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# A CAMEL Rating's Shelf Life

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## **Abstract:**

How quickly do the CAMEL ratings regulators assign to banks during on-site examinations become "stale"? One measure of the information content of CAMEL ratings is their ability to discriminate between banks that will fail and those that will survive. To assess the accuracy of CAMEL ratings in predicting failure, Rebel Cole and Jeffery Gunther use as a benchmark an off-site monitoring system based on publicly available accounting data. Their findings suggest that, if a bank has not been examined for more than two quarters, off-site monitoring systems usually provide a more accurate indication of survivability than its CAMEL rating. The lower predictive accuracy for CAMEL ratings "older" than two quarters causes the overall accuracy of CAMEL ratings to fall substantially below that of off-site monitoring systems. The higher predictive accuracy of off-site systems derives from both their timeliness—an updated off-site rating is available for every bank in every quarter—and the accuracy of the financial data on which they are based. Cole and Gunther conclude that off-site monitoring systems should continue to play a prominent role in the supervisory process, as a complement to on-site examinations.

*JEL Classification:* G21, G28

*Key Words:* Bank, Bank Failure, CAMEL, Commercial Bank, Offsite Supervision

## **A CAMEL Rating's Shelf Life**

How long does a supervisory rating derived from an on-site examination of a bank's financial condition adequately reflect the bank's financial viability? Insofar as financial conditions can, and often do, change rapidly, we would not expect a given examination rating to remain accurate for long periods of time. Yet, during the late 1980s, a tumultuous period for the banking industry characterized by high failure rates, many banks went for several years between on-site examinations. The need for more up-to-date examination ratings was recognized by Congress and codified in the Federal Deposit Insurance Corporation Improvement Act of 1991 (FDICIA), which requires regulators to conduct annual on-site examinations.<sup>1</sup> However, even annual on-site examinations cannot always detect rapid changes in a bank's financial condition. The question remains as to how quickly the bank examination ratings commonly known as "CAMEL" ratings become "stale".

We attempt to answer this question by analyzing the historical relationship between examination ratings and bank failures. Although failure prediction is not the primary purpose of the CAMEL rating, its ability to predict failures offers a convenient metric for assessing the decay of information contained in an examination rating.

To assess the accuracy of examination ratings in predicting failure, we use as a benchmark an off-site monitoring system based on publicly available accounting data. This system is very much similar to one component of the Federal Reserve's comprehensive Financial Institutions Monitoring System (FIMS), which the Fed implemented in 1993 to monitor the

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<sup>1</sup> FDICIA permits banks that are small, well-capitalized, and highly rated to be examined only once every eighteen months.

condition of banks between examinations.<sup>2</sup> If up-to-date examination ratings are an accurate measure of financial condition, then their ability to predict bank failures should be at least as high as that of the ratings generated by our off-site monitoring system. In analyzing the predictive accuracy of examination ratings, we take into account the length of time between on-site examinations and subsequent failures because we expect recent examinations to be more accurate in predicting failures than examinations conducted in the relatively distant past.

Our findings suggest that the information content of examination ratings decays rather quickly. Specifically, the ability of examination ratings to anticipate failures appears to exceed that of off-site monitoring systems only when the ratings used are based on on-site examinations conducted no more than two quarters earlier. If a bank has not been examined for more than two quarters, our findings suggest that off-site monitoring systems can provide a more accurate indication of survivability. The reduction in predictive accuracy for relatively "old" CAMEL ratings causes the overall accuracy of CAMEL ratings to fall substantially below that of off-site monitoring systems.

Off-site monitoring systems are critically dependent upon the accuracy of their accounting data inputs, however, and the integrity of those data can only be ensured by periodic on-site examinations. These systems also may have difficulty in identifying emerging problems unless these problems manifest themselves through the accounting data inputs. It seems likely that on-site examinations are more likely to identify such paradigm shifts, and to require that

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<sup>2</sup> The Federal Reserve uses FIMS not only to track the financial condition of individual banks and banking organizations between on-site examinations but also to direct examination resources. An overview of FIMS is provided by Cole, Cornyn, and Gunther (1995). Putnam (1983) describes the bank surveillance systems used by regulators during the 1970s and early 1980s.

banks recognize emerging financial difficulties through reserves and charge-offs. Moreover, systems such as our benchmark require that we observe relatively frequent failures, and, historically, there has been a paucity of bank failures.<sup>3</sup> We therefore conclude that off-site monitoring systems should continue to play a prominent role in the supervisory process, but only as a complement to comprehensive, on-site examinations. In addition, our results indicate that an off-site monitoring model, such as the one used to produce our benchmark ratings, would be a valuable tool for anyone interested in tracking the financial condition of individual banks.

### **On-site monitoring**

The Uniform Financial Institutions Rating System, adopted in 1979, provides federal bank regulatory agencies with a framework for rating the financial condition and performance of individual banks. Regulators periodically visit banking offices to evaluate their financial

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<sup>3</sup> To generate accurate forecasts, offsite monitoring systems such as ours typically require that we observe 50-100 failures. Yet in 1993 and 1994, there were only 43 and 11 bank failures respectively. Historically, from the mid-1930s until the early 1980s, no more than 20 bank failures were recorded in any one year. Whether systems based upon the failure experience of the 1980s will be accurate in predicting failures during the 1990s and beyond is open to debate.

soundness, to monitor their compliance with laws and regulatory policies, and to assess the quality of their management and systems of internal control.<sup>4</sup>

Based on the results of these on-site evaluations, regulators then rate the performance of individual banks along five key dimensions—capital adequacy, asset quality, management, earnings, and liquidity—yielding the rating system's acronym, CAMEL. Each of the five areas of performance are rated on a scale of 1 to 5 as follows: 1—strong performance, 2—satisfactory performance, 3—performance that is flawed to some degree, 4—marginal performance that is significantly below average, and 5—unsatisfactory performance that is critically deficient and in need of immediate remedial action.

Once each of the five areas of performance has been assigned a rating, a composite, or overall, rating is derived, again on a scale from 1 to 5. The five composite rating levels are described as follows in the Commercial Bank Examination Manual produced by the Board of Governors of the Federal Reserve System: 1—an institution that is basically sound in every respect, 2—an institution that is fundamentally sound but has modest weaknesses, 3—an

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<sup>4</sup> According to the American Institute of Certified Public Accountants Committee on Working Procedures, “internal control comprises the plan of organization and all of the coordinate methods and measures adopted within a business to safeguard its assets, check the accuracy and reliability of its accounting data, promote operational efficiency, and encourage adherence to subscribed managerial policies.”

institution with financial, operational, or compliance weaknesses that give cause for supervisory concern, 4—an institution with serious financial weaknesses that could impair future viability, and 5—an institution with critical financial weaknesses that render the probability of failure extremely high in the near term.

The frequency of on-site examinations has varied considerably over recent years. Before FDICIA's adoption, banks often were not subject to annual examinations.<sup>5</sup> Because a bank's financial condition can change appreciably from one quarter to the next, more frequent on-site examinations provide a more accurate assessment of a bank's current financial condition. And the earlier regulators can identify a troubled bank, the more quickly they can intervene with supervisory actions intended to return the bank to financial health or, if necessary, close the bank so as to minimize losses to the Bank Insurance Fund.<sup>6</sup>

The benefits of more frequent on-site examinations, however, must be weighed against the substantial costs of such examinations to both regulators and banks. The perceived trade-off between the costs and benefits of more frequent examinations has precluded Congress from requiring more than an annual frequency of on-site examinations.<sup>7</sup> When banks are only subject to annual on-site examinations, the task of monitoring individual banks on a more frequent basis devolves to off-site monitoring systems such as FIMS.

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<sup>5</sup> State-chartered banks regulated by the Federal Reserve generally were subject to annual examinations even before the FDICIA mandate.

<sup>6</sup> Gilbert (1993) provides evidence that failing banks examined in their last twelve months of operation imposed lower losses on the Bank Insurance Fund, as a percentage of their assets, than banks that were not examined near the time of failure.

<sup>7</sup> It is important to note that “problem banks,” those with composite CAMEL ratings of 4 or 5, are generally subject to an on-site examination twice per year.

### **Off-site monitoring**

Various off-site monitoring systems have been developed to complement the CAMEL rating system. While these systems have employed a wide variety of analytical tools, most have relied on a common source of data—the Report of Condition and Income, or "call report"—which each bank submits quarterly to its primary regulatory agency. The financial data contained in this report provide timely information on the performance of individual banks and a strong foundation for off-site monitoring systems.

It is important to note that one of the primary functions of the on-site examination process is to ensure that each bank has in place a system of internal control that checks the accuracy and reliability of its accounting data. Without accurate accounting data, off-site systems cannot detect banks whose financial condition is deteriorating.

To illustrate the nature and function of off-site monitoring systems, we develop a system based on key financial ratios derived from the bank call report data. In this system, we use standard statistical methods to estimate the relationship between the financial ratios measured at year-end 1985 for all U.S. insured commercial banks and the likelihood of bank failure during the two-year period from the second quarter of 1986 through the first quarter of 1988.<sup>8</sup>

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<sup>8</sup> Failures are identified starting in the second quarter of 1986, rather than the first quarter, to impose a one-quarter lag in the estimated relationship. This is done to approximate real-world



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conditions, under which edited call report data generally are not available until forty-five to seventy days after the end of each quarter. Consequently, failures occurring during that first quarter are excluded from the analysis. When the estimated relationship is used to predict future bank failures, lags in the reporting of call report data imply a short lag between the call report date and the period over which failures are predicted.

We use seven financial indicators, each measured as a percentage of gross assets, to characterize the financial posture of individual banks. As shown in Table 1, these indicators are measures of capital adequacy, asset quality, earnings, and liquidity—four of the five components of the CAMEL rating. Equity capital, which serves as a buffer protecting a bank's solvency against financial losses, is our measure of capital adequacy; more capital is expected to reduce the chance of failure. We use three indicators of asset quality—loans past due 90 days or more and still accruing interest, nonaccrual loans, and other real estate owned (which, for the most part, consists of foreclosed real estate). Higher values of each indicator should increase the probability of failure in subsequent years. To measure earnings, we use net income as our indicator. Higher income generally reflects a lack of financial difficulties and so also would be expected to reduce the likelihood of failure. Finally, we use two indicators of liquidity—investment securities and large certificates of deposit (\$100,000 or more). Liquid assets, such as investment securities, enable a bank to respond quickly to unexpected demands for cash and typically reflect relatively conservative financial strategies, whereas volatile liabilities, such as large certificates of deposit, often reflect relatively aggressive financial strategies, impose high interest expenses, and are subject to quick withdrawal. As a result, we expect higher values of investment securities to reduce the chance of failure, whereas higher values of large certificates of deposit should increase the probability of failure.

The historical relationship between these financial indicators and failure is estimated using statistical methods.<sup>9</sup> The estimation results indicate that the variables included in the

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<sup>9</sup> Specifically, our off-site monitoring system uses the probit methodology to estimate the historical relationship between the financial indicators and the likelihood of failure. The

system are important indicators of bank survivability and that each affects the probability of failure in the expected fashion. With the estimated relationship in hand, we can now insert into the system values of the seven financial indicators reported for year-end 1987 to generate predictions of the probability of failure for individual banks over the two-year period from the second quarter of 1988 through the first quarter of 1990. This exercise illustrates the manner in which regulators use off-site monitoring systems in practice. A historical relationship is estimated between a set of financial indicators and the likelihood of bank failure, which then provides the basis for generating predictions of future failures. Here, we compare the predicted probabilities of failure for the period from the second quarter of 1988 through the first quarter of 1990 with the failures that actually occurred, thereby establishing a sense of the system's predictive accuracy. We can then use the off-site surveillance system to benchmark the ability of CAMEL ratings to anticipate bank failures.

### **The information content of CAMEL ratings**

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statistical underpinnings of this methodology are described by Maddala (1983).

To measure the information content of CAMEL ratings, we test their ability to discriminate between banks that will fail and banks that will survive.<sup>10</sup> Accuracy in predicting bank failure is an important ingredient of a successful banking supervision program, but it is important to remember that CAMEL ratings were never intended to measure the probability of bank failure. Instead, they were designed to serve as a summary measure of financial condition, not just a measure of catastrophic failure. For example, a CAMEL rating can only take on five discrete values, making it difficult to discriminate among banks within each rating class. Moreover, regulators don't expect every bank assigned a "5"-rating to fail. Indeed, one goal of bank supervision is to intervene and take actions that will return troubled banks to financial health.

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<sup>10</sup> Berger and Davies (1994) provide a detailed review of the academic literature on the value of the information generated by federal bank examinations. Based on their own results, Berger and Davies conclude that CAMEL downgrades reveal previously private unfavorable information about bank condition.

To provide a benchmark for assessing the accuracy of CAMEL ratings in predicting failure, we use results from the off-site monitoring system presented in the previous section. Since CAMEL ratings incorporate confidential information from on-site examinations, as well as public information from the quarterly call reports and other sources, we expect that, in predicting bank failures, up-to-date CAMEL ratings would be more accurate than the ratings from our off-site monitoring system.<sup>11</sup> Moreover, both CAMEL ratings and off-site ratings should be significantly more accurate in predicting failure than a naive model that randomly selects a sample of banks as likely to fail.

*Are Timely CAMEL Ratings Informative?*

In assessing the predictive accuracy of CAMEL ratings, we take into account the length of time between on-site examinations and the beginning of our forecast period. Because CAMEL ratings are assigned on a flow basis as examinations are completed, there are numerous vintages of CAMEL ratings available at any one time. We expect the accuracy of CAMEL ratings in predicting failures to be a decreasing function of the length of time between the assignment of the rating and the beginning of the forecast period.

To test this hypothesis, we assess the accuracy of the CAMEL ratings for individual banks at year-end 1987 in predicting failures during the two-year period from the second quarter

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<sup>11</sup> Jones and King (1995) report that on-site examination information improves the ability of risk-based capital ratios derived from call report information to identify banks with a high risk of insolvency. Moreover, call report information often depends on examination results, rather than the other way around, as on-site examinations frequently result in substantial changes to reported financial information. Berger and Davies (1994) provide evidence that the call report acts as a conduit to transmit examination results to the public.

of 1988 through the first quarter of 1990. Because all bank examinations are not conducted at the same time, the CAMEL ratings available at year-end 1987 were assigned during a wide span of time. While many of the ratings were based on examinations conducted during the fourth quarter of 1987, many others were assigned much earlier and were based on examinations conducted during the previous year and even earlier. Because the financial condition of individual banks can change appreciably from quarter to quarter, the CAMEL ratings based on examinations conducted near the end of 1987 should provide a better indication of future survivability than those based on examinations conducted a year or more earlier.

To provide an indication of how well recent CAMEL ratings predict failure, we first limit our sample to ratings assigned “as of” the fourth quarter of 1987.<sup>12</sup> Of the 9,880 insured commercial banks used in this analysis, 2,254 had CAMEL ratings assigned based on financial data from the fourth quarter.<sup>13</sup> We sort the 2,254 banks from worst to best based on their composite CAMEL ratings. Then, we sort the banks within each of the five possible composite ratings from worst to best based on the arithmetic average of their five CAMEL component

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<sup>12</sup> There are three primary dates typically associated with an examination—the start date, the end date, and the “as of” date. The “as of” date derives its name from the fact that it is the date for the financial data on which the CAMEL rating is based. We use the “as of” date to match CAMEL ratings with the ratings from our off-site monitoring system, which also are dated based on the date of the financial data used.

<sup>13</sup> The number of banks included in our analysis is limited by our access to historical CAMEL rating data. Of the 13,365 U.S. insured commercial banks that meet the other requirements of our study, we are able to obtain year-end 1987 CAMEL ratings for 9,880, or 74 percent. Of these 9,880 banks, 244 failed during the two-year period examined. Also, of the 9,880 banks, 9,740 were rated based on a “full scope” examination, another 134 had ratings associated with “limited scope” examinations, and the remaining six were the subject of “targeted” examinations. The results reported here are qualitatively identical when the analysis is limited to “full scope” examinations.

ratings.<sup>14</sup> This is somewhat ad hoc, in that bank examiners do not intend for the component ratings to be used as a means of ranking banks within rating classes, but some such ranking procedure is necessary to obtain a metric comparable to our offsite monitoring score. Using the resulting ranking as our guide, we expect the banks with the worst ratings to be the most likely to fail during the two-year period from second-quarter 1988 through first-quarter 1990.

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<sup>14</sup> While the equal weighting of the five component ratings is somewhat arbitrary, we also used several alternative schemes to weight the five component ratings for determining ranks within composite CAMEL rating groups. The results are not qualitatively different when alternative weightings are used.

Chart 1 shows the accuracy of the CAMEL ratings based on fourth-quarter 1987 financial data in predicting failures during the subsequent two-year period of interest (April 1988—March 1990).<sup>15</sup> The horizontal axis measures the proportion of banks predicted to fail. For example, the value of 10 on the horizontal axis indicates that the top 10 percent of the sample of banks, as sorted from the worst to best CAMEL ratings, are predicted to fail. The vertical axis gives, as a percentage of the total number of banks that actually failed, the number of failed banks correctly identified as failures. So, for example, when the 10 percent of banks with the worst CAMEL ratings are predicted to fail, Chart 1 indicates that 89 percent of the failures that actually occurred are identified successfully. In comparison, the 10 percent of the same sample of banks with the highest predicted probability of failure, as generated by the off-site monitoring system, includes 87 percent of the failures that actually occurred. Hence, when each system considers the 10 percent of banks most likely to fail, recently assigned CAMEL ratings are slightly more accurate in identifying failures than are the ratings generated by our off-site monitoring system.

Overall, the on-site and off-site systems' degrees of accuracy are comparable, as indicated by the tendency for the two curves in Chart 1 to remain fairly close together. This is somewhat surprising as we might expect the on-site system to be considerably more accurate when only recently assigned ratings are used. However, there is an important feedback effect that greatly benefits the offsite system. During the examination, supervisors require banks that have not adequately reserved against or charged off losses to do so, and these actions are reflected in key call report data that are inputs to the off-site monitoring system, e.g., capital, earnings, and asset

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<sup>15</sup> We exclude the first quarter of 1988 because examinations based upon December 1987 financial statements would not be finalized until at least some point during the first quarter of



quality. Hence, the more recent the examination, the more accurate is the call report data, and this accuracy improves the performance of the offsite monitoring system in identifying failures.

Both systems perform much better than the expected results of the naive model that randomly selects potential failures. For example, if 10 percent of the banks are selected at random and predicted to fail, only 10 percent of the failures would be successfully identified, on average. This indicates that both recent CAMEL ratings and off-site ratings are highly accurate in predicting bank failure.

#### *How Soon Do CAMEL Ratings Become Stale?*

While recently assigned CAMEL ratings provide a good indication of the survival prospects for individual banks, the speed with which financial conditions can change suggests that CAMEL ratings assigned in the relatively distant past may not predict future failures as well as "fresh" CAMEL ratings. To provide an indication of how well relatively dated CAMEL ratings predict failure, we augment our initial sample of banks rated as of fourth-quarter 1987 with banks rated as of the third quarter of that year. Of the 9,880 insured commercial banks used in this analysis, 4,529 had CAMEL ratings based on financial data from the third or fourth quarter. Once again, we sort these individual banks from worst to best based on their composite CAMEL ratings and average CAMEL component ratings, with the expectation that those with

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1988.

the worst ratings would be the most likely to fail during the two-year period from second-quarter 1988 through first-quarter 1990.

Chart 2 shows the accuracy of the CAMEL ratings based on data from the third or fourth quarter of 1987 in predicting failures during the two-year period. Overall, the on-site and off-site systems' levels of predictive accuracy are again comparable, as indicated by the closeness of the two curves. When the 10 percent of the banks with the worst ratings are predicted to fail, the CAMEL ratings capture 88 percent of the failures that actually occurred, while the off-site monitoring system identifies 87 percent. These findings suggest that, for the time period examined, no appreciable reduction occurs in the relative ability of CAMEL ratings to anticipate failures when examinations conducted one quarter earlier are augmented with examinations conducted two quarters earlier.

A different picture emerges, however, when banks with a most recent examination of three quarters ago are also included in the analysis. Chart 3 shows the accuracy of the CAMEL ratings as of the second, third, or fourth quarter of 1987 in predicting failures during the two-year period from second-quarter 1988 through first-quarter 1990. Of the 9,880 insured commercial banks used in this analysis, 6,358 had CAMEL ratings based on financial data from the second, third, or fourth quarter. When the banks with three-quarter-old CAMEL ratings are included in the analysis, the accuracy of the CAMEL ratings in predicting failures is appreciably less than that of the ratings (predicted probabilities of failure) generated by the off-site monitoring system. When the 10 percent of the banks with the worst ratings are predicted to fail, the CAMEL ratings identify 78 percent of the failures that actually occurred, whereas the off-site ratings

identify 85 percent of the failures.<sup>16</sup> Based on these findings, it appears that a substantial reduction occurs in the relative ability of CAMEL ratings to anticipate failures when examinations conducted one and two quarters earlier are augmented with examinations conducted three quarters earlier.<sup>17</sup>

The reduction in the predictive accuracy of CAMEL ratings continues when banks with four-quarter-old CAMEL ratings are included in the analysis. Of the 9,880 insured commercial banks used in this analysis, 7,872 had CAMEL ratings based on financial data from the first through fourth quarters of 1987. As shown in Chart 4, for this broader sample of banks, the ratings from the off-site monitoring system are substantially more accurate forecasts of bank failure than the CAMEL ratings. When the 10 percent of the banks with the worst ratings are predicted to fail, the CAMEL ratings identify 73 percent of the failures that actually occurred, whereas the ratings from the off-site monitoring system capture 86 percent of the failures.

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<sup>16</sup> The lower success rate of the CAMEL ratings in identifying failures implies that the CAMEL ratings also mistakenly predict a greater number of surviving banks as failing.

<sup>17</sup> This result is consistent with Gilbert and Park (1994), who find that early warning systems often can identify emerging problems at failing banks earlier than on-site examinations.

Finally, we consider all banks for which CAMEL ratings would have been available at year-end 1987. Interestingly, of the 9,880 insured commercial banks analyzed, 2,008 had CAMEL ratings at year-end 1987 based on financial data from 1986 or earlier. When these 2,008 banks are included and the entire sample of 9,880 banks is analyzed, the accuracy of the off-site monitoring system relative to CAMEL ratings is even higher. When the 10 percent of the banks with the worst ratings are predicted to fail, the CAMEL ratings identify only 74 percent of the failures that actually occurred, whereas the ratings from the off-site monitoring system identify 88 percent, as shown in Chart 5. The reduction in predictive accuracy for relatively old CAMEL ratings causes the overall accuracy of CAMEL ratings to fall substantially below that of off-site monitoring systems.<sup>18</sup>

These results indicate that CAMEL ratings can become stale rather quickly, pointing to the conclusion that off-site monitoring systems provide regulators with valuable information on bank survivability over and above the information generated by the examination process. In practice, output from regulatory offsite monitoring systems is reviewed by supervisory personnel in conjunction with information obtained during previous on-site examinations and other sources including the Uniform Bank Performance Report and the Bank Holding Company Performance Report. These latter reports are analytical tools created by supervisory personnel on a quarterly basis showing the effect of management decisions and economic conditions on a banks' financial performance and balance sheet composition. The results of this comprehensive off-site analysis

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<sup>18</sup> For example, looking separately at the 2,008 banks with CAMEL ratings based on financial data from 1986 or earlier, the 10 percent with the worst CAMEL ratings includes only 59 percent of the subsequent failures, while the 10 percent with the worst off-site ratings includes 95 percent of the subsequent failures. Similarly large differences in predictive accuracy occur for banks

are then used to accelerate the on-site examination of institutions showing financial deterioration; to identify the areas of most supervisory concern in those institutions already scheduled for examination; and to allocate the most experienced examiners to troubled institutions.

## **Conclusion**

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examined in the first and second quarters of 1987.

The findings reported here suggest that the information content of CAMEL ratings decays rapidly. During the period examined, the ability of CAMEL ratings to anticipate failures is comparable to or better than that of off-site monitoring systems only when the CAMEL ratings are based on on-site examinations conducted no more than two quarters prior to the forecast period. If a bank has not been examined for more than two quarters, then off-site monitoring systems more accurately indicate survivability. The reduction in predictive accuracy for relatively old CAMEL ratings causes the overall accuracy of CAMEL ratings to fall substantially below that of off-site monitoring systems. The higher predictive accuracy of off-site ratings derives from both their timeliness—an updated off-site rating is available for every bank in every quarter—and the accuracy of the call report data on which they are based. Of course, these conclusions are based on the particular period analyzed, and may not generalize to all other periods.<sup>19</sup> Nevertheless, the pattern of CAMEL ratings and bank failures during the recent period of banking difficulties points to the value of off-site monitoring systems as a supplement to the supervisory ratings generated from periodic on-site examinations. We conclude that off-site monitoring systems such as the Federal Reserve’s FIMS should continue to play a prominent role in the supervisory process.

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<sup>19</sup> We obtained similar results when analyzing bank failures occurring during two year periods from 1988-92. In later periods, there were too few failures to conduct any meaningful analysis. Only 41 banks failed during all of 1993, and even fewer in 1994. We were prevented from analyzing earlier periods by our inability to obtain CAMEL ratings from those periods.

### References

- Berger, Allen N., and Sally M. Davies (1994), "The Information Content of Bank Examinations," Finance and Economics Discussion Series, no. 20 (Washington, D.C.: Board of Governors of the Federal Reserve System, July).
- Cole, Rebel A., Barbara G. Cornyn, and Jeffery W. Gunther (1995), "FIMS: A New Monitoring System for Banking Institutions," *Federal Reserve Bulletin*, January, 1–15.
- Gilbert, R. Alton (1993), "Implications of Annual Examinations for the Bank Insurance Fund, Federal Reserve Bank of St. Louis *Review*, 35–52.
- , and Sangkyun Park (1994), "The Value of Early Warning Models in Bank Supervision," (Federal Reserve Bank of St. Louis, mimeo).
- Jones, David S., and Kathleen Kuester King (1995), "The Implementation of Prompt Corrective Action: An Assessment," *Journal of Banking and Finance* 19 (June): 491–510.
- Maddala, G. S. (1983), *Limited-Dependent and Qualitative Variables in Econometrics* (Cambridge: Cambridge University Press), 22–27.
- Putnam, Barron H. (1983), "Early Warning Systems and Financial Analysis in Bank Monitoring: Concepts of Financial Monitoring," Federal Reserve Bank of Atlanta *Economic Review*, November, 6–13.

**Table 1**  
**Financial Indicators Used in the Off-Site Surveillance System**

<u>Financial indicator</u> *	<u>Expected effect on the likelihood of bank failure</u>
<i>Capital Adequacy</i>	
Equity capital	Reduce
<i>Asset Quality</i>	
Loans past due 90 days or more and still accruing	Increase
Nonaccrual loans	Increase
Other real estate owned	Increase
<i>Earnings</i>	
Net income	Reduce
<i>Liquidity</i>	
Investment securities	Reduce
Large certificates of deposit (\$100,000 or more)	Increase

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\* Each indicator is measured relative to gross assets.  
DATA SOURCE: Report of Condition and Income.