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A Contracting-Theory Interpretation of the Origins of Federal Deposit Insurance

Conventional wisdom holds that the enactment of federal deposit insurance helped small rural banks at the expense of large urban institutions. This paper uses asymmetric-information, agency-cost paradigms from corporate-finance theory and data on bank stock prices to show how deposit insurance could and did help stockholders of large banks. The broadening stockholder distribution of large banks during the stock-market bubble of the late 1920s undermined the efficiency of double liability provisions in controlling incentive conflict among large-bank stakeholders. Federal deposit insurance restored depositor confidence by asking government officials to take over and bond the task of monitoring managerial performance and solvency at U.S. banks.

WHEN CONGRESS ENACTED federal deposit insurance in 1933, scholars understood it to be a tool for helping small banks and for restoring the liquidity of bank deposits. Still, Calomiris and White (1994, p. 164) note that by late 1931, representations of urban constituencies in "eastern states that had not supported deposit insurance for decades introduced federal deposit insurance bills." These authors argue that the severity of losses experienced in the early 1930s caused this switch, energizing small depositors into a political force strong enough to overcome unvarying large-bank opposition to deposit insurance. In their view, "small, rural banks and lower-income individuals (with small deposit accounts) were clear winners, while large, big-city banks, wealthy depositors and depositors in failed banks were losers."

It was, of course, recognized that deposit insurance could also have incentive effects. At the outset, Emerson (1934) explained that deposit insurance would intensify risk-taking incentives at banks unless it was properly priced and principles of sound banking were consistently enforced. In the late 1960s, scholars began to argue that deposit insurance was mispriced (Scott and Mayer 1971) and had in fact fueled a massive reduction in stockholder-contributed bank capital (Pelzman 1970). But it was not until the onset of the 1989 FSLIC debacle that the profession came to appreciate the many and perverse ways that this substitution of subsidized government guarantees for stockholder-contributed capital at insured institutions shifted risks from owners to taxpayers.

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This paper shows that the rebalancing of Congressional support in the 1930s may have been assisted by changes in the funding-cost benefits that deposit insurance could offer stockholders in a substantial number of large urban banks. The analysis uses theories of regulatory competition and financial contracting under information asymmetry to explain these benefits and to challenge the Calomiris-White characterization of the initial beneficiaries of federal deposit insurance.

Evidence of stockholder benefits at large banks was first developed by Wilson and Kane (1997). Wilson and Kane show that at large national banks the longstanding contracting protocol in which stockholders attached contingent *personal guarantees* to bank debt began to unravel in the late 1920s. This protocol dictated wind-up rules for insolvent banks that—at national banks and at banks chartered by all but ten states—extended the liability of shareholders for bank debt beyond the value of the assets owned by the firm (Esty 1998).

The predominant wind-up rule divided stockholder-contributed capital into separate par and surplus accounts. Par capital (sometimes called "legal capital") is the minimum amount of capital (*PAR*) that the jurisdiction chartering a bank dictates that the stockholders maintain as on-balance-sheet equity. Surplus capital (*SUR*) is the sum of additional paid-in capital and undistributed profits that have not been allocated to the par account. Stockholder in national banks and in state-chartered banks in most extended-liability states were subject to "double liability" on the *par value* of their stock. Double liability means that, to cover a liquidating bank's unpaid debts, the receiver could personally assess each stockholder for an amount up to its pro rata share of the bank's par capital. For stock held in a "street name," the nominee would be assessed and incur the cost of collecting the reimbursement it was due from the ultimate owner.

Winton (1993) analyzes the agency costs that extended-liability shareholders and corporate creditors face when there is asymmetric information about shareholders' wealth. His model clarifies that contingent liability would affect investor incentives to own and trade bank stock and would influence stockholders' incentive to monitor bank managers. These incentives vary over time with five factors: the condition of the bank, the level of shareholder wealth, the shareholder's proportionate position in the bank, the probity of controlling interests, and the degree of asymmetry in information about shareholder wealth. In turn, the value of stock shares in a double-liability bank should rise and fall with the strength of monitoring incentives.

Winton's model implies that, if we could observe agency costs, variation in these costs would prove more important at large banks than at small ones. First, other things equal, a large bank's asset base may be expected to be more complex and therefore harder for outsiders to value. Second, other things equal, a large bank may be expected to have a more diffuse stockholder list than a smaller bank. At small banks during the days of double liability, loan business tended to be local, ownership tended to be highly concentrated, and bank stock could not be traded anonymously.

Winton's analysis supports the hypothesis that, as the stockholder distribution and geographic reach of large U.S. banks broadened during the stock-market bubble of the 1920s, double liability might have ceased to be an efficient way to control incentive

conflict among large-bank stakeholders. A web of empirical evidence is woven in this paper that buttresses this inference.

Standard explanations of the banking crisis of the 1930s focus on pressure generated by customer deposit runs. As a byproduct, this paper serves to rationalize customer runs at large banks by portraying them in part as a response to a prior silent run by large-stock shareholders from bank stock.

Winton's model lets one interpret the banking crisis of the 1930s as evidencing a loss of customer confidence in the value of the services stockholders performed in monitoring managerial performance and solvency at large banks. This interpretation in no way challenges Friedman and Schwartz' (1963) conclusion that the Federal Reserve ought to have used its discount window more aggressively or the idea that deposit insurance enhanced bank liquidity. Our contracting-theory perspective similarly complements Gorton's (1988) argument that timid Federal Reserve lending could not substitute effectively for the triage activities performed by private bank clearinghouses during the 1863–1914 National Banking era. Besides adding liquidity to the economy, aggressive Federal Reserve lending would have imposed extensive monitoring and triage duties on Fed officials in order to exercise the due diligence implicit in any responsible lending decision.

The contracting-theory perspective also clarifies that the discount window and federal deposit insurance guarantees are not redundant policy instruments. The discount window serves to guarantee the liquidity of deposits only at economically solvent banks. Deposit insurance serves to bond the contractual performance even of the rest of the banking system. It does this by imposing a credible and nonlinear penalty structure on the government for failures in monitoring bank safety and soundness (Black, Miller, and Posner 1978).

1. CONTRACTING PERSPECTIVES ON THE NATURE OF BANKING

Recent banking research has injected asymmetric-information contracting-theory perspectives into theories of managing repeat-business customer relationships (Hodgman 1963; Kane and Malkiel 1965), delegated monitoring (Diamond 1984), and deposit insurance (Merton and Bodie 1994; Kane 1995). The result has been to fashion an asymmetric-information contracting theory of banking and banking policy.

The guiding principle of principal-agent contracting theory is that banks and regulators are drawn to contracts that give all counterparties an incentive to use scarce information and resources efficiently (Jensen and Meckling 1975). An important application of the theory is to explain how over time and space the character of the contracting protocols used by banks and other financial institutions adapts to variation in informational transparency, managerial and financial technology, and regulation. The penetration of contracting perspectives into banking theory helps to explain why and how risk-based regulatory restraints on capital structure have come to displace liquidity requirements as the central policy tools for controlling bank risk.

Traditional banking theory saw a bank simply as a financial intermediary (Gurley

and Shaw 1960). Contracting theory portrays bank activities far more generally. A bank becomes an ever-adapting exercise in financial engineering: an amorphous information and deal-making factory.

In their back offices, banking factories collect information, verify information, store information, process information, manage information, and transmit information for their own and customer accounts over various internal and external communications networks. Middle-office personnel use the warehoused information to design and price a series of incentive-compatible contracting protocols. Each protocol records the fact that the bank and customer agree on the explicit terms of a financial deal and assigns specific and enforceable rights and duties to the counterparties. Finally, front-office personnel negotiate deals and exchange contracts and services with customers.

Corporate-finance theory emphasizes that every contract establishes a principal-agent relationship between the counterparties. Agency costs are costs that arise whenever a contractual agent does not fully share the objectives of its principal. Agency costs have three components:

1. Costs that the agent incurs to *bond* its willingness to perform its duties under the contract;
2. Costs that the principal incurs to *monitor* and *enforce* contractual performance;
3. Residual opportunities for *nonperformance* that are not controlled by the contract.

The central proposition in agency theory is that counterparties have an incentive to minimize agency costs. These costs are minimized when the marginal costs of the bonding, monitoring, and enforcement controls put in place equal the marginal benefit of the residual nonperformance opportunities that these controls rein in.

In banking activities, principal-agent relationships and resulting agency costs are thickly layered. When a bank is acting simply as a financial intermediary, it simultaneously agrees to act as an agent in deposit contracts and to act as a principal in requiring its borrowers to repay their loans. When a bank securitizes a pool of loans that it continues to service, it enters into a three-way contract. It becomes an agent both for the investors in the pool and for the borrowers whose payments it collects. Similarly, when a bank enhances the credit of a bond issuer, it incurs an agency obligation to the bondholders and becomes a principal to the issuer.

Capital contributed by stockholders bonds a wider range of a bank's agency obligations than is expressly covered by federal deposit insurance guarantees. But conjectural implicit federal guarantees pass through an indirect blessing to most of an insured bank's other contractual obligations. The value of an institution's conjectural guarantees grows with its regional or national economic importance and with its political clout. This is because authorities have strong incentives to go slow in disciplining or closing an important bank. The productivity of a bank's efforts to sidetrack disciplinary action allows a bank's counterparties to count on having time to unwind at low cost their uninsured positions in a troubled bank.

To reduce the agency costs occasioned by implicit guarantees was a principal ob-

jective of the FDIC Improvement Act of 1991. This Act imposes specific duties of prompt corrective action and least-cost insolvency regulation on federal banking regulators.

2. REGRESSION EVIDENCE OF LONG-LASTING CONTRACTING-THEORY DISEQUILIBRIUM IN THE 1930S

Winton's model clarifies that extended liability imposes contingent obligations that bond the obligation of large-block shareholders to monitor bank managers on behalf of other stakeholders. The net value of the extended liability bond (E) to stockholders may be interpreted as the difference between compensation paid for their monitoring and loss-control services and the costs they incur in performing and bonding these services. The gross compensation declines whenever creditors perceive stockholder monitoring services to decline in quality or reliability. The net compensation also varies with anything that affects the costs engendered by the contract.

Increases in stockholder distribution make it harder for other stakeholders to assess the value of contingent stockholder support. An increase in the breadth of stockholder distribution makes it more costly for all stakeholders to use a bank's stockholder list to monitor the wealth or stock trading of the bank's owners. Monitoring costs are increased because ownership becomes less concentrated and stock trading becomes more anonymous. On the other hand, maintaining narrow ownership to enhance stock-trading transparency and stockholder incentives to monitor managerial activity imposes costs on bank shareholders and may decrease a bank's intangible assets by limiting the bank's ability to pursue its growth opportunities.

It would be a mistake to assume that market forces require E to equal zero at all times. As long as stockholders were legally forced to post the double-liability bond, the costs to stockholders of supporting the bond could rise above the benefits to depositors. On the other hand, the premium paid for monitoring services could exceed stockholder performance and bonding costs for two reasons. Large-block shareholders could develop private information and they could bond their monitoring performance with highly illiquid assets that they knew wouldn't have to be liquidated or borrowed against unless the bank became distressed. Research by Calomiris and Kahn (1991) shows how the issuance of demandable debt would reinforce large-block stockholders' monitoring incentives by making it easy for depositors to penalize these stockholders nonlinearly as soon as customers began to lose confidence in the bank or its policies.

Using quarterly data and the statistical market-value accounting model, Wilson and Kane (1997) have estimated the average net monitoring premium E that stockholders earned through the contingent-liability bond at double-liability banks during 1927–1933.

Figures 1 and 2 summarize the outcome of their chief regression experiment. At each date, the model regresses the value of the bank's market capitalization against the reported values of par capital, surplus capital, and lagged market capitalization.

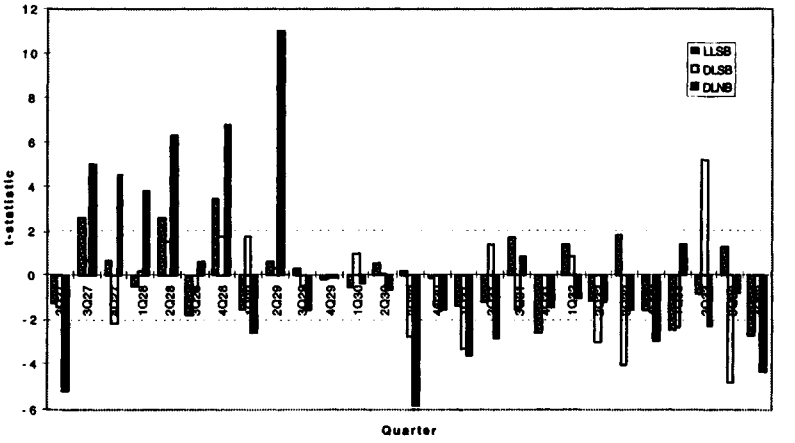

FIG. 1. Plot of Quarter-by-Quarter *t*-statistics for *E* at Banks with More than $2 Million in Book Net Worth, 1927–1933

The underlying intuition is that markets price stock using accounting data and unspecified other information. The influence of nonaccounting information is proxied by the lagged value of the endogenous variable. Using this model, the *t*-value of the difference between the regression coefficients for the predetermined variables *PAR* and *SUR* serves to establish whether *E* differs significantly from zero.

The data set is cross-classified by size and wind-up rules. Banks are partitioned into two size classes, then subdivided into three contracting-theory environments: limited-liability state banks (LLSB) as a control group, extended-liability state banks

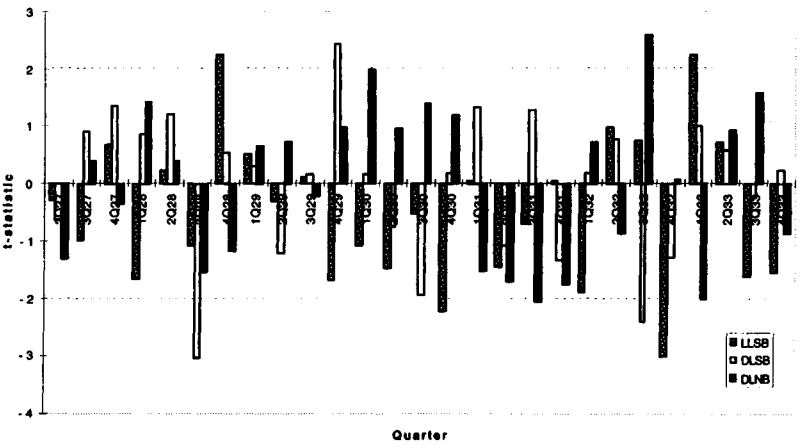

FIG. 2. Plot of Quarter-by-Quarter Cross-sectional *t*-statistics for *E* at Banks with Less than $2 Million in Book Net Worth, 1927–1933

(DLSB), and double-liability national banks (DLNB). The data are assembled from the William B. Dana Company's *Bank and Quotation Record.*

The authors find that, for all classes, the sign and statistical significance of the net monitoring premium fluctuated greatly from quarter to quarter. The figures display results for a partition in which the threshold between large and small banks is set at $2 million in the book value of equity. However, the qualitative difference in the sign and statistical significance of E proved robust to substantial increases and decreases in the size threshold.

The time series of cross-section regression coefficients indicates that double liability seldom offered statistically significant net benefits or burdens to stockholders of small banks at any time during 1927–1933. This implies that depositors felt that they could readily monitor stockholders and managers of small banks. Through 1930.2, similar results emerge even for large state-chartered banks.

But large national banks showed a different pattern. From 1927.2 through 1929.2, stockholders at large national banks earned a *positive* average monitoring premium. During the next four quarters, the premium declined to insignificance. Then, from mid-1930 on, the estimated monitoring premium became predominantly negative at large banks in all extended-liability jurisdictions. The frequency and significance of negative values proved greater for large national banks than for large institutions chartered in extended-liability states.

Contracting theory suggests that we may interpret these estimates as follows. During the late 1920s, large-block stockholders at most institutions earned only a normal return on their bonding services; however, stockholders at large national banks were able to extract an expected net premium for bonding their monitoring services. As the depression and the banking crisis of the 1930s unfolded, the inherited extended-liability contracting structure became inefficient. In this period of reduced stockholder concentration, increased bank transparency, and continuing negative shocks to shareholder wealth, the benefits of double liability declined sharply at many banks. The gross monitoring premium offered could no longer cover the costs to bank stockholders of maintaining the bond. These costs consisted of limitations on acceptable sources of capital that reduced profit growth and constraints on share liquidity. Both of these costs were functions of trading restrictions that served to protect creditors and wealthy shareholders from being victimized by transactions that transferred stock to persons who could not be expected to cover their share of contingent obligations.

3. SUPPORTING EVIDENCE

This paper subjects the contracting-theory explanation for deposit insurance enactment to three sensitivity tests. The first and second tests are event studies. These tests seek to ascertain whether and how federal banking legislation enacted in 1927 and 1933 affected stock price appreciation at a sample of New York City banks. Because both pieces of legislation contained provisions that promised to impact other channels of projected bank profitability, our tests partition the samples in ways that could identify a putative legislative effect on the size of the net double-liability premium.

A major aim of the Banking Act of 1933 was to compartmentalize commercial banking from investment banking. Its relevance for the double-liability premium is that the Act established the Federal Deposit Insurance Corporation (FDIC) and initiated a process of phasing out double liability for national banks.

The major effect of the Banking Act of 1927 was to constrain interstate banking to the detriment of large banks. This legislation promised to affect the double-liability premium by removing a longstanding $100 floor on the par value of national-bank stock shares. This provision authorized national banks to split their stock to increase share liquidity and to broaden the distribution of ownership by making shares in the bank more affordable to smaller investors.

The Dana Company's *Bank and Quotation Record* is the principal source of the data analyzed in Figures 1 and 2. This source collected dealer bid and asked prices on bank stock once a month. The time aggregation entailed in using monthly data undermines our ability to isolate the effects of specific information flows. In intervals as rich in economic surprises and policy proposals as Franklin Roosevelt's first few months in office, it is unreasonable to suppose that we can disentangle from monthly movements in bank-stock prices much information about the benefits of a single piece of legislation.

To confront this difficulty, we focus our event-study tests on weekly data reported in the *Commercial and Financial Chronicle* used by Calomiris and Wilson (1996). This source gives weekly stock quotes for fifty-one New York City (NYC) banks. The sample includes nine large and nine small national banks and twenty-two large and eleven small banks chartered by the double-liability state of New York.

A third branch of our analysis directly examines the evolution of shareholder concentration at NYC banks during 1927–1933. We begin by confirming that many of the banks in our 1933 NYC sample previously pursued the opportunity to lower their par value by undertaking a stock split. We next analyze, in event time, the price behavior these stocks show before and after they split. We show that each bank's event-week response in 1933 correlates positively with the percentage change in its stockholder distribution. We also use an ad hoc regression model to test hypotheses about potential determinants of the breadth of stockholder distribution in the NYC bank sample.

Controlling for four other influences (charter status, surplus capital, the number of shares outstanding, and a positive time trend), our regression estimates show that the number of shareholders increased substantially with the par capital of a bank. This finding indicates that ownership concentration and the reliability of stockholder monitoring services declined most sharply at the particular banks whose shareholders faced the largest aggregate contingent liability. The greater increase in stockholder distribution at large banks is consistent with the hypothesis of a "silent run" by informed large-block stockholders. Far from using their place in the governance process to discipline bank managers on behalf of other stakeholders, informed bank stockholders took advantage of the increased liquidity and anonymity of trading in their lower-priced stock shares to reduce their personal exposure to what they may have projected to be liquidation losses.

A. Event-Study Analysis of the Impact of the Banking Act of 1933

We begin by conducting event-study tests of the effects that the enactment of the Banking Act of 1933 had on the stocks of different classes of national and state banks. These tests—which use weekly data for New York City banks—produce results consistent with the hypothesis that stockholders of large national banks benefitted more from the passage of the Act than shareholders of either small national banks or institutions chartered by New York State. It is not unreasonable to interpret this pattern of benefits as giving evidence about the value of jettisoning double liability for large-bank stockholders. This is because rational investors should expect that the capitalized value of benefits conveyed by the Act's prohibition on explicit interest on interbank and corporate demand-deposit balances at large banks to be short-lived (that is, eaten away over time by competitive pressure to provide implicit interest) and more than offset by the capitalized value of opportunity losses rooted in the restrictions that the Act placed on the investment-banking activities these banks could undertake.

Table I reports event-study experiments using bank stock-price data covering the fifty-one weeks that the stock exchanges were open in 1933. Although the evidential value of the experiment reported in panel A is reduced by a low R^2, the result supports the hypothesis that the elimination of double liability benefitted stockholders in large national banks and in double-liability state banks. The model fitted in this panel introduces cross-sectional and event-time dummies into the standard two-parameter market model:

$$R_{it} = a + bR_{Mt} + u_{it}^{R}. \tag{1}$$

In this model, a and b represent the market-model intercept and slope, respectively. Other symbols are defined as follows:

R_{it}: The percentage price appreciation observed in time interval t for the average of the bid and asked prices quoted for bank i's stock;

R_{Mt}: The percentage price appreciation recorded in time interval t for the Dow Jones industrial average;

u_{it}^{R}: The residual return on bank i's stock in time interval t.

Inference focusses on the significance of coefficients c_{jk} found for the product of particular bank-classification dummy variables (D_{jk}) and a zero-one event-time dummy (D_T). The bank-classification dummies are zero except that they become unity when a bank's size index is j and its charter index is k. Index j is either L (large) or S (small). The charter index k takes on either the value N (for national banks) or DL (for banks chartered by the double-liability state of New York). The event-time dummy D_T is zero except that it assumes the value of unity for observations occurring in the week that includes June 12, 1933—the date on which Franklin Roosevelt signed the Banking Act into law.

Coefficient estimates support our contention that the Act benefitted large national

TABLE 1

1933 EVENT-STUDY EXPERIMENTS

R_{it} Denotes the Weekly Percentage Price Appreciation on Stocks in NYC Banks in 1933

Panel A: Ordinary Least-Squares Regression Model

$$R_{it} = a + bR_{Mt} + c_{LNT}D_{LNi} \cdot D_T + c_{LST}D_{LNi} \cdot D_T + c_{SNT}D_{SNi} \cdot D_T + c_{SST}D_{SSi} \cdot D_T + u_{it}^R$$

Parameter	Parameter Estimate	t-value
a	−.53	−2.30
b	.23	5.72
c_{LNT}	17.28	4.10
c_{LST}	9.33	3.90
c_{SNT}	−.58	−.15
c_{SST}	4.10	1.10
R^2	0.29	
standard error	11.13	
N	2,391	

Panel B: Seemingly Unrelated Regression Models for Price Appreciation at Subsamples of Large and Small NYC Banks Recording a Stock Price in Each Trading Week of 1933

1. Large Banks	*SUR* Estimate of Event-Week Response (in percent)	t-value
• *National Banks*		
Chase NB	27.39	4.57
N City B	21.20	7.44
Commercial NB&TC	4.67	0.89
N Exchange B&TC	7.51	1.23
First NB	6.33	1.29
Public NB	16.30	2.65
Sterling NB&TC	32.84	5.40
Subsample Average:	16.61	
• *State-Chartered Banks*		
Bankers TC	10.47	2.00
B of NY & TC	6.09	1.51
Bronx County TC	25.92	2.79
Banca Commerciale Italiano TC	−0.11	−0.19
Brooklyn TC	18.86	2.56
B di Sicilia TC	0.83	0.27
Central Hanover TC	6.13	1.19
Chemical B TC	7.64	1.53
Continental B	10.89	1.82
Corn Exchange B	13.08	2.25
Empire TC	18.94	4.66
Fifth Avenue B	0.87	0.45
Fulton TC	8.20	4.17
Guaranty TC	9.72	1.56
Irving TC	16.70	3.12
Kings County TC	0.13	0.15
B of the Manhattan Co	41.81	7.14
Manufacturers TC	25.77	3.07
New York TC	16.21	2.75
Title Guarantee & TC	4.28	0.27
US TC of NY	6.41	3.00
Underwriters TC	−13.77	−0.82
Subsample Average:	10.69	

continued

TABLE 1
(*Continued*)

2. Small Banks	*SUR* Estimate of Event-Week Response (in percent)	*t*-value
• *National Banks*		
Bensonhurst NB	0.12	0.06
Bronx NB	0.22	0.06
Flatbush NB	0.73	0.09
Fort Greene NB	0.79	0.12
Kingsboro NB	0.21	0.07
Lafayette NB	−1.67	−0.05
Peoples NB - Brooklyn	0.36	0.11
N Safety B&TC	6.96	0.87
NB of Yorkville	0.68	0.19
Subsample Average:	0.93	
• *State-Chartered Banks*		
Citizens B - Brooklyn	0.13	0.19
Clinton B	−1.07	−0.15
Clinton TC	8.41	1.39
Pennsylvania Exchange B	−0.24	−0.04
Trade B of NY	0.51	0.09
B of Yorktown	−0.54	−0.11
Subsample Average:	1.20	

NOTES: B = Bank; N = National; TC = Trust Company.
DATA SOURCE: *Commercial and Finacial Chronicle*

banks more than other banks. The coefficients of $D_{LN}\cdot D_w$ and $D_{LS}\cdot D_w$—c_{LNw} and c_{LSw}—are positive and significant. This supports the lobbying-pressure hypothesis that such banking reform legislation could not pass unless it offered sufficient benefits to win the support of large banks. Also, c_{LNw} is greater than c_{LSw}, and both values are well above the coefficients for smaller banks. The smaller coefficients for small banks have mixed signs and do not differ significantly from zero.

We interpret c_{LSw} as benchmarking the value conferred on large double-liability banks by federal deposit insurance and deposit-rate restrictions *minus* the value of investment-banking opportunities surrendered (see Kroszner and Rajan 1997) *plus* the value to state-chartered large banks of whatever pressure the Act generated on authorities in New York State to jettison double liability. Assuming that the capitalized value of deposit-rate restrictions did not exceed the value of lost opportunities for investment banking, the difference ($c_{LNw} - c_{LSw}$) represents a conservative estimate of the incremental value stockholders of large national banks received from enacting an end to double liability. The standard error of this difference is 4.83 percent, which implies a *t*-value of 1.65.

Panel B reports coefficients found for the event-week dummy at individual banks when a seemingly unrelated regression (*SUR*) representation of equation (1) is fitted to individual banks. To allow error-covariance estimation to occur without deleting the weeks that any bank has missing data, it seemed appropriate to restrict the *SUR* run to banks that reported stock prices for all fifty-one trading weeks. Software limitations dictated our fitting the *SUR* model separately for large banks and small banks. Estimates of event-week responses differ greatly between the two size classes. In the

large-bank subsample, only one institution failed to show a positive event-week response. More than half of these positive responses were statistically significant at large banks. On the other hand, only two small banks showed a substantial event-week effect and no small bank showed a statistically significant effect at all.

B. Event-Study Analysis of the Impact of the Banking Act of 1927

A 1924 report of the House banking committee (U.S. Congress 1924) described the legislative push behind the bill that evolved into the 1927 Act. The goal was to "put new life into the national banking system (p. 4)" by responding to regulatory competition from state banking legislatures:

> legislation is urgently needed at this time . . . to permit national banks effectively to carry on the banking business and . . . to protect them in so far as Congress can from the inroads of competition from State member banks of the Federal Reserve System which are operating under charter powers granted by the State legislatures. (p. 1)

Table 2 investigates the hypothesis that the Banking Act of 1927 significantly changed the return-generating process for both national and state banks in our NYC sample. In 1927, more individual NYC banks existed than in 1933. Our experiments introduce time-varying coefficients into the two-parameter market model (1). We divide the fifty-one observable weeks of 1927 into three segments: the pre-event weeks, $t = 1, \ldots, 12$; the event week in which the McFadden Act was passed, $t = 13$; and the post-event weeks, $t = 14, \ldots, 51$. We define the following dummy variables:

$D_{(-)}$ = unity for $t = 1, \ldots, 12$ and is zero otherwise;
$D_{(0)}$ = unity in the event week 13 and is zero otherwise;
$D_{(+)}$ = unity for $t = 14, \ldots, 51$ and is zero otherwise.

TABLE 2

1927 EVENT-STUDY EXPERIMENT
R_{it} Denotes the Weekly Price Appreciation on NYC Bank Stock in 1927 in Percent

$$R_{it} = a_{(-)}D_{(-)} + a_{(+)}D_{(+)} + [c_{LN}D_{LNi} + c_{LS}D_{LSi} + c_{SN}D_{SNi} + c_{SS}D_{SSi}]D_{(0)} + [b_{(-)}(D_{(-)} + b_{(+)}(D_{(+)} + D_{(0)})]R_{Mt} + v_{it}^{R}$$

Coefficient	Regression Estimate	t-value
$a_{(-)}$	−0.21	−0.13
$a_{(+)}$	.619	6.66
$b_{(-)}$	.116	0.64
$b_{(+)}$	.218	4.61
c_{LN}	−.989	−0.71
c_{LS}	−1.17	−1.12
c_{SN}	−1.07	−0.50
c_{SS}	.257	0.33
R^2	.024	
standard error	4.787%	
N	3859	

DATA SOURCE: *Commercial and Financial Chronicle*
NOTES: The following dummy variables partition the data across time:
$D_{(-)}$ = unity for $t = 1, \ldots, 12$ and is zero otherwise;
$D_{(0)}$ = unity in the event week 13 and is zero otherwise;
$D_{(+)}$ = unity for $t = 14, \ldots, 51$ and is zero otherwise.
D_{LN}, D_{LS}, D_{SN}, and D_{SS} partition the data by bank size and charter class.

Table 2 fits the following model:

$$R_{it} = a_{(-)}D_{(-)} + a_{(+)}D_{(+)} + [c_{LN}D_{LNi} + c_{LS}D_{LSi} + c_{SN}D_{SNi} + c_{SS}D_{SSi}]D_{(0)} + [b_{(-)}D_{(-)} + b_{(+)}(D_{(+)} + D_{(0)})]R_{Mt} + \nu_{it}^{R}. \quad (2)$$

Coefficient estimates for $a_{(-)}$ and $a_{(+)}$ and $b_{(+)}$ indicate that the market-model parameters increased following the passage of the McFadden Act. However, only the shift in a is statistically significant. The deflection of returns in the event week itself proves insignificant. The c coefficients measure the average event-week effects experienced by banks in different size-charter classes. Event-week benefits prove positive for small state banks, while benefits are negative for the other three combinations of charter and size. However, the t-values for size-charter effects are insignificant and so are coefficient differences across these classes.

Although the R^2 is low, the significant increase in the market-model intercept implies that the Banking Act of 1927 supported an increase in expected weekly returns on bank stock. The increase in market-model slope, though insignificant, intimates that the Act may have increased the sensitivity of bank stock to market movements. As long as the stock market promised to expand, increased sensitivity would be beneficial for bank stockholders.

Tests using the *SUR* model found a significant event-week response (positive) for only one of twenty large national banks: Garfield National Bank. *SUR* runs for thirty-one large state banks showed no significant responses and a preponderance of negative values.

Because the Banking Act of 1927 contains many provisions, these event-study results cannot be directly nor predominantly attributed to the value of national banks' newfound freedom to split their stock shares. It is, however, possible to test three imbedded hypotheses. If the freedom was valuable, we would expect inside shareholders in national banks to use this freedom. The other hypotheses are that splitting a bank's stock would widen a stock's distribution and importantly affect the post-event trajectory of a split stock's price. We test these hypotheses in the next section.

C. Analysis of Post-1927 Stock Splits at NYC Banks

Table 3 shows that twenty-eight of the fifty-one members of the 1933 NYC sample went on to split their stock. All but four of the splits occurred in 1929. Only three splits occurred after the October 1929 stock-market crash. The Times Square Bank is the only split that occurs during the 1930s. This 1930 split is also the only case where the quoted or market stock price does not lie well above the presplit par value.

Some banks allowed their stockholders to trade at both the old and the new par values during a transition period. Table 4 uses one such case to clarify that dealer spreads on the two classes of stocks were not equivalent. Spreads prove proportionately much wider on the lower-par class. The considerable widening of spreads on split shares is a consistent and intriguing phenomenon in the 1933 NYC sample. We intend to in-

TABLE 3

STOCK SPLITS OCCURRING DURING 1927–33 IN THE WEEKLY SAMPLE OF NEW YORK CITY BANK STOCKS

BANK	SPLIT DATE	PAR	BID	ASK	PAR	BID	ASK
B of America NA*	4/28/28	$100	$1240	$1250	$25	$288	$292
B of Manhattan Co	11/2/29	100	1070	1090	20	195	215
Bankers TC	4/6/29	100	1750	1825	10	175	180
Bronx County TC	8/17/29	100	532	550	20	100	106
Bryant Park B	8/24/29	100	480	—[1]	20	65	—[2]
Central Union TC	3/2/29	100	2575	—[3]	20	492	500
Chase NB*	7/6/29	100	955	965	20	204	206
Chatham Phenix NB and TC*	9/21/29	100	775	790	20	165	169
Chelsea Exchange B	3/2/29	100	415	420	25	115	120
Chemical NB*	5/11/29	100	1660	1680	10	112	115
Continental B	5/18/29	100	800	840	10	69	72
Corn Exchange B	5/25/29	100	1070	1080	20	208	212
Empire TC	9/7/29	100	600	610	50	122	127
Equitable TC	11/9/29	100	520	540	20	100	110
Fidelity TC	3/23/29	100	440	455	50	230	240
Fidelity TC	8/17/29	50	210	218	20	63	72
Hanover NB*	1/12/29	100	1500	1550	50	785	815
International Germanic TC	8/17/29	100	203	211	50	104	108
Interstate TC	7/20/29	100	315	323	20	65	67
Amer Ex Irving TC	4/20/29	100	177	784	10	71	73
Manufacturers TC	6/2/28	100	1200	1220	20	297	302
N City B*	1/19/29	100	1380	1390	20	278	281
New York TC	2/23/29	100	1150	1165	25	252	257
N Park B*	5/25/29	100	1100	1115	20	158	163
Port Morris B	5/25/29	100	1250	1350	10	125	135
Public NB&TC*	9/1/28	100	805	820	25	200	205
Times Square TC	8/10/30	100	50	55	40	20	22
Title Guaranty TC	4/27/29	100	1000	1020	20	194	199

DATA SOURCE: *Commercial and Financial Chronicle.*
NOTES: *Institution is chartered as a national bank.
[1]Bid quote was listed. Previous spread was $30.
[2]Ditto. The first post-split spread observed was $5.
[3]Ditto. The previous observed spread was $50.

vestigate this phenomenon in another paper. We believe that it reflects dealer concern that insiders might have been selling on adverse information.

The price range in which a stock trades is believed to influence the mix of investors holding the stock. In particular, lowering the range is expected to make it easier for low-wealth investors to trade round lots, increasing (i) trading liquidity, (ii) the number of stockholders overall (Lamoreux and Poon 1987) and (iii) the ratio of household to institutional investors (McNichols and Dravid 1990).

Although subject to survival bias, our data can test the hypothesis of increased distribution directly. We presume that increased distribution lowers the size of large-block holdings and the wealth of the average shareholder. On this presumption, affirming this increased-distribution hypothesis adds to the case for inferring a breakdown of the double-liability contracting protocol at large banks. Signaling theorists (Grinblatt, Masulis, and Titman 1984) hypothesize that splits convey a positive signal about insiders' private information in which the size of the split ratio conveys favorable information about future earnings. Our data prove inconsistent with this view.

Figure 3A plots the cumulative average appreciation in bid and asked prices during

TABLE 4

BID-ASK QUOTES ON $20 AND $100 PAR SHARES OF EMPIRE TRUST COMPANY DURING A SEVENTEEN-WEEK PERIOD OF SIMULTANEOUS TRADING OF DUAL-PAR STOCKS

	Quotes on $20 Par Shares		Quotes on $100 Par Shares	
Week of	Bid	Ask	Bid	Ask
9/7/29	$122	$127	$595	$605
9/14/29	121	125	590	600
9/21/29	122	126	595	605
9/28/29	123	127	600	610
10/5/29	118	123	580	600
10/12/29	118	123	590	598
10/19/29	119	123	585	595
10/26/29	115	119	540	560
11/2/29	90	95	450	470
11/9/29	75	85	320	420
11/16/29	70	80	360	390
11/23/29	80	90	400	420
11/30/29	80	85	405	415
12/7/29	82	86	417	426
12/14/29	81	85	407	415
12/21/29	80	85	385	395
12/28/29	78	83	380	390

SOURCE: *Commercial and Financial Chronicle*

an event-time window that starts thirty weeks before, and ends thirty weeks after the NYC-sample stock splits. To control for market movements, Figure 3B uses each bank's sixty-one-week market-model beta to calculate a beta-adjusted cumulative deviation from the price appreciation recorded for the Dow-Jones Average during each week of the event window. Figure 3C cumulates the appreciation relative to the Dow-

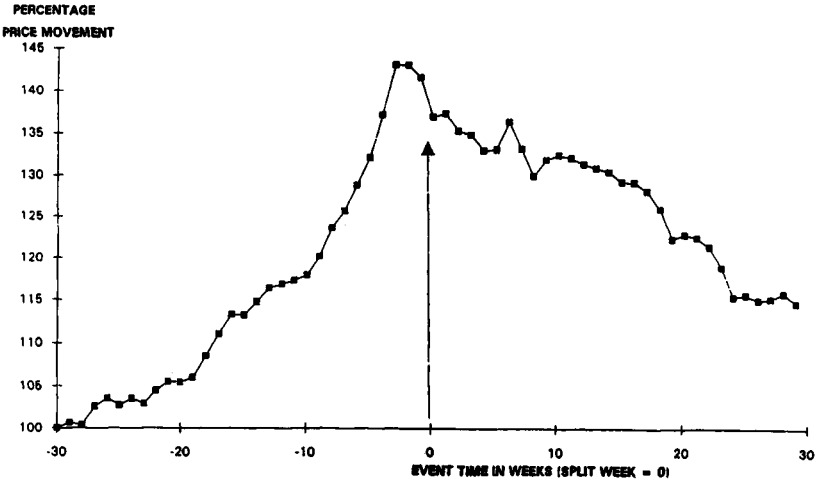

FIG. 3A. Unadjusted (Beta = 0) Cumulative Price Appreciation before and after Stock Splits for NYC Sample

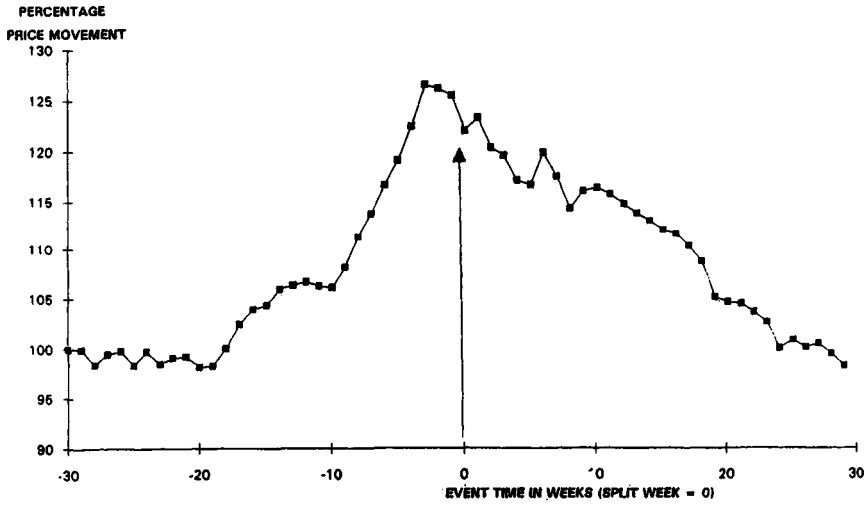

FIG. 3B. Beta-adjusted Cumulative Price Appreciation before and after Stock Splits for NYC Sample

Jones Average itself. All three charts show a marked decline in stock performance after a split.

Insiders were selling to dealers at the bid and outsiders were buying at the asked. This pattern of results indicates selling pressure. On average, the inside information that motivated the 1928–30 NYC bank splits was negative rather than positive in character.

This finding suggests the hypothesis that the 1928–30 splits in bank stock may be

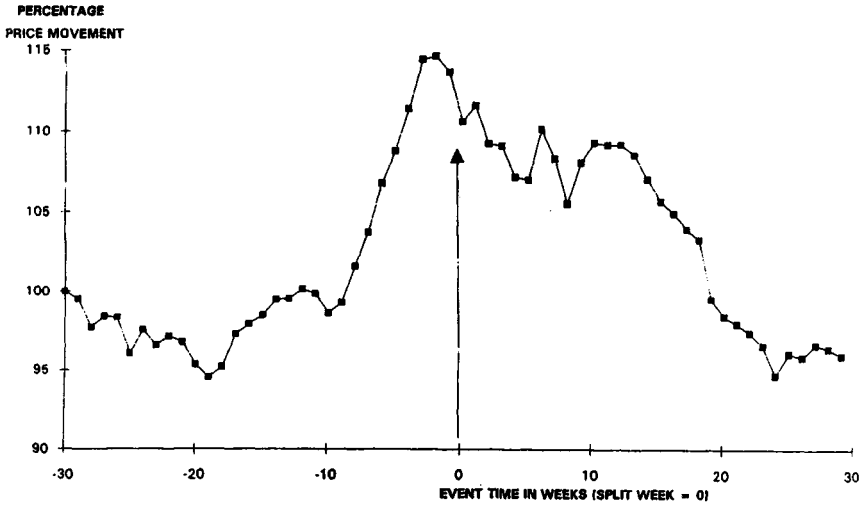

FIG. 3C. Market-adjusted (Beta = 1) Cumulative Price Appreciation before and after Stock Splits for NYC Sample

usefully interpreted as initial public offerings (IPOs) of closely held firms. Although an IPO might be motivated simply by large-block shareholders' desire to diversify an inefficient exposure to a concentrated set of risks, insider concern about this exposure is bound to be stronger when they possess adverse private information. A corporation's stock is typically found to perform poorly after an IPO (Ritter 1991) or secondary offering (Lee 1997). However, for double-liability banks, Winton's model adds a second reinforcing explanation for the stock price decline. After a split, the value of stockholder monitoring services to other stakeholders (which is imbedded in bank stock price) would fall for two reasons. First, Winton shows that, when large-block shareholders reduce their position, the probability that managers are effectively monitored and the quality of managerial performance would both decline. Second, as owners become more numerous and less wealthy on average, the cost of monitoring their wealth and trading activity rises and creditors encounter a fall in the expected value of the aggregate assets being posted as a bond.

Table 5 compares the frequency in 1926 and 1930 of the par values chosen by a panel of banks in different size-charter classes. The panel includes all banks in "major" cities (listed in our Appendix) for which the *Bank and Quotation Record* reported a par value throughout the period 1926–1933. The average par value continued to decline in each category during 1930–33, but post-1930 effects on relative frequencies are negligible.

In 1926, three points stand out. First, a number of national banks enjoyed an exemption from the $100 minimum value. Exemptions prove much more frequent for small banks than for large ones. It is reasonable to presume that exemptions could be negotiated for state banks that were seeking to convert to a national charter and perhaps also for banks that were specifically organized to serve a small market. Second, within size classes, national banks have a smaller mean par value than state banks do. The difference turns on the different relative frequencies of $50 and $100 observations. Third, the tails of the relative-frequency distributions for large banks with different charters differ much more than those for small ones. All three points support the hypothesis that the $100 minimum was a more burdensome restraint for large national banks in 1926 than it was for smaller ones.

Between year-end 1926 and 1930, the frequency of very low par values increased for all classes of banks. This lowered the mean par value and raised the standard deviation observed for each category. Mann-Whitney and Kolmogov-Smirnov tests show that the 1926 and 1930 distributions differ significantly. The greater frequency of the $50 value for state banks suggests that a $50 minimum remained a charter requirement in several states. In both charter classes, a higher percentage of large banks moves away from the $100 par value than small banks. Within size categories, more national banks than state-chartered banks moved off the $100 par value.

Data on the number of shares (*NSHARES*) and number of individual shareholders (*NINDIV*) were collected from Moody's *Banking and Finance Manuals* bank by bank and year by year. Table 6 reports regression estimates of a triangular model of the yearend levels of *NSHARES* and *NINDIV*. These equations introduce the control variable $(SHARE\ PRICE)_{it}$ which equals the year-end market price of a single share on

TABLE 5

DISTRIBUTION OF PAR VALUES AT A PANEL OF 1445 SURVIVING LARGE AND SMALL NATIONAL AND STATE BANKS IN 1926 AND 1930

Panel A: Banks Whose Book Net Worth Exceeds $2 Million in 1926

Par Value of Stock Shares (in $)	Large Banks in 1926		Large Banks in 1930	
	State Charter	National Charter	State Charter	National Charter
10	1	2	20	10
20	0	0	20	22
25	4	0	34	15
30	0	0	0	0
40	0	0	0	0
50	22	3	15	4
60	0	0	0	0
80	0	0	0	0
100	208	141	146	94
1,000	2	0	2	0
Totals	237	146	237	146

Panel B: Banks Whose Book Net Worth Is Less than $2 Million in 1926

Par Value of Stock Shares (in $)	Small Banks in 1926		Small Banks in 1930	
	State Charter	National Charter	State Charter	National Charter
10	6	1	22	11
20	0	1	27	18
25	15	5	42	18
30	2	1	2	1
40	0	2	0	1
50	88	17	75	15
60	2	1	2	1
80	1	0	1	0
100	592	328	535	291
1,000	0	0	2	0
Totals	706	356	706	356

DATA SOURCE: *Bank and Quotation Record*
NOTE: Sample consists of all banks in "major" cities that reported a par value throughout 1926–1933.

bank *i*. Table 4 fits the following two equations to an irregularly reporting panel of the 1933 sample of NYC banks:

$$NINDIV_{it} = a_0 + a_1(t - 1926) + a_2 D_{N,i} + a_3(SHARE\ PRICE_{it}) + a_4 SUR_{it} + a_5 PAR_{it} + a_6(NSHARES_{it}) + V^I_{it}. \quad (3)$$

$$NSHARES_{it} = b_0 + b_1(t - 1926) + b_2 D_{N,1} + b_3(SHARE\ PRICE_{it}) + b_4 SUR_{it} + b_5 PAR_{it} + V^S_{it}. \quad (4)$$

Panel data are incomplete because the number of shareholders is not reported by each bank in every year. The usable sample averages about thirty-two banks per year.

The regression estimates show that increases in stockholder distribution are driven chiefly by the size of the bank's surplus and par capital and (reflecting the influence of stock splits) by the number of outstanding shares. The number of shares and the num-

TABLE 6

REGRESSION ESTIMATES OF TRIANGULAR MODEL (3) AND (4) OF YEAREND SHAREHOLDER DISTRIBUTION AT IRREGULARLY REPORTING MEMBERS OF THE 1933 NYC BANK SAMPLE, 1926–1933

	NINDIV [Model (3)]		*NSHARES* [Model (4)]	
	Regression Coefficient	*t*-value	Regression Coefficient	*t*-value
intercept	−1,026.47	1.35	48,195	0.46
(*t*−1926)	336.79	1.95	31,705	1.32
D_N	−354.71	−0.56	−10,315	−0.12
SHARE PRICE	1.47	1.64	−344	−2.78
SUR (in $ mil.)	−896.23	8.82	−10,807	−5.02
PAR (in $ mil.)	293.65	−5.54	55,636	18.09
NSHARES	.008	17.56	...	
R^2	.923		.786	
Standard error	4,269.83		645,932	
Number of observations	261		261	

DATA SOURCE: Moody's *Bank and Finance Manuals* and Dana Co.'s *Commercial and Financial Chronicle*

ber of stockholders each increase with a bank's par capital (*PAR*) and fall with the surplus position (*SUR*).

The significance of the difference in the *PAR* and *SUR* coefficients may be clarified by a thought experiment. When a bank's *SUR* grows while its *PAR* does not, it is building capital through retained earnings and may have little need to raise outside capital. When a bank's *PAR* grows, it has decided to build capital by issuing additional shares of stock. Coefficient differences imply that, whenever *PAR* and the double-liability bond grow while holding the value of book-value equity fixed, large-block shareholders would prefer to enlist new shareholders. The regressions estimate that the direct and indirect increase in shareholders attributable to a $1 million reallocation of capital from surplus to the par account would exceed nine hundred.

A complementary way to investigate the interaction of par, size, and regulatory competition in broadening stockholder distribution is to contrast the behavior of splitting banks with another sample of banks matched in size and charter status. Although we could not find good size matches for most of the largest members of each charter class, the largest state banks split their stock at least as frequently as national banks did.

Perhaps our most persuasive evidence is found in Figure 4. This chart plots *SUR* estimates of the 1933 event-week responses for each large bank displayed in Table 1 against the observed 1927–33 change in the bank's stockholder distribution. The positive correlation between the event-week responses and the observed broadening in stockholder ownership is striking. The scatter diagram firmly supports our contracting-theory explanation for the softening of large-bank opposition to the enactment of federal deposit insurance that Calomiris and White found during the 1930s.

4. SUMMARY AND POLICY IMPLICATIONS

Winton's contracting theory (1993) explains how and why a broadening of stockholder distribution at large banks could render double liability an unconvincing way

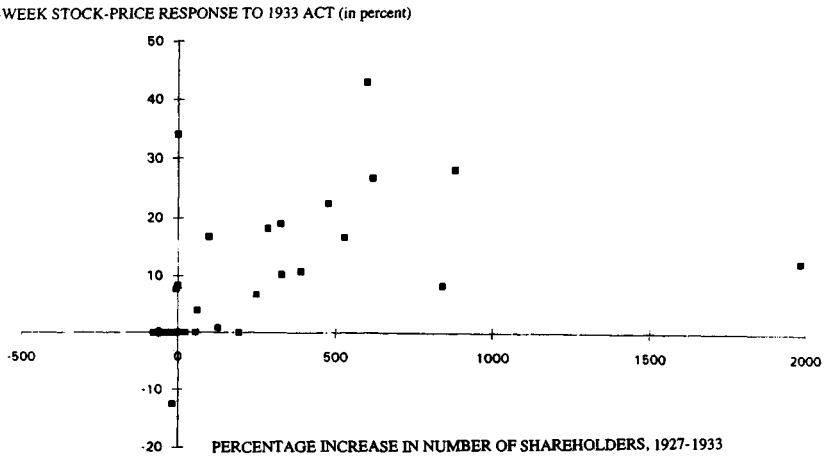

FIG. 4. Relationship between *SUR* Estimates of the 1933 Event-Week Response and the 1927–1933 Increase in the Number of Shareholders at Large NYC Banks

for stockholders to bond their monitoring services. This paper clarifies that the pressure of regulatory competition led Congress to grant national banks permission in 1927 to broaden their stockholder distribution. It also shows that the legislation that granted this permission changed the return-generating process for bank stock and that stockholder distribution at large banks expanded greatly between year-end 1926 and year-end 1930. We show that, after a split, stockholder returns declined markedly.

Figures 1 and 2 show that the net monitoring premiums offered to large national bank stockholders were significantly positive from mid-1927 through mid-1929 when most stock splits were unfolding. During the next year, the net monitoring premium was negligible. From mid-1930 through 1933, our estimate of the net premium at large national and double-liability state banks was often significantly negative and usually more negative than at the control group of limited-liability state banks. Finally, we cite event-study evidence that is consistent with the hypotheses that 1933 legislation that dictated the phase-out of double liability benefitted stockholders at large banks more than stockholders of small ones and that this legislation had a greater effect on large double-liability banks than on large limited-liability institutions.

The strength of our case lies not in the persuasiveness of any particular piece of evidence, but in how comfortably the various pieces fit together. Like a mosaic, each piece reinforces the effect of the others in supporting a contracting-theory interpretation of the pattern of changes observed in double-liability monitoring premiums during 1926–1933.

We believe that our research offers a useful policy suggestion for banking supervisors in developing countries. In these countries, private bank stock is usually closely held and efforts to establish accounting transparency are often fiercely resisted. In similar circumstances in U.S. history, insolvency-driven penalties for stockholders imposed by contingent double liability succeeded in controlling depositor losses and

even in engendering voluntary bank liquidations at troubled institutions (Macey and Miller 1992). Instituting extended liability for closely held bank stock can strengthen supervisory protections in developing countries and penalize in timely fashion ministerial efforts to foist unwise credit-allocation schemes on a country's private banking sector.

APPENDIX TABLE

LIST OF CITIES COVERED IN THE TABLE 5 SAMPLE

Birmingham	AL	New Bedford	MA	Raleigh	NC
Mobile	AL	Peabody	MA	Winston-Salem	NC
Montgomery	AL	Salem	MA		
Selma	AL	Springfield	MA	Cincinnati	OH
		Taunton	MA	Cleveland	OH
Fresno	CA	Worcester	MA	Columbus	OH
Los Angeles	CA			Youngstown	OH
Oakland	CA	Detroit	MI		
Pasadena	CA	Grand Rapids	MI	Portland	OR
Sacramento	CA				
San Bernardino	CA	Minneapolis	MN	Allentown	PA
San Diego	CA			Erie	PA
San Francisco	CA	St. Louis	MO	Philadelphia	PA
San Jose	CA	Kansas City	MO	Pittsburgh	PA
Stockton	CA	St. Joseph	MO	Scranton	PA
				Wilkes-Barre	PA
Bridgeport	CT	Omaha	NE		
Hartfort	CT			Providence	RI
New Haven	CT	Atlantic City	NJ	Newport	RI
Norwich	CT	Asbury Park	NJ	Woonsocket	RI
Waterbury	CT	Bayonne	NJ		
		Bridgeton	NJ	Greenville	SC
Wilmington	DE	Camden	NJ	Spartanburg	SC
		East Orange	NJ		
Washington	DC	Elizabeth	NJ	Knoxville	TN
		Hoboken	NJ	Memphis	TN
Atlanta	GA	Jersey City	NJ	Nashville	TN
		Long Branch	NJ		
Chicago	IL	Morristown	NJ	Dallas	TX
		Mt. Holly	NJ	Houson	TX
Indianapolis	IN	Newark	NJ	Houston	TX
		New Brunswick	NJ		
Louisville	KY	Passaic	NJ	Salt Lake City	UT
		Plainfield	NJ		
New Orleans	LA	Paterson	NJ	Barre	VT
Shreveport	LA	Trenton	NJ	Burlington	VT
		Union City	NJ	Montpelier	VT
Baltimore	MD	Woodbury	NJ	Rutland	VT
Beverly	MA	Binghamton	NY	Lynchburg	VA
Boston	MA	Brooklyn	NY	Norfolk	VA
Brockton	MA	Buffalo	NY	Petersburg	VA
Cambridge	MA	Elmira	NY	Portsmouth	VA
Easrt Cambridge	MA	Jamaica	NY	Richmond	VA
Fall River	MA	Jamestown	NY	Roanoke	VA
Fitchburg	MA	New Rochelle	NY		
Gloucester	MA	NYC	NY	Seattle	WA
Haverhill	MA	Port Chester	NY	Spokane	WA
Holyoke	MA	Rochester	NY		
Lawrence	MA	Syracuse	NY	Milwaukee	WI
Lowell	MA	Yonkers	NY		
Lynn	MA				

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