

# FRBSF ECONOMIC LETTER

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## Off-Site Monitoring of Bank Holding Companies

Bank supervisors engage in extensive monitoring of banking organizations in order to enforce regulations and to guard against systemic risk. In the United States, primary responsibility for monitoring bank holding companies (BHCs) falls to the Federal Reserve. The Fed currently uses a combination of on-site and off-site monitoring to fulfill its supervisory responsibilities. On-site supervisory visits produce a detailed picture of an institution's financial condition and risk profile, but they do absorb considerable resources and are conducted only about once a year. Given the changing nature of banking, this is more than enough time for an institution's risk profile to change sharply, so the Fed complements on-site inspections with off-site monitoring based on analyzing supervisory data gathered on a quarterly basis through standard regulatory reporting forms. Off-site monitoring permits more timely supervisory analysis and hence a potentially more efficient allocation of scarce supervisory resources. An important component of off-site monitoring is based on using econometric models. This *Economic Letter* summarizes recent research on using econometric models to conduct off-site monitoring of BHCs.

### Supervision of bank holding companies

Financial intermediaries such as banks and BHCs are thought to play key roles in the economic system by creating highly liquid deposit contracts out of funds that are invested in highly illiquid projects. This benefit comes with a cost, however. Banking institutions are necessarily fragile and can be susceptible to runs. Policymakers have seen fit to provide insurance to protect against the harm created by bank runs. However, this support in the form of deposit insurance and discount window lending has had the consequence of giving banks an incentive to take more risks than they would otherwise. If the government is willing to provide insurance, banks may choose to increase their risk because, if these risks pay off, the profit goes to the bank, while the losses go to the government. This "heads-I-win-tails-you-lose" scenario is a principal justification for bank regulation in this country.

Since the financial condition of the holding company could affect the condition of its bank subsidiaries, full-scope on-site inspections of BHCs are a

key element of the supervisory process. They are generally conducted once a year, particularly for larger and more complex BHCs. At the conclusion of an inspection, the supervisors assign the BHC a composite rating summarizing their assessment of the BHC's overall health and financial condition. This rating is called BOPEC, and it stands for the five key areas of supervisory concern: the condition of the BHC's **B**ank subsidiaries, **O**ther nonbank subsidiaries, **P**arent company, **E**arnings, and **C**apital adequacy. BOPEC ratings range from one (best) to five (worst). A rating of one or two indicates that the BHC is not considered to be of supervisory concern. BOPEC ratings are highly confidential and are not publicly available.

Between on-site inspections, supervisors use an off-site system based primarily on two key information sources. First is the BHC Performance Report, which is filed by BHCs and their subsidiaries and is a detailed summary of their quarterly regulatory reporting forms. The report summarizes approximately 800 BHC-related variables across several years. From this report, certain variables are selected as key performance criteria, and if a BHC fails to meet these criteria in a given quarter, it is noted as an exception that requires further monitoring.

The second source is the supervisory CAMELS ratings assigned to banks within the holding company. These ratings are assigned by the various bank supervisory agencies; the OCC for national banks, the FDIC for state banks that are not members of the Federal Reserve System, and the Federal Reserve for state member banks. As with BOPEC ratings, CAMELS ratings are assigned after bank examinations. The acronym refers to the six key areas of concern: the bank's **C**apital adequacy, **A**sset quality, **M**anagement, **E**arnings, **L**iquidity, and **S**ensitivity to risk. The composite CAMELS rating is like the BOPEC rating—one to five with one as the best rating. Since the condition of a BHC is closely related to the condition of its subsidiary banks, the off-site BHC surveillance program includes monitoring recently assigned CAMELS ratings.

As with on-site BHC inspections, on-site bank examinations occur about once a year, which is long enough for the gathered supervisory information

to become less representative of the bank's condition. To address this issue, in 1993 the Federal Reserve instituted an off-site monitoring system for banks, known as SEER—System for Estimating Examiner Ratings. An important component of SEER is a model that forecasts bank CAMELS ratings for the next quarter. The model is estimated every quarter in order to reflect the most recent relationship between selected financial ratios and the two most recent quarters of actual CAMELS ratings. Significant changes in a bank's CAMELS rating as forecasted by the SEER model could be sufficient to warrant closer monitoring of the bank. The off-site BHC surveillance program also explicitly monitors the SEER model's forecasted CAMELS ratings.

### A model for off-site BHC monitoring

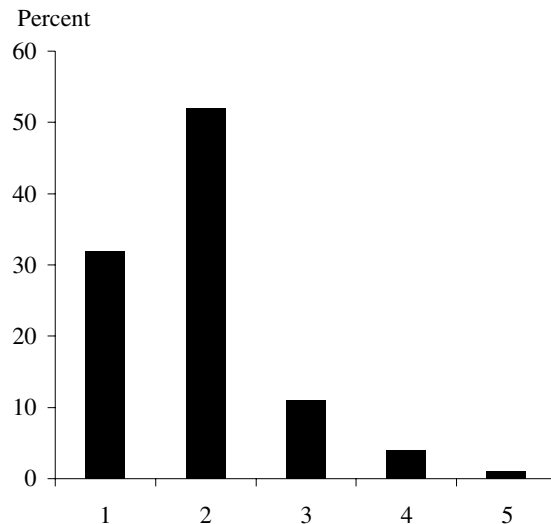
In Krainer and Lopez (2001), we explored the usefulness of a model similar to SEER for monitoring BHCs off-site. Specifically, the model forecasts the BOPEC ratings to be assigned at an upcoming on-site inspection using the most recent data available to supervisors. The data sample for our analysis includes the supervisory BOPEC ratings assigned over the period from 1990 to 1999. We chose to analyze only BOPEC ratings assigned after an on-site, full-scope inspection. Our sample of BOPEC ratings is further refined to include only inspections of BHCs with a lead bank, four quarters of reported supervisory data, and prior BOPEC ratings. Figure 1 presents the distribution of the 3,963 BOPEC ratings assigned over our sample period to 1,440 different BHCs. About 84% of the ratings fall in the upper two categories, which indicate little supervisory concern.

Our proposed BOPEC off-site monitoring (BOM) model is similar in structure to the SEER model for CAMELS ratings. The choice of which supervisory variables to include in the model is challenging; as mentioned, there are more than 800 variables at the supervisors' disposal for this purpose. For this study, we selected nine explanatory variables that are reasonable proxies for the five components of the BOPEC rating.

The first variable is the natural log of total BHC assets, which is our control variable for firm size. The next three variables capture the supervisory concerns regarding the BHC's bank subsidiaries, as summarized in the "B" component of the rating: the CAMELS rating of the BHC's lead bank, the ratio of the BHC's "problem loans" (i.e., nonperforming loans, nonaccrual loans, and other real estate owned) to its total assets, and the ratio of the BHC's allowances for losses on loans and leases (ALLL) to its total loans, another proxy for the health of the BHC's loan portfolio.

The fifth variable is an indicator of whether the BHC has a securities subsidiary, which during our

**Figure 1**  
BOPEC rating percentages, 1990-1999



sample period is the Section 20 subsidiary that engages in securities activities that BHCs were not permitted to engage in before the Gramm-Leach-Bliley Act of 1999. This variable is a proxy for the types of nonbank activities the BHC is engaged in and speaks to the "O" component of the BOPEC rating. We also include as the sixth variable the ratio of a BHC's trading assets to its total assets as a proxy of its nonbanking activities.

The seventh variable is the so-called "double leverage" ratio between the BHC and its lead bank, which is the ratio of the lead bank's equity capital to that of the parent's equity capital. This variable provides a measure of the soundness of the parent BHC, and we use it as a proxy for the condition of the parent BHC as summarized in the "P" component of the BOPEC rating. The eighth variable is the BHC's return on average assets (ROAA), defined as the ratio of the four-quarter average of the BHC's net income to the four-quarter average of its assets. This variable is used to proxy for the "E" component of the BOPEC rating. The ninth variable is the BHC's ratio of equity capital to its total assets, which is a proxy for the "C" component of the BOPEC rating. We also include additional variables related to whether the BHC is publicly traded or privately owned.

### Empirical results

Our empirical results are generally in line with our expectations. We found that larger BHCs tend to have better BOPEC ratings, which could be due to larger banks having more diversified asset portfolios. We found that an improvement in a BHC's lead bank CAMELS rating tends to cause the parent's BOPEC rating to improve as well. Our results indi-

cate that an increase in a BHC's problem loans or ALLL tends to cause its BOPEC rating to worsen. We found that the presence of a Section 20 subsidiary and increased trading assets tends also to cause BOPEC ratings to worsen. Our results indicate that an increase in the BHC's equity capital ratio tends to cause its BOPEC rating to improve. Our results indicate that a BHC's double leverage and ROAA do not seem to affect its BOPEC rating.

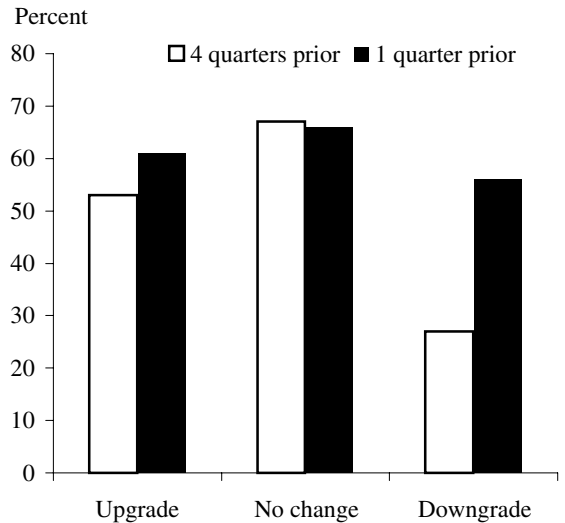
In order to be useful for supervisory purposes, the BOM model must be able to forecast BOPEC ratings accurately. In order to mimic actual practice, we re-estimated the model every quarter based on a rolling data sample of the last four quarters. We then evaluated the accuracy of the model's forecasts by comparing them to the actual BOPEC ratings assigned.

Figure 2 presents our analysis of the forecast accuracy of our model relative to actual BOPEC changes (i.e., upgrade, no change, or downgrade). We transform our BOPEC forecasts into BOPEC change forecasts by examining how far they are from the median forecast for their BOPEC peer-group. If our transformed forecast is one full rating grade below its peer-group median, then the BHC is forecast to improve. If the transformed forecast is one full rating grade above its peer-group median, then the BHC is forecast to worsen. Otherwise, the transformed BOPEC forecast indicates no change in BOPEC rating.

"No changes" to BOPEC make up the largest category and are well forecasted at all horizons between four quarters and one quarter prior to their assignment. They are forecasted correctly about 67% of the time. BOPEC downgrades are forecasted correctly about 30% of the time at four quarters prior, and that percentage improves to 56% at one quarter prior. Upgrades are forecasted correctly about 50% of the time at four quarters prior and 60% of the time at one quarter prior. The change forecast should be compared to the "naive" forecast where, given no information about a specific BHC's condition, the probability that the BHC is either upgraded or downgraded is about 25%. Overall, the transformed BOPEC forecasts are accurate about 55% to 65% of the time. These results strongly indicate that the BOM model's forecasts

**Figure 2**

**Percentage of correctly forecasted BOPEC outcomes**



are capable of detecting actual BOPEC assignments up to four quarters prior and could thus be useful for supervisory monitoring purposes.

**Conclusion**

This research suggests that the BOPEC off-site monitoring model can summarize supervisory information on BHCs in a simple and practical way. As with the off-site monitoring model currently used for supervisory bank ratings, this model could give supervisors a tool for detecting potentially significant changes in BOPEC ratings up to four quarters ahead of time. Therefore, it offers practical value for banking supervisors, who would be interested in having accurate early warnings of changes in BHC conditions.

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**Reference**

Krainer, J., and J.A. Lopez. 2001. "Incorporating Equity Market Information into Supervisory Monitoring Models." Federal Reserve Bank of San Francisco Working Paper 01-14. <http://www.frbsf.org/publications/economics/papers/2001/wp01-14bk.pdf>

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