Regulator Use of Market Data to Improve the Identification of Bank Financial Distress

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Abstract

This paper assesses the extent to which stock market information may help bank regulators identify bank financial distress. The research specifies a variety of stock return and other market-related variables that might contain elements of longer-term trends and be capable of anticipating changes in regulatory ratings of commercial banks and thrift institutions. Univariate tests confirm a remarkable tendency for market-related variables to decline, or otherwise move, far in advance of formal regulatory rating downgrades, a finding suggesting that these variables may have useful predictive content. Furthermore, multivariate tests support the notion that market-related variables add predictive value to the value contained in publicly available Call Report financial data. The evidence supports the use of market-related variables in off-site monitoring applications.

JEL Classification: G1, G23

I. Introduction

During the past two decades, research on the relation between market signals and bank financial health has repeatedly implied that bank supervision might benefit from using information embedded in stock market prices, returns, or other market-related data. This implication was first voiced by Pettway (1980) after he found that stock returns of banks destined for failure signaled problems almost a year (38 weeks) before regulators began the examination process that led to the banks being classified on the problem-bank list. More recently, Flannery (1998) reiterates the theme, pointing out that regulators might use market data either to reduce the time required to recognize problems or to increase the accuracy of forecasts of future changes in bank condition.

In theory, it is not clear whether stock price, return, or other market-related data should lead, move contemporaneously with, or follow regulatory awareness of problems. The theory of efficient markets suggests that the market evaluates and prices public information at the fastest rate possible. Because the primary source of bank financial information, the quarterly *Report of Condition and Income* (Call Report), is available to regulators and the market at about the same time, market efficiency suggests that market awareness of Call Report-related problems could precede regulator awareness.[1] However, managers can often hide "bad" news from public scrutiny, whereas regulators have authority to access nonpublic information through confidential on-site examinations.[2] Regulator access to confidential information could easily offset any processing speed advantage held by the market and enable regulators to recognize problems either contemporaneously with or ahead of the market.

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[1] Virtually all Call Report data are released to the public, typically about 75 days (10–11 weeks) after the end of each quarter to which they apply. Approximately the same data as those released to the public are made available internally to regulators about 2–3 weeks earlier. Although regulators receive the data a little earlier than the public, it is nevertheless possible that the market can process the information at a faster rate than regulators upon release.

[2] It has been shown that there is a correlation between bank examinations and commercial bank write-off of assets and increased loan provisioning. This suggests that some institutions do hide "bad" news from the public in their financial statements until forced to make changes by the regulators. See Dahl, O'Keefe, and Hanweck (2000).

Empirical evidence does not consistently either support or reject the hypothesis that information embedded in market prices has useful predictive value to regulators. Pettway (1980) examines a small sample of large-bank failures and finds market signals that preceded regulatory awareness by long lead times, but Simons and Cross (1991) analyze a more recent sample to find that regulators appear to have been aware of problems before the market recognized them. Berger and Davies (1998) find that the market anticipates upgrades in regulatory ratings but follows downgrades. Flannery and Houston (1999) find that the market placed a high value on regulatory certification of bank accounting data in 1988, but a much lower value in 1990. Berger, Davies, and Flannery (2000) find that regulators acquire information sooner than bond rating agencies do, but the regulatory assessments are less accurate in predicting future changes in the performance of bank holding companies than are either stock or bond market indicators.

This study examines the extent to which market data can be used by regulators in evaluating bank financial condition. Market-related information offers the potential for assisting regulators at two points in their assessment, or rating, of bank capital, assets, management, earnings, and liquidity ("CAMEL" ratings).[3] First, during the period preceding a CAMEL rating downgrade, market-related information might be used to anticipate the need for the downgrade. Second, during the period after a CAMEL rating downgrade, market information might help distinguish institutions that will subsequently recover (rating upgrades) from institutions that subsequently encounter more serious problems (rating downgrades or failure).

Since our interest is to identify variables that are useful for early-warning purposes, we focus on longer-term trends that are observable in practice and that precede rating changes with sufficient advance warning to provide regulators with a timely tool for policy change. Although

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[3] In the late 1990s, a sixth component was added to the CAMEL rating system, recognizing bank and thrift sensitivity to interest rate or market risk. But because the empirical portions of our analysis relate to ratings performed before the late 1990s, we reference the five-component rating system in effect at that time.

market variables may meet these criteria on a univariate basis, their usefulness is enhanced by an ability to add marginal predictive value to other information used by regulators to monitor financial health—information such as Call Report financial data.

Some previous studies have incorporated market data into traditional default or bankruptcy models to assess the riskiness of institutions. For example, Altman (1968), KMV Corporation (1995), and Shumway (2001), have adopted this approach each using a different statistical methodology to analyze the issue. In contrast to these earlier studies, this paper utilizes logistic regression analysis and incorporates significantly more and a greater variety of market variables into the model to identify financially distressed institutions.

Section II of this paper describes the institutional setting in which regulators assess bank financial health, and Section III discusses conceptual issues relating to regulatory use of market data. Section IV describes a sample of publicly traded banks and thrifts that received CAMEL rating downgrades, and this sample is used in Sections V and VI to examine the performance of market-related variables around the time of the CAMEL rating changes. Section VII specifies a logistic regression model to test the marginal predictive content of market-related variables compared with accounting data from bank financial reports in anticipating changes in CAMEL ratings. Section VIII concludes.

II. The Institutional Setting

Modern bank supervision uses information from on- and off-site supervisory tools as the starting point for its analysis. The largest banks and bank holding companies are monitored by on- and off-site analysts (examiners) who keep abreast of any information that can be found, including news reports, Wall Street analysis, and traditional Call Report financial data. Most

smaller and mid-sized banks are monitored initially with automated analysis of Call Report

information, and, if risk is identified, they are then reviewed by analysts.[4]

Periodic on-site safety-and-soundness examinations begin with off-site pre-exam reviews

of Call Report and other pertinent data. On-site reviews then check the reported information and

explore issues that might not be revealed in the quarterly reports.[5] On-site examinations provide

extensive financial information that is not generally available to the public, such as the payment

histories of performing and nonperforming loans, loan classifications and the adequacy of loan-

loss provisions, and bank capital.[6]

Bank examiners assign overall, or composite, CAMEL ratings of 1 or 2 to institutions in

sound financial condition. Downgrading a bank's rating to 3 sends an important signal of

financial weakness and is normally accompanied by an agreement between the bank's primary

regulator and senior bank management specifying the nature of the bank's weakness and

procedures for changing bank policies to rectify the perceived problems. These agreements are

classified by regulators as "informal" enforcement actions because they are not administratively

or judicially enforceable in a court of law in the event of noncompliance.[7] Nevertheless, the

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[4] See Cole and Gunther (1998) for a discussion of off-site monitoring systems.

[5] The Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA) mandated annual examinations for large banks and all banks with unsatisfactory supervisory ratings. Since then, the examination schedule for most banking organizations has been stretched out to approximately every 18 months.

[6] For a detailed discussion of the bank examination process, see Curry et al (1997), 463–475.

[7] Informal enforcement actions are usually issued within three months after completion of the examination that leads to the downgrade and may require institutions to make changes, such as raising new equity capital, limiting the origination of certain types of loans, or increasing loan-loss reserves. Although regulators vary in their practices, the most common type of informal action accompanying a downgrade to 3 is a "memorandum of understanding" (MOU), which is written by bank supervisors and signed by bank officials and supervisors. MOUs specify activities that must be undertaken by the bank, time frames for implementing the new procedures, and special requirements for reporting to the bank's supervisor. A second type of agreement, known as a "board resolution," is drafted by the individual bank and signed by each member of the bank's board of directors; it commits the institution to a certain course of action. Since 1983, the FDIC has informed the banks it supervises of their composite CAMEL ratings as part of the FDIC's report to bank management on the results of the examination. The Comptroller of the Currency and the Federal Reserve began revealing their ratings in December 1988.

agreements represent a loud "shot across the bow" signaling significant regulatory concern and the need for change. Informal enforcement actions are kept confidential by regulators out of concern that public exposure of a bank's problems may result in a decline in the deposit base or otherwise increase the difficulty or cost of recovery. As might be expected, the financial health of banks receiving a CAMEL rating of 3 varies, although regulators make no effort to distinguish composite quality ratings beyond the integers 1–5.[8] Institutions downgraded to 3 may remain in that state for periods ranging from several months to several years before passing to a higher or lower grade.

Downgrading a bank's CAMEL rating to 4 or lower indicates the existence of serious problems that could lead to insolvency. In practice, the term "problem" bank is often reserved for institutions with composite ratings of 4 or lower, and regulatory "problem-bank lists" tend to specify institutions with these ratings, although practices vary. Banks downgraded to 4 typically require immediate remedial actions and intensive monitoring by regulatory officials. In some cases, bank supervisory officials may not assign the more serious "formal" enforcement actions to 4-rated banks as long as bank management addresses regulatory concerns. If feasible, regulators prefer to work with informal enforcement actions because they are confidential and less confrontational than the more serious "formal" enforcement actions. However, most banks downgraded to ratings 4 and 5 receive formal enforcement actions, and these actions were made public beginning in 1989.[9] Institutions with CAMEL ratings of 4 can continue in business for as

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[8] Supervisors do, however, provide individual component ratings on a bank's performance in the five categories of capital, assets, management, earnings, and liquidity. The overall, or composite, rating is based primarily on the ratings for each of the individual categories.

[9] Formal enforcement actions are stringent legal decrees that are enforceable in courts and often carry heavy penalties for noncompliance. They are usually issued within three to nine months of the completion of the bank examination that resulted in reclassification to a rating of 4 or 5. After FIRREA, formal enforcement actions become part of the public record when issued. As noted by Curry et al. (1999), during the 1980–1994 period, 89 percent of all formal enforcement actions were imposed on banks with ratings of 4 or 5.

long as several years before either returning to a higher grade, moving to a lower grade, or being declared insolvent by their primary regulator. A rating of 5 indicates an extremely high probability of failure, usually within the next 12 months.

III. Prudential Bank Supervision and the Interpretation of Market Data

Prudential bank supervision recognizes that bank examinations impose costs on banks and that higher costs should be justified by higher benefits, such as a comparable reduction in the expected cost of failure. Regulators have a responsibility to balance the need to limit the expected cost of failure against the need to minimize oversight costs, especially for well-run institutions.

With an eye toward balancing the costs against the benefits of bank supervision, we specify four criteria as a starting point for assessing whether information contained in market data is useful to regulators. First, the information should be "separable" at the bank level. This point simply recognizes that a change in a bank's rating must be justified by the circumstances of that bank. Informational messages that are applicable to groups of banks, such as a change in the risk of all banks in a geographic region, are difficult (costly) to review or apply at the bank level because of their broad application. Second, the message must be "clear" in the sense that there exists a low likelihood of multiple interpretations. The hope is that the message specifies the nature of the market's concern to the point that a meaningful regulatory response can be formulated. Unclear messages may motivate inappropriate regulatory response, raising the supervisory cost borne by the regulated institutions. Third, the informational message must precede problems with sufficient advance warning to provide regulators with a timely tool for policy change. Finally, the market signals should, on the margin, contain information not available in other sources of information commonly used by off-site monitoring, such as Call

Report financial data. Market information that cannot add incremental benefit to the content of commonly used financial data may be viewed as redundant and could fail to justify an expenditure of regulatory resources.

For the purposes of this study, the first two hurdles can be overcome by a focus on elements of longer-term trend in stock prices, returns, and other market-related variables. Since stock prices and returns of firms in the same industry are correlated, short-term informational messages for specific institutions are often reflected in the prices and returns of many other firms in the same industry.[10] This characteristic presents a relatively high cost for distinguishing and interpreting shorter-term signals of specific firms compared with those of other firms in the industry. Over longer periods, however, conflicting signals tend to offset, and it becomes easier to assign informational signals to specific institutions. Focusing on longer-term trends thereby allows regulators to limit the use of regulatory resources by targeting only the most appropriate firms for regulatory review.

The third hurdle requires that market signals have predictive content and sufficient advance notice. The vast resources of the market, which contains tens of thousands of traders, analysts, and similar participants, greatly exceed the resources of all banking industry regulators. Apart from vast resources, the market may also access certain types of nonpublic information that is not available to regulators, such as large stock sales by insiders and private contacts between individuals who may be old friends or former business associates. These points combine to suggest that market awareness of problems might precede regulatory awareness, possibly by a large margin, despite the ability of regulators to access nonpublic information through examinations.

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[10] See Jordan, Peek, and Rosengren (2000).

The final hurdle—identifying the incremental value added by market signals—is the most difficult to deal with because it involves distinguishing the predictive content of market variables from the content of other common sources of information. But market variables should not be expected to be independent of other variables or effects. Rather, they need only provide sufficient additional value so that their contribution can be clearly distinguished from the contributions of the other variables. For example, if the market has a unique ability to interpret accounting data contained in quarterly reports, then in regressions that explain changes in financial position we expect market variables to provide significant additional explanatory power to financial ratios derived from the quarterly reports.

An intriguing aspect of market data is that various aspects of financial theory effectively extend the list of market-related variables beyond prices and returns. For example, Merton's (1973) option model anticipates a rise in return volatility as an institution approaches insolvency. [11] Wang (1994) ties trading volume to the flow of information about a firm's financial health, suggesting that trading volume should rise as information about financial distress is released. [12] Although a comprehensive analysis of market-related variables goes beyond the scope of this paper, return volatility and trading volume nevertheless are two variables that are easily observed and, according to financial theory, may contain predictive content.

In summary, it appears conceptually feasible for a number of market-related variables to provide regulators with the ability to speed their identification of risk without imposing burdensome costs on regulated institutions. Debate about regulatory use of market-related

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[11] French, Schwert, and Stambaugh (1987) lend empirical support to this view by documenting a positive relation between the volatility of market returns and market excess returns (market return minus T-bill yield).

[12] Gallant, Rossi, and Tauchen (1992) find supportive empirical evidence that large daily price movements are followed by high trading volume.

information in prudential bank supervision should therefore focus on empirical questions, not conceptual ones. In particular, do market-related variables add marginal predictive value to Call Report or other information easily available to regulators in off-site monitoring systems? In the absence of marginal predictive value, market signals may be viewed as redundant information with little supervisory value.

IV. The Sample

The empirical analysis begins with a sample of publicly traded banks and thrifts whose ratings were downgraded to problematic levels over the 1988–1996 period. Since a CAMEL rating of 3 signifies significant regulatory concern, but ratings of 4 and 5 signify more-severe financial distress that is often followed by failure, we separate institutions downgraded to 3 from those downgraded to 4 or 5. Recognizing that the financial industry had many problems in the early and middle 1980s, we limited the sample to institutions that were downgraded to 3 beginning in 1988 or were downgraded to either 4 or 5 beginning in 1989.[13] Combining the 4s and 5s into a single group appeared reasonable, given that institutions may pass to failure from these two ratings but almost never from a rating of 3. As noted earlier, informal enforcement actions, which are not made public, are associated with a rating downgrade to 3, whereas formal

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[13] In the case of thrifts, 1989 was a watershed year because of the passage of FIRREA, which provided the funds needed to resolve the thrift crisis and contained provisions (such as higher capital requirements) that improved the safety and soundness of financial institutions. See Gupta and Misra (1999) for an overview of changes made to the banking system throughout the 1980s and in the early 1990s. Although banks did not experience the same depth of problems as thrifts, the late 1980s nevertheless marked an important change in bank regulation because of a significant increase in the regularity of bank examinations as well as other new requirements. For example, FIRREA required annual examinations for banks with assets over $250 million or banks that had poor ratings; it also required that regulators take prompt corrective action for undercapitalized institutions. As noted, the examination requirement has since changed for most institutions: a periodic examination is now required approximately every 18 months.

enforcement actions, required by FIRREA to be made public, are associated with the assignment of 4 and 5 ratings.

To improve the integrity of the analysis, we also imposed several additional restrictions. Since our focus is on longer-term stock market behavior around the time of rating downgrades, the sample was limited to institutions that had a lengthy period of superior ratings before their downgrade. This condition is implemented by the requirement that institutions have CAMEL ratings in the 1–2 range at least three years before downgrade to a 3. Similarly, institutions downgraded to a 4 or 5 were required to have ratings in the 1–3 range for at least three years preceding downgrade to 4 or 5. The sample is also limited to banks and thrifts that either were not affiliated with bank holding companies or were members of holding companies that held only a single banking-related institution. Restricting the sample in this fashion ensures that the extensive financial data reported on bank Call Reports corresponds closely to the institution that issues the stock.[14] This restriction also reduces contamination from activities of nonbank subsidiaries of bank holding companies.[15] Since the empirical analysis combines Call Report financial data with stock market information reported by the Center for Research in Securities

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[14] This correspondence is important because the public equity of banks held by holding companies is typically issued at the holding-company level, whereas detailed Call Report financial data are reported at the bank level. Banks are also distinguished from their holding companies in bankruptcy, because individual banks are taken over by the Federal Deposit Insurance Corporation whereas their holding companies fall under the purview of standard bankruptcy law.

[15] Analysis of multibank-holding-company stocks carries disadvantages as well as advantages compared with analysis of single-bank holding companies and nonholding companies. For example, multibank holding companies tend to be large institutions that are widely traded and rated by nationally recognized rating agencies. Although single-bank holding companies and banks not affiliated with holding companies tend to have the opposite characteristics, their Call Report data nevertheless correspond directly to the institution that is publicly traded, and their financial data are far more extensive than financial data released at the holding company level. Moreover, the many activities of holding-company subsidiaries cannot be separated from the aggregated data reported at the holding company level, and this lack of separability obscures the extensive information released by individual banks. Market signals at the holding-company level may or may not correspond to the performance of the bank subsidiary. The potential disconnect between the performance of individual banks and the market signals of their holding companies may widen as holding companies diversify into additional nonbank activities subsequent to the passage of the Gramm-Leach-Bliley Act of 1999.

Prices (CRSP), both sources of data were required for a bank to be included in the sample.

Table 1 provides summary statistics for the two groups of downgraded institutions. The sample size is relatively large for both groups, with 122 institutions downgraded to 3 and 148 downgraded to 4 or 5. The sample varies slightly from quarter to quarter for several reasons, including the lack of available data on individual firms and the de-listing rules of the various exchanges (rules such as minimum capital requirements or minimum trading activity). The number of institutions in the 4 or 5 group is larger than the number in the 3 group primarily because the three-year constraint on previous ratings limits the group of 3s more than the group of 4s and 5s.

Considerable diversity is apparent in the sample. For example, both groups of downgraded institutions had a wide range of asset sizes, including institutions with total assets under $100 million as well as institutions with assets over $5 billion. More than 75 percent of the institutions had assets under $1 billion, while almost 20 percent had assets in the $1–5 billion range and about 5 percent had assets in the over $5 billion range. The relatively healthier condition of institutions downgraded to 3 is reflected in the higher book equity-to-assets and return-on-assets ratios compared with the ratios reported for institutions downgraded to 4 or 5. The stronger financial health appears to be recognized by the market, as the market price summary statistics are also higher for institutions downgraded to 3 compared with those downgraded to 4 or 5. The diversity in asset size is accompanied by diversity in market capitalization (average price times number of shares at the end of the quarter), which declines with market price. The sample breakout by charter type shows that banks (65 percent) have a higher representation than thrifts (35 percent).

V. Univariate Trends before Rating Downgrades

The first point at which market information has the potential to help bank regulators is the period preceding a CAMEL rating downgrade. As explained above, downgrades to ratings of 3 are distinguished from downgrades to ratings of 4 or 5 by the distinct financial and regulatory problems of banks in the latter category. Our focus on longer-term trends is implemented by an analysis of quarterly data for several years preceding the downgrade.

Table 2 displays the univariate characteristics of stock prices, returns, and other market-related variables for banks and thrifts eight quarters (two years) preceding their downgrades to CAMEL rating 3, 4, or 5. The zero quarter contains the start date of the examination that results in the rating downgrade.[16] As noted above, the sample of institutions in the 3- and 4- or 5-rated categories varies slightly from quarter to quarter because of the de-listing rules of the various exchanges (rules such as minimum capital requirements or minimum trading activity).

The stock price data show prices falling consistently throughout the two years before the downgrades, with the result that the change in stock price is negative in nearly every quarter during that period. For the 3-rated group, the average stock price starts at around $15 per share in the eighth quarter before the downgrade, then falls to $10 per share in the zero quarter, whereas for the 4- or 5-rated group, the average price declines from about $11 to $6 per share for the same period. The lower prices for the 4- or 5-rated institutions suggests that the market is able to distinguish the more serious financial problems of institutions approaching a 4 or 5 rating compared with those approaching a rating of 3.

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[16] Examinations that lead to rating downgrades typically take one to two weeks to complete, and they conclude with a notification to management that the institution's rating has been downgraded. Thus, the zero quarter can be regarded as approximately contemporaneous with the rating change.

In an effort to test the consistency of changes in stock prices across the sample, we used a t-test to test the hypothesis that the mean of each quarterly sample equals zero. For the 3-rated group, this test shows that the change in stock price becomes statistically significant in the sixth quarter preceding the downgrade. For the 4- or 5-rated group, the change is significant for all eight quarters before the downgrade, reflecting the more distressed nature of this group. The consistency of the t-test results, across many quarters before the rating downgrades, confirms that market prices have considerable univariate predictive content long before regulators formally alter an institution's rating.

Two measures of trading activity are included in Table 2 to allow an examination of the hypothesis that higher trading activity should accompany market assessment of new information. But although the data clearly reflect a long-term trend of declining prices before downgrade, neither of the trading activity variables reflects the corresponding rise in trading activity hypothesized by financial theory. The most direct measure of trading activity—average daily trading volume— declines slightly for the 3-rated group and follows no consistent trend for the 4- or 5-rated group throughout the eight quarters before the downgrades. A second measure of trading activity, known as "turnover," divides the shares traded in any quarter by total shares outstanding. Like the trading volume variable, the turnover variable also shows no discernible trend for either of the groups. Therefore, the trading activity variables contain no easily observed univariate predictive content before CAMEL rating downgrades.

The remainder of Table 2 displays various measures of quarterly returns commonly found in previous empirical studies. The first return-related variable is the simple cumulative return, calculated by multiplying unity plus the daily return for each stock i on day t $(1+r_{it})$ across all trading days in each quarter, then subtracting unity. Consistent with the long-term decline in prices, cumulative returns are consistently negative preceding downgrade for both the 3-rated

group and the 4- or 5-rated group. However, our t-tests also find that the cumulative returns are not significantly distinguishable from zero for institutions downgraded to 3, although they are significant for institutions downgraded to 4 or 5.

The cumulative return data are followed by a measure of return volatility, the standard deviation of daily returns. In contrast to the trading activity variables, the trend of volatility appears consistent with financial theory, which anticipates rising volatility as an institution encounters distress. For example, the volatility of the variable rises steadily for both groups as the downgrades approach, especially during the four quarters immediately preceding the downgrades. The level of volatility is noticeably higher for the most severely distressed institutions (downgraded to 4 or 5) compared with the moderately distressed institutions (downgraded to 3). The statistical content of the rising trend is confirmed by significant t-statistics beginning about a year before the rating downgrades.

The remaining columns examine market excess returns by calculating the differences between the cumulative quarterly return of each stock and the cumulative quarterly returns for three indexes of market performance. The first two indexes are the equal- and value-weighted indexes reported on the CRSP tapes. The third index is a value-weighted index constructed from CRSP data for the bank and thrift industries. [17]   Means tests are applied to all quarterly samples of excess returns to determine whether the mean excess return is statistically distinguishable from zero.

The market excess return variables consistently show patterns of negative returns that are statistically significant in most of the eight quarters before rating downgrades, although the

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[17] The industry value-weighted index was created from approximately 2,200 banking institutions that could be identified on the CRSP tapes and tied back to their specific charters. Separate value-weighted indexes were created for banks and for thrifts using the CRSP utility for creating value-weighted indexes (DSXPORT). At the beginning of each year, the sample of banks or thrifts was established; then the index was calculated for that year. The final index combined the yearly indexes into a continuous long-term series.

significance varies by index. The results for the CRSP equal-weighted return index reflect the most consistent trend, as they are virtually always negative and significant at the 1 percent level. Excess returns calculated from the CRSP value-weighted index perform very similar to excess returns calculated from the CRSP equal-weighted index, with only slightly lower levels of significance for a few. The excess returns calculated from the industry value-weighted index did not precede or anticipate rating downgrades as consistently as the other excess return variables did.

From a broad perspective, the excess return data reported in Table 2 serves to reaffirm Pettway's (1980) finding of negative excess returns for lengthy periods preceding financial distress, although our analysis is based on much more extensive data and statistical tests of the significance of each quarterly excess return.[18] From the narrower interests of this paper, the excess return variables exhibit consistent negative patterns, effectively anticipating CAMEL rating downgrades long before they actually occur.

Table 3 performs a sensitivity analysis of the results in Table 2 by examining monthly trends of the most consistent quarterly variables. The trends are examined during the 17 months preceding the rating downgrade, in other words, for a period of almost five quarters. The monthly trends are not as consistent as the quarterly trends, although some data have reliable predictive content. The change in the stock price variable is always negative, but the change is not statistically significant for a number of months for the 3-rated group, although it is almost always significant for the more distressed firms in the 4- and 5-rated group. The performance of the volatility variable, the change in the standard deviation of daily returns does not have the anticipated negative sign in all quarters and is almost never significant at the 1 percent or 5 percent level. The CRSP equal-weighted excess

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[18] The Pettway study examined only six large banking organizations.

return performs the best of all variables examined, showing negative returns that are significant at the 1 percent or 5 percent level in most months for both groups of firms. Consistent with our earlier findings, the remaining estimates of market excess returns, calculated with either the CRSP value-weighted index or the industry value-weighted index, are always negative, but not as consistently significant as excess returns based on the equal-weighted index. These results suggest that the equal-weighted market excess return retains, to a large degree, its predictive content over monthly as well as quarterly periods.

Table 4 extends the sensitivity analysis by examining the best-performing series from Table 3 over weekly periods. We limit the reported data to weeks 36 through 10 (months 9 through 2) preceding CAMEL rating downgrades. The weekly results are noticeably less conclusive than the monthly data. Somewhat surprisingly, the best-performing variable is the stock price, which is almost always negative and statistically significant at the 1 percent or 5 percent level in more than one-half of the reported observations, especially for the most distressed 4- and 5-rated group. The two measures of market excess returns are not consistently negative, and they are only occasionally significant at the 1 percent or 5 percent level. Thus, the predictive content of individual market variables is very limited in weekly applications. This result cautions against the use of short-term return trends for identifying longer-term market movements preceding rating downgrades.

VI.   Univariate Trends after Rating Downgrades

In addition to anticipating a rating downgrade to the 3 or 4/5 level, regulators also have a special interest in the period immediately after the downgrade. In this regard, the interests of this paper prompt us to ask, "Can the market distinguish future 'winners' (subsequent upgrades) from 'losers' (subsequent downgrades) in the immediate aftermath of the rating downgrades?" Distressed institutions require close regulatory supervision. Most either recover (are

subsequently upgraded) or encounter more serious problems (either are subsequently

downgraded or fail) in reasonable periods of time after the rating changes, although some

institutions languish in these rating categories for several years after their initial rating change.

If market variables can anticipate the path taken, this information might be used to allocate

supervisory resources, or otherwise improve regulatory oversight of problematic institutions.

Although the ability of the market to anticipate the subsequent performance of a downgraded

institution is interesting by itself, the supervisory value of the anticipation is enhanced if it is

observed relatively soon after the downgrade—such as during the first quarter after the

downgrade.

Tables 5 and 6 present univariate results similar to the results in Table 2. The previous

groups of 3- and 4/5-rated firms are broken into two subsamples, depending on whether the

downgraded institutions subsequently recover (Table 5) or whether they slide into deeper

financial distress (Table 6). Since a subsequent rating change can occur at any time after the

initial downgrade, Tables 5 and 6 show declining samples during the eight quarter period after

the downgrades.[19] For example, the sample of 3-rated banks that recover declines from

54 observations during the zero quarter to 48 in the eighth quarter after the downgrades, while

the 4/5-rated group goes from 94 to 87. A similar pattern is observed for firms that did not

recover after their downgrade (Table 6).

Table 5 suggests that immediately after the initial rating change, the market does not

anticipate the recovery of institutions that have experienced CAMEL rating downgrades. The

exact nature of the reaction is different, however, depending on the financial condition of the

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[19] As institutions approach failure, they may also drop out of the sample because their stock prices are dropped from CRSP, given the de-listing rules of the various exchanges. In our sample, the most common reasons for de-listing were insufficient number of market makers and insufficient capital.

group. For example, for the 3-rated group after the downgrade, average stock prices follow a downward trend for only the first quarter, going from about $11 per share in quarter zero to $10 per share in quarter one before rebounding slightly in quarter two. In other words, for this group, the market soon determines that recovery is under way. For the 4/5-rated group, stock prices follow a downward trend for about two quarters on average after the downgrade, with prices declining from almost $7 per share in the zero quarter to about $6 per share in quarter two. Thus, the upward trend in prices associated with market anticipation of recovery for the 4/5-rated group does not occur for about six months. The downward trend in prices after the downgrades causes all estimates of market excess returns to be negative after the initial downgrade, so these variables retain no more predictive content than the stock prices. In addition, contrary to the results in Table 2, the volatility variables fail to develop the downward trend anticipated by financial theory. Consistent with the results in Table 2, no clear trend appears in the trading activity variables (trading volume and turnover). Thus, market-related variables provide little univariate predictive content for institutions that recover from a rating downgrade.

In contrast to the results in Table 5, Table 6 finds the market capable of anticipating the performance of institutions whose distress deepens after a CAMEL rating downgrade to the 3 or 4/5 level. In Table 6, stock prices for the 3-rated group follow a steady downward trend after the downgrade. A similar pattern is observed for the 4/5-rated group, with prices declining continuously for all eight quarters after the downgrade. For both groups, the downward average price trend during the quarters after downgrade causes negative cumulative and market excess returns, and the t-statistics associated with the negative returns tend to be statistically significant. The volatility variables also recover much of their earlier explanatory power, as volatility rises steadily in the period after downgrade. Consistent with our earlier results, no clear trend appears in the trading activity variables.

Comparative interpretation of results in Tables 5 and 6 is difficult to do. Table 6 in isolation suggests that market-related variables have univariate predictive content. However, similarities between the downward trends of prices and returns in Tables 5 and 6 make it more difficult to distinguish winners from losers after rating downgrades. For example, the market appears to identify future "losers" in the 4/5-rated institutions in Table 6 with declining average stock prices and returns in the first quarter after the downgrade. However, the identification of "winners" in Table 5 takes up to four quarters for the 3-rated group and up to six quarters for the 4/5-rated group. Thus, univariate market signals regarding an institution's prospects for recovery, subsequent to a rating downgrade, are difficult to interpret.

VII. The Predictive Power of Stock Returns Compared with Financial Ratios

Testing the marginal importance of stock price and return variables against Call Report financial data allows us to formally gauge the statistical strength of the two types of explanatory variables. Our approach proceeds by initially specifying a traditional CAMEL rating prediction model and then extending the model to include stock prices, returns, and other market related variables. Although the stock price and return variables need not dominate the traditional ratio-based model, a minimum level of competency is required to justify a conclusion that market-related variables are a meaningful addition to traditional analysis.

In this section, logistic regression equations are estimated to explain changes in financial institution supervisory (CAMEL) ratings with publicly available financial information.[20] Table 7 defines the variables used in the regressions, along with related means and standard definitions. Two sets of regressions are estimated, one for predicting rating downgrades and the other for

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[20] Logistic regression has been used extensively in this type of analysis, especially by Sinkey (1975), Elmer and Borowski (1988), Gajewski (1989), and Cole and Gunther (1995 and 1998).

predicting either recovery or ultimate failure subsequent to a rating downgrade. A dichotomous variable is specified for both equations. The dependent binary variable in the first equation (CAMELCAT) tests our ability to explain CAMEL rating downgrades, whether to ratings of 3, 4, or 5. To this end, each downgraded institution is "matched" with a randomly chosen, publicly-traded bank or thrift that is healthy and is in the same asset class as the downgraded institution. If Call Report or CRSP return data are not available for an institution in any quarter, that institution is dropped from the sample during the quarter. The dependent variable in the first set of regressions takes a value of 1 if the institution is rated 1 or 2 and is downgraded to 3, and 0 if the institution is rated 1 or 2 and does not experience a downgrade. In the second set of regressions, the dichotomous dependent variable tests our ability to explain whether an institution either recovers or suffers further distress after a rating downgrade. In this case, the dependent variable takes a value of 0 if the institution recovers, and a value of 1 if its distress deepens after a downgrade.

The logit model is estimated by the use of data for market variables from quarter four preceding the downgrade, while Call Report data are taken from quarter five. The reason the market variables from a given quarter are matched with Call Report financial data from the preceding quarter is that the Call Reports are routinely released in the quarter following the quarter to which they apply.

The first independent variable is a control variable for charter type. This variable is important because in 1989 FIRREA provided funds to deal with a backlog of troubled thrifts whose financial condition had slipped below the condition of troubled banks during that era. A dummy variable, INSBIF, distinguishes banks and thrifts by assigning a value of unity to institutions that come under the umbrella of the Bank Insurance Fund (BIF), and a value of zero to institutions that come under the Savings Association Insurance Fund (SAIF). As shown in

Table 7, the mean of the INSBIF variable equals 0.69, signifying that commercial banks

represent 69 percent of the 3-rated group, and therefore thrifts 31 percent of the same group. For

the 4/5-rated group, banks represent 60 percent and thrifts 40 percent. For the overall sample,

banks represent 64 percent and thrifts 36 percent. The coefficient for the "charter" dummy is

expected to be positive in CAMEL rating models using financial ratios because, in the post-

FIRREA period, banks tended to have a higher likelihood of downgrades than thrifts with similar

asset sizes: many of the most-troubled thrifts had already been sold or liquidated by the Federal

Savings and Loan Insurance Corporation or handed off to the Resolution Trust Corporation for

resolution.

   The traditional CAMEL prediction model is specified with variables from the Call

Reports. The first variable is the equity-to-assets ratio (EQ_AS), which measures the ability of a

firm to absorb loan losses before bankruptcy and is expected to be negatively related to future

distress. The credit quality of the loan portfolio is captured in the NC_RES variable, which

measures the amount of delinquent assets less loan-loss reserves relative to total assets.

A positive sign is expected for this variable, signifying that higher levels of delinquent loans are

associated with a higher likelihood of rating downgrades and failure. The overall profitability of

the institutions is measured by the return-on-assets variable (ROA), which is expected to be

inversely related to future downgrades. Two measures of liquidity are posited: the securities-to-

assets ratio (SC_AS) and the volatile liabilities-to-assets ratio (VL_AS). The SC_AS is expected

to be negatively related to future distress, reflecting that higher levels of securities to assets

provide sources of additional liquidity in troubled times. However, the volatile liabilities ratio

VL_AS is expected to have a positive sign, reflecting that higher levels of volatile liabilities are

normally associated with potential for problems of liquidity and funding during times of crisis.

The market variables are segmented into two groups, one specifying "core" financial variables that reflect market activity, the other accounting for market risk. In the first group, the first variable is market price, which is measured as the natural logarithm of the average quarterly price. This variable is expected to be inversely related to rating downgrades. Market excess returns is captured by EXRET, which measures the CRSP equal-weighted excess quarterly returns for each observation and is discussed extensively above in the univariate analysis connected with Table 2. Given the high degree of negative excess return persistence observed in Table 2, we expect EXRET to possess at least some failure predictive content and to be negatively related to the future downgrades. Firm dividend policy is captured by the dummy variable DIV, which is equal to unity if the bank paid a dividend in the last four quarters, or zero otherwise. The coefficient for DIV is expected to have a negative sign, reflecting financial weakness if the firm fails to pay a dividend.

In the second group of variables, those that account for market risk as suggested either by the market model of Fama and French (1993) or the option model of Merton (1974), the first variable, SDRET, is the standard deviation of annualized quarterly returns and is expected to be positively related to future downgrades. As investors become concerned over potential distress and potential bankruptcy, more variation may appear in return patterns. Another stock market model variable, TURN, which measures stock turnover in particular quarters, is also expected to be positive during periods of financial distress. The third market model variable, the book equity-to-market value ratio (BE/ME), is expected to have a positive coefficient as the ratio moves directly with changes in stock prices, holding book equity constant. This ratio, therefore, also serves as proxy for financial distress.

Equation (1) shows the basic logit estimation equation, which sequentially adds stock market data to Call Report financial data on the right-hand side of the regression:

$$
\text{(1)} \quad \text{CAMEL} = \boldsymbol{a} + \boldsymbol{b}_1(\text{Charter}) + \sum_{c=2}^{6} \boldsymbol{b}_c(\text{Call Report variables}) +
$$

$$
\sum_{c=7}^{9} \boldsymbol{b}_c(\text{Core Market variables}) + \sum_{c=10}^{12} \boldsymbol{b}_c(\text{Risk variables})
$$

Pre-Downgrade Results

The results for the pre-downgrade period are presented in Table 8. As noted, the

regressions were run at four quarters before the event date (or, in this case, before the date the

institutions experienced their downgrades to the 3, 4, or 5 levels). Panel A shows the results for

firms that were downgraded to 3, and Panel B shows the results for firms that were downgraded

to 4 or 5. Specification 1 shows the CAMEL prediction model primarily using Call Report data.

The control variable for charter type, INSBIF, has a positive coefficient and is significant only

for those banks that are in the worst financial condition—the 4/5-rated group. This finding

reveals that commercial banks generally tended to be more distressed than thrifts during the early

1990s and therefore exhibit a higher likelihood of being downgraded.

The first Call Report variable, the equity-to-asset ratio (EQ_AS), has a negative sign as

expected for both groups, thereby confirming the importance of equity levels in models

predicting distressed CAMEL ratings. The portfolio quality variable (NC_RES) has its

anticipated positive coefficient and is significant for only the 3-rated group, confirming the

relationship between downgraded supervisory ratings and credit quality.[21] The return-on-asset

variable (ROA) also exhibits a negative sign, as expected, and is highly significant. The two

liquidity measures (SC_AS and VL_AS) also perform as expected: the former is negative and

significant, confirming the fact that there is an inverse relationship between the level of security

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[21] EQ_AS and NC_RES are independent variables that have high correlation values. These high correlations range between -.82530 and -.85646 in specifications 1 to 3 of Table 8.

holdings and financial distress, and the latter shows a positive and significant relationship between volatile liabilities and future downgrades. For specification 1 for each group, all signs are correct and most coefficients are significant at the 1 percent level. These results suggest that this equation serves as a good starting point or benchmark for assessing the incremental value of information embedded in stock returns compared with the information contained in commonly used financial ratios.

The analysis proceeds by selectively adding market variables that offer several measures of returns or stock-return trends to the benchmark regressions containing only financial ratios. This approach facilitates the ability to examine the predictive content of each of the market variables, through their individual coefficients and t-statistics. It also tests the predictive content of market-based models compared with the content of traditional models, through the likelihood ratio test statistic and the Akaike Information Criterion (AIC).[22] If the likelihood ratio test statistic is positive and significant, we may conclude that a market-based regression has significantly higher predictive content than the Call Report model reported in the first specification of the model. A similar conclusion can be reached if the AIC measure exhibits a lower value for the market-based specifications relative to the Call Report model.

The logistic regressions incorporating market variables are presented in specifications 2 and 3. Of the three core market variables added into specification 2—the natural logarithm of the stock price (LN_PR), the equal-weighted market excess return variable (EXRET), and the dividend variable (DIV)—all have the expected negative signs for the coefficients. The log of price variable is significant primarily for the 3-rated group. For the 4/5-rated group, both the

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[22] *See* Pindyck and Rubinfeld (1991), 240, for a discussion of the likelihood ratio test. *See* Greene (2000), 306, for a discussion of the AIC.

dividend and excess return variables are significant, portraying a mixed picture for the core

market variables.[23]

Specification 3 adds two additional market-risk variables: the standard deviation of the

return variable (SDRET), which measures the variance of the returns, and the turnover ratio

(TURN), which measures average trading volume. In this regression, these other market-related

variables failed to show any significant increase in marginal predictive value for either of the

groups. The SDRET variable was significant at the 5 percent level for the 3-rated group, and the

TURN variable was significant at the 10 percent level for the 4/5-rated group. In the last

specification (4), only the publicly available stock-market variables are included. Based upon

the AIC, this equation does not improve upon specification 1, which incorporated only Call

Report variables.

A likelihood ratio test is performed, measuring the equation specifications that contain

stock-market variables (specifications 2 and 3) compared with the equation specification that

does not contain stock-market information (specification 1). As shown in Table 8, equations 2

and 3 show greater explanatory power compared with specification 1, suggesting value added by

the introduction of the market variables. Specification 4, with only the stock-market data, has

significantly less explanatory power than specifications 1, 2, and 3. These results are shown by

the AIC. The AIC value is lower for both regressions 2 and 3 relative to equation 1, suggesting

that the stock-market variables are adding to the overall predictive content of the model. The

AIC for the last equation is much higher than it is for the previous three regressions, suggesting

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[23] It should be noted that the decline in dividend payments to shareholders of downgraded banks and thrifts as reflected in all specifications in Table 8 could be the result of a combination of both management decisions to reduce dividends because of financial problems as well as regulatory orders imposed by bank supervisors.

that the model using only market-related variables performs at a lower level than the other three specifications.[24]

Table 9 contains in-sample and out-of-sample tests of the model for both the 3-rated and 4/5-rated groups.[25] The critical probability that is used is 50 percent. This critical probability is used to determine how the model performs in identifying which banks or thrifts in the two groupings are properly classified as likely to experience future CAMEL rating downgrades. Within the in-sample classification group for the 3-rated institutions, the correct prediction of distressed or healthy banks and thrifts generally increases, moving from specifications 1 to 3; then the correct prediction level declines in specification 4. The group prediction columns generally reveal a similar pattern for the 4/5-rated group. Thus, for the in-sample forecasts, these findings show that adding stock variables increases the predictive accuracy of the model in identifying CAMEL rating downgrades in the first three specifications. This is reflected in the Type I and Type II errors, which are also displayed in Table 9.

A similar pattern is observed for the out-of-sample forecasts, although the classifications are not as accurate as for the in-sample forecasts. For example, for the specifications for the 3-rated group, the model correctly classified an average of 66 percent of the downgrades for the out-of-sample, compared with 76 percent for the in-sample. For the 4/5-rated group the

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[24] There is an inverse relationship between the level of the AIC value and the effectiveness of the model. The lower the value, the more effective the model.

[25] The logit models are tested for their accuracy of classifications on both in-sample and out-of-sample data. The in-sample data refer to the data set for the periods used to construct the model from the - 4 quarter before the downgrades. The estimated logit model for the in-sample data was run on 94 observations for the pre-3-rated group and 114 for the pre-4/5-rated group to test the effectiveness of the model in accurately classifying the observations. The out-of-sample tests were run on the remaining 20 percent of the sample—specifically, 32 observations for the pre-3-rated group and 41 for the pre-4/5-rated group—to determine the accuracy of the forecasts or classifications. Each of the observations for the pre-period was matched against a highly rated institution in the regression models. For the post-period, the in-sample tests amounted to 91 observations for the 3-rated group and 108 for the 4/5-rated group. The out-of sample tests were conducted on 31 observations for the post-3-rated group and 36 for the post-4/5-rated groups.

classifications were relatively more accurate, identifying about 72 percent of the downgrades for the out-of-sample data relative to about 74 percent for the in-sample data. The overall accuracy of the model appears to improve as the conditions of the institutions deteriorate.

Post-Downgrade Results

Table 10 shows the logistic regression results for the first quarter *after* the CAMEL downgrades for the 3- and 4/5-rated groups. As mentioned previously, the second model is run to determine if it is sensitive enough to predict which institutions will likely recover or experience future downgrades or failures. Banking regulators would benefit if the model were able to distinguish these differences within a relatively short period after the initial downgrades. The results show that all the coefficients for the Call Report variables have the anticipated signs and perform as expected, but the significance of the tests varies between the 3- and 4/5-rated groups. The log of market price and the excess return variables generally add to the CAMEL predictions in most specifications, although there is some variation in levels of significance, which range from 1 percent to 10 percent depending on the specification. As before, when the market-risk variables are combined with the Call Report data and core market variables, they generally do not add significantly to the equation. Therefore, the logistic regression tests tend to suggest that relatively simple measures of market price and market excess returns appear to offer the best hope of improving the predictive content of Call Report data. Although the market excess return variable is not a dominating variable for the 3-rated group, for the most distressed organizations—the 4/5-rated group—it adds significantly to standard models based on the accounting data in quarterly reports. Other market variables, such as return volatility, dividend payment performance, turnover in shares, and the ratio of book to market value equity, appear to have little marginal predictive value.

Table 11 contains information on the accuracy of the model in the post-downgrade period. The critical probabilities for these in-sample and out-of-sample classifications are 0.56 for the 3-rated group and 0.35 for the 4/5-rated group.[26]

In general, these findings show that the addition of stock-market information to the Call Report data not only increases the correct predictions of banks that will either have more financial distress or recover but also minimize the incorrect predictions—although the results are not as strong as in the pre-downgrade period. As we move from specification 1 with only Call Report data to specifications 2 and 3, the model generally improves the correct prediction of financial distress especially for the most-distressed—banks in the 4/5-rated group. For specification 4 in relation to specification 1, the stock-market variables have only a mixed correct prediction rate when compared with Call Report variables alone.

VII.   Conclusions

This paper explores the notion that stock price, return, and other market-related variables can be used to improve the predictive content of Call Report financial ratios for the purpose of anticipating CAMEL rating changes. A sample of 122 banks and thrifts that were downgraded to the CAMEL 3 level and 148 banks and thrifts downgraded to the 4 or 5 level was analyzed over the period 1988–1996. Extensive univariate analysis confirms that relatively simple measures of stock prices and returns exhibit downward trends as much as two years before banks and thrifts experience CAMEL rating downgrades to 3, 4, or 5. The longer-term nature of these trends suggests that the univariate trends are not commonly found in stock returns of healthy institutions. Previous research has not confirmed the pre-downgrade returns of patterns found in

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[26] These critical probabilities are derived from the ratio of the regression sample that experienced further financial distress to the total sample that was used in the regression.

this paper—certainly not for the length of time or for the variety of market variables used in this research. However, no simple relation appears in univariate comparisons of several other market variables, including average trading volume and average quarterly turnover of shares.

The second section of the paper adds stock return variables to regression equations that include financial ratios commonly used to predict CAMEL rating changes (both upgrades and downgrades) in off-site monitoring models. The results provide several additional points of interest. Most important, adding relatively simple measures of excess returns, stock prices, and an institution's dividend record improve the CAMEL ratings predictive content of Call Report data and otherwise appears to have a limited independent role in anticipating financial distress. The predictive content of the models is most robust for institutions experiencing the greatest financial distress—those being downgraded to the 4 or 5 level. Other market-related variables, such as return volatility, trading volume, and the book-to-market equity ratio, appear to have limited predictive value.

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Table 1
Summary Statistics

The data are from Call Report financial data reported to regulators or reported on the CRSP tapes during the quarter in which the CAMEL rating of the institution was downgraded. Market capitalization equals equity price times number of shares at the end of the quarter of the downgrade.

	A) At Time of Downgrade to 3				B) At Time of Downgrade to 4 or 5			
	Number	Minimum	Median	Maximum	Number	Minimum	Median	Maximum
Call Report Financial Data								
Total assets ($000s)	122	55,277	466,233	9,416,623	148	61,833	409,272	6,854,757
Book equity/Asset ratio (%)	122	2.44	7.07	21.36	148	-2.49	5.85	16.34
Net income/Asset ratio (%)	122	-7.40	0.28	3.14	148	-28.58	-0.26	1.53
CRSP Market Data								
Market price ($ per share)	122	1.89	8.29	56.01	148	0.31	5.23	21.94
Market capitalization ($000s)	122	2,796	218,110	656,355	148	970	18,802	453,149
Book/Market equity ratio	122	0.09	1.54	10.72	148	-3.31	1.98	23.68

	At Rating Change	Later Upgraded	Later Downgraded	At Rating Change	Later Upgraded	Later Downgraded
Total Sample	122	54	68	148	94	54
Number with Assets <= $1 Billion	92	43	49	119	76	43
Number with Assets $1-5 Billion	25	10	15	23	15	8
Number with Assets > $5 Billion	5	1	4	6	3	3
Number of Banks	85	36	49	89	56	33
Number of Thrifts	37	18	19	59	38	21

Table 2

Stock Price and Return Characteristics by Quarter *Preceding* Downgrade in CAMEL Rating

The data reported on each of the quarter-to-rating change lines (-8 to 0) are calculated as simple averages for all trading days in each quarter. If data required for any quarterly calculation are missing, then they are omitted from the calculation. Excess returns are calculated as the difference between the cumulative quarterly return of each stock and the cumulative quarterly return of the various indexes. T-statistics testing the hypothesis that the mean equals zero are shown below many of the quarterly average return and change in return statistics. A single, double, or triple "*" indicates significance at the 10%, 5%, and 1% levels, respectively.

Qtrs. To Rating Change	Sample	Avg. Stock Price ($)	Change Stock Price ($)	Avg. Daily Trading Volume (shares)	Avg. Qtrly. Turnover Ratio (%)	Cum. Qtrly. Return (%)	St. Dev. Daily Return (%)	Change St. Dev. Daily Return (%)	CRSP Eq. Wt. Excess Return (%)	CRSP Va. Wt. Excess Return (%)	Industry Va. Wt. Excess Return (%)
					A) Trends Preceding Downgrade to 3						
-8	116	14.67	0.07	13,050	17.03	3.11	2.43	-0.06	-2.61	-1.07	-0.64
			0.38			1.83 *		-0.68	-1.77 *	-0.74	-0.44
-7	121	14.43	-0.22	10,760	15.36	-1.13	2.46	0.02	-4.93	-4.56	-3.20
			-1.03			-0.82		0.24	-4.05 ***	-3.71 ***	-2.65 *
-6	122	13.80	-0.65	12,538	15.09	-1.82	2.59	0.14	-0.06	-0.05	-0.04
			-2.58 ***			-1.23		1.41	-5.16 ***	-4.32 ***	-3.10 ***
-5	126	12.75	-0.94	10,106	13.79	-1.47	2.60	0.04	-5.67	-5.19	-3.15
			-2.10 **			-0.92		0.42	-4.48 ***	-3.73 ***	-2.43 **
-4	126	12.30	-0.45	10,675	14.28	-1.16	2.88	0.28	-5.52	-3.81	-3.63
			-2.67 ***			-0.70		2.53 **	-3.87 ***	-2.58 **	-2.34 **
-3	125	11.95	-0.39	12,023	15.70	-1.63	3.08	0.19	-4.82	-3.88	-2.05
			-2.08 **			-0.90		1.85 *	-3.12 ***	-2.39 **	-1.32
-2	124	11.63	-0.36	11,657	14.68	-2.70	3.38	0.30	-6.95	-4.76	-3.08
			-2.46 **			-1.30		2.51 **	-3.93 ***	-2.55 **	-1.70 *
-1	123	10.71	-0.94	12,343	16.30	-3.91	3.86	0.46	-8.94	-6.78	-7.25
			-4.92 ***			-1.96 *		3.28 ***	-5.52 ***	-3.78 ***	-4.50 ***
0	122	10.12	-0.56	12,480	16.49	-3.18	4.05	0.18	-11.07	-6.69	-8.07
			-2.69 ***			-1.37		1.25	-5.96 ***	-3.17 ***	-3.99 ***
					B) Trends Preceding Downgrade to 4 or 5						
-8	148	11.09	-0.33	10,715	14.72	0.20	2.92	0.02	-4.55	-3.37	-2.23
			-2.20 **			0.13		0.18	-3.78 ***	-2.61 **	-1.83 *
-7	152	10.72	-0.36	11,335	12.93	-3.09	3.06	0.16	-5.79	-5.31	-3.76
			-2.66 ***			-2.12 **		1.46	-4.50 ***	-4.05 ***	-2.82 ***
-6	151	10.40	-0.33	9,469	13.95	-2.22	3.08	0.03	-0.06	-0.06	-0.04
			-2.62 ***			-1.43		0.23	-4.82 ***	-3.90 ***	-3.18 ***
-5	154	9.85	-0.53	9,560	12.72	-4.69	3.45	0.39	-9.57	-8.17	-7.17
			-4.73 ***			-3.23 ***		2.67 ***	-6.67 ***	-6.06 ***	-5.23 ***
-4	154	9.45	-0.40	9,311	12.82	-6.13	3.53	0.08	-11.77	-10.56	-10.46
			-2.90 ***			-3.86 ***		0.63	-8.38 ***	-7.43 ***	-7.52 ***
-3	151	8.66	-0.84	9,956	13.45	-6.37	4.08	0.65	-11.15	-10.00	-8.74
			-6.13 ***			-3.18 ***		4.39 ***	-6.70 ***	-5.44 ***	-5.05 ***
-2	150	7.79	-0.84	9,932	13.05	-8.46	4.89	0.81	-13.26	-11.53	-10.73
			-5.73 ***			-4.26 *		2.62 ***	-7.65 ***	-6.00 ***	-5.77 ***
-1	149	6.83	-0.97	10,246	13.51	-6.29	5.79	0.88	-12.69	-9.53	-9.65
			-6.89 ***			-2.00 **		2.86 ***	-4.61 ***	-3.18 ***	-3.41 ***
0	148	5.97	-0.90	10,684	13.20	-11.72	5.87	0.82	-17.15	-13.72	-14.01
			-6.88 ***			-4.04 ***		3.04 ***	-6.73 ***	-4.95 ***	-5.38 ***

Table 3

Stock Price and Return Characteristics by Month *Preceding* Downgrade in CAMEL Rating

The data reported on each of the month-to-rating change lines (-17 to 0) are calculated as simple averages for all trading days in each month. If data required for any monthly calculation are missing, then they are omitted from the calculation. Excess returns are calculated as the difference between the cumulative monthly return of each stock and the cumulative monthly return of the various indexes. T-statistics testing the hypothesis that the mean equals zero are shown below many of the monthly average return and change in return statistics. A single, double, or triple "*" indicates significance at the 10%, 5%, and 1% levels, respectively.

Months To Rating Change	Change Stock Price ($)	Change St. Dev. Daily Return (%)	CRSP Eq. Wt. Excess Return (%)	CRSP Va. Wt. Excess Return (%)	Industry Va. Wt. Excess Return (%)	Months To Rating Change	Change Stock Price ($)	Change St. Dev. Daily Return (%)	CRSP Eq. Wt. Excess Return (%)	CRSP Va. Wt. Excess Return (%)	Industry Va. Wt. Excess Return (%)
A) Trends Preceding Downgrade to 3											
-17	-0.17	-0.14	-1.90	-1.25	-0.93	-8	-0.20	0.14	-2.05	-1.86	-0.73
	-1.11	-1.20	-2.89 ***	-1.84 ***	-1.32		-2.75 ***	1.19	-2.52 **	-2.26 **	-0.83
-16	-0.33	0.02	-2.70	-2.39	-1.64	-7	-0.23	0.03	-1.46	-0.78	-0.03
	-1.85 *	0.18	-3.70 ***	-3.17 ***	-2.21 **		-2.44 **	0.26	-1.53	-0.80	-0.03
-15	-0.15	0.08	-0.94	-0.86	-0.15	-6	-0.10	0.35	-3.39	-2.82	-2.09
	-1.75 *	0.88	-1.07	-0.94	-0.16		-0.92	2.30 **	-3.10 ***	-2.47 **	-1.86 *
-14	-0.14	0.16	-2.35	-2.42	-1.62	-5	-0.30	-0.06	-3.09	-2.08	-1.63
	-1.52	1.57	-3.14 ***	-3.18 ***	-1.96 *		-2.67 ***	-0.38	-3.31 ***	-2.09 **	-1.70 *
-13	-0.20	-0.05	-2.53	-2.31	-1.81	-4	-0.29	0.09	-2.06	-1.44	-1.26
	-2.02 **	-0.39	-3.14 ***	-2.71 ***	-2.29 **		-2.83 ***	0.62	-1.88 *	-1.31	-1.14
-12	-0.10	0.14	-0.16	0.52	0.10	-3	-0.27	0.16	-3.81	-3.24	-3.48
	-0.86	0.94	-0.18	0.56	0.11		-2.77 ***	0.94	-3.78 ***	-3.27 ***	-3.48 ***
-11	-0.02	-0.07	-2.55	-2.41	-1.97	-2	-0.24	0.21	-2.73	-2.01	-2.14
	-0.30	-0.59	-3.19 ***	-3.02 ***	-2.35 **		-2.49 **	1.24	-2.29 **	-1.62	-1.74 *
-10	-0.18	0.33	0.21	0.74	1.32	-1	-0.19	0.13	-3.04	-2.41	-2.93
	-1.39	2.44 **	0.18	0.61	1.11		-1.54	0.76	-2.41 **	-1.77 *	-2.12 **
-9	-0.06	-0.12	-3.17	-2.85	-2.45	0	-0.14	0.14	-4.01	-2.54	-2.86
	-0.49	-0.87	-3.99 ***	-3.40 ***	-2.79 ***		-1.26	0.63	-3.72 ***	-2.26 **	-2.58 **
B) Trends Preceding Downgrade to 4 or 5											
-17	-0.19	0.07	-3.74	-3.53	-3.14	-8	-0.35	0.34	-2.16	-1.66	-0.88
	-2.65 ***	0.62	-4.91 ***	-4.64 ***	-3.89 ***		-3.86 ***	2.05 **	-1.78 *	-1.33	-0.70
-16	-0.19	0.10	-2.63	-2.40	-2.08	-7	-0.16	0.00	-2.36	-1.94	-1.65
	-3.15 ***	0.96	-3.18 ***	-2.92 ***	-2.47 **		-1.89 *	-0.01	-2.26 **	-1.76 *	-1.52
-15	-0.08	0.16	-1.32	-0.99	-0.53	-6	-0.32	0.11	-4.93	-4.47	-4.24
	-0.98	0.97	-1.28	-0.95	-0.50		-4.44 ***	0.68	-5.00 ***	-4.34 ***	-4.27 ***
-14	-0.13	-0.03	-3.62	-3.21	-2.79	-5	-0.42	0.17	-5.16	-4.09	-3.74
	-1.86 *	-0.18	-3.75 ***	-3.35 ***	-2.93 ***		-4.76 ***	0.81	-4.56 ***	-3.57 ***	-3.36 ***
-13	-0.07	0.09	-2.60	-2.28	-2.38	-4	-0.34	0.18	-4.84	-4.16	-4.02
	-1.01	0.63	-2.90 ***	-2.54 **	-2.60 **		-5.34 ***	0.82	-3.04 ***	-2.49 **	-2.46 **
-12	-0.16	-0.04	-4.41	-3.72	-3.89	-3	-0.28	0.41	-3.04	-2.21	-2.39
	-1.56	-0.31	-5.15 ***	-4.20 ***	-4.58 ***		-3.98 ***	2.11 **	-2.09 **	-1.42	-1.49
-11	-0.37	0.11	-5.42	-5.34	-5.01	-2	-0.20	0.07	-5.18	-4.11	-3.75
	-4.91 ***	0.75	-6.98 ***	-6.50 ***	-6.11 ***		-2.77 ***	0.33	-4.23 ***	-3.12 ***	-2.90 ***
-10	-0.41	0.66	-4.02	-3.57	-2.85	-1	-0.27	0.45	-3.69	-2.53	-2.76
	-4.96 ***	3.28 ***	-4.22 ***	-3.61 ***	-2.95 ***		-3.20 ***	1.62	-1.90 *	-1.26	-1.43
-9	-0.31	-0.12	-5.54	-5.32	-4.66	0	-0.35	-0.06	-6.49	-5.68	-5.83
	-4.32 ***	-0.73	-6.08 ***	-5.55 ***	-4.79 ***		-4.94 ***	-0.23	-4.89 ***	-4.13 ***	-4.27 ***

Table 4

Stock Price and Return Characteristics by Week *Preceding* Downgrade in CAMEL Rating

The data reported on each of the week-to-rating change lines (-36 to -10) are calculated as simple averages for all trading days in each week. If data required for any weekly calculation are missing, then they are omitted from the calculation. Excess returns are calculated as the difference between the cumulative weekly return of each stock and the cumulative weekly return of the various indexes. T-statistics testing the hypothesis that the mean equals zero are shown below many of the weekly average return and change in return statistics. A single, double, or triple "*" indicates significance at the 10%, 5%, and 1% levels, respectively.

Weeks To Rating Change	Change Stock Price ($)	CRSP Eq. Wt. Excess Return (%)	CRSP Va. Wt. Excess Return (%)	Weeks To Rating Change	Change Stock Price ($)	CRSP Eq. Wt. Excess Return (%)	CRSP Va. Wt. Excess Return (%)	Weeks To Rating Change	Change Stock Price ($)	CRSP Eq. Wt. Excess Return (%)	CRSP Va. Wt. Excess Return (%)
A) Trends Preceding Downgrade to 3											
-36	0.00	-0.50	-0.20	-27	0.00	0.44	0.46	-18	-0.10	-0.17	0.10
	0.04	-1.05	-0.39		-0.08	0.68	0.71		-2.20 **	-0.30	0.18
-35	-0.04	0.69	0.70	-26	-0.03	-0.28	-0.04	-17	-0.08	-1.13	-1.16
	-0.60	1.24	1.26		-0.58	-0.49	-0.06		-1.47	-1.64	-1.64
-34	-0.01	-0.49	-0.46	-25	0.04	-0.34	-0.31	-16	-0.03	-0.05	0.11
	-0.28	-1.01	-0.90		0.76	-0.48	-0.43		-0.63	-0.09	0.19
-33	-0.04	-0.13	-0.07	-24	-0.13	-2.00	-1.82	-15	-0.05	-0.87	-0.76
	-0.58	-0.26	-0.14		-2.45 **	-3.87 ***	-3.33 ***		-0.80	-1.31	-1.15
-32	-0.07	-0.63	-0.49	-23	-0.16	-2.07	-1.85	-14	-0.09	0.04	0.09
	-1.70 *	-1.42	-1.05		-2.60 **	-4.26 ***	-3.72 ***		-1.48	0.09	0.20
-31	-0.05	0.21	0.39	-22	-0.11	-0.77	-0.70	-13	-0.01	-1.35	-1.14
	-0.79	0.35	0.63		-2.01 **	-1.27	-1.12		-0.37	-2.01 **	-1.72 *
-30	-0.01	-0.40	-0.14	-21	-0.04	-0.47	-0.19	-12	-0.05	0.19	0.36
	-0.14	-0.72	-0.25		-0.66	-0.98	-0.38		-1.22	0.34	0.64
-29	-0.07	-0.39	-0.43	-20	-0.03	0.82	1.02	-11	-0.02	-0.67	-0.65
	-1.69 *	-0.71	-0.78		-0.50	1.42	1.74		-0.37	-1.48	-1.36
-28	-0.04	-0.90	-0.65	-19	-0.08	-1.86	-1.67	-10	-0.11	-1.59	-1.49
	-0.93	-1.87 *	-1.32		-1.43	-3.49 ***	-3.04 ***		-2.86 ***	-3.14 ***	-2.87 ***
B) Trends Preceding Downgrade to 4 or 5											
-36	-0.12	-0.62	-0.39	-27	-0.24	-0.66	-0.60	-18	-0.13	-1.22	-1.08
	-2.96 ***	-1.13	-0.70		-1.82 *	-1.01	-0.91		-3.96 ***	-1.41	-1.23
-35	-0.07	-0.53	-0.51	-26	-0.07	-1.32	-1.24	-17	-0.06	-0.28	-0.06
	-1.56	-0.75	-0.70		-2.38 **	-2.40 **	-2.15 **		-1.85 *	-0.36	-0.07
-34	0.03	-0.14	0.06	-25	-0.08	-0.38	-0.05	-16	-0.06	-1.12	-0.90
	0.60	-0.24	0.11		-2.80 ***	-0.62	-0.08		-2.05 **	-1.59	-1.22
-33	-0.06	-0.76	-0.54	-24	-0.04	-0.97	-0.76	-15	-0.08	-1.75	-1.80
	-1.30	-1.49	-1.05		-1.19	-1.58	-1.21		-2.78 ***	-2.33 **	-2.34 **
-32	-0.14	-0.84	-0.75	-23	-0.09	-1.55	-1.31	-14	-0.10	0.11	0.32
	-2.50 **	-1.42	-1.25		-3.49 ***	-2.73 ***	-2.22 **		-2.23 **	0.14	0.39
-31	0.01	0.29	0.40	-22	-0.10	-1.41	-1.35	-13	0.00	0.21	0.25
	0.33	0.49	0.68		-3.06 ***	-2.24 **	-2.14 **		-0.03	0.26	0.29
-30	-0.05	-0.81	-0.77	-21	-0.09	-1.05	-0.84	-12	-0.08	-0.65	-0.33
	-1.01	-1.36	-1.25		-2.89 ***	-1.62	-1.28		-2.41 **	-0.88	-0.43
-29	-0.08	-0.28	-0.16	-20	-0.04	-0.74	-0.49	-11	-0.05	-1.52	-1.45
	-2.53 **	-0.41	-0.24		-1.53	-1.01	-0.67		-1.43	-2.10 **	-1.97 *
-28	-0.07	-1.52	-1.49	-19	-0.12	-1.81	-1.69	-10	-0.08	-0.21	-0.01
	-1.43	-2.36 **	-2.29 **		-3.63 ***	-2.96 ***	-2.72 ***		-2.29 **	-0.27	-0.02

Table 5

Stock Price and Return Characteristics by Quarter *after* Downgrade in CAMEL Rating: Subsequent Recovery

The data reported on each of the quarter-to-rating change lines (0 to 8) are calculated as simple averages for all trading days in each quarter. If data required for any quarterly calculation are missing, then they are omitted from the calculation. Excess returns are calculated as the difference between the cumulative quarterly return of each stock and the cumulative quarterly return of the various indexes. T-statistics testing the hypothesis that the mean equals zero are shown below many of the quarterly average return and change in return statistics. A single, double, or triple "*" indicates significance at the 10%, 5%, and 1% levels, respectively.

Qtrs. After Rating Change	Sample	Avg. Stock Price ($)	Change Stock Price ($)	Avg. Daily Trading Volume (shares)	Avg. Qtrly. Turnover Ratio (%)	Cum. Qtrly. Return (%)	St. Dev. Daily Return (%)	Change St. Dev. Daily Return (%)	CRSP Eq. Wt. Excess Return (%)	CRSP Va. Wt. Excess Return (%)	Industry Va. Wt. Excess Return (%)
A) Trends Following Downgrade to 3: Subsequent Recovery
0	54	10.99	-0.32	10,946	17.49	0.40	4.25	0.11	-8.96	-2.22	-4.24
			-1.47			0.10		0.47	-2.86 ***	-0.60	-1.21
1	54	10.58	-0.41	7,922	14.46	1.01	4.18	-0.06	-5.42	-1.29	-3.97
			-1.66 *			0.39		-0.23	-2.02 **	-0.49	-1.41
2	53	10.60	0.08	7,412	13.37	9.87	4.33	0.07	-3.97	3.62	-2.34
			0.30			2.14 **		0.32	-0.88	0.80	-0.52
3	53	11.56	0.95	7,855	14.74	2.28	4.06	-0.27	-10.08	-2.34	-6.77
			3.43			0.86		-1.55	-4.06 ***	-0.90	-2.46 **
4	52	11.90	0.37	8,722	14.04	9.89	4.81	0.69	-1.39	6.92	2.67
			1.66 *			2.52 **		1.02	-0.36	1.67 *	0.64
5	52	12.62	0.71	7,539	12.44	19.92	5.04	0.23	11.33	16.28	12.77
			2.31 ***			2.02 **		0.66	1.16	1.67 *	1.31
6	51	14.30	1.44	8,635	15.68	15.92	3.72	-0.15	4.57	13.52	11.22
			4.67 ***			4.55 ***		-0.87	1.46	3.81 ***	3.20 ***
7	51	15.13	0.83	7,941	13.80	7.22	3.14	-0.58	-2.82	4.85	2.03
			2.52 ***			2.63 ***		-2.81 ***	-1.03	1.77 *	0.75
8	48	14.97	0.89	8,101	13.32	12.58	3.31	0.06	3.29	9.94	6.84
			3.68 ***			4.36 ***		0.37	1.17	3.67 ***	2.54 **
B) Trends Following Downgrade to 4 or 5: Subsequent Recovery
0	94	6.66	-0.52	8,681	10.63	-4.07	5.00	0.05	-11.46	-6.36	-8.58
			-3.33 ***			-1.11		0.20	-3.48 ***	-1.82 *	-2.55 **
1	94	6.07	-0.60	9,323	11.59	-7.10	6.05	1.05	-14.35	-9.87	-11.90
			-3.91 ***			-2.12 **		2.97 ***	-4.40 ***	-2.94 ***	-3.50 ***
2	94	5.81	-0.22	10,674	12.09	5.44	6.65	0.56	-5.75	1.17	-3.32
			-1.24			1.34		2.10 **	-1.60	0.29	-0.84
3	94	5.90	0.05	9,950	11.01	6.54	7.06	0.47	-7.13	1.89	-3.48
			0.32			1.27		0.73	-1.48	0.36	-0.66
4	92	6.20	0.23	10,691	13.04	14.86	6.62	0.08	3.08	11.46	6.60
			1.63			2.70 ***		0.24	0.57	2.08 **	1.19
5	89	5.89	0.09	12,485	12.67	5.30	6.89	0.10	-5.19	1.72	-2.06
			0.64			1.44		0.28	-1.44	0.46	-0.54
6	88	6.35	0.52	15,859	15.00	15.30	6.86	-0.10	2.21	11.43	6.88
			3.00 ***			3.79 ***		-0.24	0.59	2.77 ***	1.67 *
7	87	7.26	0.94	19,709	18.22	18.95	6.39	-0.53	7.34	16.33	11.30
			5.00 ***			4.55 ***		-1.54	1.82	3.90 ***	2.71 ***
8	87	7.81	0.56	20,665	14.08	13.04	5.99	-0.40	3.59	11.12	8.03
			3.94 ***			2.43 **		-1.15	0.70	2.06 **	1.50

Table 6

Stock Price and Return Characteristics by Quarter *after* Downgrade in CAMEL Rating: Subsequent Distress

The data reported on each of the quarter-to-rating change lines (0 to 8) are calculated as simple averages for all trading days in each quarter. If data required for any quarterly calculation are missing, then they are omitted from the calculation. Excess returns are calculated as the difference between the cumulative quarterly return of each stock and the cumulative quarterly return of the various indexes. T-statistics testing the hypothesis that the mean equals zero are shown below many of the quarterly average return and change in return statistics. A single, double, or triple "*" indicates significance at the 10%, 5%, and 1% levels, respectively.

Qtrs. After Rating Change	Sample	Avg. Stock Price ($)	Change Stock Price ($)	Avg. Daily Trading Volume (shares)	Avg. Qtrly. Turnover Ratio (%)	Cum. Qtrly. Return (%)	St. Dev. Daily Return (%)	Change St. Dev. Daily Return (%)	CRSP Eq. Wt. Excess Return (%)	CRSP Va. Wt. Excess Return (%)	Industry Va. Wt. Excess Return (%)
A) Trends Following Downgrade to 3: Subsequent Distress											
0	68	9.43	-0.75	13,699	15.70	-6.03	3.90	0.24	-12.75	-10.23	-11.11
			-2.28 **			-2.28 **		1.30	-5.74 ***	-4.39 ***	-4.85 ***
1	68	8.68	-0.74	15,037	16.74	-10.85	4.36	0.47	-15.95	-14.38	-13.20
			-3.32 ***			-3.02 ***		2.02 **	-5.68 ***	-4.34 ***	-4.28 ***
2	67	7.29	-1.32	14,715	16.82	-9.16	5.49	1.08	-14.67	-12.19	-12.27
			-3.76 ***			-2.51 **		3.32 *	-4.88 ***	-3.57 ***	-4.04 ***
3	67	6.45	-0.83	14,393	15.64	-8.73	6.66	1.16	-17.24	-13.80	-15.86
			-3.62 ***			-2.26 **		1.76 ***	-4.96 ***	-3.67 ***	-4.38 ***
4	66	5.87	-0.50	15,945	15.49	-3.27	7.19	0.47	-11.67	-6.14	-6.94
			-2.30 **			-0.60		0.72	-2.42 **	-1.18	-1.37
5	64	5.65	-0.39	19,325	17.27	-7.68	7.05	1.37	-13.30	-9.58	-11.34
			-1.58			-1.33		1.88 ***	-2.35 **	-1.66 *	-1.99 **
6	63	5.34	-0.38	15,724	14.09	-4.92	7.69	0.71	-15.83	-9.46	-13.04
			-2.33 **			-0.89		1.38	-3.19 ***	-1.72 *	-2.44 **
7	61	4.87	-0.16	18,531	14.49	3.14	8.66	0.77	-7.40	-0.11	-4.00
			-0.89			0.47		1.27	-1.24	-0.02	-0.61
8	58	4.69	0.00	20,009	15.13	12.86	7.75	-0.33	2.06	9.96	5.53
			0.00			1.57		-0.44	0.27	1.22	0.68
B) Trends Following Downgrade to 4 or 5: Subsequent Distress											
0	54	4.78	-1.57	14,170	17.68	-25.03	7.41	2.18	-27.06	-26.52	-23.46
			-7.53 ***			-5.97 ***		3.86 *	-7.39 ***	-6.63 ***	-6.23 ***
1	50	3.22	-1.73	15,113	16.68	-32.47	10.55	3.04	-38.01	-34.95	-34.07
			-8.40 ***			-8.36 ***		3.28 *	-11.76 ***	-9.76 ***	-10.33 ***
2	49	2.33	-0.91	12,270	16.38	-25.62	12.57	2.07	-32.19	-28.00	-29.66
			-5.91 ***			-4.50 ***		2.02 **	-6.63 ***	-5.32 ***	-5.97 ***
3	48	1.79	-0.55	13,135	14.69	-0.36	13.94	1.37	-8.64	-4.22	-6.23
			-5.95 ***			-0.03		0.98	-0.75	-0.35	-0.53
4	43	1.42	-0.50	11,557	13.10	-19.68	17.00	4.42	-32.61	-24.64	-30.07
			-5.47 ***			-2.10 **		2.38 **	-4.00 ***	-2.72 ***	-3.49 ***
5	33	1.26	-0.35	8,148	9.10	2.80	16.54	1.50	-9.77	-2.24	-7.65
			-3.37 ***			0.23		0.82	-0.84	-0.18	-0.62
6	21	1.32	-0.30	8,791	8.57	-8.67	16.86	2.95	-20.08	-11.80	-16.09
			-2.47 **			-0.64		1.65	-1.56	-0.89	-1.23
7	17	1.06	-0.42	9,704	10.35	-31.28	15.33	1.84	-39.97	-34.13	-37.35
			-3.02 ***			-4.10 ***		0.94	-4.63 ***	-4.30 ***	-4.65 ***
8	15	0.81	-0.35	10,404	12.00	-15.99	18.47	3.32	-27.56	-18.83	-21.71
			-2.81 ***			-1.23		1.38	-2.23 **	-1.39	-1.59

Table 7

Definitions of Variables, Means, and Standard Deviations

		CAMEL 3-Rated		CAMEL 4/5-Rated	
		Mean	**Standard Deviation**	**Mean**	**Standard Deviation**
Dependent Variable					
CAMELCAT (pre-period)	Dummy variable equal to 1 if the institution experienced a CAMEL rating downgrade to 3, 4 or 5, and 0 otherwise.	0.50	0.50	0.50	0.50
CAMELCAT (post-period)	Dummy variable equal to 1 if the institution experienced a CAMEL rating upgrade, and 0 otherwise.	0.56	0.46	0.35	0.48
Charter					
INSBIF	Dummy variable equal to 1 if the institution is associated with the Bank Insurance Fund, and 0 if it is associated with the Savings Association Insurance Fund.	0.69	0.46	0.60	0.49
Call Report Variables					
EQ_AS	Equity divided by total assets (%).	8.98	5.00	7.23	3.21
NC_RES	Non-Current (delinquent) assets, less loan-loss reserves, divided by total assets (%).	1.15	1.36	1.97	2.30
ROA	Year-to-date annualized earnings, divided by total assets (%).	0.51	1.37	0.14	1.26
SC_AS	Securities divided by total assets (%).	18.15	14.20	15.81	12.11
VL_AS	Volatile liabilities divided by total assets (%).	23.11	10.77	23.02	10.86
Core Market Variables					
LN_PR	Natural logarithm of market price.	2.33	0.62	2.05	0.67
EXRET	Market excess return, calculated as the difference between the cumulative quarterly return of each stock and the cumulative quarterly return of the CRSP equal weighted index.	-0.06	0.16	-0.12	0.17
DIV	Dummy variable equal to 1 if a dividend is paid during the the previous 4 quarters, and 0 otherwise.	0.37	0.48	0.33	0.47
Risk Variables					
SDRET	Standard deviation of daily returns during the quarter.	0.03	0.02	0.04	0.03
TURN	Number of shares traded in a quarter divided by the number of shares outstanding at the end of the quarter (%).	14.28	13.67	12.82	13.15
BE_ME	Book equity divided by market capitalization.	1.49	0.91	1.85	1.53

Table 8
Table 8
Logit Regression Results: 4 Quarters *before* Downgrade

This table preforms Logit regression analysis on the sample of commercial banks and thrift institutions. All independent variables are defined in Table 7. T-statistics are shown in parentheses below their corresponding regression coefficients. A single, double, or triple "*" indiciates significance at the 10%, 5%, and 1% levels, respectively.

Specification

Independent Variable	Anticipated Sign	CAMEL 3-Rated Group (Panel A) 4 Quarters Before Downgrade 1	2	3	4	Camel 4/5-Rated Group (Panel B) 4 Quarters Before Downgrade 1	2	3	4
Intercept	+	1.34	3.01	4.22	2.00	2.85	3.05	2.87	0.52
		(2.15) **	(2.84) ***	(2.99) ***	(1.77) *	(3.67) ***	(2.75) ***	(1.98) **	(0.57)
Charter									
INSBIF	+	0.50	0.59	0.72	0.29	1.11	1.37	1.45	0.32
		(1.17)	(1.34)	(1.60)	(0.81)	(2.52) **	(2.82) ***	(2.92) ***	(0.94)
Call Report Variables									
EQ_AS	−	-0.12	-0.12	-0.13		-0.22	-0.24	-0.25	
		(2.84) ***	(2.83) ***	(3.01) ***		(3.03) ***	(3.11) ***	(3.08) ***	
NC_RES	+	0.26	0.22	0.23		0.02	0.01	0.01	
		(2.51) **	(2.01) **	(2.13) **		(0.45)	(0.09)	(0.16)	
ROA	−	-0.98	-0.80	-0.76		-1.86	-1.79	-1.77	
		(2.97) ***	(2.30) **	(2.19) **		(5.09) ***	(4.09) ***	(3.88) ***	
SC_AS	−	-0.06	-0.06	-0.06		-0.11	-0.11	-0.12	
		(4.32) ***	(4.16) ***	(4.06) ***		(5.70) ***	(5.52) ***	(5.54) ***	
VL_AS	+	0.06	0.07	0.06		0.08	0.07	0.07	
		(4.14) ***	(4.07) ***	(3.87) ***		(4.09) ***	(3.85) ***	(3.80) ***	
Core Market variables									
LN_PR	−		-0.67	-1.08	-0.89		-0.03	-0.02	-0.51
			(1.88) *	(2.50) **	(2.64) ***		(0.07)	(0.06)	(1.85) *
EXRET	−		-1.48	-1.88	-1.58		-3.96	-4.06	-3.77
			(1.25)	(1.42)	(1.45)		(2.70) ***	(2.77) ***	(3.31) ***
DIV	−		-0.50	-0.40	-0.38		-0.77	-0.88	-0.67
			(1.34)	(1.06)	(1.14)		(1.87) *	(2.06) **	(2.04) **
Risk Variables									
BE_ME	+				0.28				0.12
					(1.33)				(0.67)
SDRET	+			-20.09	-16.39			-1.67	17.06
				(1.72) **	(1.58)			(0.12)	(1.56)
TURN	+			0.02	0.01			0.03	0.02
				(1.43)	(1.22)			(1.82) *	(1.41)
AIC		215.20	211.32	209.88	253.85	197.70	191.89	192.26	285.03
R^2		0.27	0.31	0.33	0.11	0.44	0.47	0.47	0.18
χ^2 (relative to specification 1)		NA	9.88 **	15.31 ***	NA	NA	11.81 ***	15.44 ***	NA
degrees of freedom			3	5			3	5	

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Table 9
CAMEL Prediction Accuracy and Error Analysis: 4 Quarters *before* Downgrade

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CAMEL 3-Rated Group

Equation Specification	D--Pred (D) (Correct D) (%)	D--Pred (ND) (Type 1 Error) (%)	ND--Pred (ND) (Correct ND) (%)	ND--Pred (D) (Type 2 Error) (%)
In-Sample Classification				
1	75.53	24.47	75.53	24.47
2	77.66	22.34	70.21	29.79
3	78.72	21.28	73.40	26.60
4	70.21	29.79	62.77	37.23
Out-of-Sample Classification				
1	65.63	34.38	81.25	18.75
2	65.63	34.38	78.13	21.88
3	68.75	31.25	71.88	28.13
4	62.50	37.50	62.50	37.50

CAMEL 4/5-Rated Group

Equation Specification	D--Pred (D) (Correct D) (%)	D--Pred (ND) (Type 1 Error) (%)	ND--Pred (ND) (Correct ND) (%)	ND--Pred (D) (Type 2 Error) (%)
In-Sample Classification				
1	77.88	22.12	78.76	21.24
2	79.65	20.35	81.42	18.58
3	77.88	22.12	78.76	21.24
4	61.95	38.05	73.45	26.55
Out-of-Sample Classification				
1	73.17	26.83	82.93	17.07
2	78.05	21.95	90.24	9.76
3	78.05	21.95	87.80	12.20
4	58.54	41.46	73.17	26.83

Table 10
Logit Regression Results: 1 Quarter *after* Downgrade

This table extends the logit regressions performed in Table 8, using the sample of downgraded banks and thrifts, but performs the analysis 1 quarter after downgrade. T-statistics are shown in parentheses below their corresponding regression coefficients. A single, double, or triple "*" indicates significance at the 10%, 5%, and 1% levels, respectively.

Specification

Independent Variable	Anticipated Sign	CAMEL 3-Rated Group (Panel A) 1 quarter after Downgrade				Camel 4/5-Rated Group (Panel B) 1 quarter after Downgrade			
		1	2	3	4	1	2	3	4
Intercept	+	1.28	1.60	5.28	3.06	-1.58	-0.80	-1.49	-1.21
		(1.17)	(1.14)	(2.31) **	(1.87) *	(1.21)	(0.51)	(0.77)	(1.02)
Charter									
INSBIF	+	0.79	0.80	0.82	-0.12	0.11	0.33	0.43	0.47
		(1.27)	(1.26)	(1.24)	(0.23)	(0.17)	(0.45)	(0.58)	(0.81)
Call Report Variables									
EQ_AS	-	-0.35	-0.37	-0.44		-0.24	-0.28	-0.26	
		(3.04) ***	(3.16) ***	(3.43) ***		(1.64)	(1.77) *	(1.63)	
NC_RES	+	0.33	0.35	0.46		0.51	0.39	0.39	
		(2.08) **	(2.18) **	(2.57) **		(3.75) ***	(2.68) ***	(2.70) ***	
ROA	-	-0.38	-0.25	-0.24		-0.27	-0.04	-0.01	
		(1.71) *	(1.00)	(0.90)		(2.02) **	(0.20)	(0.07)	
SC_AS	-	-0.04	-0.04	-0.04		-0.05	-0.05	-0.05	
		(2.21) **	(2.14) **	(1.82) *		(1.73) *	(1.35)	(1.31)	
VL_AS	+	0.06	0.05	0.05		0.05	0.05	0.05	
		(2.21) **	(2.03) **	(1.86) *		(1.55)	(1.46)	(1.48)	
Core Market Variables									
LN_PR	-		-0.14	-1.08	-1.00		-1.05	-0.90	-1.46
			(0.30)	(1.66) *	(1.86) *		(1.98) **	(1.57)	(2.71) ***
EXRET	-		-1.60	-1.73	-2.26		-4.65	-4.31	-4.68
			(1.27)	(1.30)	(1.99) **		(3.03) ***	(2.66) ***	(3.27) ***
DIV	-				0.01				0.24
					(0.01)				(0.27)
Risk Variables									
BE_ME	+				-0.16				-0.02
					(1.17)				(0.23)
SDRET	+			-33.01	-17.11			6.05	7.55
				(2.16) **	(1.44)			(0.61)	(1.02)
TURN	+				0.01				0.03
					(0.70)				(1.62)
AIC		109.72	112.00	108.76	131.11	104.29	93.71	95.33	107.20
R^2		0.27	0.29	0.33	0.10	0.37	0.45	0.45	0.36
χ^2 (relative to specification 1)		NA	1.72	6.96 *	NA	NA	14.58 ***	14.96 ***	NA
degrees of freedom			2	3			2	3	

Table 11
CAMEL Prediction Accuracy and Error Analysis: 1 Quarter *after* Downgrade

CAMEL 3- Rated Group

Equation Specification	D--Pred (D) (Correct D) (%)	D--Pred (ND) (Type 1 Error) (%)	ND--Pred (ND) (Correct ND) (%)	ND--Pred (D) (Type 2 Error) (%)
In-Sample Classification				
1	74.51	25.49	75.00	25.00
2	74.51	25.49	82.50	17.50
3	72.55	27.45	77.50	22.50
4	70.59	29.41	65.00	35.00
Out-of-Sample Classification				
1	58.82	41.18	50.00	50.00
2	52.94	47.06	71.43	28.57
3	64.71	35.29	64.29	35.71
4	82.35	17.65	35.71	64.29

CAMEL 4/5-Rated Group

Equation Specification	D--Pred (D) (Correct D) (%)	D--Pred (ND) (Type 1 Error) (%)	ND--Pred (ND) (Correct ND) (%)	ND--Pred (D) (Type 2 Error) (%)
In-Sample Classification				
1	68.42	31.58	85.71	14.29
2	81.58	18.42	87.14	12.86
3	81.58	18.42	87.14	12.86
4	81.58	18.42	77.14	22.86
Out-of-Sample Classification				
1	66.67	33.33	70.83	29.17
2	83.33	16.67	75.00	25.00
3	75.00	25.00	70.83	29.17
4	66.67	33.33	62.50	37.50