1.02.76	*FW* − 6	Hamilton Bancshares Inc. (holding company of HNB) needs to make substantial addition to loan-losses reserves for 1975, asks halt in trading for January 2 only.
2.16.76	*FW* − 0	HNB is declared insolvent by Comptroller of Currency; deposit liabilities assumed by another bank.

SOURCE.—Various annual issues of the *Wall Street Journal Index*.
NOTE.—*FW* is failure week.
* The relevance of this event is explained below on p. 315.

banks. Therefore, the method employed in this study is first to relate events in the progression of each bank failure to abnormal performance of its stock prices and then to examine any abnormal performance of various bank portfolios grouped by size of total deposits at the time of those events.

Dates of events in the progression of each bank failure and brief descriptions are provided in chronological order in table 1. Since this study seeks to detect any contagion effect of banks that ultimately failed, any adverse firm-specific information observed prior to the formal failure of those banks is considered a critical event. The search for critical events was carried out for a 5-year period preceding the failure

date. The annual issues of the *Wall Street Journal Index* were the main source of information.

B. Data

The potential contagion effects of large bank failures on the performance of the banking industry are examined, using the market model. It is often argued that very large banks are generally immune to bankruptcy because regulatory authorities would not allow them to fail (Horvitz 1975; Mayer 1975). Thus, the degree of contagion effect may be negatively correlated with the size of solvent banks. In order to reveal any differential contagion effect due to size, three portfolios of solvent banks and bank holding companies (BHCs) grouped by size of total deposits as of December 31, 1974, are constructed: (1) 12 banks (referred to as "money center") with total deposits ranging from $9.7 to $50.7 billion; (2) 31 banks (referred to as "medium size") with total deposits ranging from $1.6 to $8.6 billion; and (3) 30 banks (referred to as "smallest") with total deposits ranging from $0.4 to $1.5 billion.[6] The sample consists of the largest set that could be obtained for the given data requirements. To be included, each solvent bank must have weekly rates of return for the period 1969–77. Weekly rates of return are computed for each bank using either daily returns (when available)[7] or successive end of week daily bid prices plus dividends (in weeks where they became ex-dividend), adjusted for stock splits and stock dividends.[8] The latter method was used to calculate weekly rates of return for each of the three failing banks.

C. Measurement of Abnormal Returns

The market model assumes the relation between individual security returns and the market to be given by

$$\tilde{R}_{jw} = \alpha_j + \beta_j \tilde{R}_{mw} + \tilde{\epsilon}_{jw}, \tag{1}$$

6. Total deposits for each company were obtained from *Moody's Bank and Finance Manual*. Mean ($\bar{X}$) and standard deviation (SD) of total deposits for each bank group are as follows (millions of dollars):

	$\bar{X}$	SD
Group 1	22013.3	13847.4
Group 2	3179.5	1911.6
Group 3	1083.0	365.3

7. Daily rates of return were obtained from the tapes of the Center for Research in Security Prices (CRSP) at the University of Chicago. Weekly returns are the compounded daily returns for each calendar week.

8. Daily prices and dividend data were obtained from the various quarterly issues of over-the-counter *Daily Stock Prices Record* published by Standard and Poor Corporation.

where

$\tilde{R}_{jw}$ = rate of return of security j over week w,
$\tilde{R}_{mw}$ = rate of return on the CRSP value weighted index of all common stocks in the New York and American Stock Exchanges (used as a surrogate of the market portfolio of risky assets) over week w,[9]
β_j = covariance $(\tilde{R}_{jw}, \tilde{R}_{mw})$/variance $(\tilde{R}_{mw})$,
$\tilde{\epsilon}_{jw}$ = disturbance term of security j in week w, $E(\tilde{\epsilon}_{jw}) = 0$, and
α_j = constant term.

The market model is used to determine whether investors in each failed bank and in various stock portfolios of solvent banks realized abnormal returns in time intervals surrounding the bank failures. For each failure, the interval begins 20 weeks before the date of the first critical event and ends 5 weeks after the failure date (see tables 2–4). For each failed bank separately, the week of failure is denoted by FW, and $FW - t$ designates the tth week before the respective failure. For each security j ($j = 1, \ldots, 73$) in every calendar week W, the parameters of equation (1) ($\hat{\alpha}_{jW}$, $\hat{\beta}_{jW}$) are estimated by using data from 60 weeks preceding week W. Abnormal returns, $\hat{\epsilon}_{jW}$, are estimated for each calendar week W, as the difference between weekly realized security returns (R_{jW}) and the corresponding estimated weekly returns predicted from the market model ($\hat{\alpha}_{jW} + \hat{\beta}_{jW} R_{mW}$). For any calendar week, the average weekly residual across sample members is

$$AR_{iW} = \frac{1}{N_i} \sum_{j=1}^{N_i} \hat{\epsilon}_{jW}, \tag{2}$$

where N_i is the number of banks in portfolio $i = 1, \ldots, 3$. These average residuals are summed over event time to obtain cumulative average weekly residuals (CAR):

$$CAR_{K,L} = \sum_{w=K}^{L} AR_{iw}, \tag{3}$$

where K and L specify the time period relative to FW. The average and cumulative average weekly residuals are interpreted as the abnormal returns of sample members.

To determine whether estimated average abnormal weekly returns on a portfolio of securities, over various time intervals relative to each failure date, are significantly different from zero,[10] the standardized

9. Weekly market rates of return are the compounded daily market returns for each calendar week.

10. Since industry and other factors cause residuals to be correlated across securities in a given time period, it is incorrect to assess the impact of a certain bank failure on the industry by analyzing the frequency distribution of individual security t-statistics; rather, the analysis should relate to abnormal returns on portfolios of securities constructed for each period.

average residual for portfolio i in each week W is first calculated as

$$SR_{iW} = \frac{AR_{iW}}{SD_{iW}} \sim t(59), \tag{4}$$

where SD_{iW} is the standard deviation of the average weekly portfolio residuals, calculated from the previous 60-week data.[11] It is assumed that the SR_{iW} are identically distributed independent random variables. (Each has a t-distribution with 59 *df.*) The portfolio test statistic is the ratio of the sample mean of SR_{iW} to the standard deviation (σ) of this sample mean:[12]

$$PTS = \frac{\Sigma_{w=K}^{L} SR_{iw}/M}{\sigma(\Sigma_{w=K}^{L} SR_{iw}/M)} = \frac{\Sigma_{w=K}^{L} SR_{iw}}{\sqrt{M}}, \tag{5}$$

where K and L are the first and last calendar weeks, respectively, of a certain time period relative to FW, in which portfolios are formed; M is the number of weeks in the period; and $\sigma(SR_{iW}) = 1$ because of standardization. Whenever M is sufficiently large, we can approximate the distribution of PTS by the standard normal distribution.

IV. Results and Analysis

Abnormal returns realized by stockholders of each failing bank in the weeks preceding each bankruptcy date, the corresponding abnormal returns on three portfolios of solvent banks, and the market portfolio return are reported in tables 2, 3, and 4, respectively. These results will be analyzed separately for each bank failure.

A. *The Case of USNB of San Diego: Failure due to Fraud and Internal Irregularities*

At the time of its failure (October 18, 1973), USNB was the largest bank to fail in U.S. history. It had approximately $1 billion in deposits. Two major critical events are observed during the course of its solvency deterioration (table 1). The first event (May 24, 1973), 21 weeks previous to FW, was the forced resignation of USNB's president and chairman of the board, who was involved in illegal activities with the bank's funds. Capital market reaction was negative and stockholders of USNB sustained significant abnormal losses of 25% during weeks $FW - 21$ and $FW - 20$ combined (table 2). However, a week later ($FW - 19$) a reversal took place in the capital market and investors

11. To obtain an estimator of the standard deviation in week W, the following procedure is used. For each firm j in the portfolio in week W, the market model (eq. [1]) is estimated again over weeks $W - 120$–$W - 61$. The estimated parameters $\hat{\alpha}_j$ and $\hat{\beta}_j$ obtained are then used to calculate residuals for each firm j over weeks $W - 60$–$W - 1$. These residuals are averaged across firms for each of the 60 weeks preceding week W and then used to calculate SD_{iW}.

12. A similar test was used by Dodd and Ruback (1977).

TABLE 2 **Performance Measures for Weeks Surrounding the Announcement Date of USNB Failure**

Weeks to Failure	USNB		12 Money-Center Banks		31 Medium-Size Banks		30 Smallest Banks		All 73 Banks		Market Portfolio
	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Weekly Return (%)
−41	.55	.17	.81	.54	.33	.27	.30	.33	.40	.38	1.31
−40	−.84	−.26	−.14	−.10	1.44	1.22	.77	.86	.91	.89	−.62
−39	.11	.03	−.74	−.50	.08	.06	.10	.11	−.05	−.05	−.69
−38	−.42	−.13	−3.03	−2.07***	−1.23	−1.03	−1.49	−1.68****	−1.63	−1.60	−2.22
−37	−.56	−.17	−.75	−.50	−2.57	−2.13***	−2.19	−2.45**	−2.12	−2.04***	−1.93
−36	−1.92	−.60	−4.75	−3.17**	−2.88	−2.35***	−2.89	−3.15**	−3.19	−3.03**	.34
−35	−.01	−.00	−.67	−.41	.01	.01	−.85	−.86	−.45	−.40	.04
−34	.93	.29	1.25	.77	−.37	−.29	−.74	−.74	−.25	−.23	−1.79
−33	−.73	−.23	1.09	.67	.00	.00	−.33	−.33	.04	.04	−1.15
−32	−.38	−.12	1.21	.74	.53	.42	.73	.73	.72	.64	1.54
−31	.05	.02	−.41	−.25	.03	.03	−.28	−.28	−.17	−.15	−.41
−30	−.98	−.30	−1.76	−1.08	−2.11	−1.71****	−2.19	−2.18***	−2.08	−1.86****	−4.29
−29	−2.59	−.80	.11	.07	−.15	−.12	−.59	−.59	−.29	−.26	2.47
−28	.48	.15	−.85	−.53	−2.01	−1.64	−2.31	−2.29***	−1.94	−1.74****	−2.28
−27	.45	.14	.05	.03	.06	.05	.58	.56	.27	.24	2.39
−26	.95	.29	−1.00	−.63	−.91	−.73	−1.22	−1.17	−1.05	−.93	−.11
−25	−.01	−.00	−.95	−.59	−.02	−.02	−.36	−.34	−.31	−.28	−4.56
−24	−1.04	−.32	−.34	−.21	−2.34	−1.89****	−1.87	−1.80****	−1.82	−1.61	3.45
−23	−2.45	−.77	.35	.22	.37	.29	.64	.60	.48	.42	−2.14
−22	−2.94	−.93	−1.33	−.86	−1.19	−.98	−3.03	−2.92**	−1.97	−1.78****	−4.41
Cumulative: *FW* − 41–*FW* − 22	−11.35	−.79[a]	−11.85	−1.76****	−12.93	−2.36**	−17.22	−3.93*	−14.50	−2.99**	−15.06
−21[b]	−7.86	−2.47**	1.18	.82	.47	.42	−2.55	−2.57**	−.66	−.65	3.72
−20	−17.14	−5.18*	.80	.55	.74	.66	−.17	−.17	.37	.37	−3.65
−19	21.82	5.58*	−.70	−.49	−1.73	−1.55	−1.42	−1.38	−1.44	−1.41	2.59

−18	2.23	.47	2.31	1.62	1.52	1.31	1.53	1.45	1.65	1.60	−1.55
−17	3.14	.67	.27	.18	−.84	−.72	−.29	−.27	−.43	−.41	−1.44
−16	−.57	−.12	2.39	1.66	.40	.34	.61	.57	.82	.77	.60
−15	1.83	.39	−.14	−.10	−.30	−.26	−.20	−.19	−.24	−.22	−2.60
−14	−3.69	−.79	.35	.24	.62	.54	.96	.91	.71	.69	3.39
−13	−1.76	−.37	1.91	1.33	.40	.36	.60	.57	.73	.73	3.66
−12	−5.67	−1.27	−1.21	−.81	−1.50	−1.37	−1.36	−1.30	−1.39	−1.39	2.22
−11	1.53	.34	−.26	−.18	−.75	−.67	−.31	−.29	−.49	−.48	−2.49
−10	−3.50	−.77	−.92	−.63	−1.61	−1.43	−1.14	−1.08	−1.30	−1.27	−1.48
−9	.29	.06	−.41	−.28	−.30	−.27	−2.16	−2.04***	−1.08	−1.05	−2.18
−8	−.66	−.14	−.86	−.58	−.57	−.50	−.94	−.86	−.77	−.74	−.63
−7	.94	.21	1.18	.79	.62	.55	−.03	−.03	.44	.43	2.74
−6	1.97	.43	3.92	2.67**	3.88	3.49**	1.82	1.69****	3.04	2.98**	.90
−5	−.60	−.13	−1.24	−.79	−.22	−.19	.16	.15	−.23	−.22	−.39
Cumulative *FW* − 21−*FW* − 5	−7.70	−.75	8.57	1.46	.83	.17	−4.89	−1.17	−.27	−.07	3.41
−4	−3.05	−.67	.86	.54	.65	.55	.42	.39	.59	.55	3.21
−3	−4.05	−.90	.65	.41	1.39	1.18	2.05	1.89****	1.54	1.43	1.43
−2[c]	−7.74	−1.71****	.55	.35	1.26	1.06	1.54	1.39	1.26	1.15	1.43
−1	−9.41	−2.03***	1.61	1.00	.78	.65	.88	.78	.96	.86	1.36
0	...	...	−1.53	−.94	2.01	1.69****	1.19	1.04	1.09	.98	−1.21
+1	...	...	−1.81	−1.10	−.87	−.74	−1.42	−1.26	−1.25	−1.15	.71
+2	...	...	−.02	−.01	−.13	−.11	−.75	−.66	−.37	−.34	−3.54
+3	...	...	−.60	−.36	−1.46	−1.25	−.20	−.18	−.80	−.74	−1.77
+4	...	...	−.24	−.15	−2.23	−1.89****	−2.61	−2.37***	−2.06	−1.88****	−1.85
+5	...	...	2.13	1.28	−1.37	−1.14	−1.50	−1.28	−.85	−.74	−4.19

[a] *PTS* of eq. (5).
[b] Resignation week.
[c] Dividend omission.
* Significant at .05% level (one-tailed test).
** Significant at 1.0% level (one-tailed test).
*** Significant at 2.5% level (one-tailed test).
**** Significant at 5.0% level (one-tailed test).

gained a significant positive abnormal return of about 22%. The resignation event seemed to have a contagion effect only on the smallest bank group, which consists of banks similar in size to USNB. Its investors sustained in week $FW - 21$, on the average, abnormal losses of 2.55% (significant at the 1% level). The market return, however, in that week was positive (3.72%), and no further significant reaction is observed for any of the bank groups in either week $FW - 20$ or week $FW - 19$. In the previous 20 weeks ($FW - 41$–$FW - 22$), stockholders of each solvent bank group sustained, on the average, significant abnormal losses (*CAR* of −14.5%, significant at the 1% level, for the entire sample), where the largest losses were sustained by the smallest bank group (−17.22%, significant at the 0.05% level). However, it should be noted that during each week of the same time period, investors in USNB earned normal returns (as predicted from the market model). Still, the cumulative market return was negative (−15%). Thus, the negative *CAR* of the solvent banks in this period seems to have been caused by events unrelated to USNB difficulties.

The second major critical event occurred two weeks before bankruptcy date ($FW - 2$): USNB omitted its dividend for the third quarter of 1973.[13] Subsequently, USNB's investors sustained significant abnormal losses of 7.7%. However, on the average, no corresponding abnormal returns are observed in that week on any of the solvent bank portfolios. Note that during each of the previous 16 weeks ($FW - 18$–$FW - 3$), USNB's investors earned normal returns. Similar results are observed for each solvent bank group during most of this period. In the last week before failure ($FW - 1$), USNB's investors sustained significant abnormal losses of 9.4%, but no apparent contagion effect is observed on the performance of any of the solvent bank portfolios or the market portfolio. A similar observation can be made for both the failure week (FW) and the following 5 weeks ($FW + 1$–$FW + 5$). These findings suggest that the contagion effect of USNB's failure was marginal at best.

B. The Case of FNB of New York: Failure due to Losses from Foreign Exchange Transactions

Less than a year after USNB's failure, on October 8, 1974, FNB became the all-time largest bank failure in U.S. history. About 5 months before its failure, FNB was the twentieth-largest bank in the nation, with deposits close to $3 billion. The first major event that drew public attention to Franklin's financial difficulties occurred on May 10, 1974, 22 weeks ($FW - 22$) before its final bankruptcy date: Franklin eliminated its regular dividend for the second quarter of 1974, and an-

13. A dividend omission is considered to be a relatively rare event in the banking industry.

nounced that it had sizable foreign exchange losses. Subsequently, Franklin's stockholders sustained abnormal losses of 35.5% (significant at the 0.05% level).[14] The reaction of the market for bank stocks was strong (table 3) and investors in each solvent bank group sustained, on the average, significant abnormal losses during that week (*AR* of −6.16%, significant at the 0.05% level, for the entire sample, at *FW* − 22). Note that these losses were about twice as much for the largest bank group as compared with the smallest bank group (−9.51 vs. −4.85%, respectively). However, this event had no observable impact on the capital market as a whole (the market weekly return was −0.16%).

The significant negative abnormal performance of the various solvent bank groups in week *FW* − 22 may be considered a pure contagion effect. However, it may just as well be interpreted as investors' reaction to a common type of unfavorable signal. The reason is that the revelation about the adverse activities that led to Franklin's financial difficulties was correlated across banks. Specifically, the foreign exchange losses that led to Franklin's failure were at that time typical of a fair number of other banks, both in the United States and in Europe (Rose 1974). For example, several weeks after Franklin's dividend omission, a large European bank, Bankhaus Herstatt of West Germany, failed unexpectedly (on June 27, 1974 at week *FW* − 15). The bank's losses in foreign currency trade were cited as the reason for its liquidation. Following this unexpected failure by Herstatt in *FW* − 15, investors in each solvent bank group sustained, on the average, significant abnormal losses of which the largest were of −5.79% for the medium-size bank group (significant at the 1% level).

Franklin's stock never resumed trading after its suspension on May 13, 1974. However, with the Federal Reserve Board's assistance, the bank remained in operation for 5 more months until the FDIC finally arranged its takeover, and only then, on October 8, 1974, was it declared insolvent. This intentionally long delay by the banking regulatory agencies provided an opportunity for Franklin's uninsured depositors to withdraw their funds, and for the FDIC to arrange a purchase assumption with minimal financial strain on the trust fund the FDIC administers.[15] During most of this period, no significant effect is observed on any of the solvent bank portfolios. Particularly, in almost each week following Bankhaus Herstatt's failure (*FW* − 14 through *FW* + 5), investors in each solvent bank group realized normal returns (as predicted by the market model). Notice that the cumulative market return for the period *FW* − 14–*FW* − 1 was −28.2%, with a strong

14. Notice that a week earlier (*FW* − 23) Franklin's stockholders sustained significant abnormal losses of 13%, probably because the bad news had leaked to the market earlier.

15. For an extended discussion of this subject see Sinkey (1979, pp. 154–58).

TABLE 3 **Performance Measures for Weeks Surrounding the Announcement Date of FNB Failure**

	FNB		12 Money-Center Banks		31 Medium-Size Banks		30 Smallest Banks		All 73 Banks		Market Portfolio
Weeks to Failure	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Weekly Return (%)
−42	5.44	1.09	−.60	−.39	.07	.06	−.40	−.33	−.23	−.20	.02
−41	−.21	−.04	2.25	1.50	1.93	1.60	1.34	1.07	1.74	1.51	4.22
−40	8.51	1.71****	2.74	1.73****	3.52	2.79**	2.48	1.90****	2.96	2.44**	2.35
−39	7.83	1.55	.97	.59	2.72	2.00****	2.77	2.04***	2.46	1.89****	−4.99
−38	6.85	1.33	1.15	.69	2.53	1.82****	1.90	1.37	2.04	1.55	2.16
−37	−4.09	−.79	−2.17	−1.29	−1.22	−.85	−.69	−.49	−1.16	−.85	1.03
−36	4.01	.77	−.18	−.11	.62	.43	.21	.15	.32	.23	−1.16
−35	2.65	.51	.15	.09	.45	.31	−.01	−.01	.21	.16	−2.75
−34	−.78	−.15	−.49	−.29	−1.36	−.94	.22	.15	−.57	−.41	−.16
−33	−.98	−.19	.50	.30	−.51	−.35	−.82	−.56	−.47	−.34	3.39
−32	−1.29	−.25	1.43	.84	−.41	−.29	.04	.03	.08	.05	.57
−31	−3.88	−.75	−1.95	−1.19	−.36	−.25	−.20	−.14	−.56	−.41	2.34
−30	−7.21	−1.38	.85	.52	.02	.01	.29	.20	.27	.19	1.62
−29	−.77	−.15	−.16	−.10	−.48	−.33	−.41	−.28	−.40	−.29	−2.18
−28	−3.00	−.56	.02	.01	−.64	−.42	−.04	−.03	−.29	−.20	−3.39
−27	.73	.13	−2.91	−1.85****	−.81	−.55	−.45	−.31	−1.01	−.73	−1.22
−26	5.76	1.07	.52	.34	−1.93	−1.32	−.77	−.54	−1.05	−.77	−.96
−25	−5.33	−.98	.22	.15	.49	.32	−1.21	−.85	−.26	−.19	1.65
−24	1.66	.31	−.68	−.44	−2.21	−1.48	−1.09	−.76	−1.49	−1.09	−4.14
−23	−13.12	−2.49**	−2.49	−1.58	−2.14	−1.39	−.58	−.40	−1.56	−1.10	1.38
Cumulative *FW* − 42–*FW* − 23	2.72	.17[a]	−.83	−.11	.28	.26	2.58	.49	1.03	.32	−0.22
−22[b]	−35.52	−6.40*	−9.51	−6.09*	−6.13	−3.97*	−4.85	−3.39**	−6.16	−4.42*	−.16
−21	...	...	3.76	1.90****	−.23	−.13	−1.25	−.80	.01	.01	−3.66
−20	...	...	−1.08	−.56	.04	.02	−1.21	−.82	−.66	−.44	.20
−19	...	...	−.81	−.42	−1.43	−.87	−2.09	−1.39	−1.60	−1.06	−1.29
−18	...	...	1.00	.52	1.95	1.20	2.70	1.82****	2.10	1.41	6.10
−17	...	...	−1.98	−1.02	−1.13	−.67	−1.29	−.83	−1.33	−.86	−1.46

−16	...	...	−4.87	−2.48**	−2.79	−1.66	−.60	−.39	−2.23	−1.44	−4.35
−15[c]	...	...	−4.91	−2.38***	−5.79	−3.35**	−3.15	−2.03***	−4.56	−2.87**	−2.03
Cumulative *FW* − 22–*FW* − 15			−18.40	−3.72*	−15.51	−3.33*	−11.74	−2.77**	−14.43	−3.42*	−6.65
−14	...	...	1.45	.66	−2.05	−1.05	.06	.04	−.61	−.35	−2.77
−13	...	...	2.60	1.19	2.32	1.18	−.47	−.29	1.22	.70	−.59
−12	...	...	7.52	3.45**	2.65	1.36	2.60	1.68****	3.43	2.03***	.95
−11	...	...	−2.70	−1.14	.06	.03	1.29	.80	.11	.06	−1.04
−10	...	...	−.15	−.06	−.16	−.08	.33	.20	.04	.02	−4.56
−9	...	...	−1.08	−.44	−1.65	−.82	−1.28	−.77	−1.40	−.78	3.23
−8	...	...	−1.40	−.58	−2.44	−1.21	−.86	−.53	−1.62	−.90	−6.02
−7	...	...	−.57	−.23	.27	.13	−.39	−.23	−.14	−.07	−5.38
−6	...	...	−.70	−.29	−.83	−.39	−2.11	−1.25	−1.34	−.72	.40
−5	...	...	1.39	.57	−1.23	−.58	−1.45	−.85	−.89	−.48	−1.03
−4	...	...	3.48	1.45	3.31	1.59	2.09	1.25	2.84	1.55	−8.49
−3	...	...	3.14	1.33	−1.39	−.67	−1.95	−1.18	−.88	−.48	7.64
−2	...	...	.75	.30	1.89	.90	3.44	2.06***	2.34	1.27	−6.60
−1	...	...	−.81	−.33	−.61	−.29	−.02	−.01	−.40	−.22	−3.94
Cumulative *FW* − 14–*FW* − 1			12.92	1.57	.14	.03	1.28	.25	2.70	.44	−28.20
0	...	...	1.03	.42	6.93	3.32**	1.79	1.07	3.85	2.11***	13.86
+1	...	...	.60	.24	1.24	.48	2.66	1.51	1.72	.83	1.56
+2	...	...	1.93	.76	−.37	−.14	−1.47	−.81	−.44	−.21	−2.58
+3	...	...	−1.99	−.79	−2.52	−.97	−2.90	−1.58	−2.59	−1.23	5.22
+4	...	...	−.78	−.32	−.09	−.04	1.44	.81	.43	.21	1.96
+5	...	...	.98	.40	1.76	.71	2.53	1.40	1.95	.97	−3.64

[a] *PTS* of eq. (5).
[b] Dividend omission and foreign exchange losses.
[c] Herstatt failure and money market disruption.
* Significant at .05% level (one-tailed test).
** Significant at 1.0% level (one-tailed test).
*** Significant at 2.5% level (one-tailed test).
**** Significant at 5.0% level (one-tailed test).

TABLE 4 **Performance Measures for Weeks Surrounding the Announcement Date of HNB Failure**

Weeks to Failure	HNB		12 Money-Center Banks		31 Medium-Size Banks		30 Smallest Banks		All 73 Banks		Market Portfolio
	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Abnormal Return (%)	*t*-Value	Weekly Return (%)
−41	−9.49	−1.46	−2.25	−.81	−.66	−.26	−1.53	−.77	−1.28	−.59	2.72
−40	5.93	.90	−.68	−.24	.30	.12	.59	.30	.26	.12	1.98
−39	1.56	.23	−.74	−.27	.43	.17	.27	.14	.17	.08	−.02
−38	−.88	−.13	−.73	−.26	−.60	−.24	−.97	−.49	−.77	−.36	.36
−37	.54	.08	−1.76	−.63	−.59	−.23	−.80	−.40	−.87	−.40	.97
−36	−2.30	−.35	−.82	−.29	−.03	−.01	.78	.39	.18	.08	1.63
−35	−6.79	−1.03	3.50	1.27	2.04	.81	.59	.29	1.68	.78	−1.93
−34	−5.79	−.86	4.60	1.65	2.55	1.02	1.30	.65	2.37	1.10	2.47
−33	1.53	.23	−2.16	−.75	1.75	.70	2.11	1.06	1.25	.58	2.52
−32	2.23	.34	.28	.10	.45	.18	.76	.38	.55	.25	−.34
−31	1.06	.16	−.40	−.15	.18	.08	.67	.35	.29	.14	.63
−30	5.48	.85	.93	.36	.91	.38	.97	.51	.94	.46	−1.19
−29	−3.25	−.51	−1.70	−.66	−.27	−.11	.63	.33	−.14	−.07	−4.36
−28	3.24	.50	−.87	−.34	.31	.13	−.77	−.41	−.33	−.16	−1.53
−27	−6.48	−1.10	.25	.10	.04	.02	−.23	−.13	−.04	−.02	−2.33
−26	1.42	.24	−1.90	−.75	−2.54	−1.10	−1.03	−.57	−1.81	−.94	.31
−25	1.20	.20	−2.53	−1.03	−.08	−.04	.37	.21	−.30	−.16	−2.42
−24	−1.72	−.29	−.33	−.14	−1.12	−.55	−1.65	−.95	−1.21	−.69	3.32
−23	3.25	.55	−1.93	−.81	.19	.10	.22	.13	−.15	−.08	−1.50
−22	1.43	.24	−1.49	−.63	−.18	−.09	.71	.41	−.03	−.02	−2.76
Cumulative *FW* − 41–*FW* − 22	−7.83	−.27[a]	−10.73	−.96	2.81	.24	2.99	.32	.76	.02	−1.47
−21[b]	−10.58	−1.80****	−1.65	−.76	−1.29	−.67	−2.70	−1.57	−1.93	−1.15	2.85
−20	1.39	.23	−1.48	−.69	−.76	−.40	−.99	−.56	−.97	−.57	.42
−19	2.14	.36	−1.15	−.53	−1.95	−1.02	−1.15	−.65	−1.49	−.88	−.48

−18		−.79	−.13	−1.54	−.71	−1.19	−.62	−1.30	−.74	−1.29	−.76	2.56
−17		−2.56	−.43	1.32	.61	.99	.53	−.80	−.45	.31	.18	.81
−16		.51	.09	−1.55	−.71	.62	.33	.67	.37	.28	.17	1.07
−15		−1.25	−.22	−3.75	−1.71****	−2.51	−1.34	−1.41	−.80	−2.26	−1.35	−.90
−14		−17.52	−3.09**	3.01	1.35	.61	.32	.24	.14	.85	.50	.70
−13		.18	.03	3.48	1.57	.56	.30	.16	.09	.88	.52	2.02
−12		−1.25	−.21	−3.83	−1.72****	−.31	−.16	−.68	−.40	−1.04	−.62	−1.47
−11		−9.29	−1.58	−.38	−.17	−1.37	−.73	−2.01	−1.22	−1.47	−.88	1.93
−10		−8.52	−1.43	−3.30	−1.45	−2.28	−1.20	−1.36	−.82	−2.07	−1.23	−4.87
−9		13.96	2.31***	−.87	−.38	.06	.03	.57	.34	.12	.07	.95
−8		6.38	1.01	3.31	1.43	4.07	2.38***	2.02	1.24	3.10	1.91****	1.20
−7		−5.05	−.80	2.57	1.10	−1.03	−.58	−.00	−.00	−.02	−.01	1.65
−6		.98	.16	2.14	.92	1.16	.66	2.08	1.31	1.70	1.04	.97
−5		1.31	.21	−.22	−.09	2.86	1.62	2.35	1.46	2.15	1.30	4.70
−4		4.21	.68	−1.13	−.48	−.38	−.21	1.52	.93	.27	.17	2.30
−3		18.70	2.97**	−2.67	−1.15	−2.86	−1.59	−.64	−.40	−1.92	−1.15	2.37
−2		19.76	2.92**	6.83	2.92**	1.74	.95	2.03	1.26	2.69	1.61	1.88
−1		9.99	1.39	−.67	−.27	1.35	.73	1.26	.77	.98	.57	−.70
Cumulative *FW* − 21− *FW* − 1		22.70	.58	−1.53	−.20	−1.91	−.15	−.14	−.07	−1.13	−.12	19.96
0		−31.79	−4.37*	.12	.05	.25	.14	1.22	.75	.63	.37	.65
+1		...	...	−.67	−.27	−1.78	−.99	−.94	−.58	−1.25	−.75	2.64
+2		...	...	.85	.35	.85	.47	1.05	.65	.93	.56	−2.15
+3		...	...	−.82	−.34	−.61	−.34	−.76	−.49	−.71	−.43	−.39
+4		...	...	.06	.02	1.11	.74	−.05	−.04	.46	.33	1.65
+5		...	...	3.91	1.81****	1.12	.79	−.72	−.58	.82	.64	−.30

[a] *PTS* of eq. (5).
[b] Dividend omission.
* Significant at .05% level (one-tailed test).
** Significant at 1.0% level (one-tailed test).
*** Significant at 2.5% level (one-tailed test).
**** Significant at 5.0% level (one-tailed test).

turning point at *FW* (market return of 13.86%). It is difficult, however, to relate this last observation with the formal closing of FNB.

C. *The Case of HNB of Chattanooga: Failure due to Losses from Risky Real Estate Loans*

The Hamilton's failure appears to have been caused by losses from real estate loans that were channeled illegally from Hamilton Mortgage Corporation during 1973–74. Following the deep recession in 1974, especially in the construction and real estate industries, HNB suffered heavy loan losses in 1975 that led to its failure on February 16, 1976 (Sinkey 1979, pp. 199–205). The first major event that may be considered a signal of severe financial difficulties, as with the previous two large bank failures, was the announcement of quarterly dividend omission on September 19, 1975, 21 weeks before failure ($FW - 21$). At that time, Hamilton's stockholders sustained abnormal losses of 10.58% (significant at the 5% level). However, on the average, no corresponding abnormal returns are observed on any of the solvent bank portfolios (table 4).

In the following weeks, up to 1 week preceding failure, Hamilton's stock price behavior was unstable and probably reflected high uncertainty regarding the bank's future solvency.[16] For example, 14 weeks previous to failure ($FW - 14$), Hamilton's stockholders sustained abnormal losses of 17.52%; in weeks $FW - 3$–$FW - 2$ they gained abnormal returns of about 38%; and finally in the failure week (FW), they suffered abnormal losses of approximately 32%. This suggests that even shortly before failure the capital market did not fully expect that the bank would soon be declared insolvent. Again, no corresponding abnormal performance is observed for any of the solvent bank portfolios or the market portfolio. Thus, HNB's failure had no contagion effect.

V. Summary and Conclusions

This study analyzes the three largest bank failures in U.S. history in an attempt to detect contagion effects on the performance of the banking industry and the economy as a whole. The analysis uses stock prices of three solvent bank groups of different size, and of each failing bank, to measure their abnormal performance in the weeks surrounding each bankruptcy date. Critical events related to each bank failure are detected for this purpose. A distinction is made between bank failures that might have been caused by adverse activities whose revelation is

16. Note that in a previous study, Aharony, Jones, and Swary (1980) found that the behavior of a firm's common stock during its solvency deterioration period is characterized by a high variance of returns.

assumed to be uncorrelated across banks (e.g., fraud) and failures caused by problems common to many banks in the industry.

The main conclusion is that the pure contagion effect hypothesis is not supported by the data. The results indicate that the failures of USNB and HNB, which were primarily the result of problems specific to these banks such as fraud and internal irregularities, did not have any contagion effect. The implication is that failure of a dishonestly run banking institution, even a large one, need not cause panic and loss of public confidence in the integrity of the banking system as a whole. Thus, the standard regulatory measures available, such as deposit insurance and purchase assumption, appear to be sufficient in such cases.

On the other hand, the primary cause of FNB's failure was heavy foreign exchange losses. Apparently, this led to a significant negative abnormal performance of the various solvent bank groups. However, similar difficulties with foreign exchange transactions also afflicted a fair number of other banks during the same period. Thus, the observed drop in solvent bank stock prices may be interpreted as investors' reaction to a common type of unfavorable signal, rather than a pure contagion effect.

References

Aharony, Joseph; Jones, Charles P.; and Swary, Itzhak. 1980. An analysis of risk and return characteristics of corporate bankruptcy using capital market data. *Journal of Finance* 35 (September): 1001–16.

Benston, George J. 1973. Bank examination. *Bulletin of the Institute of Finance* (New York University), nos. 89–90 (May).

Black, Fischer; Miller, Merton H.; and Posner, Richard A. 1978. An approach to the regulation of bank holding companies. *Journal of Business* 51 (July): 379–412.

Burns, Arthur F. 1974. Maintaining the soundness of our banking system. *Federal Reserve Bank of New York Monthly Review* (November), pp. 263–67.

Dean, James W., and Giddy, Ian H. 1981. Averting international banking crises. Monograph Series in Finance and Economics no. 1. New York: New York University, Graduate School of Business Administration.

Dodd, Peter R., and Ruback, Richard. 1977. Tender offers and stockholder returns: an empirical analysis. *Journal of Financial Economics* 5 (December): 351–73.

Hill, G. W. 1975. *Why 67 Insured Banks Failed: 1960–1974*. Washington, D.C.: Federal Deposit Insurance Corporation.

Horvitz, Paul M. 1975. Failure of large banks: implications for banking supervision and deposit insurance. *Journal of Financial and Quantitative Analysis* 10 (November): 589–601.

Johnston, Robert. 1977. International banking, risk and U.S. regulatory policies. *Federal Reserve Bank of San Francisco Economic Review* (Fall), pp. 36–43.

Kreps, Clifton H., and Wacht, Richard F. 1971. A more conservative role for deposit insurance. *Journal of Finance* 26 (May): 605–14.

Mayer, Thomas. 1975. Should large banks be allowed to fail? *Journal of Financial and Quantitative Analysis* 10 (December): 603–10.

Meltzer, Allen H. 1967. Major issues in the regulation of financial institutions. *Journal of Political Economy* 75 (July/August): 482–501.

Murphy, Neil B. 1979. Disclosure of the problem bank lists: a test of the impact. *Journal of Bank Research* 10 (Summer): 88–96.

Pettway, Richard H. 1976. The effects of large bank failures upon investors' risk cognizance in the commercial banking industry. *Journal of Financial and Quantitative Analysis* 11 (September): 465–77.

Pettway, Richard H. 1980. Potential insolvency, market efficiency, and bank regulation of large commercial banks. *Journal of Financial and Quantitative Analysis* 15 (March): 219–36.

Pettway, Richard H., and Sinkey, Joseph F., Jr. 1980. Establishing on-site bank examination priorities: an early-warning system using accounting and market information. *Journal of Finance* 35 (March): 137–50.

Rose, Sanford. 1974. What really went wrong at Franklin National. *Fortune* 90 (October): 118–227.

Sinkey, Joseph F., Jr. 1979. *Problem and Failed Institutions in the Commercial Banking Industry*. Greenwich, Conn.: JAI.