1-1-1994

Stock Price Reactions to the Passage of the Federal Deposit Insurance Corporation Improvement Act of 1991

Andrew H. Chen  
*Southern Methodist University*

Marcia Millon Cornett  
*Southern Illinois University Carbondale*

Sumon C. Mazumdar  
*McGill University*

Hassan Tehranian  
*Boston College*

Follow this and additional works at: [https://scholar.smu.edu/business_workingpapers](https://scholar.smu.edu/business_workingpapers)

Part of the [Business Commons](https://scholar.smu.edu/business_workingpapers)

This document is brought to you for free and open access by the Cox School of Business at SMU Scholar. It has been accepted for inclusion in Historical Working Papers by an authorized administrator of SMU Scholar. For more information, please visit [http://digitalrepository.smu.edu](http://digitalrepository.smu.edu).
STOCK PRICE REACTIONS TO THE PASSAGE OF THE FEDERAL DEPOSIT INSURANCE CORPORATION IMPROVEMENT ACT OF 1991

Working Paper 94-0409*

by

Andrew H. Chen
Marcia Millon Cornett
Sumon C. Mazumdar
Hassan Tehranian

Andrew H. Chen
Edwin L. Cox School of Business
Southern Methodist University
Dallas, Texas 75275
(214) 768-3275

Marcia Millon Cornett, Southern Illinois University- Carbondale

Sumon C. Mazumdar, McGill University

Hassan Tehranian, Boston College

* This paper represents a draft of work in progress by the authors and is being sent to you for information and review. Responsibility for the contents rests solely with the authors and may not be reproduced or distributed without their written consent. Please address all correspondence to Andrew H. Chen.
STOCK PRICE REACTIONS TO THE PASSAGE OF THE FEDERAL DEPOSIT INSURANCE CORPORATION IMPROVEMENT ACT OF 1991

ABSTRACT

This paper provides the first empirical analysis of the FDIC Improvement Act's (FDICIA's) impact on the banking industry. We examine the impact of events leading up to the Act's passage on the market value and systematic risk of commercial banks. We find that (a) large (small) bank stocks' value increased (decreased) as the FDICIA's passage became evident; and (b) large banks' systematic risk decreased significantly over the period surrounding FDICIA, while that of small banks did not change significantly. This supports Peltzman's (1976) "buffering effect" hypothesis that the market viewed FDICIA as protective of large banks. We postulate that such differences between large and small banks are due to risk-adjusted deposit insurance premia and restrictions on access to the Federal Reserve's discount window introduced through FDICIA.
I. Introduction

The dramatic escalation of bank failures in the U.S. during the late 1980's and early 1990's has attracted considerable public attention. It has been suggested that this crisis in the banking industry is, at least partially, due to the Federal Deposit Insurance Corporation's (FDIC's) flat-rate insurance premium scheme. Such a pricing scheme is argued as being unfair to well-run institutions and, in fact, encourages excessive risk-taking by bank management.¹ In an attempt to reduce such incentives for moral hazard in the banking industry, regulatory reforms have been proposed and implemented. Among other things, these reforms have imposed risk-adjusted standards and closer supervision of riskier banks in order to maintain the safety and soundness of the banking industry, as well as to reduce the enormous burden that bank failures have imposed on the FDIC's Bank Insurance Fund (BIF).

The most recent piece of banking legislation is the Federal Deposit Insurance Corporation Improvement Act (FDICIA), which was signed into law in December 1991. This Act has several broad objectives, it intends to reform federal deposit insurance, to protect deposit insurance funds, to recapitalize the bank insurance fund and to improve supervision and regulation of insured depository institutions. In short, FDICIA intends to protect the FDIC from further loss by adopting several measures that are aimed at curbing moral hazard behavior by bank managers.

Two specific regulatory changes introduced by FDICIA are of particular importance since they greatly alter the structure of the "regulatory safety net" previously
in place. First, the Act incorporates a system of reassessment of deposit insurance premia. This is the first legislative attempt at redressing the incentive for banks’ moral hazard behavior due to a flat-rate deposit insurance scheme. FDICIA mandates a reassessment of a bank’s premium rate on a semi-annual basis in order to recapitalize the bank insurance fund to the target reserve ratio in a period of fifteen years. Although such an alternative premium structure is still not theoretically, actuarially fair (banks can alter their portfolios immediately after a premium rate has been assessed), it nevertheless is a significant move toward ameliorating the risk-taking incentive inherent in a flat-rate deposit insurance premium structure that is based on an average risk measure across all banks. Unlike the flat-rate system in place prior to FDICIA, the premium rate under the new system is determined on a bank specific basis and thus, is risk-adjusted insofar as the bank’s own historical risk profile is explicitly considered. Further, the rate is reassessed semi-annually and thus, addresses any revisions in a bank’s risk profile to a considerable degree. Second, FDICIA greatly curtails banks’ access to the Federal Reserve discount window for emergency funds in periods of illiquidity. Such credit, which is an important dimension of the regulatory "safety net," also provides banks with a regulatory incentive for risk-taking since it is given at a subsidized rate (see Chen and Mazumdar (1994a, 1994b) or Kaufman (1990)).

A central issue in the economics of regulation is identifying the intended and unintended benefits of regulatory actions and the agents which are supposed to receive them. A large body of literature examines the economic effects of regulation. Much of this literature uses tools from welfare economics to assess the extent to which regulation
affects market reactions. For example, in a seminal article, Stigler (1971) envisions a positive economics of regulation as specifying the arguments underlying the supply and demand for regulation. In his model, the good being transacted in the political market is a transfer of wealth, with constituents on the demand side and their political representatives on the supply side. The market distributes more of the good to that group of constituents whose effective demand is highest. In this economic view of regulation, legislators do not necessarily promote the general welfare. Instead, benefits are captured by a small but dominant coalition that has a large per capita stake.²

More recently, studies have relied on financial theory to infer the impact of regulatory changes. As argued by Schwert (1981), if markets are strong-form efficient, financial data is more informative than other measures because asset price movements incorporate all relevant information as soon as it becomes available. Several recent studies have employed stock market data to measure the effect of various regulatory changes in the banking industry (e.g., Allen and Wilhelm (1988), Brickley and James (1986), Cornett and Tehranian (1989, 1990), Flannery and James (1984), Musumeci and Sinkey (1990a, 1990b), Sundaram, Rangan and Davidson (1992), and Unal (1989)).³ These studies utilize a financial theory paradigm to test for the effects of informational change associated with regulatory reform on stock prices.⁴

Stigler (1971) posits that one coalition group can use the regulatory process to improve its relative competitive position within the industry. Posner (1974) points out that the differential effects of regulatory change on various industry members will cause members to campaign for regulation in a differential manner. More specifically, Stigler
(1974) argues that the incentive of large firms within the industry may differ substantially from their smaller counterparts. Empirical evidence supports these views. Several studies have found that the effects of a regulatory change are not homogeneous throughout the industry. For example, James (1983) finds that bank deregulation of deposit rate ceilings resulted in gains for wholesale banks but losses for commercial banks. Allen and Wilhelm (1988) present evidence that the Depository Institutions Deregulation and Monetary Control Act of 1980 provided a wealth transfer from non-Federal Reserve System member banks and Savings and Loans (S&Ls) to Federal Reserve member banks and S&Ls. Furthermore, Cornett and Tehranian (1989, 1990) find that the banking deregulations passed in 1980 and 1982 benefited stockholders of large banks and savings and loans, but produced negative abnormal stock returns for small depository institutions.

In this paper, we examine the impact of information events in legislating and adopting the FDICIA of 1991 on the market value and systematic risk of commercial banks. We look at the individual and overall impact of announcements that advanced the implementation of FDICIA on a sample of commercial banks grouped by asset size. The results of the paper indicate that FDICIA did produce significant changes in the value of commercial banks. Specifically, the empirical results show that the values of large banks were positively affected as the passage of the proposed FDICIA became evident, while the increased probability of passage resulted in negative value changes for smaller banks. The test results also show that the difference in market reactions for the two samples (large versus small banks) was significant. Finally, we find that the
systematic risk of the sample of large banks decreased significantly over a period surrounding the passage of FDICIA, while no significant change was found for the sample of small banks. Thus, the passage of FDICIA appears to have favored large banks, both in terms of market value and systematic risk, at the expense of small banks.

The rest of the paper is organized as follows. Section II describes the background and economic consequences of FDICIA. Section III introduces the data, methodology and hypotheses concerning returns to common stockholders of commercial banks. Section IV presents the results for the stock returns. Section V examines the impact of the Act on systematic risk of the commercial banks. Finally, Section VI concludes the paper.

II. Summary and Economic Consequences of FDICIA

The introduction and passage of the Federal Deposit Insurance Corporation Improvement Act of 1991 was the result of severe pressure on the profitability and market share of commercial banks and the resulting deterioration in the health of the bank deposit insurance fund. Regulators feared that bank insolvency cost could rise so high that they would exhaust not only the resources of the Bank Insurance Fund (BIF), but the financial ability of healthy banks to pay for them. Haunted by the collapse of the savings and loan industry regulators were moved to enact regulations which would prevent a similar occurrence in the banking industry.
While the stringent measures advocated by FDICIA reduced moral hazard opportunities by all banks, the impact may not have been uniform throughout the industry. As mentioned above, two particularly important regulatory changes introduced by FDICIA were the introduction of a risk-based deposit insurance premium schedule and restricted access to the Federal Reserve discount window. Both of these changes have conflicting influences which may affect values of small banks differently from large banks.

Recent empirical evidence indicates that small banks appear to undertake significantly greater credit risk exposure (see Duan, Moreau and Sealey (forthcoming)). Therefore, the reassessment of FDIC premia on a risk-adjusted basis is more likely to adversely affect small banks. Since larger banks would be less liable for the restoration of the bank deposit insurance fund to its target level, the stock returns of large banks should increase in response to events signaling the positive probability of the passage of FDICIA.

Conversely, Duan, Moreau and Sealey also provide evidence that large banks tend to have greater interest rate risk. FDICIA explicitly recognizes the importance of interest rate risk exposure in determining a bank’s overall risk, and hence a bank’s capital adequacy according to the FDIC risk-adjusted premium schedule. Therefore, it is feasible that if the FDIC risk-adjusted premium schedule places greater weight on interest rate risk than on credit risk, small banks may benefit at the cost of larger banks.

FDICIA’s emphasis on early closure and restricted access to subsidized credit from the Federal Reserve discount window may also have conflicting influences on the
relative impact of the Act on large and small banks. That is, the Federal Reserve's
guidelines clearly state that smaller banks have greater access to its discount window for
"adjustment credit" to meet liquidity needs. Since FDICIA intends to curb such discount
window borrowing, the loss of this facility is more likely to adversely affect small bank
than large bank stock returns.

The greater access small banks have to the discount window, however, does not
necessarily imply greater use by small banks. Indeed, recent theoretical and empirical
literature on banks' Federal funds (hereafter fed funds) activity provides some contrary
evidence. It has been found that larger, money center banks tend to be net borrowers
(buyers) in this inter-bank, short-term money market, while small banks tend to be net
sellers. Since the fed discount window and the fed funds market are alternative sources
of funds for meeting liquidity needs, and since the Federal Reserve guidelines prohibit a
bank from borrowing at the discount window and simultaneously lending funds in any
other market (thereby earning an arbitrage interest spread), it follows that small banks,
which are net sellers in the fed funds market, rely relatively less on the fed's discount
window. Thus, any restrictions regarding discount window borrowing may affect larger
banks more than smaller banks since they appear to use the facility more (even though
smaller banks may have greater access to it).

Given the potential impact on commercial banks described above, it is
hypothesized in this paper that the passage of FDICIA should have produced a
measurable impact on the returns to stockholders of these institutions and that
stockholders of large banks experienced wealth changes which were different from those
of stockholders of small banks. In the next sections of the paper, the effect of the Act on stock returns is examined.

III. Data, Methodology and Hypotheses

A. Data

The data to be analyzed consist of daily stock returns for commercial banks that were either listed on the New York Stock Exchange (NYSE) or the American Stock Exchange (ASE), or traded in the Over-the-Counter (OTC) market between December 18, 1990 (when consideration of the new banking regulation was announced) and December 20, 1991 (when the Federal Deposit Insurance Corporation Improvement Act was signed into law). To be included in the final sample a bank must trade during this entire period. Daily return data were collected from the Center for Research in Security Prices (CRSP) data tapes where usable price records were found for 414 banks.

The tests performed on the sample require us to identify all dates on which important new information about the regulation became publicly available. News items pertaining to changes in regulation were compiled by examining the New York Times Index, the Wall Street Journal Index, the Washington Post Index, trade journals in banking and FDIC news releases. Three time periods were examined: 1) the year preceding the formal proposal of the regulation to Congress; 2) the period of enactment; and 3) a period following the signing of FDICIA into law. Our search produced fifteen events in which important information about passage of the regulation was announced. Table 1 lists these fifteen events and the dates on which they occurred.\textsuperscript{8}
In order to test for stock price reaction to regulatory change, it is necessary that the events chosen for the test were unanticipated by the markets. Throughout the period of passage of FDICIA, uncertainty about the outcome of the bill was high. As stated in the *Wall Street Journal* on February 6, 1991 (p. A10) "...prospects for passage are highly uncertain. In addition to controversies surrounding its own bill, the Bush bill will compete with several other large banking packages." Examining the articles relating to the fifteen events studied here, it appears that in several instances new information was contained in the announcement. For example, the first three events revealed the initial details of the banking overhaul. These announcements outlined, for the first time, specific regulations introduced in the bill. Event 7 (Banking bill clears House panel by 36 to 0 vote) came as a surprise and sharply increased the probability of passage of the banking bill. While the vote was expected to be favorable prior to the event, it was not expected to be unanimous (thus, sending such a strong signal). As stated in the *Wall Street Journal* article, "yesterday, though, it was a combination of Republicans and freshmen Democrats under intense lobbying pressure from banks that prevailed...." Event 8 (key lawmakers resisting quick passage of broad banking reform sought by Bush) also was unexpected. On June 11, 1991, the General Accounting Office warned that the bank insurance fund may be exhausted in six months. Later that day in a meeting between several key legislators and White House officials "several members said they believe that the more urgent matter of insurance fund should be addressed first, and
separately" (Wall Street Journal, June 12, 1991, p. A2). The members said they would not rush the banking bill through as requested by President Bush, thus reducing the probability of passage in 1991. A final, although not inclusive, example is event 12 (House defeats banking bill). While the defeat of the banking bill was a resounding one (324 to 89 to defeat the bill), the day prior to the vote the outcome was uncertain. As stated in the November 4, 1991 Wall Street Journal (p. A3), "Banking Committee Chairman Henry Gonzalez gave the legislation only a 50-50 chance of House passage. Rep. Chalmers Wylie of Ohio, the ranking Republican on the House banking panel said the outcome is 'too close to call.'" Thus many of the events examined here did, in fact, contain new information concerning passage of the regulation.

In order to isolate the effect of the Federal Deposit Insurance Corporation Improvement Act of 1991 on large versus small banks, the sample of 414 banks was subdivided into two groups based on total assets at the end of 1990. Following the delineation of big versus small banks found by Allen, Peristiani and Saunders (1989) in the usage of fed funds and repurchase agreement markets, we define small banks as those with book value of total assets less than or equal to $1 billion and large banks as those with book value of total assets greater than $1 billion. This break-down produced 214 small banks and 200 large banks for our analysis. The event-study methodology described in the next section allows us to identify the impact of FDICIA using these subsets of banks.
B. Methodology

The stock price impact of regulatory reform is estimated by employing a Multivariate Regression Model (MVRM) similar to that used in Schipper and Thompson (1983), Binder (1985a, 1985b, 1988), Rose (1985), Smith, Bradley and Jarrell (1986) and Cornett and Tehranian (1989, 1990). The MVRM is used because it explicitly incorporates cross-sectional heteroscedasticity across equations and contemporaneous dependence of the disturbances into the estimation process, allowing joint hypotheses to be tested utilizing the F-statistic defined by Rao (1973). Specifically, as pointed out by Fama (1976), because the magnitude of the unsystematic risk differs across firms, the variance in abnormal returns will vary across firms. In addition, Schwert (1981) states that individual asset returns for firms in the same industry measured over a common time period are contemporaneously correlated because firms react similarly to any unanticipated event. Thus, contrary to the requirements of the standard event study methodology, residuals will not be identically and independently distributed.

The MVRM model uses a system of seemingly unrelated equations which explicitly conditions the return generating process on the occurrence or nonoccurrence of an event. This conditioning is accomplished by appending zero-one dummy variables to the market model equation. The variable is set equal to one if an event occurred and equal to zero otherwise. Since the exact timing of the information release is unknown, a three-day event period is used corresponding to trading days $t = -1$, $t = 0$ and $t = +1$ relative to the announcement dates listed in Table 1. The coefficients multiplying the event dummy variables measure the event’s impact on stock returns. The model,
therefore, implies a system of portfolio return equations for two portfolios: (1) large banks and (2) small banks.  

\[
\begin{align*}
\tilde{R}_{1t} &= \alpha_1 + \beta_{11} \tilde{R}_{m_{t-2}} + \beta_{12} \tilde{R}_{m_{t-1}} + \beta_{13} \tilde{R}_{m_t} + \beta_{14} \tilde{R}_{m_{t+1}} \\
&+ \beta_{15} \tilde{R}_{m_{t+2}} + \sum_{k=1}^{K} \gamma_{jk} D_{kt} + \tilde{e}_{2t} \\
\tilde{R}_{2t} &= \alpha_2 + \beta_{21} \tilde{R}_{m_{t-2}} + \beta_{22} \tilde{R}_{m_{t-1}} + \beta_{23} \tilde{R}_{m_t} + \beta_{24} \tilde{R}_{m_{t+1}} \\
&+ \beta_{25} \tilde{R}_{m_{t+2}} + \sum_{k=1}^{K} \gamma_{2k} D_{kt} + \tilde{e}_{2t}
\end{align*}
\]  

(1)

where

- \( \tilde{R}_{jt} \) = The return on a portfolio \( j (= 1 \text{ and } 2) \), of commercial banks on day \( t \) (\( T \) = daily observations from September 1990 through March 1992); returns for each portfolio are weighted based on the full estimated covariance matrix of residuals in order to increase the efficiency of parameter estimates;

- \( \tilde{R}_{mt} \) = the return on the CRSP equally weighted index on day \( t \);

- \( \alpha_j \) = an intercept coefficient for portfolio \( j (= 1 \text{ and } 2) \);

- \( \beta_{j1} - \beta_{j5} \) = risk coefficients for the \( j \)th portfolio \( (j = 1 \text{ and } 2) \);\(^{10}\)

- \( \gamma_{jk} \) = the effect of the \( K \) regulatory changes on the \( j \)th portfolio \( (K = 15 \) in this study);\(^{10}\)

- \( D_{kt} \) = dummy variables which equal 1 during the period of the \( k \)th announcement and 0 otherwise;\(^{11}\) and,

- \( \tilde{e}_{jt} \) = random disturbances which are assumed to be normal and independent of the return on the market and the event announcement variable.

Following Theil (1971, p. 306), the system of regressions in equation (1) can be generalized as
where
\[
\begin{bmatrix}
\tilde{R}_1 \\
\tilde{R}_2
\end{bmatrix} = \begin{bmatrix}
\tilde{x} & 0 \v
\end{bmatrix} \begin{bmatrix}
\beta_1 \\
\beta_2
\end{bmatrix} + \begin{bmatrix}
\tilde{\epsilon}_1 \\
\tilde{\epsilon}_2
\end{bmatrix}
\]
(2)

\[\tilde{R}_j = T \times 1 \text{ vector (the elements of the vector are } \tilde{R}_{1j}, \tilde{R}_{2j}, ..., \tilde{R}_{nj});\]

\[\tilde{X} = \text{ a } T \times N \text{ matrix of independent variables which is the same for each equation in the system, } N = K + 2 = 17 \text{ (the first column of this matrix is of 1's, the second column is of the daily returns on } R_m, \text{ and the last fifteen columns are of dummy variables, } D_{15} \text{ for each of the fifteen events);}\]

\[\beta_j = \text{ a } N \times 1 \text{ vector of coefficients;}\]

\[\tilde{\epsilon}_j = \text{ a } T \times 1 \text{ vector of disturbances,}\]

or

\[\tilde{R} = \tilde{X} \beta + \tilde{\epsilon}\]
(3)

Estimation of the multivariate regression model in equation (3) assumes that the residuals are independent and identically distributed within each equation. Similar to Smith, Bradley and Jarrell (1986), however, it is unlikely that abnormal returns created by the events under study are fixed but unknown effects that are fully explained by the arguments in equation (3). If so, the conditional and unconditional distributions of abnormal returns would not be the same and the variance-covariance matrix for the residuals in equation (3) would not be independent of the realization of the event. Thus, estimation of the system in equation (3) must be adjusted for the possible heteroscedasticity.\(^{12}\) To correct for time-series heteroscedasticity, a procedure developed by White (1982) and Chamberlain (1982) is employed. This procedure lets the residuals
in the variance-co-variance matrix vary across observations.

The main advantage of the MVRM methodology is in the joint hypothesis testing, since the possibility of heteroscedasticity across equations and contemporaneous dependence of the disturbances are explicitly incorporated into the hypothesis test. To test the joint hypotheses in the MVRM, an F-test defined by Rao (1973) and used by Binder (1985a, 1985b) is employed. The joint hypothesis tests are of special importance in this study since, as discussed earlier, firms are expected to be differentially affected by FDICIA.

C. Testable Hypotheses

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

**Hypothesis 1:** \( \gamma_{jk} = 0 \) for each portfolio equal zero on announcement day \( k \).

**Hypothesis 2:** \( \sum_{k=1}^{K} \gamma_{jk} = 0 \); the overall economic impact of the Federal Deposit Insurance Corporation Improvement Act of 1991 equals zero for each portfolio.
IV. Results

A. Tests of Hypothesis 1: The Abnormal Return for Each Portfolio Equal Zero on Announcement Day $k$

Table 2 reports results on the MVRM analysis when the sample banks are grouped by book value of total assets. Panel A shows the portfolio abnormal returns and the $t$-statistics for each of the fifteen events across the 214 small banks and 200 large banks. These estimates are the coefficients of the dummy variables in equation 3. Column 1 lists the events and Columns 2 and 3 present the results for the two portfolios.

---

INSERT TABLE 2 HERE

---

As shown in Column 2 of Table 2 only one event produces positive and significant (at the 0.10 level) three-day cumulative average abnormal returns to stockholders of small banks, i.e., event 12 (banking bill voted down in the House), while four events produce negative and significant abnormal returns, i.e., event 1 (regulators press weak banks to reduce dividends), event 2 (banking blueprint may propose diversified holding companies), event 7 (banking bill clears House panel by 36 to 0 vote) and event 15 (Bush signs banking bill). For the remaining ten events no statistically significant investor reaction was identified. Interestingly, the significant positive cumulative abnormal return is associated with an event which indicated a decreased probability of successful passage of the bill, while the four events demonstrating significant negative abnormal returns are all associated with events which signaled an increase in the probability of passage of the bill.
Two events (event 3: big banks would get vastly broader powers under Treasury's plan, and event 15: Bush signs banking bill) produced positive cumulative abnormal returns for the sample of large banks, while one event (event 8: key lawmakers resisting quick passage of broad banking reforms) resulted in significant negative abnormal returns for this group. Contrary to the sample of small banks, the positive abnormal returns are associated with events that signal an increase in the probability of passage of FDICIA, while the negative abnormal returns are associated with events that signal a decrease in passage.

Binomial tests on the number of positive and negative abnormal returns for the events which were significant in Table 2 were all significant at better than the 0.05 level. For events 1, 2, 7, 12 and 15, out of the 214 small banks 79, 85, 87, 119 and 94 respectively, experienced positive abnormal returns. For events 3, 8 and 15, out of the 200 large banks 120, 78 and 125, respectively, had positive abnormal returns. Thus the results do not appear to be driven by outliers.

The results from Panel A of Table 2 allow us to reject the null hypothesis that the abnormal return for each portfolio equal zero on every announcement day. Rather, it appears that the values of large banks were positively affected as passage of the proposed FDICIA became evident, while the increased probability of passage created negative value changes for smaller banks.

To further test hypothesis 1, panel B of Table 2 reports the F-statistic for the significance of the difference between portfolio abnormal returns for small versus large banks for each event. The F-statistic is significant at better than the 0.10 level for events
1, 2, 3, 7, 12 and 15. These results suggest that large banks reacted significantly more favorably to events which indicated an increased probability of passage and significantly less favorably to events which indicated a decreased probability of passage of FDICIA.

As discussed in Section II, it appears that small banks, with relatively larger credit risk and reduced ability to access the discount window (rather than large banks with relatively larger interest rate risk and heavy discount window use) experienced a heavier cost from the implementation of the new regulation. The new regulation meant that the largest banks would not have to shoulder more than their share of future costs of deposit insurance nor would they experience reduced access to funds to the same extent as the small banks. This resulted in indirect benefits to this group.

B. Test of Hypothesis 2: The Overall Economic Impact of the Federal Deposit Insurance Corporation Improvement Act Equals Zero for Each Portfolio

In addition to the identification of the significance for each announcement day, of particular interest to this study is a test of the hypothesis that the overall economic impact of the Federal Deposit Insurance Corporation Improvement Act was significant for the various portfolio groupings during the entire 15-event announcement period. Focusing attention on tests that measure abnormal returns on and around all fifteen announcements provides valuable information about the wealth impact of the new regulation on different firms within the commercial banking industry.

Using the notation in equation (3), Hypothesis 2 can be expressed in the form

\[ L\beta = 1 \]
where $L$ is a $P \times N$ matrix of constants with rank $P (P \leq K)$, $\beta$ is the $N \times 1$ vector of coefficients estimated from (2), $\iota$ is a $P \times 1$ vector of constants and $P$ is the number restrictions tested in the system. As described in Theil (1971, pgs. 314, 402) the statistic

$$\frac{JT - JN}{P} (1 - L\hat{\alpha})(L[X(\hat{\Sigma}^{-1} \otimes I)X]^\prime)^{-1}(1 - L\hat{\alpha}) (\bar{\alpha} - X\hat{\beta})$$

where

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

$\otimes$ = the Kronecker product;

$T =$ the number of daily return observations ($= 272$) used for estimation parameter in equation (1);

$J =$ the number of portfolios tested; and

$P =$ the number of restrictions tested,

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

Separating the sample on the basis of asset size, the F-statistic implied by $H_0$ for the 214 small banks is 5.20 and for the 200 large banks is 2.05. Given the critical value $F(14, 504, 0.01)^{14} = 3.00$, these statistics suggest that the overall economic impact of FDICIA to stockholders of small banks was significantly different from the Act’s impact to stockholders of large banks. Specifically, the approval of FDICIA resulted in significantly smaller abnormal returns to stockholders of small banks than that of large banks. The relatively large increase in the deposit insurance premiums and the more limited access to the discount window for the smallest banks caused the value of these banks to decrease and the value of the larger, healthier banks to increase during the
period of consideration and passage of the new regulation. This pattern of wealth distribution within the commercial banking industry is consistent with the economic theory of Stigler (1971).

V. The Impact of FDICIA on the Systematic Risk of Commercial Banks

In addition to tests of stock price reactions associated with information events leading to the passage of FDICIA, the economic theory of Stigler (1971) and Peltzman (1976) suggests that the riskiness of firms in the regulated industry must be examined as well. In particular, Peltzman hypothesizes that increases in regulation reduce the riskiness of the firms being regulated in terms of the demand and cost of uncertainty. With respect to FDICIA, this "buffering effect" hypothesis suggests that the systematic risk of banks should decrease during the enactment period if the regulation is viewed by the market as being more protective in nature and should increase if the regulation subjects banks to additional competitive pressures.¹⁵

To test the Peltzman "buffering effect" hypothesis, the following three broad periods were used:

1. pre-FDICIA enactment period (1/1/90 - 12/17/90);
2. FDICIA enactment period (12/18/90 - 12/20/91);
3. post-FDICIA enactment period (12/21/91 - 12/21/92).

Within each period we computed the systematic risk of the sample banks' common stock (splitting the sample based on the book value of assets). The results of these analyses are reported in Table 3.
As seen in Table 3 the systematic risk, $\beta$, of the small banks in the sample went from 1.0665 prior to consideration of FDICIA, to 0.9565 during the period of enactment, to 0.9124 following the passage of FDICIA. All three of these coefficients are significant at better than the 0.01 level. While there is a decreasing trend in systematic risk over the three time periods, the drop in the risk is not significant. The t-statistic for the difference in systematic risk in the first (prior to consideration of FDICIA) versus second (during the period in which FDICIA was considered and enacted) period is 1.62, which is insignificant at all conventional levels. The t-statistic for the difference in systematic risk in the second versus third (after passage of FDICIA) periods, 1.04, is also insignificant. For the sample of large banks, Table 3 reports a drop in systematic risk from 0.9554 prior to consideration of FDICIA, to 0.8924 during the period of enactment, to 0.6182 following the passage of FDICIA. All of these coefficients are significant at better than the 0.01 level. Further, the drop in systematic risk across the three time periods is significant. The difference in systematic risk in the first versus third period, 0.3372, is significant at better than 0.01 level (t-statistic equals 4.05). The same level of significance is seen across periods two versus three (t-statistic equals 4.75), but not in periods one versus two (t-statistic equals 1.21).

From the results presented in Table 3 it appears that the market reacted as if the passage of FDICIA created a "buffer" against competitive pressures for large banks, but had no affect on the competition extant for small banks. If we recall the two major
legislative changes associated with FDICIA and discussed earlier, some reasons for these
differences in systematic risk of the banks are evident. First, the change to risk-adjusted
deposit insurance premia and the resulting shift of deposit insurance premiums from
those banks which were least likely to need the coverage to those which had a higher
probability of needing the coverage produced a "buffering effect" for the large (less risky)
banks but not for the small (more risky) banks. Second, the loss of greater access to the
discount window by small banks (relative to large banks) meant that these banks would
be subject to greater increases in the competition for alternate sources of funds. Larger
banks, which were not using the discount window to the same extent as small banks,
were not subjected to this increase in competition for funds. Thus, consistent with the
results for stock returns discussed in Section IV, FDICIA created a "buffer" for large
banks against increases in competition in the industry which was not also created for
small banks.

To see the effects of FDICIA on stock performance more clearly, we analyzed the
stock returns over the three subperiods around the passage of FDICIA. In particular, we
computed the market-model residuals (alpha) for the three time periods discussed above:
1) prior to the consideration of FDICIA (1/1/90 - 12/17/90); 2) during the enactment of
FDICIA (12/18/90 - 12/20/91); and 3) following the passage of FDICIA (12/21/91
- 12/21/92). The results are reported in Table 3. From Table 3 it is seen that regardless
of bank size or time period the market-model residuals are relatively low in magnitude
and statistically insignificant. There is no evidence indicating a particular market
reaction around the passage of FDICIA.
VI. Conclusion

This paper examines the impact of events leading up to the passage of the Federal Deposit Insurance Corporation Improvement Act of 1991 on the market value and systematic risk of commercial banks. Splitting the sample into large and small banks (based on the book value of total assets), we find that FDICIA did produce significant changes in the value of commercial banks. Specifically, the empirical results document that the values of large banks were positively affected as passage of the proposed FDICIA became evident, while the increased probability of passage resulted in negative value changes for smaller banks. We also find that the systematic risk of the sample of large banks decreased significantly over the period surrounding passage of FDICIA, while no significant change was found for the sample of small banks.

Two major changes associated with FDICIA were the introduction of risk-based deposit insurance and the limit of access to the Federal Reserve's discount window. The empirical results in this paper leads to the conclusion that the shift of deposit insurance premiums from those banks which were least likely to need the coverage to those which had a higher probability of needing coverage and the relatively larger impact of the reduction in access to the discount window, caused the value of small banks to decrease while the value of large banks increased. Additionally, the buffering that these legislative changes introduced for large banks relative to small banks resulted in a decrease in the systematic risk of large banks.

Finally, our results suggest that FDICIA may have some far-reaching policy implications in the long run. Since FDICIA appears to be favorably slanted towards
large banks it may lead to a greater degree of consolidation in the U.S. banking industry. Such consolidation would make U.S. banks more competitive with foreign banks which have significantly increased their presence in the U.S. over the past decade. Indeed, such consolidation may be an indirect policy objective and would be consistent with other explicit new regulatory controls that FDICIA has simultaneously imposed on foreign banks in the U.S., and which also aim to reduce the competitive edge that such banks have enjoyed in the past (see Section 202 of FDICIA).
<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12-18-90</td>
<td>Regulators press weak banks to reduce dividends to shore up equity capital</td>
</tr>
<tr>
<td>2</td>
<td>1-4-91</td>
<td>Banking blueprint may propose diversified holding companies</td>
</tr>
<tr>
<td>3</td>
<td>2-6-91</td>
<td>Big banks would get vastly broader powers under Treasury's plan</td>
</tr>
<tr>
<td>4</td>
<td>3-21-91</td>
<td>Bush introduces bill to overhaul bank industry</td>
</tr>
<tr>
<td>5</td>
<td>4-11-91</td>
<td>Fed signals its support for major parts of Treasury plan to overhaul banking; Bush’s bank overhaul plan faces delay in House panel</td>
</tr>
<tr>
<td>6</td>
<td>4-24-91</td>
<td>Administration may scale down its banking bill; broad bill to reform banking industry gets bipartisan support of House panel</td>
</tr>
<tr>
<td>7</td>
<td>5-24-91</td>
<td>Banking bill clears House panel by 36 to 0 vote</td>
</tr>
<tr>
<td>8</td>
<td>6-12-91</td>
<td>Key lawmakers resisting quick passage of broad banking reforms sought by Bush</td>
</tr>
<tr>
<td>9</td>
<td>7-1-91</td>
<td>House panel approves bill to reform banking laws</td>
</tr>
<tr>
<td>10</td>
<td>8-2-91</td>
<td>Senate panel clears plan to discourage long-term Fed loans to weak banks; Senate panel’s banking bill faces hurdles</td>
</tr>
<tr>
<td>11</td>
<td>10-4-91</td>
<td>Banking panel in House holds to broad bill</td>
</tr>
<tr>
<td>12</td>
<td>11-5-91</td>
<td>Banking bill is voted down in the House</td>
</tr>
<tr>
<td>13</td>
<td>11-15-91</td>
<td>House defeats banking bill</td>
</tr>
<tr>
<td>14</td>
<td>11-20-91</td>
<td>House and Senate pass bill</td>
</tr>
<tr>
<td>15</td>
<td>12-20-91</td>
<td>Bush signs banking bill that bolsters deposit insurance fund and tightens rules.</td>
</tr>
</tbody>
</table>
TABLE 2

Test of Hypothesis That All Abnormal Returns for Each Portfolio Jointly Equal Zero

Panel A of this table presents portfolio abnormal returns and t-statistics (in parenthesis) for 214 small and 200 large banks around each of the fifteen events. These estimates are from a regression of portfolio returns (weighted based on the full estimated covariance matrix of residuals) and dummy variables corresponding to the fifteen events. Each dummy variable equals 1 during the three-day period (t = -1, t = 0, and t = 1 relative to each announcement) and 0 otherwise. Panel B presents the F-statistic for the difference in portfolio abnormal returns.

<table>
<thead>
<tr>
<th>Event</th>
<th>Panel A: Portfolio abnormal returns (in percent)</th>
<th>Panel B: F-Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small Banks</td>
<td>Large Banks</td>
</tr>
<tr>
<td></td>
<td>N = 214</td>
<td>N = 200</td>
</tr>
<tr>
<td>1</td>
<td>-3.17 (-2.21)c</td>
<td>1.09 (0.75)</td>
</tr>
<tr>
<td>2</td>
<td>-4.23 (-2.81)b</td>
<td>1.05 (0.73)</td>
</tr>
<tr>
<td>3</td>
<td>-2.00 (-1.32)</td>
<td>2.18 (1.78)d</td>
</tr>
<tr>
<td>4</td>
<td>0.00 (0.06)</td>
<td>1.39 (0.89)</td>
</tr>
<tr>
<td>5</td>
<td>2.09 (1.14)</td>
<td>1.26 (0.69)</td>
</tr>
<tr>
<td>6</td>
<td>1.31 (0.88)</td>
<td>1.65 (0.91)</td>
</tr>
<tr>
<td>7</td>
<td>-2.85 (-2.18)c</td>
<td>1.51 (0.86)</td>
</tr>
<tr>
<td>8</td>
<td>1.11 (0.74)</td>
<td>-2.23 (-1.88)d</td>
</tr>
<tr>
<td>9</td>
<td>-1.24 (-0.83)</td>
<td>1.55 (0.89)</td>
</tr>
<tr>
<td>10</td>
<td>1.26 (0.84)</td>
<td>1.78 (1.03)</td>
</tr>
<tr>
<td>11</td>
<td>1.07 (0.71)</td>
<td>1.12 (0.78)</td>
</tr>
<tr>
<td>12</td>
<td>2.09 (1.87)d</td>
<td>-1.74 (-1.02)</td>
</tr>
<tr>
<td>13</td>
<td>1.15 (0.76)</td>
<td>-0.92 (-0.70)</td>
</tr>
<tr>
<td>14</td>
<td>-1.28 (-0.86)</td>
<td>1.21 (0.72)</td>
</tr>
<tr>
<td>15</td>
<td>-1.60 (-1.65)d</td>
<td>2.18 (1.92)d</td>
</tr>
</tbody>
</table>

*Events are described in Table 1.

bSignificant at the .01 level.

cSignificant at the .05 level.

dSignificant at the .10 level.
TABLE 3

Systematic Risk (Betas) and Market-Model Residuals (Alphas) for Small and Large\(^{a}\) Commercial Banks During Three Periods Surrounding the Enactment of FDICIA: 1) A Period Prior to Consideration of FDICIA; 2) A Period During the Enactment of FDICIA; and 3) A Period Following the Passage of FDICIA.

<table>
<thead>
<tr>
<th>Period</th>
<th>Small Banks (N = 214)</th>
<th>Large Banks (N = 200)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>T-statistic</td>
</tr>
<tr>
<td>1) Prior to Consideration of FDICIA, 1/1/90 - 12/17/90</td>
<td>1.0665</td>
<td>25.960 (^{b})</td>
</tr>
<tr>
<td>Systematic Risk, (\beta)</td>
<td>0.9565</td>
<td>34.518 (^{b})</td>
</tr>
<tr>
<td>Market-Model Residual, (\alpha)</td>
<td>-0.0005</td>
<td>0.270</td>
</tr>
<tr>
<td>2) During Enactment of FDICIA, 12/18/90 - 12/20/91</td>
<td>0.9124</td>
<td>35.013 (^{b})</td>
</tr>
<tr>
<td>Systematic Risk, (\beta)</td>
<td>0.9124</td>
<td>35.013 (^{b})</td>
</tr>
<tr>
<td>Market-Model Residuals, (\alpha)</td>
<td>0.0001</td>
<td>0.481</td>
</tr>
<tr>
<td>3) Following Passage of FDICIA, 12/21/91 - 12/21/92</td>
<td>0.0001</td>
<td>0.481</td>
</tr>
</tbody>
</table>

\(^{a}\)Small banks are defined as those with book value of total assets less than or equal to $1 billion and large banks are defined as those with book value of total assets greater than $1 billion.

\(^{b}\)Significant at the .01 level.
There are a host of papers that address this issue of mispriced deposit insurance both theoretically and empirically. See, for example, Chen and Mazumdar (1994a, 1994b), Crouhy and Galai (1991), Flannery (1989), Pennacchi (1987), Ronn and Verma (1986), Marcus (1984), Marcus and Shaked (1984) and Buser, Chen and Kane (1981).

Peltzman (1976) expands upon Stigler's (1971) model in an effort to determine the optimal size of the dominant group. He finds that the cost of using the regulatory process limits not only the size of the dominant group but also the gains. Posner (1974), Pyle (1974), Scott and Mayer (1971) and Taggart and Greenbaum (1978) provide additional insights into the economic effects of regulation.


As a result, a regulatory effect which has been documented is the incurrence of pecuniary economies by the regulated firm in its resource market. Furthermore, because of the protected nature of its product market, all or a portion of the operational and financial risk is reduced. These additional returns may be thought of as indirect subsidies passed from consumers and non-regulated producers to the regulated firm. Thus, investors react to the indirect subsidy by factoring above-normal returns into the assessment of future profitability.

Several theoretical explanations have been offered to explain this phenomenon. First, it has been argued that small banks are more risk averse than big banks. Therefore, small banks prefer to raise funds through traditional deposit markets (see Ho and Saunders (1985) and Allen, Peristiani and Saunders (1989), among others). Second, small banks have local monopoly power in their deposit markets and thus, are able to obtain deposit funds at relatively lower costs while charging higher loan rates (see Hannan and Hanweck (1988) and Rose and Kolari (1985)). A third explanation is based on information asymmetries. Allen and Saunders (1986) argue that since fed funds are uncollateralized, lenders (fed funds sellers) perceive smaller banks to have higher default risks and thus offer them fed funds at higher rates or even ration them out. Informational asymmetries would therefore limit small banks’ access to fed funds.

Chen and Mazumdar (1992) focus on the close link between reserve management and fed funds purchases as alternative sources of liquidity. They provide an inventory theoretic explanation of the large-small bank dichotomy observed in the fed funds market and also provide an integrated framework that incorporates the three influences on fed funds behavior listed in footnote 6.

Many other announcements besides the fifteen listed in Table 1 were made concerning the new regulation. For example, on May 2, 1991 Democrats on the House Banking Committee voted to consider the banking legislation before a bill to bolster the bank deposit insurance fund. This increased the probability that a decision on the bill would come before the end of 1991. In this paper, however, only those announcements which we felt referred to major changes in the reform, stumbling blocks to passage or passage by a key group are analyzed.

The models used in previous studies are slightly different from equation (1). We employ the market return at several leads and lags as an explanatory variable to overcome the possibility of nonsynchronous trading in our sample (see Scholes and Williams, 1977).

The pre (before 12-18-90) and post (after 12-20-91) FDICA periods were examined for significant shifts in the risk parameters for both subgroups of banks. A significant change in $\beta_j$ for the large bank subgroup during the period prior to the first announcement relating to the new regulation (12-18-90) and a period after the regulation was approved (12-20-91) was found. We discuss this in detail in Section V of the paper.

Depending on what time during the trading day the announcement was made, either the publication day or the day before might be the relevant announcement day. Since the exact time of the announcement is unknown, the announcement period is the three trading days, $t = -1$, $t = 0$ and $t = +1$, relative to the published announcement.
12See Smith, Jarrell and Bradley (1986, p. 477) for a detailed discussion of this situation.

13We use an F-test because Binder (1985b) presents evidence that in some cases the Wald test might be biased against the null hypothesis when there are 60 or even 250 observations per equation.

14The degrees of freedom, 504, equal (2 (the number of portfolios) * 272 (the number of observations)) - (2 (the number of portfolios) * 20 (the number of independent variables in the regression equation 1)).

15Chen and Merville (1986) also test for a "buffering effect" associated with the breakup of AT&T.

16For instance, in 1987 alone business loans at U.S. branch offices of foreign banks grew five times faster than at U.S.-owned banks (see Mazumdar 1990).


Note: The following is a partial list of papers that are currently available in the Edwin L. Cox School of Business Working Paper Series. When requesting a paper, please include the Working Paper number as well as the title and author(s), and enclose payment of $2.50 per copy made payable to SMU. A complete list is available upon request from:

Business Information Center  
Edwin L. Cox School of Business  
Southern Methodist University  
Dallas, Texas  75275
"Organizational Subcultures in a Soft Bureaucracy: Resistance Behind the Myth and Facade of an Official Culture," by John M. Jermier, John W. Slocum, Jr., Louis W. Fry, and Jeannie Gaines

"Global Strategy and Reward Systems: The Key Roles of Management Development and Corporate Culture," by David Lei, John W. Slocum, Jr., and Robert W. Slater

"Multiple Niche Competition - The Strategic Use of CIM Technology," by David Lei and Joel D. Goldhar

"Global Strategic Alliances," by David Lei and John W. Slocum, Jr.

"A Theoretical Model of Household Coupon Usage Behavior And Empirical Test," by Ambuj Jain and Arun K. Jain

"Household's Coupon Usage Behavior: Influence of In-Store Search," by Arun K. Jain and Ambuj Jain

"Organization Designs for Global Strategic Alliances," by John W. Slocum, Jr. and David Lei

"Option-like Properties of Organizational Claims: Tracing the Process of Multinational Exploration," by Dileep Hurry

"A Review of the Use and Effects of Comparative Advertising," by Thomas E. Barry


"Designing Global Strategic Alliances: Integration of Cultural and Economic Factors," by John W. Slocum, Jr. and David Lei

"The Components of the Change in Reserve Value: New Evidence on SFAS No. 69," by Mimi L. Alciatore

"Asset Returns, Volatility and the Output Side," by G. Sharathchandra


"A Model of Supplier Responses to Just-In-Time Delivery Requirements," by John R. Grout and David P. Christy

"An Inventory Model of Incentives for On-Time Delivery in Just-In-Time Purchasing Contracts," by John R. Grout and David P. Christy

"The Effect of Early Resolution of Uncertainty on Asset Prices: A Dichotomy into Market and Non-Market Information," by G. Sharathchandra and Rex Thompson

"Conditional Tests of a Signalling Hypothesis: The Case of Fixed Versus Adjustable Rate Debt," by Jose Guedes and Rex Thompson

"Tax-Loss-Selling and Closed-End Stock Funds," by John W. Peavy III

"Hostile Takeovers and Intangible Resources: An Empirical Investigation," by Tim C. Opler

"Morality and Models," by Richard O. Mason

"Global Outsourcing of Information Processing Services," by Uday M. Apte and Richard O. Mason


"Corporate Restructuring and The Consolidation of U.S. Industry," by Julia Liebeskind, Timothy C. Opler, and Donald E. Hatfield

"Catalog Forecasting System: A Graphics-Based Decision Support System," by David V. Evans and Uday M. Apte

"Interest Rate Swaps: A Bargaining Game Solution," by Uday Apte and Prafulla G. Nabar

"The Causes of Corporate Refocusing," by Julia Liebeskind and Tim C. Opler

"Global Strategy, Alliances and Initiative," by David Lei and John W. Slocum, Jr.


"Testing Whether Predatory Commitments are Credible," by John R. Lott, Jr. and Tim C. Opler

"Dow Corning and the Silicone Implant Controversy," by Zarina S. F. Lam and Dileep Hurry

"The Strategic Value of Leverage: An Exploratory Study," by Jose C. Guedes and Tim C. Opler

"Decision Model for Planning of Regional Industrial Programs," by Uday M. Apte

"Understanding the Linkage between Strategic Planning and Firm Performance: A Synthesis of more than Two Decades of Research," by C. Chet Miller and Laura B. Cardinal

"Global Disaggregation of Information-Intensive Services," by Uday M. Apte and Richard O. Mason


"A Robust, Exact Algorithm for the Maximal Set Covering Problem," by Brian T. Downs and Jeffrey D. Camm


"Unlearning the Organization," by Michael McGill and John W. Slocum, Jr.
93-0503 "The Determinants of Corporate Bank Borrowing," by Linda Hooks and Tim C. Opler
93-0504 "Corporate Diversification and Innovative Efficiency: An Empirical Study," by Laura B. Cardinal and Tim C. Opler
93-0505 "The Indirect Costs of Financial Distress," by Tim C. Opler and Sheridan Titman
93-0602 "Empirical Methods in Corporate Finance used to Conduct Event Studies," by Rex Thompson
93-0801 "A Simple Method to Adjust Exponential Smoothing Forecasts for Trend and Seasonality," by Marion G. Sobol and Jim Collins
93-0901 "Leveraged Buyouts in the Late Eighties: How Bad Were They?" by Jean Helwege and Tim C. Opler
93-0914 "Quality Management at Kentucky Fried Chicken," by Uday M. Apte and Charles C. Reynolds
93-0915 "Global Disaggregation of Information-Intensive Services," by Uday M. Apte and Richard O. Mason
94-0101 "Financial Distress and Corporate Performance," by Tim C. Opler and Sheridan Titman
94-0102 "Models of Incentive Contracts for Just-in-Time Delivery," by John R. Grout
94-0401  "Leading Learning," by Michael E. McGill and John W. Slocum, Jr.

94-0402  "Systems Analysis," by Richard O. Mason and Sue A. Conger

94-0403  "The Moderating Effects of Insupplier/Outsupplier Status on Organizational Buyer Attitudes," by Steven P. Brown


94-0405  "Strategic Restructuring and Outsourcing: The Effect of Mergers and Acquisitions and LBOs on Building Firm Skills and Capabilities," by David Lei and Michael A. Hitt

94-0406  "Corporate Diversification, Strategic Planning and Performance in Large Multiproduct Firms," by David Lei, Noel Capon, John U. Farley, and James M. Hulbert
