Comparing Market and Supervisory Assessments of Bank Performance: Who Knows What When?

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Abstract

We compare the timeliness and accuracy of government supervisors versus market participants in assessing the condition of large U.S. bank holding companies. We find that supervisors and bond rating agencies both have some prior information that is useful to the other. In contrast, supervisory assessments and equity market indicators are not strongly interrelated. We also find that supervisory assessments are much less accurate overall than both bond and equity market assessments in predicting future changes in performance, but supervisors may be more accurate when inspections are recent. To some extent, these results may reflect differing incentives of the parties.

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I. Introduction

All corporations operate under governance systems designed to reduce agency problems among shareholders, debtholders, and managers. An important factor determining the efficacy of corporate governance is the ability of the principals to obtain timely and accurate information about firm condition. For most types of firms, private-sector agents design and operate the main governance mechanisms and acquire the information needed to keep agency costs under control. In contrast, the governance of banking organizations generally involves substantial roles for government supervision and regulation in addition to the customary forms of market oversight. In this paper, we evaluate empirically the ability of government supervisors versus bond market and equity market participants to obtain timely and accurate information in the monitoring of banking organizations.[1]

In large part, supervisors base their decisions on information gathered during on-site visits, which are called examinations for banks and called inspections for bank holding companies in the U.S. Government intervention in gathering on-site information and in supervising the behavior of banks is frequently justified on the basis of a government stake in controlling bank risk-taking, and sometimes also on the basis of an assumed government comparative advantage in information gathering and monitoring. The government stake derives from the safety net (deposit insurance, discount window loans, payment guarantees), which makes government a large contingent holder of bank liabilities, and from a widespread belief that bank failures can have significant adverse consequences for the financial system.

The assumed government advantage in information gathering and monitoring may occur in part because of economies of scale in collecting information and enforcing discipline. Banks are theorized to be efficient delegated monitors of borrowers on behalf of small depositors (Diamond 1984). Similarly, the government may act as an efficient "monitor of the monitor" on behalf of all outside stakeholders, collecting information and keeping banks from taking on excessive risks or mismanaging funds (Dewatripont and Tirole 1994). Although this "monitor of the monitor" role could in principle belong to a large private-sector entity such as a rating agency, government supervisors may have a comparative advantage because of their ability to compel revelation of private information from management. As discussed below, supervisors have access

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[1]For convenience, we will simply use "supervision" to refer to both supervision and regulation, since our focus is on the supervisory process of inspecting bank holding companies and supervising their activities.

to confidential loan files and other private information that may not be divulged to outside rating agencies.

The main question we address in this paper -- "Who knows what when?" between supervisors and market monitors -- has a number of important policy implications. Proposals for narrow banking and for increased reliance on uninsured deposits and subordinated debt are based on the assumption that the market can more efficiently discipline bank behavior. In contrast, proposals for more frequent on-site examinations and more detailed government rules and penalties for bank behavior are based on an assumption that supervisory discipline is relatively efficient. A related issue concerns the secrecy of supervisory ratings. If supervisors have access to accurate relevant information on bank condition on a more timely basis than market participants, then market discipline might be improved by the disclosure of this information. Similarly, supervisory discipline might be improved by paying increased attention to observable market assessments of bank condition, such as bond ratings or stock prices, when choosing supervisory ratings or the timing of on-site visits. Although the optimal governance of banking organizations involves many issues besides just the information used by the economic agents involved, it is important that whichever parties exercise discipline over bank behavior be informed on a timely and accurate basis.

We compare supervisory assessments of bank holding company (BHC) condition to four distinct measures of market information for a quarterly sample of 184 U.S. BHCs over the period 1989:Q4 - 1992:Q2. We use changes in the Federal Reserve's BOPEC rating and the timing of on-site inspections to indicate changes in the supervisors' appraisal of a BHC's condition. BOPEC ratings are analogous to the CAMEL ratings assigned to individual banks, and range from "1" (strongest) to "5" (weakest). BOPEC ratings reflect information gathered by supervisors during on-site inspections of the BHC and examinations of the banks in the BHC, data reported on regulatory report forms, and any market information that supervisors choose to incorporate. A financial institution tends to retain the same supervisory rating until the next on-site inspection or examination -- typically about one year later. We also use market data on changes in the Moody's rating for the BHC's senior subordinated debentures, the BHC's abnormal stock return, and the changes in the proportions of equity owned by institutional investors and bank insiders (officers and directors). These four market measures are used to measure changes in the assessments of BHC condition by bond rating agencies, shareholders, institutional owners, and bank insiders, respectively. Each of these

groups potentially has access to a different information set and operates under different incentives.

We compare government and market assessments of BHC condition in terms of both **timeliness** and **accuracy**. We evaluate **timeliness** via the concept of Granger-causality. As described further below, a random variable X Granger-causes random variable Y if past X helps improve the prediction of current Y, given the past history of Y and other variables. By letting X and Y be the assessments of BHC condition by supervisors and market participants, we can discover which party's assessment variable reflected information first. For example, if we were to find that the past changes in the BOPEC ratings consistently helped to predict current changes in the Moody's ratings, we would conclude that supervisors tend to use some relevant information about BHC condition in a more timely fashion than the bond rating agency. Note that it is possible that supervisory and market assessments may be complementary and Granger-cause each other, which would be the case if each discovered some different relevant information first.

Our Granger-causality tests of timeliness have some parallels to conventional event studies in which abnormal stock returns are measured in a short time window around some event to test the effects of the event. However, the Granger-causality tests using quarterly data fit our purposes much better. We can test the effects of multiple supervisory or market variables simultaneously, rather than just focusing on a single event. The Granger-causality tests also go in both directions -- i.e., whether supervisory variables Granger-cause market variables and vice versa -- and do not always involve a continuous variable like abnormal returns reacting to a discrete variable like a BHC inspection occurring. Moreover, the actual time that confidential supervisory inspection information becomes known by the public (or if it ever becomes known) cannot be easily put into a short time window for an event study. Our Granger-causality tests allow a full year after the BHC inspections for the information to be reflected in share prices or other market variables. The one-year interval is also helpful because one year is the typical interval between BHC inspections, and so allows us to include a full supervisory cycle to see if the supervisory information becomes "stale" or out-of-date before the next inspection. The Granger-causality tests also resemble tests of the strong form of the efficient markets hypothesis (EMH), under which financial market prices promptly reflect all public and private information (Fama 1970, 1976, Jensen 1978). Our method and access to confidential supervisory ratings permits us to test whether supervisors' private information is reflected not only in market prices

(abnormal returns), but also in bond ratings and changes in the portfolios of institutional and inside investors.

We also compare the **accuracy** of supervisory versus market assessments by running "horse races" to see how well their data help predict future changes in holding company performance. Most previous studies tried to determine whether supervisors or market participants incorporated information in a more timely fashion without measuring whether their ratings or prices were accurate indicators of what they were intended to predict. It is possible to incorporate available information in a timely way without being accurate -- for example, by overreacting to new information. It is also possible to be relatively accurate without incorporating all information in a timely fashion, as may be the case if the information of another inaccurate agent is not used. For these reasons, we believe that analysis of **both** timeliness and accuracy are needed to give a complete comparison of supervisory versus market information.

Our analysis suggests that supervisory assessments and bond rating agency assessments complement one another, in the sense that each information set adds importantly to the ability to forecast the other group's assessments of BHC condition. In contrast, supervisory assessments and equity market indicators are not strongly related to each other. We attribute this important difference to diverging incentives. Bank supervisors and bond rating agencies primarily represent debtholders and are most concerned about bankruptcy risk -- the probability and severity of default states of nature. Equity market participants, in contrast, are more concerned with wealth creation, which depends primarily on the cash flows in the nondefault states of nature. We also find that supervisory assessments are much less accurate overall than either bond or equity market assessments in predicting future changes in BHC performance. This may in part reflect a difference in incentives -- supervisors may try to impose effective discipline by focusing more on current condition, whereas market participants may give more weight to expected changes in managerial behavior. It is also possible that supervisory ratings get "stale" over the supervisory cycle. Consistent with this possibility, we find supervisory assessments become much more accurate when there has been an on-site inspection in the past quarter.

The paper is organized as follows. Section II briefly describes and compares the information and incentives of supervisors and market participants involved in the governance of BHCs. Section III reviews previous research in this area, and Section IV describes the data. Sections V and VI present our Granger-

causality tests of timeliness and our horse race tests of accuracy, respectively. Section VII concludes.

II. The Information and Incentives of Supervisors and Market Participants

Government supervisors use private information gathered during on-site bank examinations and BHC inspections, as well as information on regulatory report forms like the Call Report and the Y-9, and possibly data from stock and bond markets.[2] The on-site examinations and inspections usually occur approximately annually, with the BHC supervisor having access to the reports from examinations of all the banks in the BHC. A substantial proportion of on-site time is devoted to examination of the loan files, each of which contains borrower performance information, the bank's internal rating of the loan, and business information provided by the borrower under condition of confidentiality. During a bank examination, supervisors typically examine the files of loans covering at least 40% of the dollar value of loans, paying particular attention to problem loans. Supervisors also evaluate the BHC's underwriting and risk management systems, and become privy to the BHC's strategic plan and likely future business prospects. Based on all this information, the Federal Reserve assigns each BHC a composite BOPEC rating, which reflects the conditions of the holding company's **B**ank subsidiaries, **O**ther (nonbank) subsidiaries, **P**arent company, **E**arnings, and **C**apital adequacy.[3]

Since individual banks typically do not issue stocks or bonds, we perform the analysis at the holding company level in order to compare supervisors with stock market and bond market participants. Fortunately, the supervisors setting the BOPEC ratings and scheduling the inspections have access to all the supervisory information at the bank level.

Supervisors may generate three distinct types of information. First, during on-site visits, they may learn private information about the prior condition of the BHC that is not available to market analysts. For example, supervisors can scrutinize the confidential information in the loan files, which can only be seen by supervisors and bank insiders. Second, supervisory oversight of BHC operations may have a certification effect in which it confirms the accuracy of the BHC's audited financial statements. Finally, government

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[2]See Flannery (1998) for evidence regarding the use of market information in the supervisory process.

[3]Supervisors also assign numerical ratings to each of these five components, and rate BHC management as satisfactory, fair, or unsatisfactory. We use only the composite BOPEC in our analysis.

supervisors can uniquely impose supervisory discipline if they perceive a problem situation. For example, BHCs that have their BOPEC ratings lowered may be required to hold additional equity capital, forego expansion, or revise their underwriting standards. All three types of supervisory information may affect market participants' evaluations of the BHC if and when the information is later revealed or discovered.

As noted above, we use four market indicators of BHC condition -- changes in Moody's rating for outstanding debentures, abnormal stock returns, and changes in institutional investors' and insiders' ownership positions. The information sets of these market participants likely differ. Bond rating agencies and institutional investors collect and analyze public information sources, including some of the public regulatory report forms, and market information on securities prices and holdings of other investors. These firms also often obtain voluntary information from bank insiders. The insiders likely have access to better information on bank condition than all the other agents, market or government, because of their access to all the BHC's internal data and their roles as managers.

The government supervisors and market participants also have different incentives which will affect how their information is translated in their ratings, prices, and holdings. As discussed earlier, supervisors act to protect their positions as contingent liability holders and to protect against systemic failures, and are therefore primarily concerned with the probability and severity of default states of nature. Bond rating agencies like Moody's are similarly concerned with the downside potential for losses because they act on behalf of creditors. In contrast, shareholders are less concerned about risk and are primarily interested in the upside potential for profits, i.e., the cash flows in the nondefault states of nature. An exception may be inside shareholders, who are also generally very concerned with default states, in which they may lose their jobs and a substantial share of their relatively undiversified financial portfolios. Because supervisors and bond rating agencies have similar incentives, our comparisons of changes in supervisory BOPEC ratings with changes in Moody's bond ratings yield our cleanest tests of whether supervisors or market participants have more timely or accurate information than one another. Comparisons of changes in BOPEC ratings with the equity market variables -- abnormal stock returns and changes in institutional and insider holdings -- may

be more affected by differences in incentives or preferences about risk.[4]

One other potential difference in incentives between supervisors and market participants bears note. Supervisors and market participants may place different relative weights on the current financial condition of the BHC versus the expected changes in condition from changes in managerial behavior. It is unlikely that bank supervisors would raise a supervisory rating for a bank in poor financial condition that has started to implement a credible plan to improve its condition or has replaced a poor management team with a high-quality team, even if supervisors expect these changes to reduce the probability of default. This is because unfavorable ratings may enhance supervisory discipline by giving these organizations incentives to improve their conditions or giving others incentives not to ever get into poor condition. In contrast, private-sector agents may give more weight to expected improvements in condition from managerial changes because individual market participants generally do not have as much ability or incentive to discipline bank behavior as government supervisors.

III. Literature Review

Previous research has considered either the timeliness or the accuracy of market and supervisory assessments of bank condition. The majority of the studies compared supervisory assessments with data on stock market prices, although some used bond market data. Our goal is a more comprehensive analysis.

Most of the prior studies focused on timeliness, and the early studies usually found that supervisors generally did not have information in a more timely fashion than market participants. Pettway (1980) performed event studies for six large banks which were placed on the "problem bank list" during 1972-1976. He found significantly negative cumulative abnormal stock returns as early as 38 weeks before the start of the examination which first recognized the banks' problems, suggesting a timeliness advantage for investors over supervisors. Hirschhorn (1987) investigated whether CAMEL rating changes pre-date stock price changes, using data on examination ratings of the lead banks of the 15 largest BHCs during 1978-1987. He found that the composite CAMEL and four of the five component ratings were approximately contemporaneously correlated with abnormal returns. Only the component rating for capital adequacy helped

[4]Supporting this difference in incentives, Hall, Meyer, and Vaughan (1997) found that supervisors and shareholders responded differently to balance sheet measures of BHC condition.

predict future stock returns. These results suggest that supervisors generally have little economically significant informational advantage over equity market participants. Cargill (1989) examined cross-sectional variation in the rates on large certificates of deposit for 58 large banks during 1984-1986. He found that CAMEL ratings added no significant explanatory power beyond what is provided by Call Report financial ratios, again implying that supervisory assessments do not have substantial information prior to market participants.[5]

In contrast, more recent studies generally found that supervisors did have some valuable information on a more timely basis than market participants. Simons and Cross (1991) identified 22 BHCs whose lead banks had their composite CAMEL rating lowered to the problem ratings of 4 or 5 during 1981-1987. They found that the BHC's weekly abnormal stock returns for the year preceding the downgrade were equally likely to be positive or negative, and that few news stories chronicled the firms' problems. This suggests that supervisors may have known about problems before market participants. Berger and Davies (1994) used event study methodology to identify abnormal BHC stock returns after 390 lead bank examinations during 1985-1989. They separated out the three types of information that may be generated by the examination -- private information about bank condition, certification information about the quality of audited financial statements, and supervisory discipline information about whether the bank may have greater or fewer restrictions placed on it. They found that the only type of private information that was transferred to the market was unfavorable private information about bank condition. These data suggest that bank managers may reveal favorable private information in advance, while supervisors in effect force the release of unfavorable information. Further indication that market investors learn something from on-site government inspections is provided by Flannery and Houston (1998), who evaluated the correspondence between market and book valuations for a sample of BHCs in the fourth quarters of 1988 and 1990. They found that investors evaluated financial information differently when the BHC had recently received an on-site inspection, particularly in the relatively "normal" 1988 period. Inspected BHCs showed a closer correspondence between market and book values, consistent with the hypothesis that investors view

[5]Swindle (1994) did, however, find indirect evidence consistent with a supervisory discipline effect of examinations using data on 51 of Cargill's 58 banks. She found that banks with low or downgraded ratings on the capital component of the CAMEL rating subsequently raised their primary capital ratios.

examiners as credible certifiers of the financial statements' accuracy. Finally, DeYoung, Flannery, Lang, and Sorescu (1997) investigated whether national bank examiners' private information significantly predicted changes in the risk premia on large BHCs' subordinated debentures. They found that debenture yield spreads changed up to six months after the examination information during 1989-1995, consistent with the hypothesis that examiners uncover relevant information before the market.[6]

The literature comparing the accuracy of supervisory versus market data in predicting future changes in banking institution performance is considerably sparser than the literature on timeliness, and it focuses only on the ability to predict the probability of extreme outcomes. Cole and Gunther (1998) compared supervisory ratings with Call Report information in predicting future bank failures during 1988:Q2 - 1992:Q1. They found that CAMEL ratings improved forecast accuracy, but only if the examination was in the most recent two quarters. Davies (1993) investigated the relative accuracy of supervisory versus market assessments by testing whether CAMEL or BOPEC ratings versus market/book ratios better helped predict future book-value insolvency (alternatively defined as that the bank's capital ratio falls below 2% or below 3%) during 1986 - 1991. She found that unsatisfactory bank CAMEL ratings and low market/book ratios helped predict a higher probability of book-value insolvency, whereas unsatisfactory holding company BOPEC ratings had little or no additional predictive power.[7]

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[6] Studies of bank "early warning" systems (e.g., Sinkey 1978, Whalen and Thompson 1988, O'Keefe and Dahl 1997) tested how well supervisory ratings can be predicted from publicly available information (generally Call Report data), for the purpose of allocating scarce supervisory resources. These may also be viewed in part as tests of the timeliness of supervisory information -- whether the supervisors have information not already in the publicly available data -- although this was not the main purpose. These studies generally found that the supervisory ratings were far from perfectly predictable from Call Report information. However, these studies are less informative about the issue of timeliness than studies using stock and bond market data, since market data presumably incorporate much more information than the Call Report.

[7]Some related studies evaluated the accuracy of market participants in predicting BHC problems, although they did not evaluate or compare the accuracy of government supervisors. Fraser and Richards (1985) examined the stock returns of six "upstream" banks around the time of Penn Square's failure in July 1982, and reported no abnormal returns before the failure was publicly announced. This suggests that at least in this one case, market participants were fairly inaccurate. In contrast, Jordan (1997) found evidence in favor of market participant accuracy in another setting. He examined 35 New England BHCs with publicly traded equity during that region's real estate collapse in 1990-91, and found that the stock prices of 15 BHCs which subsequently failed fell earlier and more drastically than the stock prices of 20 BHCs which survived the crisis. He also found that the surviving BHCs' insiders were much more likely than insiders at failing BHCs to purchase stock when its price fell, suggesting that insiders in particular had accurate information.

Thus, the research to date is mixed as to whether supervisory information is more or less timely than market assessments of banking organization condition, and the evidence on accuracy is sparse and focused only on predicting the probability of an extreme outcome (failure or book-value insolvency). Clearly, more research is needed to resolve these questions. In addition, there are no studies of which we are aware that evaluate both timeliness and accuracy using the same data set, no studies that compare the same supervisory ratings to both stock and bond market data, no studies that use quantity information on changes in market position as well as prices, no studies of whether supervisors versus market participants are accurate at predicting more than the probability of one extreme outcome. In this study, we try to be more comprehensive by evaluating both timeliness and accuracy for the same data set, by using both stock and bond market information, by including both price and quantity information on market participants, and by using multiple future indicators of changes in BHC performance in evaluating accuracy.

IV. Data

Table 1 summarizes our data for 184 BHCs over the period 1989:Q4 through 1992:Q2. The data are quarterly, as this is the only way the institutional and insider stock holdings data and the measures of BHC performance were available. Given our concern with evaluating new information, we express the assessments of BHC condition as the changes over the quarter, such as change in the BOPEC rating, change in the Moody's rating, or abnormal return over the quarter.

Supervisory Assessments of BHC Condition

We use the composite BOPEC rating to represent the supervisory assessment of BHC condition. Most BHCs have BOPEC ratings of 1 or 2 and are considered to be fundamentally sound. BHCs with ratings of 3, 4, or 5 are considered to be more vulnerable to adverse business conditions and to require more than normal supervision. These BHCs are generally encouraged or required to take specific actions to correct the perceived deficiencies. The sample mean BOPEC rating is 2.02. For expositional convenience, we will simply refer to BOPEC ratings of 1 or 2 as satisfactory, and ratings of 3, 4, or 5 as unsatisfactory.

We include five dummy variables for the BOPEC rating changes, focusing on whether the rating went up, went down, or was unchanged, and on whether the satisfactory-unsatisfactory threshold between {1,2} and {3,4,5} was crossed. We differentiate between BOPEC upgrades and downgrades because

managers may convey more of the favorable information to market investors in advance of a BHC inspection and withhold more of the unfavorable information. If so, BOPEC upgrades would generally reveal less private information than downgrades.[8]

We differentiate whether or not the BOPEC rating change crossed the satisfactory-unsatisfactory threshold because crossing the threshold may indicate a more substantial change in supervisory opinion and discipline than changes that remain within either the satisfactory or unsatisfactory regions. For example, a BOPEC downgrade from 2 to 3 would likely provoke a stronger reaction from shareholders and bond rating agencies than a BOPEC change from 1 to 2. As shown in Table 1, BOPEC_DN_THRESH and BOPEC_DN_NOTHRESH indicate whether the BOPEC rating was downgraded (worsened) during the quarter, and whether it crossed the threshold (e.g., from 2 to 3) or did not cross it (e.g., from 1 to 2 or from 3 to 4). BOPEC_UP_THRESH and BOPEC_UP_NOTHRESH are defined analogously for upgrades and BOPEC_NC indicates whether the BOPEC rating remained unchanged. If upgrades and downgrades have information effects of equal magnitude, then we would expect the coefficients of the corresponding "UP" and "DN" variables to be of equal size and opposite sign, and if changes that cross the threshold and do not cross it have equal effects, then we would expect the coefficients of the corresponding "THRESH" and "NOTHRESH" variables to be equal.

Unlike Moody's bond ratings -- where there is clear agreement over the threshold between investment grade and noninvestment grade -- the distinction between satisfactory and unsatisfactory supervisory ratings is not so clear. It may be argued that crossing the threshold between BOPEC ratings of {1,2,3} and {4,5} would better represent a substantial change in supervisory opinion and discipline than our threshold between {1,2} and {3,4,5} because ratings of 4 and 5 generally require urgent action to avoid significant supervisory consequences. We prefer our original threshold specification of crossing between {1,2} and {3,4,5} for the pragmatic reason that this threshold is crossed much more often, but acknowledge that crossing the alternative specification usually represents a more substantial change in supervisory opinion

[8]As noted above, Berger and Davies (1994) found evidence consistent with this argument -- abnormal returns on BHC stocks fell after a CAMEL downgrade of the lead bank, but did not rise following a CAMEL upgrade. Dahl, Hanweck, and O'Keefe (1995) found that loan losses more often increased than decreased following a bank examination, also consistent with the argument that managers tend to reveal positive information and withhold negative information prior to examination.

and discipline. To demonstrate robustness, we show our main tests using both specifications, which yield essentially the same results.

Table 1 indicates that the BOPEC rating remains unchanged in 94.4% of the BHC-quarters. In other words, BOPEC changes occur in 5.6% of our BHC-quarters or about 22.4% of our BHC-years. Of the changes, downgrades occurred about 6 times as often as upgrades, reflecting the macroeconomic recession and broad deterioration in banking conditions during the sample period. For both upgrades and downgrades, slightly more than half crossed our original satisfactory-unsatisfactory threshold between {1,2} and {3,4,5}. Substantially fewer observations crossed our alternative threshold between {1,2,3} and {4,5} -- the 0.00087 shown for BOPEC_UP_THRESH represents a single observation out of 1151 inspections in which a BHC rose from the {4,5} range into the {1,2,3} range, making it difficult to draw inferences from this variable.

The timing of BHC inspections may also reflect the supervisor's assessment of condition. Federal Reserve policies specify the minimum frequency with which each BHC must be inspected based on its size, complexity, and past BOPEC rating. Supervisors may accelerate an on-site inspection if they become concerned that the firm's condition has deteriorated. We constructed a dummy variable (INSPECT) to indicate whether a on-site inspection occurred during the quarter. Table 1 indicates that 21.7% of BHCs were inspected per quarter on average, implying an average inspection rate of almost once per year.

Market Assessments of BHC Condition

For BHCs with rated public debt, we collected Moody's ratings for senior subordinated debentures each quarter-end from the Warga-Lehman Brothers Fixed Income Database and used the rating on its largest outstanding issue (see Warga 1995). As with the BOPEC ratings, we allow for the possibility that Moody's downgrades convey more information than upgrades because managers may be more likely to publicize favorable private information in advance of a rating change. Such a result was found earlier for nonfinancial firms (Holthausen and Leftwich 1986, Hand, Holthausen and Leftwich 1992). Furthermore, a rating change that crosses the "investment grade" threshold may indicate a more substantial change in opinion than other rating changes. Therefore, we constructed dummy variables analogous to the "change in BOPEC" variables -- MOODY_DN_THRESH, MOODY_DN_NOTHRESH, etc. Here, the threshold is between investment

grade (Baa or higher) and below-investment grade ratings.[9]

As shown in Table 1, the average sample bond rating was 8.896 (between the Baa1 and A3 rating on Moody's scale). BHC ratings changed in 13.2% of our firm-quarters, and about 3/4 of these changes were downgrades, consistent with macroeconomic conditions and the typical BOPEC rating change. Only about half of the observations have Moody's ratings (547 / 1151) because not all BHCs have rated debt.

One of our three equity-market measures is the quarterly abnormal return to BHC common stock. We estimate a two-factor market model over the 100 trading days preceding the start of each quarter, using the equal-weighted CRSP index and the NYSE Index of Financial Firms as the factors. Using these estimated coefficients, we calculate the stock's abnormal return (AR) for each day in the subsequent quarter. ABNORMAL_RETURN is the cumulation of these daily ARs, and should reflect new information about BHC condition learned by at least some of the shareholders during the quarter. Table 1 shows a positive mean abnormal return for the sample of about 4% per year.

Under the strong form of the efficient markets hypothesis, prices would reflect all public and private information known to market participants, and there would be no reason to go beyond the abnormal stock return to see if any particular group of shareholders might have information on a more timely or accurate basis than government supervisors. However, we include the changes in the proportions of outstanding shares owned by institutional investors and insiders, ΔINST_HOLD and ΔINSIDER, respectively, for two reasons.[10] First, it seems likely that these groups (particularly the insiders) may have information about BHC condition that is not fully reflected in market prices. Second, as noted above, these groups may have different incentives which may affect how their information is translated in their stock holdings. The use

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[9]A robustness check using Standard and Poor's ratings in place of Moody's ratings (not shown) yielded consistent findings.

[10] SEC regulations require that anyone managing more than $100 million worth of qualifying ("Section F") securities must report those holdings on the last day of each quarter on SEC Form 13-F. We collected these data from Compact Disclosure. The SEC also requires that corporate officers, directors, and other insiders report changes in their holdings within ten days of the trade, via SEC Forms 3 and 4. Compact Disclosure reports these cumulative holdings on an "as available" basis. We scale each bank's insider holdings by the total number of shares outstanding at month-end, which Compact Disclosure obtains from 10-K, 10-Q, or 20-F filings. We combined all institutions' shares to form INST_HOLD and all insiders' shares to form INSIDER.

of three different measures of changes in equity market assessments of BHCs -- ABNORMAL_RETURN, ΔINST_HOLD, and ΔINSIDER -- allows for a richer and more comprehensive analysis of the timeliness and accuracy of supervisors and equity market participants than just the use of price data alone. Table 1 indicates positive mean net acquisitions by both institutions and insiders.

Accounting Measures of BHC Performance

For our "horse races" of whether supervisors or market participants more accurately predict changes in BHC performance, we collect three measures of the changes in BHC condition. The change in the ratio of nonperforming loans to assets (ΔNPL) reflects changes in loan underwriting performance, the change in the ratio of equity capital to assets (ΔEQUITY) measures the change in leverage, and the change in earnings per unit of assets (ΔROA) summarizes the net effect of all influences on BHC profitability. These measures should broadly cover the aspects of future performance which concern supervisors and market participants. Table 1 indicates that these performance measures reflect the banking industry's problems over the sample period -- NPL generally rose while EQUITY and ROA generally fell.

Control Variables

Neither supervisors nor market participants treat all BHCs the same way. Larger firms are usually followed by more market analysts, which may make it harder for examiners to discover unknown characteristics. However, this effect may be offset by supervisory policies which devote additional resources to monitoring the largest banking firms. We therefore include dummies for BHC asset size (SIZE1, SIZE2, and SIZE3) in all our regressions. Federal Reserve policy also mandates more frequent inspections for BHCs with "complex" financial structures, which we indicate with a dummy variable COMPLEX. Finally, to control for unspecified changes in the banking or supervisory environments, we include separate dummy variables for each calendar quarter. To save space, we do not report the estimated coefficients of these control variables in the tables.

V. Granger-Causality Tests of Timeliness

We apply the concept of Granger-causality (Granger 1969) to test whether market assessments of BHC condition systematically change before or after supervisors change their assessment. We regress each market variable and each supervisory variable on lagged market variables, lagged supervisory variables, and

control variables. We estimate logit regressions for the discrete dependent BOPEC, INSPECT, and MOODY variables. We estimate linear regressions for the continuous equity market dependent variables ABNORMAL_RETURN, ΔINST_HOLD, and ΔINSIDER.

We judge timeliness by examining the contribution to adjusted-R^2 ($\bar{R}^2$) and the coefficients of the lagged supervisory and market variables in these logit and linear regressions to see if the lagged supervisory variables help predict (i.e., Granger-cause) current market variables and if lagged market variables help predict (Granger-cause) current supervisory variables.[11] For example, if we were to find that lagged supervisory variables contributed substantially to the $\bar{R}^2$ in predicting current market variables, then we would infer that supervisors obtain and use important information about BHC condition before market participants do. It is perfectly reasonable for both market and supervisory variables to Granger-cause one another, which would be expected if market participants and bank supervisors each obtain different useful information about BHC condition prior to the other. In addition to the $\bar{R}^2$, we look at the joint significance of several groups of the parameters. We also evaluate the signs, economic significance, statistical significance of the average coefficients of the lags of each variable to determine whether the information was useful in the anticipated way.

Because Moody's variables are available for only a subset of the BHCs and because the incentives of bond rating agencies and government supervisors are much more similar to each other than to those of equity market participants, we run the analysis separately for Moody's versus supervisors and for equity market participants versus supervisors. All regressions include four quarterly lags of supervisory assessments to allow sufficient time for the confidential ratings to be learned by market participants, or for the market participants to find out the same underlying information on their own. We also include four lags of the market assessments, even though this information is publicly available relatively quickly. We do this because supervisors may become aware of significant information revealed in the market variables, but may choose to wait for the normally scheduled inspection (almost always within the next four quarters) to verify

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[11]For the logit equations, we use the pseudo-$\bar{R}^2$ statistic, which is conceptually similar to the $\bar{R}^2$ statistic in OLS regressions. Pseudo-R^2 statistic measures the proportion of the log-likelihood value explained by the model's non-intercept independent variables, i.e., $1 - (\log L_{\Omega})/(\log L_{\omega})$, where L_{Ω} denotes the likelihood value of estimation with all the independent variables and L_{ω} denotes the likelihood value of estimation with only the intercept. The R^2 reported for the logit equations is adjusted for degrees of freedom.

the information and incorporate it into the BOPEC rating.

The Timeliness of Supervisors versus Bond Rating Agencies

We first compare the timeliness of supervisors' versus bond rating agencies' information for the BHCs with Moody's data available. The Moody's rating serves as the market's assessment in these regressions, while supervisory assessments are represented by the BOPEC and INSPECT variables. All of these variables are discrete, so we use logit models for the probability of a rating change or inspection. For the Moody's and BOPEC ratings, we estimated ordered logit models for two transformed dependent variables:[12]

> MOODY_ORD equals 2 if the Moody's rating improved during the quarter, 1 if it remained unchanged, and 0 if it deteriorated.
>
> BOPEC_ORD equals 2 if the BOPEC financial rating improved during the quarter, 1 if it remained unchanged, and 0 if it deteriorated.

To assess whether supervisory assessments Granger-cause bond ratings, we estimate the ordered logit model:

(1) Probability($MOODY\_ORD_{j,t}$) = f (

$MOODY\_DN\_THRESH_{j,t-s}$, $MOODY\_DN\_NOTHRESH_{j,t-s}$,	} Lagged Bond Market
$MOODY\_UP\_THRESH_{j,t-s}$, $MOODY\_UP\_NOTHRESH_{j,t-s}$,	} Variables
$BOPEC\_DN\_THRESH_{j,t-s}$, $BOPEC\_DN\_NOTHRESH_{j,t-s}$,	} Lagged Supervisory
$BOPEC\_UP\_THRESH_{j,t-s}$, $BOPEC\_UP\_NO\_THRESH_{j,t-s}$, $INSPECT_{j,t-s}$,	} Variables
TIME, $COMPLEX_{j,t}$, $SIZE_{j,t}$) + $\varepsilon_{j,t}$.	}Controls, Error

where f(•) indicates a simple linear functional form, j is the BHC in question, t is the time period, and s = 1,...,4 denotes the lag lengths on the past variables. To assess whether bond ratings Granger-cause supervisory assessments, we estimate:

(2) Probability($BOPEC\_ORD_{j,t}$) = f (same variables as in (1))

(3) Probability($INSPECT_{j,t}$) = f (same variables as in (1)),

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[12] To keep the model simple, we do not distinguish in the dependent variables whether the Moody's or BOPEC ratings changes crossed the investment grade or the satisfactory-unsatisfactory thresholds.

The BOPEC_ORD equation is an ordered logit with three choices, and the INSPECT equation is a simple binomial logit.

Table 2 reports the estimation results for equations (1), (2), and (3) using our original specification of the BOPEC satisfactory-unsatisfactory threshold between {1,2} and {3,4,5}. Near the bottom of the table, we examine how much $\bar{R}^2$ falls when either the market or supervisory variables are excluded from the right-hand side of the equations in order to ascertain whether these variables Granger-cause or help predict current assessments. We also shown at the very bottom of each column an additional analysis of $\bar{R}^2$ using the alternative specification of the BOPEC threshold between {1,2,3} and {4,5} to ensure robustness to this difference in specification.

The first column of Table 2 reports the estimation results for the MOODY_ORD regression (1). For this equation, we are primarily interested in the effects of the lagged supervisory variables -- i.e., whether the supervisory variables Granger-cause Moody's ratings -- to see if supervisors have some useful information on a more timely basis than Moody's. The full set of lagged information and control variables under the original specification explain 18.8% of the variance of the bond rating changes ($\bar{R}^2$ = .188). Omitting the lagged supervisory variables from the equation reduces the $\bar{R}^2$ by .041, indicating that past supervisory variables substantially help explain current Moody's ratings. This suggests that information contained in past supervisory variables may be useful to Moody's. However, most of the individual coefficient estimates are not statistically significantly different from zero, and these coefficients jointly are not statistically significant (as shown in the ALL SUPERVISORY VARIABLES F-statistic). Thus, although the supervisory variables as a whole help predict Moody's rating changes, it is difficult to determine with much certainty the precise effect of individual supervisory variables.

We also tested a number of subsets of the parameters of the supervisory variables, and only the BOPEC_UP_THRESH coefficients were jointly significant.[13] The positive average coefficient of these lags of 1.243 suggests that when evaluated at the sample mean, the probability of a Moody's rating increase more than triples from 2.93% to 9.47% if there was a BOPEC improvement that crossed the satisfactory-

[13] Although the BOPEC_UP_THRESH coefficients were jointly significant, they were not statistically distinguishable from the BOPEC_UP_NOTHRESH coefficients, as revealed by the insignificant UP_THRESH = UP_NOTHRESH F-statistic.

unsatisfactory threshold at some point in the past year. Similarly, the probability of a Moody's downgrade is predicted to drop by more than two-thirds from 10.25% to 3.19% following BOPEC_UP_THRESH = 1 in one of the previous four quarters.[14] Although this average is clearly economically significant, it is not statistically significant. The average coefficients for the other lagged BOPEC variables -- BOPEC_DN_THRESH, BOPEC_DN_NOTHRESH, and BOPEC_UP_NOTHRESH -- also went in the predicted directions (positive for UPs, negative for DNs), and were generally economically significant but not statistically significant.

As shown at the bottom of the first column of Table 2, using the alternative specification of the BOPEC threshold also yields a substantial supervisory contribution to $\bar{R}^2$, in this case of .078. The coefficients (not shown) also yield comparable results.[15] Thus, the data provide limited support for Granger-causality from supervisory assessments to Moody's ratings, consistent with supervisors having some valuable information prior to Moody's.

Column 2 of Table 2 reports the results of the ordered logit regression for BOPEC_ORD. The full specification (2) explains 26.8% of the variation in BOPEC_ORD, and the market variables contribute an economically substantial 8.2% to this total. Similarly, using the alternative specification of the BOPEC threshold yielded a contribution of 6.7% for the lagged Moody's variables. As a group, the lagged market coefficients are statistically significant at the 10% level. Looking at the subsets of coefficients on the lagged market variables, we see that the average coefficients on all four sets of changes in MOODY are

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[14] The "new" probability from changing exogenous variables in a conventional binomial logit equation is given by $P_{new} = [\exp(L_{old} + \Delta L) / [1 + \exp(L_{old} + \Delta L)]]$, where L_{old} is the log-odds ratio $\ln(P_{old} / (1-P_{old}))$, P_{old} is the "old" probability, and ΔL is the predicted change in the log-odds ratio from changing the exogenous variables. To obtain the estimated P_{new}, the sample mean proportion is used for P_{old}, and the estimated coefficient times the change in the exogenous variables is used for ΔL. In our ordered logit for MOODY_ORD, to estimate the change in Probability(MOODY_UP), we use the sample mean proportion .0293 for P_{old} and the average coefficient on BOPEC_UP_THRESH of 1.24275 for ΔL. We estimate [Probability(MOODY_UP) + Probability(MOODY_NC)] the same way, except using the sample proportion .8973 (the ordered logit forces the change in the log-odds ratio for a change in an exogenous variable to be the same for both cases). The estimated change in Probability(MOODY_DN) reported in the text is simply the negative of this last change.

[15] All of the regressions from all of the tables were rerun using the alternative specification of the BOPEC satisfactory-unsatisfactory threshold, with robust findings. The average coefficients, their t-tests, and the F-tests produced virtually the same empirical results as those shown, except that the BOPEC variables were more often statistically significant under the alternative specification.

economically substantial and go in the predicted directions (positive for UP, negative for DN). Of these four sets, the coefficients are jointly statistically significant in only one case (MOODY_UP_NOTHRESH), and the average is statistically significant in only one case (MOODY_DN_NOTHRESH). To demonstrate the economic significance of these parameters, we calculate the effects of the average coefficients of the lags pf MOODY_DN_NOTHRESH, although all of other MOODY averages are larger in absolute value. The average coefficient of -0.812 suggests that starting from the mean, a Moody's rating decline that does not cross the investment grade threshold reduces the probability of a BOPEC rating increase by more than half from 0.78% to 0.35%, and more than doubles the probability of a BOPEC rating decline from 4.82% to 10.23%. The eight MOODY_UP lags are jointly statistically significant, and there is a statistical difference between the MOODY upgrades that do and do not cross the investment grade threshold.

The last column of Table 2 reports the simple logit regression explaining the incidence of on-site inspections. The lagged Moody's variables add very little explanatory power to the regression ($\Delta\bar{R}^2$ = .016 or .017 with the original or alternative specification of the BOPEC threshold). Most of the explanation of inspections is given by the past INSPECT variables, since in most cases supervisors follow their annual schedules. The market variables as a whole are not statistically significant, but the MOODY_DN_NOTHRESH coefficients are statistically significant jointly, as is their average. The average coefficient of 0.504 suggests that starting from the mean probability of INSPECT of 21.7%, a Moody downgrade that did not cross the investment grade threshold during the prior year would raise the probability of a supervisory inspection by almost 10 percentage points to 31.5%.[16]

The Timeliness of Supervisors versus Equity Market Participants

We next compare supervisors to equity market participants using the larger sample. We essentially replace the Moody's ratings changes in equations (1) - (3) with three equity-market measures of changes in BHC condition in the Granger-causality tests. Specifically, we estimate:

(4) $EQUITY\_MKT\_ASSESS_{j,t} = f($

$ABNORMAL\_RETURN_{j,t-s}, \Delta INST\_HOLD_{j,t-s}, \Delta INSIDER_{j,t-s},$ } Lagged Equity Market Vars.

[16]Put another way, a Moody's downgrade of this type reduces the expected time between inspections from about 4.6 quarters (1 / .217) to about to 3.2 quarters (1 / .315).

$$\begin{aligned} &BOPEC\_DN\_THRESH_{j,t-s},\ BOPEC\_DN\_NOTHRESH_{j,t-s},\ && \left.\begin{matrix}\\ \\ \end{matrix}\right\} \text{Lagged Supervisory} \\ &BOPEC\_UP\_THRESH_{j,t-s},\ BOPEC\_UP\_NO\_THRESH_{j,t-s},\ INSPECT_{j,t-s},\ && \} \text{ Variables} \\ &TIME,\ COMPLEX_{j,t},\ SIZE_{j,t}) + \eta_{j,t}, && \} \text{ Controls, Error} \end{aligned}$$

(5) Probability($BOPEC\_ORD_{j,t}$) = f (same variables as in (4)), and

(6) Probability($INSPECT_{j,t}$) = f (same variables as in (4)),

where $EQUITY\_MKT\_ASSESS_{j,t}$ represents the current values of ABNORMAL_RETURN, ΔINST_HOLD, and ΔINSIDER. Since these variables are continuous, we estimate linear regressions for (4). Again, we include four lags of the key variables in (4) - (6) (i.e., s = 1,...,4).

The three columns of Table 3 show the results of estimating equations (4) for the three EQUITY_MKT_ASSESS variables. The supervisory variables generally add little or no explanatory power in predicting subsequent equity market outcomes, in all cases much less than their contributions to the Moody's ratings above. The $\bar{R}^2$ contributions for the ABNORMAL_RETURN, ΔINST_HOLD, and ΔINSIDER equations are just .016, .016, and -.007 respectively for the original threshold, and .035, .016, and -.010 respectively for the alternative threshold. The slightly negative explanation of changes in insider holdings -- in which the addition of the supervisory variables does not even make up for the loss of degrees of freedom from including these variables in the equation -- is not very surprising. We expect insiders to have the best private information about BHC condition because of their access to internal data and their roles as managers, and so they are expected to learn very little from the supervisory process. The relatively small $\bar{R}^2$ contributions of supervisory variables to explaining subsequent equity price movements and institutional holdings may have a different explanation. It seems likely that supervisors have some important information that market participants outside the firm do not, given that the supervisory assessments were found to Granger-cause Moody's ratings. The stronger effect of supervisory assessments on bond ratings than on equity market variables is likely due to the difference in incentives discussed above -- supervisors and bond market participants have similar incentives to keep risks low, whereas outside equity market participants are primarily interested in keeping earnings high.

Despite the weak-to-nonexistent Granger-causality from supervisory variables to equity market

variables, several notable relationships appear in the coefficient estimates. First, in the ABNORMAL_RETURN equation, the BOPEC_DN_THRESH average coefficient is positive and statistically significant, whereas the BOPEC_DN_NOTHRESH average coefficients is negative and significant. As shown, an F-test rejects the DN_THRESH = DN_NOTHRESH null hypothesis. The explanation of these seemingly incongruous results may lie in the differing relative strengths of the three types of information that may be generated by inspections. The BOPEC downgrades that do not cross the satisfactory-unsatisfactory threshold (e.g., from 1 to 2 or from 3 to 4) may primarily have private information effects, revealing previously unknown negative information about BHC condition. In contrast, the downgrades that cross the threshold (e.g., from 2 to 3) may primarily have supervisory discipline effects. Shareholders may have a net benefit when BHCs fall into the unsatisfactory range because of increased supervisory discipline to correct problems, but for downgrades that do not cross the threshold, the unfavorable signal about BHC condition dominates. This supports our separate treatment of "THRESH" and "NO_THRESH" changes in the econometric specification. Also notable is that shareholders in general, institutional shareholders, and insiders each have different reactions to the BOPEC downgrades, supporting our decision to use the three equity market indicators, rather than price or abnormal returns alone as in other studies. Finally, the estimated positive responses of abnormal returns and institutional investor shares to the INSPECT variables are consistent with the certification effect described above in which shareholders benefit when supervisors verify a BHC's financial statements.

Table 4 tests whether the three lagged equity market assessments Granger-cause the two supervisory assessments of BHC condition, as in equations (5) and (6). The changes in $\bar{R}^2$ are again economically small, about 2% or less for both dependent variables and both specifications, suggesting very little Granger-causality from equity market variables to BOPEC_ORD and INSPECT. Despite the overall weak relationship, one potentially interesting set of findings is the positive average coefficient on the lags of ΔINST_HOLD in the BOPEC_ORD equation and the negative effects of these lags in the INSPECT equation. These signs are in the predicted directions and suggest that institutional investors may act on some information before supervisors do. Also interesting are the positive effects of the ABNORMAL_RETURN lags on the probability of inspection, which suggests that supervisors may speed up inspections when BHCs

show evidence of undertaking high-risk, high-return strategies.[17]

VI. "Horse Race" Tests of Information Accuracy

We next run "horse races" to investigate whether supervisory or market assessments more accurately predict future changes in BHC performance, as measured by the changes in the nonperforming loans (ΔNPL), equity capital (ΔEQUITY), and earnings (ΔROA) ratios. For each of these measures we run a regression of the form:

$$
\begin{aligned}
(7)\quad \Delta PERF_{j,t} = f\,(& \\
& BOND\_MKT\_ASSESS_{j,t-s} \text{ or } EQUITY\_MKT\_ASSESS_{j,t-s}, && \left.\begin{matrix}\\ \\ \end{matrix}\right\} \text{Lagged Market Vars.} \\
& BOPEC\_DN\_THRESH_{j,t-s},\ BOPEC\_DN\_NOTHRESH_{j,t-s}, && \left.\begin{matrix}\\ \\ \end{matrix}\right\} \text{Lagged Supervisory} \\
& BOPEC\_UP\_THRESH_{j,t-s},\ BOPEC\_UP\_NO\_THRESH_{j,t-s},\ INSPECT_{j,t-s}, && \} \text{ Variables} \\
& \Delta NPL_{j,t-s},\ \Delta EQUITY_{j,t-s},\ \Delta ROA_{j,t-s}, && \left.\begin{matrix}\\ \\ \end{matrix}\right\} \text{Lagged Perf. Variables} \\
& TIME,\ COMPLEX_{j,t},\ SIZE_{j,t}) + \nu_{j,t}, && \} \text{ Controls, Error}
\end{aligned}
$$

where ΔPERF is a change in one of the performance variables; BOND_MKT_ASSESS or EQUITY_MKT_ASSESS are lagged values of either the Moody's ratings or equity market variables (which are used in separate estimations); and again, s = 1,...,4, indicates four lags for all but the control variables.

The Accuracy of Supervisors versus Bond Rating Agencies

Table 5 compares supervisors with bond rating agencies by including lagged Moody's ratings on the right-hand-side of equation (7). These estimates suggest that the supervisory variables generally do not contribute to the accuracy of forecasting future BHC performance on average over time. Using the original specification of the BOPEC threshold, the supervisory variables reduce the $\bar{R}^2$ in all three cases. Under the alternative threshold specification, the supervisory assessments contribute positively to predicting ΔNPL and ΔROA, but add less than 2% in both cases. The lagged Moody's ratings also generally perform poorly in

[17]Although we do not show them in the tables, we also ran the supervisors-versus-equity-market-participants regressions using only the observations from the Moody's subsample to be sure that any differences in results between the bond market and equity market results were not a result of using different samples. Our reported results were robust to this change in use of data -- no material differences appeared when about half of the observations were excluded.

predicting future balance sheet measures of performance except for the change in nonperforming loans ΔNPL, contributing 3.3% or 3.4% to $\bar{R}^2$. The coefficients of the lagged Moody's variables are also sensible in the ΔNPL equation -- they are jointly statistically significant, the Moody's downgrades predict increases in problem loans, and dropping below investment grade predicts a bigger increase in future problem loans. These results are consistent with the hypothesis that bond rating agencies are most concerned with problem loans, which are strongly associated with impending bank defaults.

The Accuracy of Supervisors versus Equity Market Participants

Table 6 substitutes our EQUITY_MKT_ASSESS variables for the BOND_MKT_ASSESS variables used in Table 5. The data again suggest that the supervisory variables generally do not contribute substantially to the accuracy of forecasting future BHC performance. The contribution to $\bar{R}^2$ is virtually zero for predicting ΔEQUITY and ΔROA, and only about 1% for predicting ΔNPL under either specification of the BOPEC threshold.[18]

Table 6 also suggests that equity market assessments contribute to predicting future BHC performance, although it is not evenly distributed across the measures of performance. While EQUITY_MKT_ASSESS variables raise the $\bar{R}^2$ of all three performance variables and the coefficients of these variables are jointly statistically significant in all three equations, they contribute the most to explaining changes in earnings, ΔROA. This is sensible since earnings are most closely associated with value maximization. The average coefficients of the lagged market variables in these equations also have the expected signs -- in all nine cases, an improvement in lagged market assessment (price rise or increased holdings by institutions or insiders) is associated with an improvement in current actual performance (lower problem loans, higher equity, and higher earnings), although the ΔINST_HOLD average coefficients are not always statistically significant.

The most striking inference to emerge from Tables 5 and 6 is that supervisory assessments generally explain little, if any of the future changes in BHC performance after taking into account the market indicators. In contrast, bond rating changes tend to predate changes in reported loan quality, and equity

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[18]Again, the same basic results hold when we replicate Table 6 using only the observations in the Moody's subsample (not shown in tables).

market variables explain a considerable portion of future performance, particularly earnings, after accounting for supervisory assessments. One potential explanation is that supervisors may simply be less accurate at evaluating the condition and prospects for a financial institution than market analysts. An alternative explanation which was noted above is that supervisors may tend to emphasize the current condition of a BHC when choosing a BOPEC rating and give little or no weight to expected changes in condition from improvements in managerial behavior. Such a strategy may impose effective discipline by giving BHCs incentives to avoid entering or to exit from states of poor condition. Market participants, in contrast, may take actions on the basis of expected changes in managerial behavior because they may individually have less ability or incentive to discipline bank behavior than government supervisors.

A third potential explanation is that supervisory ratings may be relatively accurate when they are first assigned immediately following an inspection, but they may get "stale" after several quarters have passed without an inspection. The estimations of equation (7) shown in Tables 5 and 6 reflect the average accuracy of supervisors over the entire supervisory cycle, which typically covers about one year between inspections. As discussed above, Cole and Gunther (1998) found that bank CAMEL ratings improved the accuracy of forecasts of bank failure only if the examination was recent. To investigate this issue further, we reran the horse races using only observations in which there was a "fresh" inspection the prior quarter (i.e., using only observations in which INSPECT1 = 1, and dropping the INSPECT variables from the equation). Table 7 shows the $\bar{R}^2$ analyses for these regressions, which can be compared to the results of the regressions with the larger samples in Tables 5 and 6. In all cases, the supervisory contribution to $\bar{R}^2$ increases substantially, and in most cases exceeds the market contribution. These data suggest that supervisory ratings may be **more** accurate than market assessments immediately following an inspection, but may be less accurate on average over the entire supervisory cycle. Note that we cannot rule out the hypothesis that between inspections, supervisors may become fully aware of the implications of the market variables for bank condition, but may choose to wait for the next normally scheduled inspection to incorporate them into the BOPEC rating. Nonetheless, the evidence strongly suggests that the inspection process adds significantly to the market information at least temporarily, given that supervisory ratings appear to contribute more to the accuracy of predicting future performance than market assessments immediately following an inspection and that the

supervisory variables also helped predict the Moody's bond ratings in the Granger-causality tests of timeliness above.[19]

VII. Conclusions

The question of the best governance structure for large, complex banking organizations is quite difficult to say the least. To a large extent, policy choices regarding supervisory versus market discipline depend upon the timeliness and accuracy of the information sets of government supervisors and key market participants. Prior research on these issues yielded few definitive conclusions. The research on the relative timeliness of supervisors versus market participants gave mixed results, and the research on which parties are most accurate is sparse and focused only on predicting extreme outcomes.

Our goal is a more comprehensive analysis. We combine confidential data on supervisory assessments from bank holding company (BHC) inspection files with data from bond and stock markets and accounting information from regulatory reports. This is the first empirical study of which we are aware to evaluate both timeliness and accuracy of these banking organization assessments using the same data set, the first to compare the supervisory ratings to both stock and bond market data, the first to use both market prices and quantity information on changes in market position, and the first to evaluate whether supervisors versus market participants are accurate using multiple measures of future performance that differentiate among nonextreme outcomes.

We employ Granger-causality tests to compare the relative timeliness of government supervisors and market participants to see if either group uses some relevant information before the other. The data suggest that Moody's bond rating assessments and supervisory assessments Granger-cause one another. The lagged values of each party's ratings contribute substantially to the $\bar{R}^2$ in predicting the other party's ratings, and the average coefficients of the lags consistently have the expected signs and are usually of substantial economic magnitudes. This evidence suggests that both bond rating agencies and supervisors regularly discover relevant information that is only subsequently incorporated into the other group's assessments.

In contrast, the Granger-causality effects between equity market and supervisory assessments are

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[19]We also reran the accuracy regressions with the lags of the performance ΔNPL, ΔEQUITY, and ΔROA excluded and the results were generally consistent with those shown in Tables 5, 6, 7.

very weak to nonexistent. We argue that this result most likely reflects differences in incentives. Supervisors and bond rating agencies are most concerned about losses on debt which depend on the probability and severity of default states of nature, whereas equity market participants may be more concerned about the additions to their wealth from positive earnings in the nondefault states.

The "horse race" tests of accuracy in predicting the future performance of banking organizations also reveal some interesting differences among supervisors, bond market participants, and equity market participants. We find that bond rating agencies tend to predict future problem loans for BHCs, consistent with their incentives regarding default risk. Equity market participants are also found to be forward looking, particularly in predicting future earnings, consistent with their incentives to maximize wealth.

In contrast, the supervisory variables generally do not contribute substantially overall to predicting future values of BHC performance after taking into account the market assessments. This may be due at least in part to a difference in goals between supervisors and market participants. Supervisors may emphasize the current condition of a BHC in order to exert pressure on institutions to resolve existing or potential problems, whereas market participants may concentrate more on predicting future condition accurately and be less concerned with the discipline that they individually impose on BHC management. It is also possible that supervisory ratings may be relatively accurate when they are assigned immediately following an inspection, but may get "stale" several quarters later. Further analysis of the data is consistent with this explanation -- "fresh" supervisory assessments following an inspection generally contribute substantially to forecasting future performance and often exceed the contribution of the market's assessments.

Overall, the data suggest that supervisors, bond market participants, and equity market participants all produce valuable complementary information that may contribute to improving the governance of large banking organizations. Not surprisingly, the information produced by each party appears to reflect its incentives and organizational goals. We caution that we have considered only the timeliness and accuracy of the information embodied in supervisory and market assessments, and not the costs of acquiring this information or the reactions of banking organizations to these assessments -- all of which are needed to draw policy conclusions. For example, our findings regarding "fresh" versus "stale" supervisory assessments suggest that supervisory information may be improved by a policy of more frequent on-site visits, but the

efficacy of such visits also depends on their costs and how the banking organizations would respond.

In addition, the Lucas critique applies to any policy conclusions. We cannot assume that the information used by any of these three groups would remain constant if there were changes in policy. For example, if government supervisors were to reduce effort in information gathering and monitoring, market participants would likely increase their information acquisition efforts. Analogously, if supervisory ratings were made public, market participants would likely gather less information. The amount by which private information gathering may change as a result of these policy innovations is unknown, and so the timeliness and accuracy of information used by market participants in monitoring financial institutions might either improve or deteriorate.

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Table 1

Variable Definitions and Sample Statistics

Name	Definition	Mean	Std. Dev.	Minimum	Maximum	Num. Obs.
	SUPERVISORY ASSESSMENTS OF BHC CONDITION					
BOPEC_DN_THRESH	Dummy variable equal to 1 if BOPEC rating moved below the "satisfactory" category.					
	--Crossed original threshold from {1,2} to {3,4,5}.	0.0269	0.162	0	1	1151
	--Crossed alternative threshold from {1,2,3} to {4,5}.	0.0165	0.128	0	1	1151
BOPEC_DN_NO_THRESH	Dummy variable equal to 1 if BOPEC rating worsened within the "satisfactory" category or within the "unsatisfactory" category.					
	--Remained within {1,2} or within {3,4,5}.	0.0209	0.143	0	1	1151
	--Remained within {1,2,3} or within {4,5}.	0.0409	0.198	0	1	1151
BOPEC_UP_THRESH	Dummy variable equal to 1 if BOPEC rating improved and rose into the "satisfactory" category.					
	--Crossed original threshold from {3,4,5} to {1,2}.	0.00434	0.066	0	1	1151
	--Crossed alternative threshold from {4,5} to {1,2,3}.	0.00087	0.029	0	1	1151
BOPEC_UP_NO_THRESH	Dummy variable equal to 1 if BOPEC rating improved without crossing the threshold.					
	--Remained within {1,2} or within {3,4,5}.	0.00348	0.0589	0	1	1151
	--Remained within {1,2,3} or within {4,5}.	0.00696	0.0832	0	1	1151
BOPEC_NC	Dummy variable equal to 1 if BOPEC rating remained unchanged. (Excluded from regressions as base case).	0.944	0.242	0	1	1151
BOPEC Level	Level of BOPEC variable, not used in regressions.	2.023	0.894	1	4	1151
INSPECT	Dummy variable equal to 1 if there was an inspection performed that quarter.	0.217	0.413	0	1	1151
	MARKET ASSESSMENTS OF BHC CONDITION					
MOODY_DN_THRESH	Dummy variable equal to 1 if Moody's rating worsened and fell below investment (Baa) grade.	0.0146	0.120	0	1	547
MOODY_DN_NO_THRESH	Dummy variable equal to 1 if Moody's rating worsened but did not cross the investment grade threshold.	0.0878	0.283	0	1	547
MOODY_UP_THRESH	Dummy variable equal to 1 if Moody's rating improved and rose into investment grade.	0.0110	0.104	0	1	547
MOODY_UP_NO_THRESH	Dummy variable equal to 1 if Moody's rating improved but did not cross the investment grade threshold.	0.0183	0.134	0	1	547
MOODY_NC	Dummy variable equal to 1 if Moody's rating remained unchanged. (Excluded from regressions as base case).	0.868	0.338	0	1	547
MOODY's Level	Level of Moody's variable, not used in regressions	8.896	2.922	4	19	547

Table 1 (Continued)

Variable Definitions and Sample Statistics

Name	Definition	Mean	Std. Dev.	Minimum	Maximum	Num. Obs.
ABNORMAL_RETURN	Abnormal quarterly return on common stock	0.00960	0.257	-0.874	1.888	1123
△INST_HOLD	Quarter-to-quarter change in the proportion of outstanding shares held by institutional investors.	0.00203	0.0381	-0.284	0.393	1151
INST_HOLD Level	Level of prior variable, not used in regressions	0.258	0.192	0.000577	0.855	1151
△INSIDER	Quarter-to-quarter change in the proportion of outstanding shares held by officers and directors.	0.000157	0.0245	-0.236	0.363	1151
INSIDER Level	Level of prior variable, not used in regressions.	0.116	0.118	0.000256	0.660	1151
	ACCOUNTING MEASURES OF BHC PERFORMANCE					
△NPL	Change in the ratio of non-performing loans (past due at least 90 days or on nonaccrual status) to total assets.	0.000519	0.00554	-0.0508	0.0656	1150
NPL Level	Level of prior variable, not used in the regressions.	0.0161	0.0145	0	0.104	1150
△EQUITY	Change in the ratio of equity capital to total assets.	-0.0000371	0.00439	-0.0307	0.0225	1150
EQUITY Level	Level of prior variable, not used in the regressions.	0.0690	0.0166	0.0133	0.150	1150
△ROA	Change in the ratio of net income to total assets.	-0.000167	0.0053	-0.0441	0.0403	1150
ROA Level	Level of prior variable, not used in the regressions.	0.00372	0.00621	-0.0524	0.0185	1150
	CONTROL VARIABLES					
SIZE1	Dummy variable equal to 1 if TA > $10 billion.	0.254	0.435	0	1	1151
SIZE2	Dummy variable equal to 1 if $1 billion < TA < $10 billion.	0.741	0.438	0	1	1151
SIZE3	Dummy variable equal to 1 if TA < $1 billion. (Excluded from regressions as base case).	0.00521	0.0720	0	1	1151
COMPLEX	Dummy variable equal to 1 if BHC has public debt outstanding, or operates material credit-extending nonbank subsidiaries.	0.728	0.445	0	1	1151
TIME	Dummy variables for all but one time period were incorporated into the regressions but the sample statistics are not shown here.	----	----	----	----	----

Table 2
Logistic Regressions of Moody's and Supervisory Variables on Lagged Moody's and Supervisory Variables (Equations 1, 2, and 3)

	Dependent Variable					
	MOODY_ORD		*BOPEC_ORD*		*INSPECT*	
Variable	Coef.	Test-stat	Coef.	Test-stat	Coef.	Test-stat
INTERCEPT1	3.216**	7.33	3.349**	5.32	-0.966**	-3.41
INTERCEPT2	-3.669**	-7.48	-6.287**	-6.88		
MOODY_DN_THRESH1	0.717	0.66	-1.593	-1.36	0.038	0.04
MOODY_DN_THRESH2	-3.401**	-3.23	-0.328	-0.25	-1.022	-1.02
MOODY_DN_THRESH3	-1.203	-1.30	-0.789	-0.63	0.040	0.04
MOODY_DN_THRESH4	-0.563	-0.56	-1.530	-1.17	0.476	0.55
AVERAGE COEFFICIENT	-1.113**	-2.07	-1.060	-1.48	-0.117	-0.24
ALL LAGS=0 (F-STAT)		3.14**		0.76		0.35
MOODY_DN_NOTHRESH1	-1.076**	-2.30	-0.473	-0.71	-0.119	-0.29
MOODY_DN_NOTHRESH2	-0.546	-1.13	-0.853	-1.17	0.234	0.55
MOODY_DN_NOTHRESH3	-0.700	-1.35	-0.547	-0.78	0.371	0.86
MOODY_DN_NOTHRESH4	-0.348	-0.65	-1.374*	-1.95	1.531**	3.48
AVERAGE COEFFICIENT	-0.668**	-2.75	-0.812**	-2.44	0.504**	2.53
ALL LAGS=0 (F-STAT)		2.31*		1.70		3.30**
DN_THRESH=DN_NOTHRESH (F-STAT)		2.65**		1.20		1.81
ALL MOODY_DN LAGS=0 (F-STAT)		2.95**		1.63		1.73
MOODY_UP_THRESH1	1.985	1.09	3.230*	1.85	-0.223	-0.15
MOODY_UP_THRESH2	2.736**	2.05	-0.879	-0.30	-0.731	-0.56
MOODY_UP_THRESH3	†		0.930	0.17	†	
MOODY_UP_THRESH4	††		††		††	
AVERAGE COEFFICIENT	2.361**	2.07	1.094	0.50	-0.477	-0.48
ALL LAGS=0 (F-STAT)		2.67*		1.18		0.17
MOODY_UP_NOTHRESH1	2.036	1.47	0.801	2.14	-1.203	-1.01
MOODY_UP_NOTHRESH2	-0.896	-0.83	2.463	1.52	-0.211	-0.23
MOODY_UP_NOTHRESH3	-0.015	-0.01	3.470**	2.63	-1.024	-0.89
MOODY_UP_NOTHRESH4	2.107	1.55	0.284	0.08	0.619	0.63
AVERAGE COEFFICIENT	0.808	1.16	1.754	1.31	-0.455	-0.83
ALL LAGS=0 (F-STAT)		1.30		2.08*		0.57
UP_THRESH=UP_NOTHRESH (F-STAT)		2.02*		2.13*		0.35
ALL MOODY_UP LAGS=0 (F-STAT)		2.12*		1.88*		0.43
BOPEC_DN_THRESH1	-1.270	-1.51	3.185**	2.52	-1.127	-1.00
BOPEC_DN_THRESH2	0.158	0.18	1.508	1.15	-0.382	-0.58
BOPEC_DN_THRESH3	-1.377*	-1.70	1.182	0.71	-0.620	-0.83
BOPEC_DN_THRESH4	0.165	0.18	0.825	0.76	0.429	0.61
AVERAGE COEFFICIENT	-0.581	-1.24	1.675**	2.26	-0.425	-0.97
ALL LAGS=0 (F-STAT)		1.23		1.92		0.60
BOPEC_DN_NOTHRESH1	0.742	0.60	0.465	0.20	†	
BOPEC_DN_NOTHRESH2	-0.170	-0.16	1.874	0.77	-0.771	-0.92
BOPEC_DN_NOTHRESH3	0.446	0.35	2.645*	2.00	0.258	0.34
BOPEC_DN_NOTHRESH4	-1.757*	-1.92	3.556**	2.52	0.396	0.51
AVERAGE COEFFICIENT	-0.185	-0.33	2.135**	2.11	-0.039	-0.09
ALL LAGS=0 (F-STAT)		1.05		2.39*		0.41
DN_THRESH=DN_NOTHRESH (F-STAT)		1.22		2.36*		0.43
ALL BOPEC_DN LAGS=0 (F-STAT)		1.19		1.73		0.51

Table 2 (Continued)
Logistic Regressions of Moody's and Supervisory Variables on Lagged Moody's and Supervisory Variables (Equations 1, 2, and 3)

	Dependent Variable					
	MOODY_ORD		*BOPEC_ORD*		*INSPECT*	
Variable	Coef.	Test-stat	Coef.	Test-stat	Coef.	Test-stat
BOPEC_UP_THRESH1	1.556	0.56	-0.374	-0.11	†	
BOPEC_UP_THRESH2	2.666*	2.01	-0.025	-0.01	†	
BOPEC_UP_THRESH3	3.663**	2.32	0.725	0.13	†	---
BOPEC_UP_THRESH4	-2.914**	-2.13	0.930	0.28	-1.990*	-1.79
AVERAGE COEFFICIENT	1.243	1.33	0.314	0.16	-1.990*	-1.79
ALL LAGS=0 (F-STAT)		3.41**		0.03		3.22*
BOPEC_UP_NOTHRESH1	-0.048	-0.03	-0.617	-0.18	†	
BOPEC_UP_NOTHRESH2	0.713	0.35	0.514	0.13	†	
BOPEC_UP_NOTHRESH3	0.696	0.38	0.189	0.05	†	
BOPEC_UP_NOTHRESH4	0.646	0.27	-3.876**	-2.85	-1.392*	-1.72
AVERAGE COEFFICIENT	0.502	0.48	-0.947	-0.58	-1.392*	-1.72
ALL LAGS=0 (F-STAT)		0.08		2.06*		2.95*
UP_THRESH=UP_NO_THRESH (F-STAT)		1.81		1.04		3.03*
ALL BOPEC_UP LAGS=0 (F-STAT)		1.73		1.05		3.03*
INSPECT1	0.092	0.26	1.291**	2.28	-1.454**	-5.23
INSPECT2	-0.260	-0.74	0.708	1.36	-0.539**	-2.11
INSPECT3	-0.076	-0.21	1.080*	1.85	-0.082	-0.31
INSPECT4	-0.041	-0.12	0.225	0.46	1.177**	4.83
AVERAGE COEFFICIENT	-0.071	-0.34	0.713**	2.26	-0.225	-1.45
ALL LAGS=0 (F-STAT)		0.18		2.47**		13.18**
ALL VARIABLES=0 (F-STAT)		1.14		0.87		0.57
ALL MARKET VARIABLES=0 (F-STAT)		2.41**		1.72*		1.18
ALL SUPERVISORY VARIABLES=0 (F-STAT)		0.24		1.23		2.35**
Num. Obs.	547		547		547	

Adjusted-R^2 Values for Original BOPEC Threshold Between {1,2} and {3,4,5}

Adjusted-R^2	0.188	0.268	0.159
ΔAdjusted-R^2 (Market Contribution)	0.072	0.082	0.016
ΔAdjusted-R^2 (Supervisory Contribution)	0.041	0.138	0.120

Adjusted-R^2 Values for Alternative BOPEC Threshold Between {1,2,3} and {4,5}

Adjusted-R^2	0.200	0.242	0.171
ΔAdjusted-R^2 (Market Contribution)	0.084	0.067	0.017
ΔAdjusted-R^2 (Supervisory Contribution)	0.078	0.089	0.147

* Significant at the 10% level (two-sided test for t-statistics).

** Significant at the 5% level (two-sided test for t-statistics).

† These are cases where we were unable to specify the entire lag structure. In each of these examples there was perfect correspondence between a right-hand side dummy variable and a left-hand side dummy variable, which would result in a coefficient of +/- infinity. In these cases the lag(s) in question was combined with the nearest adjoining lag that does not suffer from this problem.

†† The fourth lag of MOODY_UP_THRESH is always equal to zero, and as such was combined with its second and and third lag in the MOODY_ORD and INSPECT regressions, and with its third lag in the BOPEC_ORD regression.

Note: All regressions shown incorporate dummy control variables for two of three size categories of BHC (total assets less than $1 billion, between $1 billion and $10 billion, and greater than $10 billion), organizational complexity (complex BHCs have material credit-extending nonbank subsidiaries or public debt outstanding), and all but one time period.

Table 3
OLS Regressions of Equity Market Variables on Lagged Equity Market and Supervisory Variables (Equation 4)

	Dependent Variable					
	ABNORMAL_RETURN		ΔINST_HOLD		ΔINSIDER	
Variable	Coef.	Test-stat	Coef.	Test-stat	Coef.	Test-stat
INTERCEPT	-0.011	-0.68	-0.141	-1.44	-0.022*	-2.16
ABNORMAL_RETURN1	-0.241**	-6.86	0.010**	2.17	0.002	0.57
ABNORMAL_RETURN2	-0.216**	-5.96	0.018**	3.73	0.001	0.17
ABNORMAL_RETURN3	0.029	0.73	0.012**	2.00	0.005	1.38
ABNORMAL_RETURN4	0.093**	2.30	0.018**	3.05	0.001	0.34
AVERAGE COEFFICIENT	-0.084**	-13.44	0.015**	19.54	0.002	1.08
ALL LAGS=0 (F-STAT)		21.34**		5.57**		0.52
ΔINST_HOLD1	0.079	0.38	-0.136**	-4.19	-0.055**	-2.60
ΔINST_HOLD2	-0.540**	-2.75	0.059*	1.89	0.004	0.19
ΔINST_HOLD3	-0.340**	-2.17	-0.027	-1.07	0.002	0.13
ΔINST_HOLD4	-0.157	-1.27	-0.027	-1.40	0.016	1.26
AVERAGE COEFFICIENT	-0.240**	-5.70	-0.033**	-4.44	-0.008	-0.68
ALL LAGS=0 (F-STAT)		2.92**		7.17**		2.31
ΔINSIDER1	0.069	0.23	-0.051	-1.06	-0.108**	-3.46
ΔINSIDER2	-0.121	-0.36	0.025	0.47	-0.014	-0.39
ΔINSIDER3	0.391	1.25	-0.041	-0.81	-0.016	-0.47
ΔINSIDER4	0.133	0.67	-0.016	-0.50	-0.027	-1.30
AVERAGE COEFFICIENT	0.118	0.56	-0.021	-0.65	-0.042**	-6.22
ALL LAGS=0 (F-STAT)		0.52		0.58		3.40**
BOPEC_DN_THRESH1	0.031	0.66	-0.007	-0.92	0.001	0.23
BOPEC_DN_THRESH2	0.079	1.62	-0.019**	-2.56	-0.001	-0.11
BOPEC_DN_THRESH3	0.209**	4.12	-0.011	-1.43	0.001	0.22
BOPEC_DN_THRESH4	0.025	0.50	-0.014*	-1.88	-0.003	-0.62
AVERAGE COEFFICIENT	0.086**	10.97	-0.013**	-10.43	-0.001	-0.02
ALL LAGS=0 (F-STAT)		4.89**		2.97**		0.13
BOPEC_DN_NOTHRESH1	0.012	0.24	-0.006	-0.76	0.008	1.54
BOPEC_DN_NOTHRESH2	-0.043	-0.88	0.010	1.27	-0.007	-1.32
BOPEC_DN_NOTHRESH3	-0.058	-1.15	-0.014*	-1.69	0.002	0.45
BOPEC_DN_NOTHRESH4	-0.082	-1.54	0.001	0.11	-0.002	-0.30
AVERAGE COEFFICIENT	-0.043**	-2.84	-0.002	-0.31	0.001	0.04
ALL LAGS=0 (F-STAT)		1.14		1.26		1.10
DN_THRESH=DN_NOTHRESH (F-STAT)		3.35**		2.30*		0.61
ALL BOPEC_DN LAGS=0 (F-STAT)		3.28**		2.18**		0.60
BOPEC_UP_THRESH1	-0.175	-0.77	-0.019	-0.52	0.002	0.07
BOPEC_UP_THRESH2	0.097	0.73	-0.003	-0.14	-0.002	-0.13
BOPEC_UP_THRESH3	-0.137	-0.85	-0.005	-0.20	0.005	0.30
BOPEC_UP_THRESH4	0.066	0.57	-0.023	-1.26	0.004	0.31
AVERAGE COEFFICIENT	-0.038	0.20	-0.013	-0.90	0.002	0.06
ALL LAGS=0 (F-STAT)		0.53		0.48		0.05
BOPEC_UP_NOTHRESH1	-0.017	-0.17	0.011	0.06	0.004	0.35
BOPEC_UP_NOTHRESH2	-0.002	-0.02	0.012	0.85	-0.002	-0.25
BOPEC_UP_NOTHRESH3	-0.022	-0.23	0.044**	2.88	0.020*	1.95
BOPEC_UP_NOTHRESH4	-0.004	-0.05	-0.033**	-2.29	0.005	0.52
AVERAGE COEFFICIENT	-0.011	-0.06	0.002	0.66	0.007*	1.72
ALL LAGS=0 (F-STAT)		0.02		3.58**		1.07
UP_THRESH=UP_NOTHRESH (F-STAT)		0.27		2.00*		0.54
ALL BOPEC_UP LAGS=0 (F-STAT)		0.28		2.01**		0.55

Table 3 (Continued)
OLS Regressions of Equity Market Variables on Lagged Equity Market and Supervisory Variables (Equation 4)

	Dependent Variable					
	ABNORMAL_RETURN		ΔINST_HOLD		ΔINSIDER	
Variable	Coef.	Test-stat	Coef.	Test-stat	Coef.	Test-stat
INSPECT1	-0.001	-0.06	-0.001	-0.13	-0.000	-0.21
INSPECT2	0.027	1.41	0.004	1.40	0.004*	1.74
INSPECT3	0.030	1.52	0.005*	1.73	0.000	0.23
INSPECT4	0.053**	2.72	0.001	0.39	0.002	0.83
AVERAGE COEFFICIENT	0.027**	5.71	0.003*	2.07	0.001	1.21
ALL LAGS=0 (F-STAT)		2.43**		1.08		0.96
ALL VARIABLES=0 (F-STAT)		8.44**		3.03**		1.94**
ALL MARKET VARIABLES=0 (F-STAT)		8.06**		4.57**		2.21**
ALL SUPERVISORY VARIABLES=0 (F-STAT)		2.16**		1.97**		0.57
Num. Obs.	1123		1151		1151	

Adjusted-R^2 Values for Original BOPEC Threshold Between {1,2} and {3,4,5}

Adjusted-R^2	0.230	0.074	0.036
Δ Adjusted-R^2 (Market Contribution)	0.060	0.036	0.013
Δ Adjusted-R^2 (Supervisory Contribution)	0.016	0.016	-0.007

Adjusted-R^2 Values for Alternative BOPEC Threshold Between {1,2,3} and {4,5}

Adjusted-R^2	0.245	0.068	0.035
Δ Adjusted-R^2 (Market Contribution)	0.061	0.037	0.012
Δ Adjusted-R^2 (Supervisory Contribution)	0.035	0.016	-0.010

* Significant at the 10% level (two-sided test for t-statistics).
** Significant at the 5% level (two-sided test for t-statistics).
Notes: Same as for Table 2.

Table 4
Logistic Regressions of Supervisory Variables on Lagged Equity Market and Supervisory Variables (Equations 5 and 6)

	Dependent Variable			
	BOPEC_ORD		*INSPECT*	
Variable	Coef.	Test-stat	Coef.	Test-stat
INTERCEPT1	3.458	1.35	-1.026	-0.85
INTERCEPT2	-5.956**	-2.31		
ABNORMAL_RETURN1	0.146	0.28	0.218	0.65
ABNORMAL_RETURN2	0.177	0.34	0.909**	2.73
ABNORMAL_RETURN3	1.213*	1.76	0.628	1.52
ABNORMAL_RETURN4	-0.410	-0.64	0.741*	1.82
AVERAGE COEFFICIENT	0.281	0.76	0.624**	2.66
ALL LAGS=0 (F-STAT)		1.04		2.33*
ΔINST_HOLD1	5.975*	1.69	-2.372	-1.00
ΔINST_HOLD2	3.115	0.90	-3.222	-1.47
ΔINST_HOLD3	4.359	1.47	-4.884**	-2.30
ΔINST_HOLD4	1.555	0.71	-0.167	-0.12
AVERAGE COEFFICIENT	3.751**	2.14	-2.661**	-2.27
ALL LAGS=0 (F-STAT)		1.33		1.84*
ΔINSIDER1	5.182	1.03	-4.896	-1.22
ΔINSIDER2	-0.047	-0.01	2.324	0.66
ΔINSIDER3	-2.801	-0.62	4.348	1.32
ΔINSIDER4	-0.158	-0.05	-1.305	-0.61
AVERAGE COEFFICIENT	0.544	0.21	0.118	0.07
ALL LAGS=0 (F-STAT)		0.37		1.06
BOPEC_DN_THRESH1	1.454	1.34	-0.156	-0.20
BOPEC_DN_THRESH2	-1.804**	-2.40	0.022	0.04
BOPEC_DN_THRESH3	-0.340	-0.42	0.439	0.82
BOPEC_DN_THRESH4	-1.077	-1.53	0.246	0.54
AVERAGE COEFFICIENT	-0.442	-1.03	0.138	0.44
ALL LAGS=0 (F-STAT)		2.34*		0.25
BOPEC_DN_NOTHRESH1	0.184	0.12	†	
BOPEC_DN_NOTHRESH2	0.617	0.43	-2.022*	-1.96
BOPEC_DN_NOTHRESH3	2.800**	2.47	-0.911	-1.16
BOPEC_DN_NOTHRESH4	1.630	1.17	-0.725	-1.36
AVERAGE COEFFICIENT	1.308*	1.86	-1.219**	-2.61
ALL LAGS=0 (F-STAT)		1.86*		2.35*
DN_THRESH=DN_NOTHRESH (F-STAT)		2.35*		1.40
ALL BOPEC_DN LAGS=0 (F-STAT)		1.97*		1.21
BOPEC_UP_THRESH1	-1.024	-0.14	†	
BOPEC_UP_THRESH2	0.167	0.04	†	
BOPEC_UP_THRESH3	1.303	0.26	†	
BOPEC_UP_THRESH4	1.650	0.48	-1.635	-1.47
AVERAGE COEFFICIENT	0.524	0.20	-1.635	-1.47
ALL LAGS=0 (F-STAT)		0.08		2.15

Table 4 (Continued)
Logistic Regressions of Supervisory Variables on Lagged Equity Market and Supervisory Variables (Equations 5 and 6)

	Dependent Variable			
	BOPEC_ORD		*INSPECT*	
Variable	Coef.	Test-stat	Coef.	Test-stat
BOPEC_UP_NOTHRESH1	-0.225	-0.07	†	
BOPEC_UP_NOTHRESH2	0.262	0.10	†	
BOPEC_UP_NOTHRESH3	1.682	0.57	†	
BOPEC_UP_NOTHRESH4	-0.809	-0.70	-1.468*	-1.86
AVERAGE COEFFICIENT	0.228	0.18	-1.468*	-1.86
ALL LAGS=0 (F-STAT)		0.21		3.46*
UP_THRESH=UP_NOTHRESH (F-STAT)		0.15		2.75*
ALL BOPEC_UP LAGS=0 (F-STAT)		0.14		2.75*
INSPECT1	2.299**	4.34	-1.575**	-5.80
INSPECT2	1.801**	3.85	-0.701**	-3.19
INSPECT3	0.711*	1.92	-0.494**	-2.10
INSPECT4	0.399	1.15	0.973**	4.97
AVERAGE COEFFICIENT	1.303**	5.64	-0.449**	-3.37
ALL LAGS=0 (F-STAT)		8.77**		18.90**
ALL VARIABLES=0 (F-STAT)		1.21		2.91**
ALL MARKET VARIABLES=0 (F-STAT)		1.05		1.66
ALL SUPERVISORY VARIABLES=0 (F-STAT)		1.49		6.43**
Num. Obs.	1145		1145	

Adjusted-R^2 Values for Original BOPEC Threshold Between {1,2} and {3,4,5}

Adjusted R^2	0.157	0.139
ΔAdjusted R^2 (Market Contribution)	0.019	0.017
ΔAdjusted R^2 (Supervisory Contribution)	0.101	0.106

Adjusted-R^2 Values for Alternative BOPEC Threshold Between {1,2,3} and {4,5}

Adjusted R^2	0.143	0.147
ΔAdjusted R^2 (Market Contribution)	0.021	0.016
ΔAdjusted R^2 (Supervisory Contribution)	0.083	0.113

* Significant at the 10% level (two-sided test for t-statistics).
** Significant at the 5% level (two-sided test for t-statistics).
† See Table 2.
Notes: Same as for Table 2.

Table 5
OLS Regressions of Accounting Measures of Performance on Lagged Moody's Ratings, Supervisory, and Performance Variables (Equation 7)

	Dependent Variable					
	ΔNPL		$\Delta EQUITY$		ΔROA	
Variable	Coef.	Test-stat	Coef.	Test-stat	Coef.	Test-stat
INTERCEPT	0.000	0.51	-0.001	-1.54	0.000	0.34
MOODY_DN_THRESH1	0.004**	2.69	-0.001	-0.57	-0.003*	-1.77
MOODY_DN_THRESH2	0.002	1.19	0.002	1.18	0.000	0.06
MOODY_DN_THRESH3	0.000	0.27	0.000	0.23	-0.002	-1.58
MOODY_DN_THRESH4	0.004**	2.65	-0.000	-0.28	0.001	0.67
AVERAGE COEFFICIENT	0.002**	10.18	0.000	0.08	-0.001	-1.41
ALL LAGS=0 (F-STAT)		3.53**		0.48		1.60
MOODY_DN_NOTHRESH1	0.000	0.72	-0.000	-0.03	0.001	1.39
MOODY_DN_NOTHRESH2	0.002**	2.85	-0.000	-0.25	-0.001	-1.20
MOODY_DN_NOTHRESH3	0.000	0.50	-0.001	-0.83	-0.000	-0.50
MOODY_DN_NOTHRESH4	-0.000	-0.69	-0.001	-1.38	0.000	0.20
AVERAGE COEFFICIENT	0.001**	2.88	-0.001*	-1.69	-0.000	-0.01
ALL LAGS=0 (F-STAT)		2.48**		0.68		0.94
DN_THRESH=DN_NOTHRESH (F-STAT)		3.07**		0.57		1.27
ALL MOODY_DN LAGS=0 (F-STAT)		3.87**		0.55		1.38
MOODY_UP_THRESH1	0.002	0.66	0.003	1.07	0.000	0.33
MOODY_UP_THRESH2	0.003	1.17	0.001	0.39	0.001	0.52
MOODY_UP_THRESH3	-0.001	-0.26	0.000	0.00	0.002	0.74
AVERAGE COEFFICIENT	0.001	0.69	0.001	0.63	0.001	0.88
ALL LAGS=0 (F-STAT)		0.61		0.43		0.31
MOODY_UP_NOTHRESH1	0.001	0.42	-0.000	-0.11	-0.003	-1.22
MOODY_UP_NOTHRESH2	-0.001	-0.32	0.001	0.55	-0.001	-0.30
MOODY_UP_NOTHRESH3	-0.000	-0.21	0.002	1.28	-0.000	-0.27
MOODY_UP_NOTHRESH4	-0.000	-0.07	0.002	0.82	0.003	1.30
AVERAGE COEFFICIENT	-0.000	0.00	0.001	1.29	-0.000	-0.09
ALL LAGS=0 (F-STAT)		0.08		0.63		0.86
UP_THRESH=UP_NOTHRESH (F-STAT)		0.36		0.57		0.52
ALL MOODY_UP LAGS=0 (F-STAT)		0.28		0.64		0.76
BOPEC_DN_THRESH1	0.000	0.07	0.000	0.29	-0.002	-1.19
BOPEC_DN_THRESH2	0.001	0.77	-0.001	-0.61	-0.004**	-3.15
BOPEC_DN_THRESH3	-0.001	-1.30	-0.000	-0.26	0.001	1.12
BOPEC_DN_THRESH4	-0.001	-0.83	0.001	0.49	0.000	0.14
AVERAGE COEFFICIENT	-0.000	-0.31	-0.001	-0.01	-0.001**	-2.10
ALL LAGS=0 (F-STAT)		0.80		0.21		3.30**
BOPEC_DN_NOTHRESH1	-0.000	-0.02	0.000	0.29	-0.001	-0.56
BOPEC_DN_NOTHRESH2	0.001	1.48	-0.000	-0.11	-0.001	-0.62
BOPEC_DN_NOTHRESH3	0.001	0.14	0.000	0.22	0.001	0.99
BOPEC_DN_NOTHRESH4	-0.001	-0.55	0.001	0.67	0.001	0.42
AVERAGE COEFFICIENT	0.000	0.28	0.001	0.28	0.000	0.02
ALL LAGS=0 (F-STAT)		0.63		0.15		0.47
DN_THRESH=DN_NO_THRESH (F-STAT)		0.66		0.16		1.74
ALL BOPEC_DN LAGS=0 (F-STAT)		0.69		0.17		1.85*

Table 5 (Continued)
OLS Regressions of Accounting Measures of Performance on Lagged Moody's Ratings, Supervisory, and Performance Variables (Equation 7)

	Dependent Variable					
	ΔNPL		$\Delta EQUITY$		ΔROA	
Variable	Coef.	Test-stat	Coef.	Test-stat	Coef.	Test-stat
BOPEC_UP_THRESH1	-0.002	-0.63	0.001	0.38	0.005	1.61
BOPEC_UP_THRESH2	0.000	0.03	0.000	0.05	0.001	0.24
BOPEC_UP_THRESH3	-0.002	-0.67	0.001	0.37	0.002	0.66
BOPEC_UP_THRESH4	0.001	0.66	-0.001	-0.22	-0.000	-0.08
AVERAGE COEFFICIENT	-0.001	-0.18	0.001	0.11	0.002	1.75*
ALL LAGS=0 (F-STAT)		0.33		0.08		0.77
BOPEC_UP_NOTHRESH1	0.001	0.46	0.000	0.29	-0.000	-0.08
BOPEC_UP_NOTHRESH2	0.001	0.39	-0.000	-0.11	0.000	0.09
BOPEC_UP_NOTHRESH3	-0.000	-0.02	0.000	0.22	-0.000	-0.10
BOPEC_UP_NOTHRESH4	-0.000	-0.02	0.001	0.67	0.001	0.39
AVERAGE COEFFICIENT	0.001	0.18	0.000	1.25	-0.000	0.00
ALL LAGS=0 (F-STAT)		0.09		0.49		0.11
UP_THRESH=UP_NO_THRESH (F-STAT)		0.20		0.28		0.44
ALL BOPEC_UP LAGS=0 (F-STAT)		0.21		0.29		0.44
INSPECT1	-0.001	-1.48	0.001	1.12	-0.000	-0.46
INSPECT2	-0.000	-1.06	-0.000	-0.04	-0.000	-0.36
INSPECT3	0.000	0.41	-0.001	-1.34	-0.001	-1.47
INSPECT4	-0.000	-0.38	-0.000	-0.49	0.000	0.18
AVERAGE COEFFICIENT	-0.000	-1.01	-0.000	-0.11	-0.000	-0.76
ALL LAGS=0 (F-STAT)		0.87		0.88		0.63
ALL VARIABLES=0 (F-STAT)		2.51**		1.76**		5.02**
ALL MARKET VARIABLES=0 (F-STAT)		2.20**		0.63		1.09
ALL SUPERVISORY VARIABLES=0 (F-STAT)		0.57		0.44		1.09
Num. Obs.	495		495		495	

Adjusted-R^2 Values for Original BOPEC Threshold Between {1,2} and {3,4,5}

Adjusted-R^2	0.151	0.082	0.321
ΔAdjusted-R^2 (Market Contribution)	0.034	-0.011	-0.002
ΔAdjusted-R^2 (Supervisory Contribution)	-0.016	-0.023	-0.003

Adjusted-R^2 Values for Alternative BOPEC Threshold Between {1,2,3} and {4,5}

Adjusted-R^2	0.184	0.101	0.338
ΔAdjusted-R^2 (Market Contribution)	0.033	-0.008	0.003
ΔAdjusted-R^2 (Supervisory Contribution)	0.015	-0.001	0.018

* Significant at the 10% level (two-sided test for t-statistics).

** Significant at the 5% level (two-sided test for t-statistics).

Note: All regressions shown include the control variables described in the notes to Table 2, as well as four quarterly lags of ΔNPL, $\Delta EQUITY$, and ΔROA.

Table 6
OLS Regressions of Accounting Measures of Performance on Lagged Equity Market, Supervisory, and Performance Variables (Equation 7)

	Dependent Variable					
	ΔNPL		$\Delta EQUITY$		ΔROA	
Variable	Coef.	Test-stat	Coef.	Test-stat	Coef.	Test-stat
INTERCEPT	0.00605**	2.71	-0.00600**	-3.42	-0.00672**	-3.76
ABNORMAL_RETURN1	-0.00361**	-5.31	0.00163**	3.06	0.00602**	11.07
ABNORMAL_RETURN2	-0.00239**	-3.25	-0.00008	-0.13	0.00082	1.38
ABNORMAL_RETURN3	0.00103	1.19	0.00076	1.12	0.00184**	2.64
ABNORMAL_RETURN4	-0.00016	-0.19	0.00005	0.08	-0.00054	-0.80
AVERAGE COEFFICIENT	-0.00128**	-6.84	0.00059**	2.37	0.00203**	26.79
ALL LAGS=0 (F-STAT)		10.38**		2.68**		31.07**
ΔINST_HOLD1	-0.00637	-1.39	0.00116	0.32	-0.00295	-0.80
ΔINST_HOLD2	-0.00853*	-1.92	0.00008	0.02	-0.00005	-0.01
ΔINST_HOLD3	-0.00239	-0.68	0.00054	0.19	0.00218	0.77
ΔINST_HOLD4	-0.00470*	-1.72	0.00119	0.56	0.00248	1.13
AVERAGE COEFFICIENT	-0.00550**	-5.89	0.00740	0.17	0.00041	0.05
ALL LAGS=0 (F-STAT)		1.86		0.10		0.57
ΔINSIDER1	-0.00003	-0.36	0.00004	0.57	-0.00005	-0.74
ΔINSIDER2	-0.00024**	-2.85	0.00017**	2.58	0.00023**	3.36
ΔINSIDER3	-0.00000	-0.06	0.00022**	3.32	0.00028**	4.10
ΔINSIDER4	-0.00014**	-2.51	0.00001	0.20	0.00016**	3.58
AVERAGE COEFFICIENT	-0.00010**	-7.77	0.00011**	14.21	0.00015**	27.15
ALL LAGS=0 (F-STAT)		3.55**		4.57**		9.66**
BOPEC_DN_THRESH1	0.00202*	1.85	-0.00101	-1.18	-0.00306**	-3.51
BOPEC_DN_THRESH2	0.00091	0.83	0.00081	0.94	-0.00165*	-1.89
BOPEC_DN_THRESH3	-0.00331**	-3.00	-0.00253**	-2.91	-0.00101	-1.14
BOPEC_DN_THRESH4	-0.00172	-1.57	-0.00012	-0.14	-0.00092	-1.04
AVERAGE COEFFICIENT	-0.00053	-0.74	-0.00071**	-2.19	-0.00166**	-11.42
ALL LAGS=0 (F-STAT)		4.28**		2.72**		3.97**
BOPEC_DN_NOTHRESH1	-0.00083	-0.73	0.00073	0.81	-0.00017	-0.19
BOPEC_DN_NOTHRESH2	0.00124	1.13	-0.00014	-0.17	-0.00113	-1.28
BOPEC_DN_NOTHRESH3	-0.00001	-0.01	-0.00067	-0.75	0.00068	0.74
BOPEC_DN_NOTHRESH4	0.00012	0.10	0.00144	1.53	0.00110	1.15
AVERAGE COEFFICIENT	0.00013	0.05	0.00034	0.57	0.00012	0.07
ALL LAGS=0 (F-STAT)		0.46		0.89		0.88
DN_THRESH=DN_NOTHRESH (F-STAT)		2.23*		1.81		2.73**
ALL BOPEC_DN LAGS=0 (F-STAT)		2.41**		1.79		2.42**
BOPEC_UP_THRESH1	-0.00102	-0.20	-0.00039	-0.10	0.00144	0.35
BOPEC_UP_THRESH2	0.00035	0.12	0.00015	0.07	0.00217	0.90
BOPEC_UP_THRESH3	-0.00033	-0.09	-0.00090	-0.31	-0.00144	-0.50
BOPEC_UP_THRESH4	0.00342	1.32	-0.00117	-0.57	-0.00009	-0.05
AVERAGE COEFFICIENT	0.00061	0.10	-0.00058	0.15	0.00052	0.12
ALL LAGS=0 (F-STAT)		0.45		0.11		0.30

Table 6 (Continued)
OLS Regressions of Accounting Measures of Performance on Lagged Equity Market, Supervisory, and Performance Variables (Equation 7)

	Dependent Variable					
	ΔNPL		$\Delta EQUITY$		ΔROA	
Variable	Coef.	Test-stat	Coef.	Test-stat	Coef.	Test-stat
BOPEC_UP_NOTHRESH1	0.00098	0.42	0.00163	0.88	-0.00105	-0.56
BOPEC_UP_NOTHRESH2	-0.00019	-0.09	0.00121	0.78	0.00098	0.62
BOPEC_UP_NOTHRESH3	-0.00344	-1.61	-0.00040	-0.24	-0.00109	-0.63
BOPEC_UP_NOTHRESH4	0.00099	0.50	-0.00024	-0.15	-0.00066	-0.42
AVERAGE COEFFICIENT	-0.00042	-0.15	0.00055	0.44	-0.00046	-0.29
ALL LAGS=0 (F-STAT)		0.76		0.36		0.32
UP_THRESH=UP_NOTHRESH (F-STAT)		0.59		0.22		0.30
ALL BOPEC_UP LAGS=0 (F-STAT)		0.60		0.24		0.31
INSPECT1	-0.00100**	-2.32	0.00028	0.81	0.00035	1.00
INSPECT2	-0.00069	-1.58	-0.00017	-0.51	0.00016	0.46
INSPECT3	-0.00041	-0.93	0.00037	1.08	-0.00001	-0.04
INSPECT4	-0.00068	-1.55	0.00022	0.65	-0.00026	-0.74
AVERAGE COEFFICIENT	-0.00070**	-7.15	0.00018	0.73	0.00006	0.08
ALL LAGS=0 (F-STAT)		2.11*		0.68		0.46
ALL VARIABLES=0 (F-STAT)		4.78**		5.14**		15.55**
ALL MARKET VARIABLES=0 (F-STAT)		5.29**		2.61**		14.48**
ALL SUPERVISORY VARIABLES=0 (F-STAT)		1.80**		0.93		1.14
Num. Obs.	1150		1150		1150	

Adjusted-R^2 Values for Original BOPEC Threshold Between {1,2} and {3,4,5}

Adjusted-R^2	0.158	0.170	0.419
ΔAdjusted-R^2 (Market Contribution)	0.039	0.014	0.085
ΔAdjusted-R^2 (Supervisory Contribution)	0.012	-0.001	0.001

Adjusted-R^2 Values for Alternative BOPEC Threshold Between {1,2,3} and {4,5}

Adjusted-R^2	0.155	0.167	0.417
ΔAdjusted-R^2 (Market Contribution)	0.040	0.012	0.082
ΔAdjusted-R^2 (Supervisory Contribution)	0.010	-0.006	0.000

* Significant at the 10% level (two-sided test for t-statistics).
** Significant at the 5% level (two-sided test for t-statistics).
Notes: Same as for Table 5.

Table 7
Horse Race Regressions
Using Only Observations With Fresh Inspections (INSPECT1=1)

Table 5-Regressions of Performance Measures on Lagged Moody's, Supervisory, and Performance Variables (Original BOPEC Threshold Between {1,2} and {3,4,5})

	Dependent Variable		
	ΔNPL	$\Delta EQUITY$	ΔROA
Adjusted-R^2	0.191	0.280	0.571
ΔAdjusted-R^2 (Market Contribution)	0.009	0.018	0.072
ΔAdjusted-R^2 (Supervisory Contribution)	0.023	0.024	0.030
Num. Obs.	150	150	150

Table 5-Regressions of Performance Measures on Lagged Moody's, Supervisory, and Performance Variables (Alternative BOPEC Threshold Between {1,2,3} and {4,5})

	Dependent Variable		
	ΔNPL	$\Delta EQUITY$	ΔROA
Adjusted-R^2	0.200	0.275	0.593
ΔAdjusted-R^2 (Market Contribution)	0.009	0.018	0.072
ΔAdjusted-R^2 (Supervisory Contribution)	0.035	0.073	0.057
Num. Obs.	150	150	150

Table 6-Regressions of Performance Measures on Lagged Equity Market, Supervisory, and Performance Variables (Original BOPEC Threshold Between {1,2} and {3,4,5})

	Dependent Variable		
	ΔNPL	$\Delta EQUITY$	ΔROA
Adjusted-R^2	0.219	0.295	0.458
ΔAdjusted-R^2 (Market Contribution)	0.006	-0.002	0.006
ΔAdjusted-R^2 (Supervisory Contribution)	0.030	0.062	0.031
Num. Obs.	251	251	251

Table 6-Regressions of Performance Measures on Lagged Equity Market, Supervisory, and Performance Variables (Alternative BOPEC Threshold Between {1,2,3} and {4,5})

	Dependent Variable		
	ΔNPL	$\Delta EQUITY$	ΔROA
Adjusted-R^2	0.207	0.281	0.452
ΔAdjusted-R^2 (Market Contribution)	0.006	-0.002	0.006
ΔAdjusted-R^2 (Supervisory Contribution)	0.028	0.047	0.027
Num. Obs.	251	251	251