Winter

1985

Economic Review

Number

1

Federal Reserve Bank
of San Francisco

The Federal Reserve Bank of San Francisco's Economic Review is published quarterly by the Bank's Research and Public Information Department under the supervision of Joseph Bisignano, Senior Vice President and Director of Research. The publication is edited by Gregory J. Tong, with the assistance of Karen Rusk (editorial) and William Rosenthal (graphics).

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Bank Stock Performance Since The 1970s

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Since 1979, a turbulent economy and an environment of deregulation have raised concern over bank risk. In the last two years, the proliferation of problem loans has heightened this concern. The following study presents empirical evidence on risk and returns of the stocks of 82 U. S. bank holding companies with assets over $1 billion each. Judging from stock performance, the post-1979 economic and deregulatory environment, at least until 1982, was not unfavorable to bank holding companies with assets over $1 billion and was favorable overall to those with assets ranging from $1 billion to $10 billion. Since 1982, there has been a sharp downward valuation on average in the equities of the very large bank holding companies—those with assets over $10 billion. Statistical analysis suggests that domestic energy losses and Latin American debt exposures may be largely responsible.

Since 1979, turbulence in financial markets and changes in the regulatory environment have raised concern over bank risk. The five-year span saw two recessions and wide variations in real growth, inflation, and interest rates. Uncertainty also has extended well beyond U. S. markets, as high interest rates, dramatic changes in exchange rates and relative commodity prices, and worldwide economic slumps have helped to bring on potential foreign debt crises.

At the same time that the external economic environment has been volatile, the deregulation of U. S. banking has proceeded at a rapid pace. Beginning with the money market certificate in 1978 and proceeding through the Depository Institution Deregulation and Monetary Control Act of 1980 and the Depository Institutions Deregulation Act of 1982, deposit rate ceilings have been all but eliminated for banks and thrifts while other nonbanking institutions have taken on bank-like powers.

In an earlier paper (Beebe, 1983), the author addressed the question of whether or not the equity risk of large bank holding companies (hereafter, "banks") had increased in the 1979–82 period as a result of the change in the economic and deregulatory environment.[1] That study found that neither the risk nor returns of the stocks of banks with assets over $1 billion seemed to have been affected adversely by the post-1979 monetary and deregulatory environment, at least through mid-1982. On the contrary, the study found some evidence of a decline in risk-sensitivity for the group consisting of the largest banks, those with assets over $10 billion.

Since 1982, bank risk has received renewed notice. Problem domestic loans have prolifer-

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ated, particularly within sectors suffering significant declines in relative prices, such as energy, construction, real estate, agriculture, and timber. Moreover, defaults and reschedulings of loans to foreign corporations and governments have become realities in some cases and sobering possibilities in others. Financial markets weathered the failures of Drysdale Government Securities in May 1982, Penn Square Bank less than two months later, the purchase of Seafirst Corporation by BankAmerica Corporation, and the "failure" of Continental Illinois Bank. During 1984 alone, an estimated seventy-nine commercial banks failed, the largest number in any year since 1938.

In light of these recent developments, the present study looks again at bank equities in the post-1979 environment with an emphasis on the period since 1982. In this study, the equities of 82 major U.S. bank holding companies ("banks") with year-end 1981 assets of over $1 billion are analyzed to determine whether or not the period through September 1984 depicts abnormal risk or returns. For the largest 24 banks, stock returns since 1982 are related statistically to total debt exposures to the Latin American countries of Argentina, Brazil, Mexico and Venezuela.

In the sections that follow, there is first a brief description of the major events that could have affected bank stocks since 1979, then a description of the statistical procedures employed, and finally a presentation of the empirical results and conclusions.

I. Events Since 1979

Since 1979, a number of important developments have unfolded that could have had dramatic effects on the equity risk and returns of large banks. Table 1 gives a chronological list of a number of such events. However, the changing environment of banking is better understood in the context of broader developments. Several such developments have occurred since 1979: (1) From October 6, 1979 through approximately October 1982, the Federal Reserve's short-run operating procedures targeted nonborrowed reserves rather than the federal funds rate or borrowed reserves; (2) the 1979–82 period was characterized by considerable interest-rate volatility; (3) in March 1980, Congress passed the Depository Institutions Deregulation and Monetary Control Act (DIDMCA) which, among other changes, extended NOW accounts to banks and thrifts on a nationwide basis and called for the phase-out of deposit rate ceilings; (4) since 1979, the economic environment has been one of volatile inflation (on the downside as well as the upside) and relative prices (particularly in world commodity markets such as oil), recessions in the U.S. and abroad, and high real interest rates worldwide; (5) the financial environment has seen an increased number of defaults and failures among thrifts, government securities dealers, and banks.

It would have been difficult to say *a priori* how this complex combination of events would affect the equities of large U.S. banks either in absolute terms or in relation to the stock market as a whole. The outcome would have depended not only on how the events actually unfolded, but also on the extent to which banks had anticipated or hedged against them, through *ex ante* portfolio and operational policies, and the degree to which intervention and protection by the regulators was perceived as important by the market. It would have been a plausible belief that turbulence within the economy would have increased the risk and depressed the prices of bank stocks held at the time. However there was no reason to presuppose that bank stocks would have been affected more adversely than the stock market in general. The impact of deregulation on the equities of large banks might have been expected to be positive, because of some combination of reduced risk and/or increased returns (see Beebe, 1983). Whether on balance regulatory protection was perceived to have increased cannot be

TABLE 1
Events Affecting U.S. Banks

October 1979	The Federal Reserve adopted a short-run operating procedure allowing greater short-run variability in the federal funds rate.
March 1980	The Depository Institution Deregulation and Monetary Control Act was signed. Credit controls were imposed through July.
February 1981	Fears of Polish rescheduling began to appear in the press.
April 1981	Polish rescheduling sessions were set for May and June.
June 1981	Agreement was reached on Polish rescheduling.
July 1981	Accounts of problems with the debt of Mexico, Venezuela, and Argentina began to appear in the press.
Late 1981	Problem energy loans became an increasing concern.
May 1982	Drysdale Government Securities defaulted on its interest payments and its parent company, Drysdale Securities, ceased public business in June. Comark (government securities) announced liquidation in June and Lombard-Wall filed for bankruptcy in August.
July 1982	Penn Square Bank in Oklahoma failed.
	Short-term interest rates declined sharply. The market apparently interpreted the decline as easier monetary policy.
August 1982	Mexico declared that it was unable to service its obligations.
October 1982	The market interpreted the Federal Reserve as having eased monetary policy again and having reverted to a short-run operating procedure emphasizing short-run federal funds rate stability.
	The Depository Institutions Deregulation Act (Garn-St Germain Bill) was signed. Among other things, the Act paved the way for the Money Market Deposit Account (MMDA) at banks and thrifts, ultimately approved for December 14, 1982.
November 1982	A tentative IMF proposal to lend $3.8 billion to Mexico was approved. Mexico would require $6.5 billion in new loans over next 13 months, according to an official IMF report.
December 1982	Banks and thrifts were allowed to begin offering MMDAs.
	$5 billion in private credit and $5 billion in IMF loans were approved for Mexico.
January 1983	A lending package was agreed upon for Brazil by private bankers and the IMF.
April 1983	A strong economy and bank earnings were reported for the first quarter. The MMDA appeared to be a positive factor for bank growth and earnings.
May 1983	Brazil did not meet IMF standards, and IMF support of the lending package was withdrawn.
July 1983	Seafirst Corp. shareholders approved the proposed acquisition of Seafirst by BankAmerica Corp.
October 1983	The first indication appeared in the press that Argentina might default by year-end.
November 1983	The IMF approved Brazil's new austerity program.
March 1984	Argentine debt was rescheduled and classified as nonperforming.
May 1984	The first run occurred on Continental Illinois Bank. The FDIC announced that it would guarantee all Continental Illinois deposits.
July 1984	The FDIC announced a proposal to purchase and restructure Continental Illinois Bank.
September 1984	Continental Illinois shareholders approved the FDIC proposal.

determined for sure, but the 1980 rise in the deposit insurance limit from $40,000 to $100,000 certainly was one corroborating factor.[2]

Given the many collinear impacts of questionable direction and degree, the strategy employed below to gauge any change in bank capital risk is to examine the behavior of bank equity risk and returns without offering a full model that explains risk and returns with exogenous variables. As a partial explanation, however, a model is estimated that relates stock returns since 1982 to Latin American debt exposures for the largest 24 banks.

II. Tests for Equity Risk and Return

In the empirical section that follows, bank stock prices are analyzed first in an absolute sense to point out the degree of actual price variation in critical periods. Then, bank stock returns are compared with returns on the S&P 500, which serves as a proxy of the "stock market." The empirics employ the single-index market model from the finance literature. This model postulates that capital risk *sensitivity* can be represented by the equity "beta" or the measured sensitivity of the firm's (or portfolio's) equity return with respect to the return on the market bundle of risky assets (originally, Sharpe, 1963).[3] Precisely because it is measured in relation to an index of risky assets, beta represents sensitivity to commonly experienced, or nondiversifiable (often called "systematic") risk. According to the capital asset pricing interpretation of the single-index market model, assets with a high beta should have a high expected return because such assets have a high degree of nondiversifiable risk (originally, Sharpe, 1964).

In its simplest form, the single-index model is:

$$BK_t = \alpha + \beta\, SP_t + e_t \qquad (1)$$

where

BK_t = percentage return for the individual bank stock over the period t in excess of the risk-free rate of interest. For this study, time periods are monthly intervals and returns are price returns calculated from month-end closing prices, exclusive of dividends and the risk-free rate of interest—that is,

$$\frac{(P_t - P_{t-1})}{P_{t-1}} - R_{\text{risk-free}}.^4$$

SP_t = percentage return on the S&P 500 in excess of the risk-free rate of interest. Again, returns are monthly price returns using month-end closing prices exclusive of dividends and the risk-free rate of interest. (Calculated as described above for BK.)

α = "excess" or "risk-adjusted" return for the sample period—i.e., in excess of the return earned for taking on nondiversifiable risk, as measured through beta.

β = the elasticity of the bank stock price with respect to the S&P 500 (interpreted as the sensitivity to nondiversifiable or "systematic" risk).

e_t = error term (interpreted as non-market-related, or residual, risk).

For the "average" stock in the S&P 500, the value of beta will be 1.0 by definition. Stocks with true betas above 1.0 carry above average nondiversifiable risk and, according to the capital asset pricing model, will have above average *ex ante* expected returns. Since the model predicts that only nondiversifiable risk will yield positive *expected* returns, the *ex ante* expected value of alpha in the model is zero.[5] However, the *ex post* measured value of alpha may differ from zero because it will reflect the impact of new information (surprises) on the stock's price during the period of estimation.

Several questions can be addressed using the above model. Questions relevant here are: (1) whether the price of bank equity is more or less sensitive to nondiversifiable (or "systematic") risk than the average equity in the S&P 500 (that is, what is the extent to which bank betas are greater than, equal to, or less than one?); (2) whether there are significant shifts in beta;

and (3) whether, during turbulent periods, bank stocks actually have significant *ex post* positive or negative alpha (that is, whether new information leaves positive or negative effects on bank stock prices after adjustments are made for the stock's normal co-movements with the stock market).

Beta gives a measure of *risk* or co-movement with the overall stock market while alpha gives a measure of *return* in excess of that associated with beta. If the market perceives bank equities to be hedged (or protected by government) against systematic risk, bank betas will be low. If the market interprets new information received during the estimation period to be adverse to banks, the estimate of alpha will be negative. New information conceivably could affect both the stock's beta (systematic risk sensitivity) and alpha (value beyond that risk sensitivity). The following analysis focuses primarily on whether or not developments since 1979 have affected these parameters.

III. Empirical Evidence

The data consist of month-end closing common equity prices for 82 bank holding companies ("banks") with total assets over $1 billion as of year-end 1981. Twenty-two of these banks have assets over $10 billion, 17 have assets of $5–10 billion and 43, assets of $1–5 billion.[6] Figure 1 depicts stock-price levels for the S&P 500 and for equally weighted indices of the three bank groups. For the full period of over 12 years, the price returns of equities for the three groups of banks generally have kept up with those of the S&P 500, although there were some subperiods that were marked exceptions.[7]

Some of the most noteworthy of the trends in bank stock prices in Figure 1 are worth highlighting and examining here:

1. All bank stocks and the S&P 500 experienced significant declines in value during 1974. The S&P 500 declined by 34 percent between January and September of 1974, while the bank stocks declined by even more. Moreover, the $1–5 billion and $5–10 billion banks suffered severe and long-lasting downward adjustments in value relative to the S&P 500 and the $10+ billion banks. It is difficult to pinpoint the cause of the long-lasting effect. It could have been due to interest-rate exposures from mortgage holdings, although this conclusion is contradicted by the relatively low betas for these two bank groups (shown later). Disintermediation attributable to consumer deposit-rate ceilings and loan defaults in nondiversified lending portfolios are other possible explanations.
2. From their depressed levels in 1975, the two groups of smaller banks generally performed strongly over the 1976–84 period. This strong performance may have been due to the fact that regional banks benefitted from anticipated and actual deregulation, particularly of consumer deposit rate ceilings.
3. Since early 1983, the group of $10+ billion banks has had a widely different price performance from that of the other two groups. Since May 1983, stocks in the group of $10+ billion banks have declined in price an average of 8 percent, while average stock prices in the $5–10 billion and $1–5 billion groups each have risen 16 percent. It is plausible that the poor performance of the largest banks since early 1983 resulted from increasing investor concern over foreign loans.

Although the indices in Figure 1 give an overall picture of the performance of large bank equities over the 12-year period, it is possible to use the market model to separate the risk and return measures of bank-stock performance. Table 2 gives estimates of bank stock betas for the full twelve-year period and for subperiods of approximately three years in length. Despite uncertainty as to a representative estimate of beta in the 1979–81 period (see the footnote to the table), it is apparent that the $10 billion and $5–10 billion banks tend to have average betas above one and the $1–5 billion banks, below one. Moreover, beta tended on average to decline in the middle of the period for all three groups and then to rise again for the two groups of largest banks.

As described in the introduction, bank stock prices did not seem to reflect increased bank risk until about 1982, when domestic and international lending risks became paramount. To test for more than one shift in the post-1979 environment relative to the 1972–79 period, the following variation of the market model [Equation (1)] allows both alpha and beta to shift at 1979:10 and again at 1982:01:

$$BK_t = \alpha_0 D_0 + \alpha_1 D_1 + \alpha_2 D_2 + \beta_0 (SP_t) + \beta_{S1} (SP_t \times D_1) + \beta_{S2} (SP_t \times D_2) + e_t \quad (2)$$

where

D_0 = one for 1972:08 – 1979:09 and zero thereafter.

D_1 = one for 1979:10 – 1981:12 and zero otherwise.

D_2 = one for 1982:01 – 1984:09 and zero otherwise.

$\alpha_0, \alpha_1, \alpha_2$ = the estimates of alpha for the 1972:08–1979:09, 1979:10–1981:12, and 1982:01–1984:09 periods, respectively.

β_0 = the estimate of beta for the 1972:08–1979:09 period.

Figure 1

Monthly Stock Levels 1972.07 To 1984.09 (month-end price levels, excluding dividends)

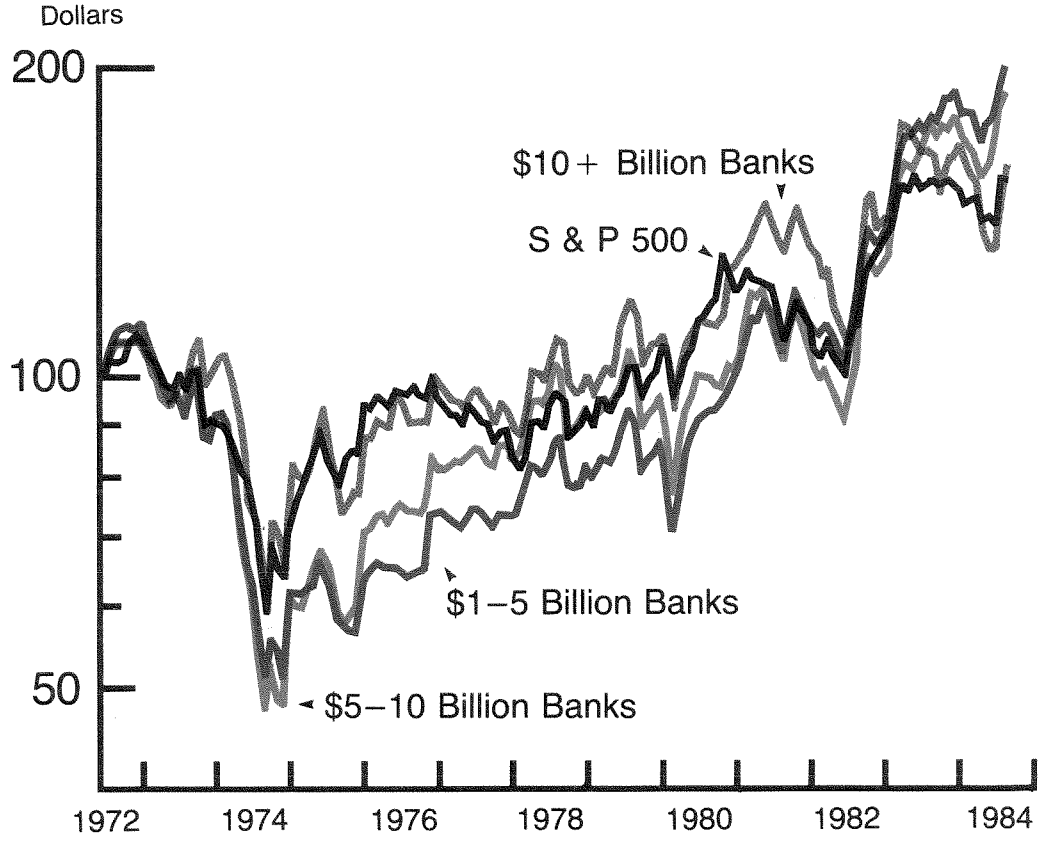


TABLE 2
Betas for Bank Stocks, 1972:08–1984:09
Mean Estimates from Individual Bank Regressions

	72:08–84:09	72:08–75:12	76:01–78:12	79:01–81:12	79:01–81:12[1]	82:01–84:09
All Banks	.93	1.00	.88	.78	1.13	.98
$10+ Billion	1.06	1.19	1.07	.64	1.00	1.23
$5–10 Billion	1.03	1.06	1.01	.87	1.22	1.14
$1–5 Billion	.83	.87	.73	.81	1.16	.78

[1]Beta for the boxed-in period is estimated for the 36 months, 1979:01–81:12, excluding the 12 months 1980:07–81:06. During the excluded 12-month period, bank stocks moved contrary to the S&P 500 in a way that gives spurious and misleadingly low estimates of the bank stock betas. For the excluded 12-month period, mean betas were −.07, −.22, .01, and −.02 for the four groups, respectively, and median $\bar{R}^2$ values were zero or negative. Median $\bar{R}^2$ values for all estimates shown in the table ranged between .20 and .54.

TABLE 3
Risk and Returns of Bank Stocks
Mean Coefficient Values and Median Test Statistics From Individual Bank Regressions 1972:08–1984:09 with Shifts at 1979:10 and 1982:01

	α_0	α_1	α_2	β_0	β_{S1}	β'_{S1}[1]	β_{S2}	$\bar{R}^2$	σ_e
All Banks	0.0%	0.3%	0.4%	.97	−.20	.22	.01	.30	6.8%
	(.02)	(.30)	(.60)	(6.22)*[2]	(−.45)	(.61)	(.04)		
$10+ bil	0.3	0.1	−0.4	1.15	−.57	−.17	.08	.39	6.4
	(.47)	(.18)	(−.25)	(8.04)*	(−2.13)*	(−.63)	(.12)		
$5–10 bil	0.1	−0.1	0.7	1.05	−.18	.25	.09	.33	6.9
	(.01)	(.00)	(.72)	(5.89)*	(−.45)	(.86)	(.17)		
$1–5 bil	−0.2	0.5	0.8	.84	−.02	.40	−.06	.26	7.1
	(−.29)	(.41)	(.77)	(5.38)*	(.07)	(1.15)	(−.17)		

Coefficient values reported are means of the estimated values for the individual bank regressions in the group. Other statistics reported are median values. Figures in parentheses are median t-statistics from the individual bank regressions in the group. Asterisks denote significance of the median t-statistic at the 90% confidence level (one-tailed test for β_0 and two-tailed test for alphas and for β_{shifts}). β_{shift} values and their t-statistics are relative to the base period β_0 value. Alpha values and t-statistics are relative to zero. Alpha values and the standard error of the estimate are expressed as monthly percentage rates of change at monthly rates.

[1]Beta shift for the boxed-in period is estimated for the 1979:10–1981:12 period, excluding 1980:07–1981:06. See the note to Table 2.

[2]Median t-statistics for β_0 using H_0: $\beta_0 = 1.0$ are −.31, .73, −.09, and −.71 for the four groups, respectively. Therefore, median β_0 estimates do not differ significantly from 1.0, the (weighted) average beta for the S&P 500.

β_{S1} = the estimate of beta for 1979:10–1981:12 relative to β_0 (that is, beta shift for the second period).

β_{S2} = the estimate of beta for 1982:01–1984:09 relative to β_0 (that is, beta shift for the third period relative to the first period).

Equation (2) was estimated separately for each of the 82 bank holding companies. Table 3 presents mean estimates of the coefficients in Equation (2) and median estimates of the test statistics for the groups of individual banks.[8] For the $10+ billion banks, the mean beta was 1.15 in the pre-October-1979 period, a figure that is well above the weighted average beta of 1.0 in the S&P 500.[9] For the $10+ billion banks, beta declined in the period between 1979:10 and 1981:12 (the decline being significant if the 12-month 1980:07–1981:06 period is included), but then rose again in the post-1981 subperiod. For the other two groups, there is no evidence of a significant shift in beta. Even for the $10+ billion banks, it is hard to conclude that beta shifted significantly given the uncertainty inherent in the 1979:10–1981:12 estimate of beta.[10]

New information received about a bank could affect the estimates of both beta and alpha. However, if a bank were to announce that some of its loans had just become subject to certain default, it is possible that beta might be largely unaffected while alpha would be affected negatively because the market value of the bank's capital would decline by the present value of the default.[11] As predicted by the efficient market hypothesis and the capital asset pricing model, investors' *ex ante* expectations of alpha are that it will be zero over any future period. However, *ex post* observations could exhibit positive or negative alpha depending on new information received during the holding (estimation) period.

Estimates of alpha are reported in Table 3. As expected for fairly long periods, median t-statistics for the alpha estimates indicate that alpha is insignificant.[12] However, even though alpha is insignificant, a value that differs from zero can have a large cumulative effect. In Figure 2, the cumulative effect of alpha (and the error term) is plotted over the 1982:01–1984:09 period. In the table, the actual stock price for each index is plotted against a "market-related" price, where the latter is that price that would compensate stockholders for market-related risk, as hypothesized by the capital asset pricing model. The "market-related" returns are calculated as follows:[13]

$$\hat{BMR}_{tj} = \hat{\beta}_j \times SP_t \qquad (3)$$

where

$\hat{BMR}_{tj}$ = estimated "market-related" return at month t for the jth individual bank (or bank group)

$\hat{\beta}_j$ = estimated beta for the jth bank (or bank group) over the 1982:01–1984:09 period (β_0 plus β_{S2} in Equation (2))

SP_t = the actual return for the S&P 500 at month t

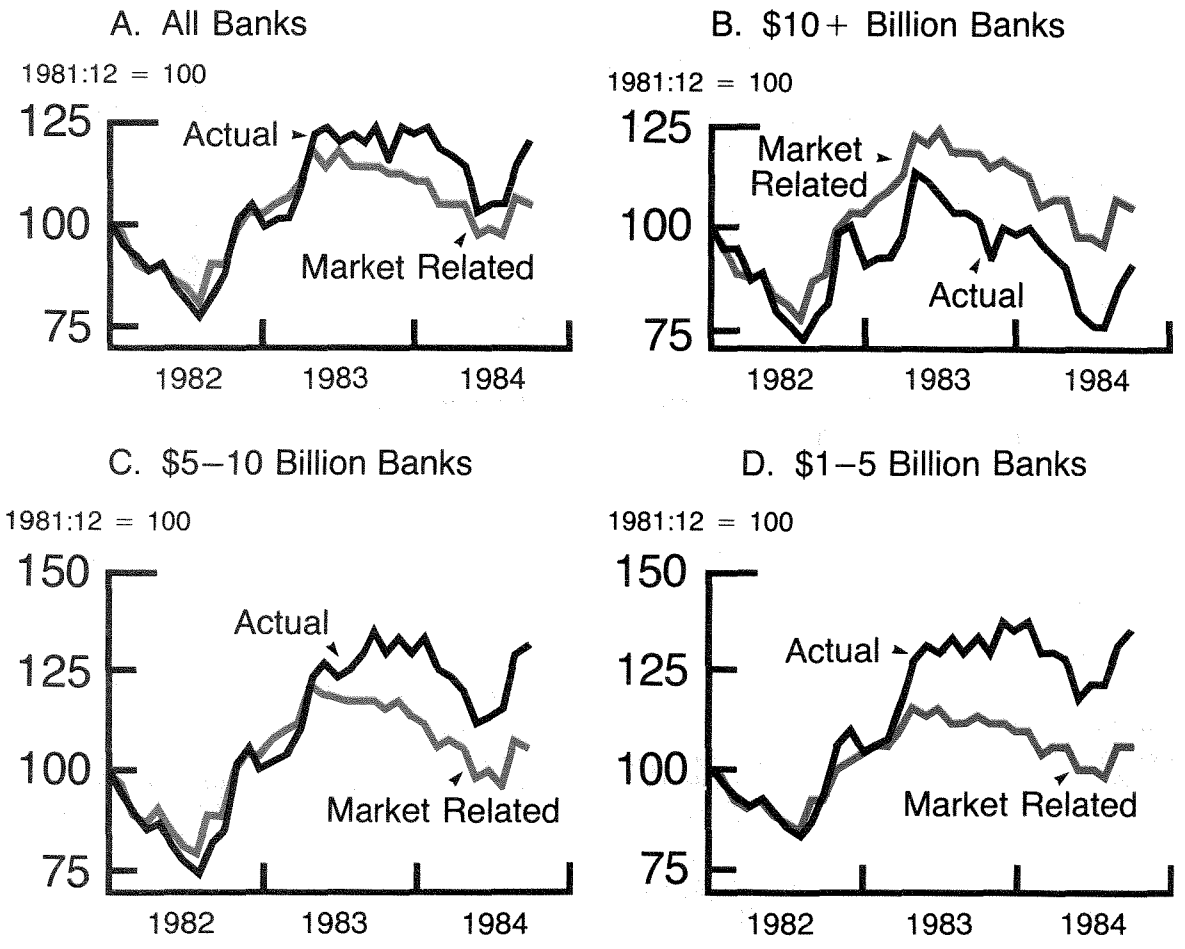
The vertical spread at a point in time between the two series in each frame of Figure 2 is interpreted as the cumulative effect of new information unrelated to beta from 1981:12 up to that point. The group of $10+ billion banks performed worse than would have been required to compensate for their beta and movements in the S&P 500, while the other two groups performed better than their betas and S&P 500 movements would have suggested. Much of the differentials in performances occurred in early 1983.

The strong performances within the $1–5 billion and $5–10 billion groups suggest that the sharp decline in interest rates between July and November 1982 and/or further deregulation of consumer deposits (the money market deposit account, MMDA, of December 1982) may have been instrumental in raising the market's valuations of these banks. When the MMDA was first implemented, regional banks that did not have access to the prime national CD market maintained that the new account would lower their marginal costs of funds. Many of these

banks normally had paid well above the national rates for jumbo CD's, holding company paper, and other marginal funds, and the MMDA would attract marginal funds at a substantially lower rate. (In contrast, many small banks and thrifts claimed that, although the MMDA might lower their marginal cost of funds, it might also raise the average cost of funds since they still had considerable amounts of 5½ percent passbook savings accounts on the books. Thus, for small banks and thrifts not included in this study, the MMDA might have resulted in a negative alpha.)

The fact that the $10+ billion banks had a negative alpha over the 1982:01–1984:09 period while the other two groups had positive average alphas suggests that there is some factor distinguishing the group of largest banks from the other two groups. One possibility is that foreign loan exposures of the largest banks may have affected their stock prices significantly since 1982. As a test of this hypothesis, the following regression was run on a cross-section of the largest 24 banks—the 22 banks in the $10+ billion group plus the two largest banks in the $5–10 billion group.[14]

Figure 2
Bank Stock Price Levels —Actual vs. Market-Related



$$\hat{\alpha}_2 = a + b \frac{\text{Latin loans}}{\text{Capital}} + e \qquad (4)$$

where

$\hat{\alpha}_2$ = the individual bank alpha for 1982:01–1984:09 as estimated by Equation (2) (see Appendix Table A1 for data across the top 22 individual banks).

$\frac{\text{Latin loans}}{\text{Capital}}$ = total loan exposures to Argentina, Brazil, Mexico, and Venezuela for March 31, 1984, divided by primary bank capital for the same date (see Appendix Table A1 for the data).

The results of the cross-section fit for Equation (4) appear in the first line of Table 4. The ratio is insignificant and the $\bar{R}^2$ is about zero. However, two banks of the twenty four were extreme outliers in the pattern of residuals, both with heavy domestic energy loan exposures. When the aberrant residuals of these two banks were "explained" by a single zero-one dummy, the Latin American loan exposure ratio became significant and the $\bar{R}^2$ rose to .65 (the second line in Table 4).

The value of the Latin American loan coefficient in the second line of Table 4 indicates that a Latin loan/capital ratio of 1.0 instead of zero would have lowered the average monthly stock price return over the 1982:01–1984:09 period by 1.03 percent per month. For the full 33-month period, the overall compounded effect would have been a 40-percent negative impact on a bank's stock price. Equally important, the dummy for the two banks with heavy energy loan exposure is also large and highly significant— −3.2 percent per month. This result, together with significant negative α_2 values for Seafirst and Continental Illinois of −5.1 percent and −5.8 percent per month (in Appendix Table A1), suggests strongly that the problems of banks with the largest negative performances were related to energy loans rather than to Latin American debt exposure. This conclusion is not surprising, since the energy loan problem resulted in a sizeable number of actual defaults and chargeoffs while the foreign lending problem up to this point has resulted primarily in reschedulings and fears of default. Moreover, because the foreign loan problem affects almost all large banks, the market might expect more government protection in the event of a crisis than with the energy loan problem.

TABLE 4
Latin Loan Exposure Related To Alpha for 1982:01–1984:09
Estimated Across the Largest Twenty-Four Banks for March 31, 1984

Constant	Latin Loans / Capital	Dummy	$\bar{R}^2$	σ_e
-.01	−.33	—	−.02	1.06
(.01)	(−.72)			
.94	−1.03	−3.22	.65	0.62
2.88	(−3.53)	(−6.61)		

The Latin loan exposure ratio consists of total non-local-currency loans to Argentina, Brazil, Mexico and Venezuela as reported in the March 31, 1984, country exposure report (FFIEC-009(a)) divided by primary bank capital as of March 31, 1984 (FDIC Call Report). (See Appendix Table A1 for the data.) The dependent variable is α_2 in Appendix Table A1.

The dummy is one for InterFirst, Dallas, and First City, Houston, and zero otherwise. It is used to capture major energy-loan exposure.

In addition to the 22 banks in the $10+ billion size group (Appendix Table A1), the two largest banks in the $5–10 billion group were included—North Carolina National Bank Corp. and Republic New York Corp. They had α_2 values of 1.3 percent and −0.6 percent and Latin loan/capital ratios of .19 and .55, respectively (lead-bank loan exposure divided by lead-bank primary capital).

It is illuminating to estimate how the stocks of the 22 banks in the \$10+ billion size group might have performed had they had no Latin American loans. For the 22 largest banks, the average Latin loan/capital ratio is 1.02. This suggests that Latin American loans had an impact on the average α_2 for the \$10+ billion size group of -1.1 percent per month (-1.03×1.02). The average estimated α_2 for the \$10+ billion banks in Table 3 was -0.4 percent per month. Without Latin American loans, therefore, α_2 might have been 0.7 percent per month ($-0.4\% + 1.1\%$), or exactly in line with the estimates of α_2 of 0.7 and 0.8 percent per month for the other two bank groups.

These crude estimates imply that once the major energy lenders are omitted, the estimate of the effect of Latin American loan exposures (obtained from a cross-section estimate within the \$10+ billion size group) explains the α_2 differential between this group and the other two groups. (Banks within the other two groups tend to have little or no Latin American exposure.)

IV. Conclusions

In the early post-1979 period (1979:10–1981:12), considerable uncertainty was found in the estimated values of beta—a measure of the sensitivity of equity returns to systematic, or nondiversifiable, bank risk. By the latter part of the post-1979 period (1982:01–1984:09), average beta values were close to the values that prevailed over the 1972:08–1979:09 period. We can conclude that the post-1979 period of economic and monetary uncertainty and financial deregulation has had no significant impact on average on the betas of bank holding companies with assets over \$1 billion. The largest banks (\$10+ billion) still have betas that average well over 1.0, while the smaller banks (\$1–5 billion) have betas that average well below 1.0.

Judging from stock price performance, we can conclude that, at least until 1982, the post-1979 economic, monetary, and deregulatory environment was not unfavorable on average to banks with assets over \$1 billion, and may have been favorable overall to bank holding companies with assets ranging from \$1 billion to \$10 billion. However, since 1982 there has been a sharp downward valuation, on average, in the equities of the very large bank holding companies, those with assets over \$10 billion. Crude statistical analysis suggests that the negative performance of the \$10+ billion bank holding companies is explained by domestic energy loan losses and Latin American debt exposures.

Once the banks with very heavy loan losses are removed from the sample of largest banks, a highly significant relationship across banks appears between negative stock performance (negative alphas) in the post-1981 period and total debt exposures to the Latin American countries of Argentina, Brazil, Mexico, and Venezuela. On average, this negative relationship is enough to account for the poor stock performance of the 22 bank holding companies with assets over \$10 billion, taken as a group, as compared to the 60 other bank holding companies with assets of \$1 billion to \$10 billion, which tend to have little Latin American debt exposure.

There are two caveats to keep in mind regarding the evidence in this study. First, it might be very misleading to extrapolate the results to smaller bank holding companies (say, with assets under \$500 million) or to thrifts. These institutions normally have very different portfolios and markets than do the large bank holding companies. Second, it is plausible that an increase in implicit regulation or government protection has affected the stock prices of large bank holding companies since 1979. Certainly, the increase in the deposit insurance limit from \$40,000 to \$100,000 in March of 1980 had a favorable impact. But we cannot be sure of the market's perception, on balance, of other changes in regulatory protection, such as the explicit policy changes of the FDIC, first to a partial payout on large deposits and then to *de facto* protection of all deposits and even non-deposit liabilities in the case of Continental Illinois.[15]

APPENDIX Table A1

Risk and Returns of Bank Stocks, $10+ Billion Banks, Reported Individually 1972:08–1984:09 with Shifts at 1979:10 and 1982:01

Bank Holding Company	α_0	α_1	α_2	β_0	β_{S1}	β'_{S1}[1]	β_{S2}	$\bar{R}^2$	σ_e	Latin Loans[2] / Capital (3/31/84)
BankAmerica Corp.	0.5%	−1.7%	−1.2%	1.19*	−1.13*	−1.09*	.02	.35	6.7%	1.21
Citicorp	−0.1	−0.2	0.4	1.26*#	−.55*	−.30	.32	.47	6.1	1.11
Chase Manhattan	−0.3	0.5	−1.3	.88*	−.26	−.07	.60*	.29	7.0	1.39
Manufacturers Hanover	0.3	−0.6	−1.0	1.20*	−1.00*	−.60	−.03	.32	7.1	2.05
J. P. Morgan	0.2	−0.6	0.1	1.16*	−1.21*	−.84*	−.04	.41	5.7	1.08
Chemical New York	0.0	0.6	0.1	1.18*	−.72*	−.25	−.13	.34	6.6	1.31
First Interstate	0.9	0.0	−0.4	1.38*#	−.73*	−.29	−.25	.38	7.0	.51
Bankers Trust	−0.1	1.2	0.5	1.11*	−.32	.35	.28	.41	6.2	1.25
First Chicago	0.2	−0.1	0.2	1.43*#	−.67*	−.13	.06	.40	7.4	.93
Security Pacific	0.4	0.4	0.5	.97*	−.66*	−.02	.56*	.31	6.9	.57
Wells Fargo	0.6	−1.1	0.9	1.51*#	−1.08*	−.49	−.28	.44	6.8	1.14
Crocker National	0.4	−0.5	−1.3	1.39*#	−.87*	−1.07*	−.52	.34	7.4	1.78
Marine Midland Banks	−0.5	1.2	−0.1	.61*#	1.34*	1.60*	.54	.27	8.1	1.16
Mellon National	0.6	0.1	−0.3	1.15*	−.48*	−.20	.09	.40	6.1	.80
Irving Bank Corp.	0.1	0.7	−0.4	.89*	−.51*	−.14	.01	.36	4.9	1.55
InterFirst, Dallas	0.4	0.6	−2.7*	1.26*#	−.87*	−.34	−.13	.38	6.6	.52
Northwest Bancorp., Minn.	0.4	−1.1	−0.3	1.32*#	−.89*	−.57*	.23	.46	6.1	.86
Texas Commerce, Houston	0.6	1.5	−0.2	.89*	−.29	.20	.08	.30	5.8	.85
Republic of Texas, Dallas	0.8	1.3	−1.2	1.62*#	−1.12*	−.39	−.44	.43	7.3	1.19
First City Bancorp, Houston	0.4	1.6	−2.7*	1.18*	−.27	.20	.60*	.43	6.9	.31
NBD Bancorp., Detroit	0.4	−2.0*	1.2	.87*	−.46*	−.06	.31	.45	4.6	.25
Bank of New York Co.	−0.1	0.4	0.6	.87*	.19	.69*	−.14	.33	5.7	.72
Addendum (excluded from $10+ billion bank index)										
Seafirst Corp. (through 6/83)	0.7	−0.6	−5.8*	.94*	−.50	−.14	.45	.27	7.4	—
Continental Illinois (through 9/26/84)	0.4	−0.2	−5.1*	1.30*	−1.16*	−.87*	.78*	.38	8.4	.72

Alpha values and the standard error of the estimate are expressed as monthly percentage rates of change at monthly rates. Asterisks denote significance at the 90-percent confidence level (one-tailed test for β_0 and two-tailed tests for alphas and for β_{shifts}). β_{shift} values and t-statistics are relative to the base period β_0 value. Alpha values and t-statistics are relative to zero. #Denotes that β_0 is statistically different from 1.0 at the 90-percent confidence level (two-tailed test).

[1]Estimates of beta in the boxed-in area are for 1979:10–81:12, excluding 1980:07–81:06 (see the note to Table 2).

[2]The ratio for First Interstate was supplied directly to the author by the holding company and it represents holding company Latin American loans divided by holding company capital. The other ratios in the column must be read with caution. Latin American loan figures are from the country loan exposure report; all of the institutions reported on a lead-bank basis except Citicorp, Bankers Trust, NBD Bancorp, and Continental Illinois which reported loans on a holding company basis. The denominator for all ratios in the final column, except that of First Interstate, is primary capital of the lead bank. The proper ratio in all cases would treat both loans and capital on a holding company basis. BankAmerica owns Seattle First Bank. First Interstate, InterFirst, Northwest, Texas Commerce, Republic of Texas, First City and NBD are all multibank holding companies.

Source: Equation (2) in the text. Latin American loan exposure is total non-local-currency loans to Argentina, Brazil, Mexico, and Venezuela as of March 31, 1984 (country loan exposure report, FFIEC-009(a)). Capital is primary bank capital from the March 31, 1984, FDIC Call Report.

FOOTNOTES

1. From October 6, 1979, through mid- to late-1982, the Federal Reserve's operating procedures were directed explicitly toward controlling nonborrowed reserves over the short-run while allowing the federal funds rate to fluctuate over a relatively wide range. In other periods, the Fed has tended to hold the short-run variability of the federal funds rate to within a narrow band.

The deregulation of banking, particularly deposit-rate deregulation and the extension of checkable deposits to thrifts, was greatly accelerated by passage of the Depository Institutions Deregulation and Monetary Control Act of March 1980 (DIDMCA). Passage of such a bill became anticipated by the market as early as late-1979. Over the 1980–83 period, deposit rate ceilings on consumer accounts at banks and thrifts were effectively eliminated. The Depository Institutions Deregulation Act of October 1982 (Garn-St Germain Act) furthered deposit rate deregulation by requiring that the Depository Institutions Deregulation Committee create an account at banks and thrifts that would be competitive with money market mutual funds. The Act also gave the regulators more leeway in arranging takeovers of failing banks and thrifts, and put into legislation much of the deregulation of thrift holding company powers that had been implemented by the Federal Home Loan Bank during 1982.

2. For evidence on the effect of regulatory protection, see Brickley and James, 1984.

3. In theory, the market bundle of risky assets should include bonds, real estate, and other forms of wealth. However, empirical tests of the market model almost always use a broad stock market index such as the S&P 500 because reliable market-value indices of other risky assets are not available.

4. Dividends paid out during a particular month should be included with price returns to obtain total returns. Because of data limitations, dividends are omitted from the bank stock returns throughout the study. For consistency, they also are omitted from S&P 500. The exclusion of dividends affects average returns and estimates of alpha, but it has little effect on the estimated betas because almost all of the monthly variations in total stock returns are in the prices.

The capital asset pricing model specifies that the relationship between returns in Equation (1) will be linear as long as returns are specified in excess of the "risk free" rate. Thus, all returns of the bank stocks and the S&P 500 in the empirical analysis are net of the return from holding to maturity Treasury bills which, at the beginning of the month, have only one month left to maturity. The Treasury bill with one month to maturity gives the purest risk-free one-month rate of interest because it is free of default and interest-rate risk. Data for the one-month risk free rate through 1982 are from the CRSP database, University of Chicago, with 1983–84 updates constructed by the author.

5. Where dividends are ignored, the *ex ante* expected value of alpha will be the dividend differential between the bank stock and the S&P 500.

6. The $10+ billion group includes the population of bank holding companies within that size class, with the exceptions of Seafirst Corp., which was acquired by BankAmerica Corp. in July 1983, and Continental Illinois which failed in the Summer of 1984 and was re-formed in September 1984. (BankAmerica Corp. equity excludes Seafirst prior to July 1983 and includes it thereafter.) Separate results are reported in Table A1 for Seafirst (through July 1983) and for Continental Illinois through September 26, 1984.

The $5–10 billion and $1–5 billion groups are samples of the populations in those size classes, where the choice of bank holding companies in each group depended on data availability. Data are from the Data Resources DRI-SEC database. They were screened by the author to correct errors and to exclude bank holding companies for which trading appeared to be infrequent.

7. Because dividends of the bank stocks were not available, returns throughout (including the S&P 500) exclude dividends. To the extent that bank stock dividends differed from those of the S&P 500, total return differentials would differ from those implied by Figure 1. The author can only infer the possible bias introduced by omitting dividends from the fact that the estimated alphas for the three bank groups over the full period are very close to zero. This fact suggests that the omission of dividends does not affect average return differentials significantly. See Footnote 5. Estimated mean alpha values over the full 1972:08–1984:09 period for the three bank groups are 0.1 ($10+ billion banks), 0.2 ($5–10 billion banks), and 0.1 ($1–5 billion banks), with median t-statistics of .27, .30, and .30 respectively.

8. Since the paper focuses on the average results of *individual* banks, the regressions are run on individual bank data and the mean coefficients of the individual bank regressions are reported for each group. Grouping the banks into portfolios and then running one regression for each group would seriously overstate the t-statistics because grouped data would reduce the standard errors by diversifying away much of the variance in individual bank data. Median test statistics ($\bar{R}^2$, σ_e, and t-statistics) are reported for the same groups of individual bank regressions. Medians are used for test statistics because mean test statistics are not appropriate for confidence tests such as the t-test.

9. As noted in the footnote to Table 3, the median beta value is insignificantly different from 1.0.

10. For earlier hypotheses and tests of the beta for large money center banks, see Beebe, 1977 and 1983.

11. Beta would rise if the default changed the systematic risk-sensitivity of the remaining portfolio. It also would rise somewhat because the market value of capital would decline and hence capital leverage would rise. For a given systematic risk of bank assets and liabilities, beta of the bank's equity is sensitive to equity leverage.

12. The longer the estimation period for alpha, the more likely the estimate is to be zero. There are two reasons for

this result: (1) any mispricing of securities (that is, market inefficiency) is likely to be very short-lived; and (2) the longer the time period, the less likely it would be for new information to be serially correlated. For isolated banks, alpha estimates in Table 3 are significant in some cases. See Appendix Table A1.

13. The "market-related" price levels for the indices in Figure 2 are calculated by setting the price level in 1981:12 equal to 100 and then cumulating the monthly market-related returns that are derived from Equation (3).

14. The 24 banks in the cross-section sample include the 22 banks in the $10+ billion size group (Appendix Table A1) plus North Carolina Bank Corporation and Republic New York Corporation, which are the two largest banks in the $5–10 billion group. Seafirst and Continental Illinois are excluded from the sample.

15. For an analysis of the market's perception of spillover effects from Continental Illinois, see Furlong, 1984.

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