

Financially Distressed Banks: How Effective Are Enforcement Actions in the Supervision Process?

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One major purpose of federal and state regulation of banks is to ensure that institutions maintain safe-and-sound business practices. The main tool used to achieve this goal is bank supervision in general—and bank safety-and-soundness examinations in particular. Regulators conduct on-site examinations to ensure that bank operations are consistent with sound banking practices. When on-site examinations identify unsafe, unsound, or illegal banking practices, regulators use a variety of supervisory enforcement actions to require institutions to take corrective measures. These enforcement actions are intended to accomplish several things, including: bringing about alterations in the practices and behavior that caused the problems, stabilizing the institutions, and averting potential losses to the deposit insurance fund. Violations of enforcement agreements are a serious matter—noncompliance often carries heavy penalties, including the termination of deposit insurance.

This article investigates the effects of bank examinations and enforcement actions on the behavior of problem banks. We provide information on the effectiveness of supervision of distressed institutions through the issuance of formal enforcement actions during the 1980s and 1990s, a period of greater stress and turmoil for U.S. financial institutions than any other since the Great Depression. The first section discusses the legal and regulatory framework for the application of formal enforcement actions. The second section focuses on the enforcement polices available to

the FDIC: kinds of actions, procedures used, and number and types of enforcement actions issued by the FDIC in recent decades. The third section reviews previous empirical studies and then discusses the methodology, the sample and data, and the model, variables, and results. The last section presents the conclusions.

Evolution of Bank Enforcement Powers

The Banking Act of 1933 gave the federal banking supervisory agencies limited powers to force banking institutions to follow agency directives.¹ It also granted the FDIC, as the insurer of commercial banks, the power to terminate federal deposit insurance for any institution found guilty of serious offenses.² Over time, however, the power to take deposit insurance away from a financial institution proved to be an in-

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¹ For an article on the statutory history of bank enforcement powers, see Huber (1988). Although most agencies have similar enforcement powers, this article focuses primarily on the Federal Deposit Insurance Corporation (FDIC). As deposit insurer, it is the only agency with the power to terminate a financial institution’s deposit insurance.

² The standard for terminating deposit insurance is a high one and must involve findings of unsafe and unsound banking conditions or practices, or violations of law or regulations.

flexible and impractical enforcement tool. The FDIC must move rapidly to deal with day-to-day issues involving unsafe or unsound banking practices or to remove dishonest and incompetent officials from the banks it supervises. Termination of deposit insurance involves a lengthy and complicated legal process, and a successful attempt is often tantamount to a death penalty for the institution.³ In other words, terminating deposit insurance is analogous to wielding a blunt instrument in a surgical procedure that requires a more refined tool. As a result, the FDIC and most other regulatory agencies used other methods of forcing changes in bank behavior.⁴ In summary, the early enforcement powers of the bank regulatory agencies were often ill-suited to dealing with institutions that were unwilling to cooperate with regulatory officials or had dishonest officers. As a consequence, the supervision of troubled banks was sometimes ineffective.

In response to what were perceived as weak bank enforcement laws, Congress passed the Financial Institution Supervisory Act of 1966 (FISA), which greatly expanded bank enforcement powers for all federal regulatory agencies. FISA permitted the banking agencies to issue cease-and-desist (C&D) orders against financial institutions to halt specific practices of the bank. C&D powers were broadly applicable and thus were flexible enough to be used against all aspects of a bank's business, from loan operations to internal controls. In addition to prohibiting certain practices, C&D orders usually required bank officials to take "affirmative actions" to correct conditions resulting from the violations or practices that provided the basis for the order.

But the procedures for rendering a permanent C&D order could lead to untimely delays in the implementation of such orders, often compounding supervisory problems. Thus, in the most serious cases FISA also permitted the banking agencies to issue temporary C&D orders that become effective immediately upon service. This authority improved the supervision of troubled banks: temporary C&D orders could help prevent further deterioration of the institution. Temporary orders were imposed when certain practices were likely to cause insolvency, dissipate the bank's assets or earnings, weaken the bank's condition, or otherwise prejudice the interests of the bank's depositors.⁵ Although the power to issue C&D orders would solve many of the earlier enforcement problems facing the banking agencies, such orders would not be effective in dealing with activities of dishonest officers and directors. Thus, an additional provision in FISA

authorized the agencies to remove individuals affiliated with commercial banks, including officers, directors, and employees, and to issue prohibition orders to bar their involvement with another federally insured bank.

Bank enforcement powers for the federal banking agencies were broadened further by passage of the Financial Institutions Regulatory and Interest Rate Control Act of 1978 (FIRIRCA). This Act gave the banking authorities the right to bring C&D orders not only against a bank but also against practices of individual officers and directors of a bank. Moreover, FIRIRCA granted the FDIC and the other agencies the authority to assess civil money penalties (fines) against both banks and individuals for failing to meet the terms of C&D orders, violating any written agreements, or willfully or flagrantly violating federal or state laws and regulations. Generally these fines were approximately \$1,000 per day, but under specific circumstances they could range up to \$10,000 per day.

In 1989, the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) further enhanced the FDIC's enforcement powers by granting regulators the right to apply all existing enforcement authority against not only the bank itself and the officers, directors, and employees or any individuals acting as agents of the bank, but also against other "affiliated parties" such as outside accountants, consultants, attorneys, or other contractors.⁶ Thus, cease-and-desist actions, removal or prohibition of individuals from the institution, and all other enforcement actions could be brought against anyone in this group. FIRREA also

³ Few attempts actually result in the removal of federal deposit insurance. However, just the threat to remove deposit insurance is a potent weapon in the attempt to force improvement in the condition of the institution and to obtain the institution's cooperation.

⁴ For example, the federal supervisory agencies in the past attempted to seek the cooperation of offending banks by conducting special examinations and lengthy regular examinations; and in some cases, all expenses were billed to the banks. To force compliance with agency mandates, the agencies also used their leverage in other areas: when institutions requested permission to open banking offices, to merge with other organizations, or to make bank holding company acquisitions, for example, supervisory authorities often conditioned their approval upon changes in the other aspects of the requesting banks' operations—aspects the agencies were concerned about, such as capital levels. See Huber (1988), 128–29.

⁵ For the FDIC, the standard for issuing a temporary C&D order is higher than for a regular C&D order. Temporary C&D orders can be issued only in the most serious circumstances, when the potential solvency of the institution is threatened.

⁶ To apply formal enforcement authority to outside or "affiliated parties" of the bank, such as contractors, the law sets up a higher standard for regulators to meet. Regulators must show that these parties "knowingly or recklessly" violated laws and regulations, thereby causing loss or damage to the institution.

significantly expanded the amount of civil money penalties that could be levied against both banks and individuals: these may now extend to \$1 million a day for knowingly violating laws and regulations and thereby causing substantial loss to the institution. The assessment schedule for fines depends on the seriousness of the infraction, which is weighted by such factors as the willfulness or recklessness of the conduct, the existence of violations of fiduciary duty, the presence of pecuniary gain or personal benefit, and the intentions of the perpetrating parties.⁷

The types of banking practices that could lead to the initiation of enforcement actions include the following, among others:

Management Problems

- unsatisfactory management
- poor loan administration
- insufficient corporate planning
- inadequate internal controls

Financial Problems

- inadequate capital
- inadequate loan-loss reserves
- large volume of subquality assets
- excessive asset growth
- undue concentration of loans
- failure to recognize or charge off losses
- operating losses or inadequate earnings
- poor liquidity
- unwarranted dividends or other insider payments
- failure to file with regulators, or filing of inaccurate reports

The FDIC's Enforcement Policies

In this section we focus on the enforcement policies of the Federal Deposit Insurance Corporation—the federal agency that regulates state nonmember banks. We survey the kinds of enforcement actions available to the FDIC, the procedures it uses, and the number and types of enforcement actions it brought during the period 1980–1996.

Kinds of Bank Enforcement Actions

Several types of enforcement actions are available to the FDIC. They are discussed here in ascending order of seriousness (from the informal to the formal; from those whose existence is not disclosed to the public to those whose existence is publicly disclosed; and from those that are not enforceable in court to those that are).

Bank Board Resolution. This is a declaration by a bank's board of directors outlining a plan to deal with the bank's safety-and-soundness issues. The resolution sets forth reforms and time frames within which the reforms should be completed. Regulators permit this less-harsh informal action when they believe that the institution is not in serious jeopardy of failure and that the institution's board and management are cooperating with supervisory officials. The declaration is not publicly disclosed and is not enforceable in a court of law. Thus, this type of action is categorized as informal.

Memorandum of Understanding (MOU). The MOU represents the next level in the enforcement action process. It is an agreement drafted by regulators and signed individually by each member of the board of the affected institution. It outlines specific actions the bank must take and establishes deadlines for reaching these goals. The existence of an MOU is not public information, nor is it enforceable in a court of law. Thus, this type of action also is categorized as informal.⁸

Cease-and-Desist Order. As mentioned above, all federal banking agencies may pursue cease-and-desist orders for actions that constitute (1) unsafe and unsound banking practices, (2) violations of federal or state laws and regulations, and (3) violations of any written directive entered into with a banking agency. Note that despite their name, cease-and-desist orders do more than prohibit certain types of practices; they usually require, as well, that banking officials take action to correct conditions resulting from the violation that provided the basis for the order.

C&D orders are issued after a hearing on the record, and they remain in effect until remedial actions have been taken. The hearing takes place between 30 and 60 days from the time the notice is served unless the institution requests an earlier date. The order takes effect 30 days after the hearing, and remains until it is set aside by a court order or is terminated by the agency. C&D orders are made public and generate adverse publicity for the institution. These actions and those in the following categories are classified as formal enforcement actions.

⁷ Under FIRREA, the FDIC was also granted back-up authority to issue enforcement actions against thrift institutions supervised by the Office of Thrift Supervision (OTS).

⁸ Nevertheless, securities laws affecting publicly traded companies may require that in all of an institution's public disclosures, it reveal the existence and terms of an MOU.

Suspension, Removal, or Prohibition of Individuals from a Federally Insured Depository Institution.

Bank regulators have the power to suspend, remove, or prohibit individuals from associating with an insured depository institution for specific violations of laws, regulations, or agreements. In addition, individuals who have been convicted of criminal violations of laws can be barred for life from working or associating with a federally insured institution.

Civil Money Penalties (CMPs). CMPs may be imposed for violations of laws, regulations, C&D orders, or other written agreements. As mentioned above, the amounts of the fines levied are proportional to the seriousness of the violations and can range from \$1,000 per day for simple violations to \$25,000 per day for reckless actions or breaches of fiduciary responsibility—and up to \$1 million per day if regulators find evidence of “knowingly” committed acts that cause significant loss to the institution or significant gain to individuals. Regulators use a matrix to determine the extent of the penalty, basing it on the intent of the violators and their history of infractions. Cooperation by bank officials is a mitigating factor in the assessments of CMPs. Penalties are assessed by written notice, and an aggrieved party may request a hearing on the penalty assessment within ten days of notice. The imposition of CMPs, like the imposition of cease-and-desist orders, is always accompanied by public notification of the event by regulators, and such notification may deter potential future violators.

Suspension or Termination of Deposit Insurance. Suspension or termination of deposit insurance is the most serious type of enforcement action the FDIC can bring. This type of action is brought as a last resort to force a bank to improve conditions in the institution by altering its banking practices, especially if officials are not cooperating with supervisory officials.

Placement in Conservatorship or Receivership. The chartering agencies for commercial banks and thrift institutions have the authority to place troubled and uncooperative or recalcitrant institutions into an FDIC conservatorship or receivership in preparation for the sale or liquidation of the institution. This type of action is the most severe inasmuch as it results in the termination of the charter, or the right of private parties to operate a financial institution.

Procedures Used

The FDIC’s enforcement action process begins when the agency notifies bank officials of any financial weaknesses, operational problems, or violations of

banking laws or regulations that were identified during an examination. Examiners assign an overall, or composite, safety-and-soundness rating on a scale of “1” to “5,” with a 1 rating the highest (representing a low level of supervisory concern) and a 5 rating the lowest, representing a critically deficient level of performance and thus the highest degree of supervisory concern. Composite ratings of 4 bestow “problem bank” status and require remedial actions on the part of the troubled bank.⁹ The safety-and-soundness ratings are also known by the acronym CAMELS, after the six areas examiners review: Capital adequacy, Asset quality, Management, Earnings, Liquidity, and Sensitivity to market risk.

Under FDIC procedures, if a bank emerges from the examination with supervisory concerns or problem-bank status, bank supervisors may notify bank officials that an enforcement action against the bank might be issued, usually within three months from the date of the examination. However, when the composite examination rating is 3, a less-stringent informal action is generally pursued, except in the circumstance noted below. The 3 rating implies that although failure is only a remote possibility, the bank has weaknesses that, if not corrected, could worsen and put the bank in a more severe situation. The informal action (in the form of a bank board resolution or an MOU) may be directed, for example, at persuading bank management to strengthen its underwriting policies or increase its reserves for future loan losses. Although informal actions communicate supervisory concerns and require a plan to address those concerns, they are not administratively or judicially enforceable in a court of law in the event the agreed-upon corrective actions are not taken. If the condition of the institution at the time of the 3 rating represents an improvement over earlier periods, informal actions may not always be issued.

The FDIC takes a more serious formal enforcement action, such as issuing a cease-and-desist order, when a bank’s prospects for failure are more than a remote possibility. As a general policy, at the time of the examination when the institution receives a 4 or 5 rating, FDIC examiners notify participants that a formal action will be pursued. (Again, regulators may choose not to issue a formal action when the current condition of the bank clearly reflects significant improvement resulting from earlier actions or when individual circumstances make this supervisory tool inappropriate. For example, the replacement of existing with new management may permit regulatory authorities the use of

⁹ Some 3-rated banks are also considered to be problem banks.

an informal MOU in place of the formal C&D order—although if the bank still warrants a problem-bank rating, the belief that bank management has recognized the problems and will implement a corrective action is not always a sufficient basis for precluding formal actions.) Formal actions are also brought when informal actions have been unsuccessful in addressing supervisory concerns, either because bank management has failed to abide by the agreements or because the institution continues, nonetheless, to deteriorate. As mentioned above, besides prohibiting unsafe or unsound practices and violations of law, the FDIC usually requires the institution to correct conditions resulting from such violations or practices. For example, if a bank is operating with an excessive amount of substandard loans, a cease-and-desist order may require the bank both to reduce the dollar volume of such loans to an amount specified in the order and to adopt sound lending policies and practices.

To eliminate the need for time-consuming formal hearings, the FDIC attempts to get the parties to agree to the order while waiving their right to an administrative hearing. In waiving this right, the institution neither admits nor denies wrongdoing. The institution's waiver reduces the time required to put the order in place. If an institution chooses to contest the order, the implementation of the enforcement action is delayed pending a hearing before an administrative law judge and the issuance of the final order by the FDIC Board of Directors.

If an organization fails to get relief at this level, it has the right of appeal in the federal courts. Under certain conditions, such actions can result in lengthy delays in the implementation of the formal actions. If regulators have serious concerns about the solvency of the bank, including concerns about fraud, dissipation of assets, or other matters that require immediate attention, they have the statutory authority to issue a temporary C&D order that becomes effective as soon as it is served. The bank has the right to appeal the temporary order to a federal judge within ten days of the action and request an injunction.

The FDIC monitors bank compliance with both informal and formal enforcement provisions by requiring timely progress reports, usually monthly or quarterly, and by scheduling subsequent examinations and visitations. If monitoring reveals that a bank is failing to comply with provisions of an enforcement action, regulators may assess fines for noncompliance. As with all regulatory actions, the lifting or cancellation of C&D orders is considered when the institution's overall condition has improved and the bank has substantially complied with the terms of the order. Enforcement actions requiring remedial measures generally remain in effect for approximately two years. However, in the more serious cases, actions can last up to three or four years and during this period are subject to amendments mandating further actions by the institution.

Number and Types of Formal Enforcement Actions Issued, 1980–1996

Table 1 shows the number of formal FDIC enforcement actions taken from 1980 to 1996. During the 1970s, when the number of problem banks was

Table 1
FDIC Formal Enforcement Actions by Examination Rating, 1980–1996

Year	Number	CAMELS Rating at Examination before Enforcement Action				
		1	2	3	4	5
1980	47	1	3	2	33	8
1981	40	2	6	2	23	7
1982	96	3	2	4	58	29
1983	244	0	3	5	170	66
1984	188	2	5	9	101	71
1985	284	1	9	6	164	104
1986	183	0	5	4	87	87
1987	203	2	2	9	90	100
1988	178	4	3	6	77	88
1989	164	0	5	6	80	73
1990	160	0	4	7	84	65
1991	244	0	9	12	127	96
1992	237	0	19	15	147	56
1993	161	2	13	31	71	44
1994	104	7	34	13	26	24
1995	71	3	26	8	20	14
1996	78	8	17	11	17	25
Total	2,682	35	165	150	1,375	957

Source: FDIC.

Note: Formal actions for safety-and-soundness purposes only issued against FDIC-supervised banks (state nonmember and mutual savings banks).

relatively small, the FDIC did not widely use formal supervisory enforcement actions. During the 1980s and early 1990s, however, as the problem-bank population increased dramatically, the number of formal enforcement actions issued by the FDIC increased accordingly, going from only 47 in 1980 to a peak of 284 in 1985. From 1986 through 1990, as the number of problem banks decreased, the issuance of formal actions also declined, with an annual average of approximately 178. But the growing number of problem banks in New England caused the number of FDIC formal actions to increase again, peaking at 244 in 1991 and gradually declining thereafter as the economy improved and commercial bank earnings rebounded.

The greatest proportion of actions were brought against 4-rated banks, which accounted for over half of all formal actions. Generally such institutions suffer from serious problems but are usually salvageable. An additional 36 percent of the total were issued against 5-rated banks, which are thought to have substantial risk of failing within one year. Actions against these banks are intended to correct the problems if possible, but if the institution is too ill to recover, the objective is to limit losses before failure. A small number of actions (200) were brought against highly rated (1- and 2-rated) banks. Over half of these actions dealt with the removal and suspension of officers and directors.

Table 2 shows the types of formal enforcement actions issued by the FDIC from 1980 to 1996. The largest number consists of cease-and-desist actions issued under Section 8(b) of the Federal Deposit Insurance Act (FDI Act), accounting for over 60 percent (1,637) of the total number of actions. These actions are generally issued to curb practices like insider abuses, unsound underwriting practices, inaccurate loan-loss reserve accounting, and unwise dividend policies and other types of unauthorized fund transfers. Other major formal action

categories, categorized by FDI Act sections where authorized, include Section 8(a) proceedings for termination of insurance and Section (8)(e) removals of officers, directors, and other principals; actions in those two categories accounted for an additional 33 percent (884) of the total. Miscellaneous actions make up the remainder.

Empirical Analysis of the Effect of Formal Enforcement Actions

Because information on formal actions was not publicly reported until 1989, few empirical studies have evaluated the effects of enforcement actions on bank behavior. The limited evidence that is available generally suggests that banks operating under formal enforcement actions alter their banking practices to a greater extent than banks not operating under formal actions. In two empirical studies of New England banks, Peek and Rosengren (1995, 1996) analyzed the effects that formal actions had on capital levels, commercial real-estate lending, and overall lending for the years 1989–1994. Over this period, more than one-third of the banks in New England had enforcement actions outstanding against them and were under intense pressure to raise capital and restrict certain types of real-estate lending. Peek and Rosengren’s findings showed that although poorly capitalized banks shrank their assets more than better capitalized institutions did to meet capital requirements, the reduction was more dramatic if regulators had imposed formal actions. In addition, banks that were operating under formal agreements cut their commercial real-estate lending as well as overall lending to a

Table 2
FDIC Formal Enforcement Actions by Type, 1980–1996

Section	Number	Description
8(a)	425	Termination of insurance
8(b)	1,637	Cease-and-desist order
8(c&b)	96	Temporary cease-and-desist order
8(e)	459	Removal, prohibition, suspension of individuals
8(a&t)	2	Temporary suspension of deposit insurance
8(g)	20	Suspension/prohibition of individuals for criminal acts misconduct
8(I)	2	Petition for enforcement of administrative order
ILSA*	13	Capital directives
PCA†	28	PCA directives
Total	2,682	

Source: FDIC.

Note: Formal actions for safety-and-soundness purposes only.

*International Lending Supervision Act.

†Prompt corrective action.

greater extent than did banks that were not under similar agreements.¹⁰

In another study, Curry et al. (1997) found that most financially distressed banks in the years 1980–1995 exhibited greater reductions in asset growth, larger restrictions on dividends, and higher levels of capital infusions during the periods before the examinations that reduced their supervisory examination ratings to 4. However, the *ex post* results were generally more pronounced if the banks were 4-rated and operating under a formal enforcement action.¹¹ Two other studies—Peek, Rosengren, and Jordan (1999) and Brous and Leggett (1996)—focused upon the “announcement effects” that formal actions have upon stock prices or shareholder wealth. Both found that the announcement effects of formal actions resulted in large negative abnormal stock returns for publicly traded organizations.

In our analysis, problem-bank behavior is related to the dates of regulatory intervention, specifically the date of the on-site examination that produced a formal enforcement action or a composite CAMELS rating downgrade to problem-bank status (that is, to a composite CAMELS rating of 4). It is important to point out that CAMELS downgrades may occur with or without formal enforcement actions, and actions may occur with or without CAMELS downgrades. We therefore attempt to control for potential overlap between these two types of intervention in the empirical tests. The intervention date is also referred to as the “event date.” Since banks report their financial condition at the end of each calendar quarter, the empirical analysis matches the exact event date to the quarter during which intervention occurred, henceforth referred to as the “event quarter.” We anticipate that bank management will react to the deteriorating financial condition of the institution before the bank examination that produces an adverse rating (or enforcement action) and will begin to make changes necessary for survival. However, we hypothesize that at the time of the on-site examination that produces the CAMELS downgrade or at the time of the issuance of the formal enforcement action, examiners might persuade or require management to make *additional* changes in the bank’s portfolio and operating policies. Thus, we anticipate that for these banks, significant changes occur during the event quarter. Another hypothesis to be tested is that formal enforcement actions are more effective than CAMELS ratings downgrades without formal enforcement actions in bringing about behavioral changes during the event quarter as well as during sub-

sequent quarters, because they are legal decrees and noncompliance often carries serious penalties. Thus, the most pronounced changes are expected for those banks that receive a formal enforcement action.

The empirical analysis is conducted in two stages. The first stage examines the effects of bank enforcement actions in a univariate framework, with a graphical presentation of key performance variables for the various time periods studied. The second stage presents estimates of regression models that test for behavioral differences between the banks that received formal enforcement actions and those that did not for the event quarter, as well as for subsequent quarters. As part of the regression analysis, we also address a potential sample selection bias by using the sample-selectivity estimation method of Heckman (1979) to test for sample selectivity bias. The Heckman method is a two-stage model that first uses probit analysis to estimate a selection model. The probit model yields estimates of each bank’s odds of being “selected” for some form of regulatory intervention (actions or downgrades). This variable, which controls for sample selectivity, is then included as an instrumental variable in the performance model (or behavioral model) which is estimated using ordinary least squares regression. The results of the Heckman model estimations are discussed in an appendix to this paper.

Sample and Data

To study the aforementioned relationships, we examined all commercial and mutual savings banks whose primary federal supervisor was the FDIC over the 1978–1998 period. FDIC-supervised banks constituted approximately 51 percent of all insured U.S. commercial banks and savings institutions and accounted for nearly 15 percent of industry assets as of year-end 1998.

Our measures of regulatory intervention include all but two categories of formal enforcement actions is-

¹⁰ During the New England recession of the early 1990s when banks were experiencing heavy losses in commercial real-estate lending, it was difficult for troubled banks to raise external capital to meet bank capital requirements. Thus, most banks had no option but to shrink their assets.

¹¹ In a nonstatistical case study of bank enforcement actions on 72 problem banks in 1991, the U.S. General Accounting Office (GAO) (1991) found that more-positive changes in bank behavior were associated with the more-stringent formal enforcement actions than with informal efforts by the regulators to work with the banks. The GAO recommended that regulators take early and more forceful regulatory action tied to specific unsafe and unsound banking practices.

sued by the FDIC (see table 2) plus all on-site safety-and-soundness examinations by the FDIC or state banking supervisors.¹² Excluded from our intervention measures are formal enforcement actions directed against individuals—Section 8(e), removal of individuals, and Section 8(g), suspension of individuals—since these actions can involve lengthy legal cases and are not generally expected to result in immediate performance changes at banks upon issuance. While formal enforcement actions are often directed at altering poor management practices, changes in these practices are very difficult to measure and document. Consequently, we focus on another goal of formal enforcement actions—altering poor financial performance. To measure financial performance, we use the quarterly reports of income and condition (Call Reports) that all insured banks are required to file with their primary federal regulator each calendar quarter end. These financial statements include standard income statements and balance sheets, as well as related reports such as those on nonperforming loans and sources of new equity capital.

To determine the stability of the relationships, we analyzed three different subperiods: (1) 1979–1985, (2) 1985–1990, and (3) 1990–1998. Each subperiod corresponds with one of the various regional banking crises in the United States that occurred over this entire period, including the Southwest banking crisis in the 1980s and the Northeast crisis in the early 1990s.

Before proceeding to the empirical analysis, we find it helpful to know the relative frequency with which problem banks that receive formal enforcement actions recover or fail. Table 3 follows the changes in composite CAMELS ratings for a sample of 1,212 FDIC-supervised banks that were initially CAMELS 4-rated and received formal enforcement actions. One year after receiving formal enforcement actions, 46 percent of the banks were still CAMELS 4-rated, approximately 26 percent had improved their CAMELS ratings, and 28 percent had deteriorated further or ceased operating (a relative-

ly high percentage, 10.6 percent, had been involved in FDIC-assisted mergers or liquidations, that is, had failed, and 4.5 percent had merged with other banks or been liquidated without FDIC assistance). Two years after receiving actions, 39 percent of the banks had improved their CAMELS ratings, while 34 percent had deteriorated further or no longer operated. Indeed, a very high percentage—17.2 percent—had failed after two years. These statistics indicate that although a substantial proportion of banks receiving formal enforcement actions are able to improve their condition, many fail. The remainder of the empirical analysis investigates banks’ responses to formal enforcement actions in more detail and the extent to which the responses accord with regulators’ expectations.

Univariate Results

In the first stage of the analysis, we studied bank behavior before, during, and after the event quarter by focusing on changes in several performance measures, including asset growth, external equity capital injections, net loan charge-offs, loan-loss provisions, the level of nonperforming loans, and profitability (return on assets). As mentioned above, the expectation is that as banks approach “problem” or troubled-bank status, they will be in retrenchment mode to avoid a condition that would threaten their solvency. Thus, under these circumstances banks should be reducing growth or shrinking assets, generating new equity capital, charging off bad loans, increasing loan-loss provisions, and fully recognizing nonperforming loans on financial reports. These reactions should be reflected in lower profitability during this period when the bank is on the way to recovery or failure.

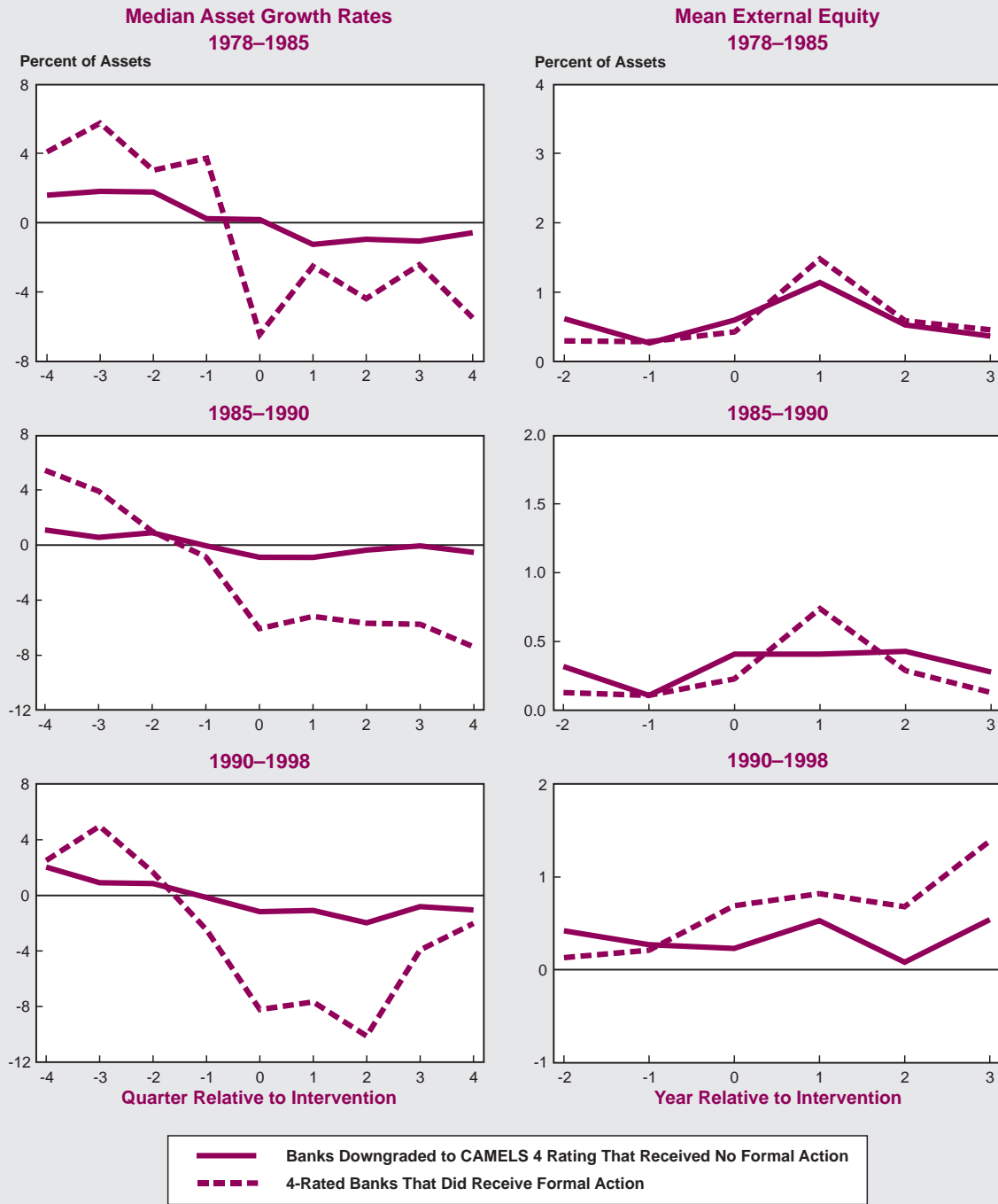
Figures 1–3 show the behavioral patterns for the selected performance measures, all measured as a percentage of bank assets, for two groups

Table 3
Changes in Composite Ratings of 4-Rated Banks Receiving Enforcement Actions

Composite CAMELS Rating	One Year after Action	Two Years after Action
1	0	4 (0.3%)
2	54 (4.5%)	204 (16.8%)
3	256 (21.1%)	268 (22.1%)
4	558 (46.0%)	326 (26.9%)
5	161 (13.3%)	104 (8.6%)
Assisted Mergers and Liquidations	128 (10.6%)	208 (17.2%)
Unassisted Mergers and Liquidations	55 (4.5%)	98 (8.1%)
Total	1,212	1,212

¹²All FDIC formal enforcement actions were tabulated and analyzed for the years 1980–1996 only. Call Report and bank examination data from earlier and later years were included to enable us to study behavior before and after the imposition of formal actions.

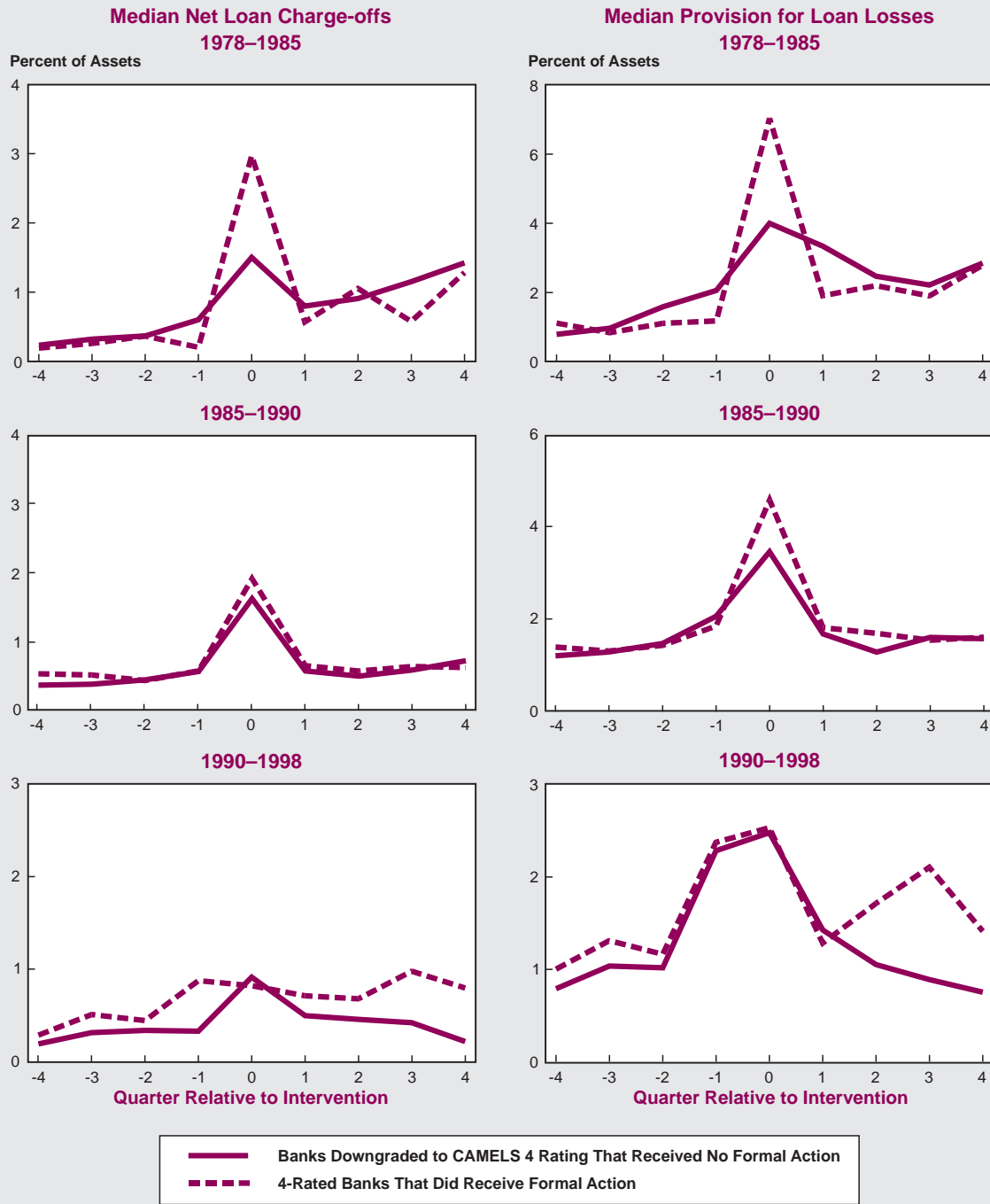
Figure 1
Asset Growth Rates and Capital Infusions of CAMELS 4-Rated Banks
before and after Regulatory Intervention



of banks before, during, and after intervention. The first group contains those banks that are CAMELS 4-rated as of the event quarter during which they received a formal enforcement action. Some of these banks may have also been downgraded to CAMELS 4 during the event quarter or during a prior quarter. The second group contains those banks receiving a down-

grade to CAMELS 4 rating during the event quarter without a formal enforcement action. The results for the selected performance measures generally show that both groups of banks start to change their behavior within a year before the event quarter and that those changes tend to accelerate during the event quarter. Furthermore, banks that received formal actions

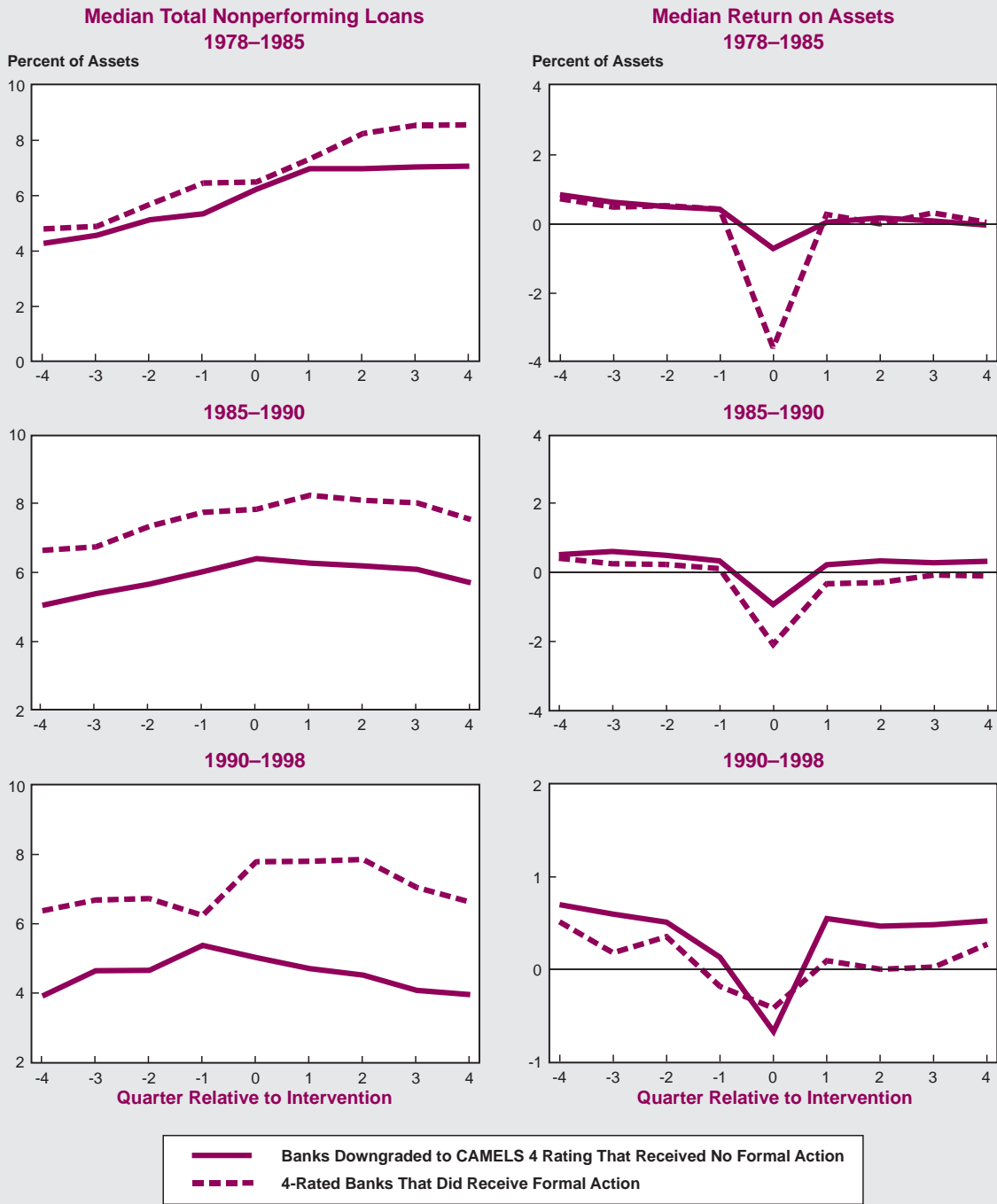
Figure 2
Net Loan Charge-offs and Provision for Loan Losses of CAMELS 4-Rated Banks
before and after Regulatory Intervention



generally had more pronounced changes in the performance measures during and after the event quarter than the downgraded bank group had. For example, changes in the median asset growth rates for banks receiving formal actions were generally much greater than those for the downgraded banks not receiving actions.

The other performance measures revealed similar trends. Mean external capital infusions began before regulatory intervention and generally accelerated in the first year after intervention; median net loan charge-offs and median loan-loss provisions also increased significantly in the quarter before and during the event quarter in anticipation of the examination and man-

Figure 3
 Nonperforming Loans and Profitability of CAMELS 4-Rated Banks
 before and after Regulatory Intervention



dates from the examiners.¹³ The median level of nonperforming loans also was increasing before and subsequent to intervention for both groups of banks, while profitability (ROA) was declining, reflecting the above-mentioned accounting changes in the balance sheets. For most measures and most time periods analyzed, banks receiving formal actions showed more

pronounced changes than did the downgraded bank group. It is also important to point out that these changes in the (annualized) *rates* of provisioning,

¹³ Most banks in our sample did not receive external capital injections, hence the median values for external capital injections were typically zero. However, mean external capital injections for our sample were higher the year after enforcement actions were received.

charge-offs, and profits are not due merely to the underlying changes (decline) in total bank assets used to scale the performance measures. The total dollar values of provisions and charge-offs rose during the event quarter as well. In general, the univariate results (figures 1–3) show that the reduction in asset growth indicates that moral hazard was being contained, and banks were not allowed to grow out their problems. In most cases, banks were actually shrinking assets. In the case of surviving institutions, increased capital injections and additional loan-loss provisioning helped restore equity positions and were instrumental in facilitating recovery. In the case of failed institutions, these actions helped reduce the costs to the deposit insurer.

Empirical Model

To analyze the effects of the two types of regulatory intervention more fully, a multivariate framework is required. We hypothesize that bank j 's performance during quarter t is dependent upon the bank's condition in the prior quarter, $t - 1$, and upon the incidence of regulatory intervention during quarter t . It is also possible that banks react to regulatory intervention gradually, correcting deficiencies over several quarters. Therefore, we include three lagged regulatory intervention measures.¹⁴ The behavioral model is as follows:

$$(1) \text{ Performance measure } (j, t) = a + b_1(\text{Nonperforming loans}) (j, t - 1) + b_2(\text{Performing loans}) (j, t - 1) + b_3(\text{Changes in nonperforming loans}) (j, t - 1) + b_4(\text{Other real estate owned}) (j, t - 1) + b_5(\text{Loan income earned but not collected}) (j, t - 1) + b_6(\text{Equity}) (j, t - 1) + b_7(\text{Allowance for loan losses}) (j, t - 1) + b_8(\text{Intervention dummy}) (j, t) + b_9(\text{Intervention dummy}) (j, t - 1) + b_{10}(\text{Intervention dummy}) (j, t - 2) + b_{11}(\text{Intervention dummy}) (j, t - 3) + \text{Error term } (j, t)$$

All performance and condition variables are measured as a percentage of bank assets in order to limit the effects of potential heteroskedasticity. Furthermore, those performance measures that were computed as quarterly financial flows—provisions for loan losses, net loan charge-offs, and asset growth—were all expressed as annualized rates. However, several performance measures were available only annually—external capital injections and cash dividends on common and preferred stock.¹⁵ We estimated equation 1 using ordinary least squares (OLS) regression on samples of FDIC-supervised banks that were CAMELS 4-rated as of a quarter end. In addition to controlling for bank condition through the asset-quality measures, we restricted the regression sample to all CAMELS 4-rated banks to further limit the potential for the regulatory intervention variable to serve merely as an instrumental variable for bank condition.

Variables

The performance measures tested include those areas often mentioned in formal enforcement actions: loan-loss provisions, net loan charge-offs, asset growth, external capital injections, and cash dividends on common and preferred stock. We hypothesize that these performance measures are dependent upon bank loan quality in the prior period as reflected in the levels of nonperforming and performing loans. *Nonperforming loans* are defined as all loans past due 30 days or more on interest and principal repayment plus all nonaccrual loans (loans no longer accruing interest income). *Performing loans* are included to incorporate the effects of general lending risks upon performance and are defined as total gross loans net of nonperforming loans. *Changes in nonperforming loans* are defined as the percentage change in nonperforming loans between periods t and $t - 1$ and are included to account for the effect of changes in loan quality over the period. *Other real estate owned* is included as another asset-quality measure

and is defined as all real estate owned by the bank, including real estate foreclosed on or acquired because of loan defaults. *Loan income earned but not collected* is the accumulated amount of earned but uncollected loan interest income and reflects both asset quality and potential overstatement of interest earnings by management. *Equity capital* reflects both the accumulated effects of prior performance upon earnings and, because of regulatory capital requirements, may be related to management's ability and desire to provide for loans losses, to charge off loans, or to increase asset size.

¹⁴ The reason we use only three lagged regulatory intervention measures is that problem banks are normally examined at least every four quarters. As a result, the significance of intervention measures lagged more than three quarters may be influenced by compounding events, such as subsequent examinations and subsequent formal enforcement actions.

¹⁵ For the performance models investigating the effects of regulatory intervention upon external capital generation and cash dividends, for obvious reasons we exclude prior-period equity capital as an explanatory variable.

The *allowance for loan losses* reflects the accumulated effects of prior loss provisioning and loan charge-offs, and may influence management's ability and willingness to provide for future loan losses, make charge-offs, and limit bank asset growth.

Regression Results

The results of estimation of equation 1 for loan-loss provisioning are shown in tables 4a and 4b. These tables report results for the two regulatory intervention measures, broadly defined as CAMELS downgrades to a 4 rating (with and without enforcement

actions) and formal enforcement actions (with and without CAMELS downgrades). The relationships between bank performance measures and prior-period condition variables were generally in agreement with expectations. For example, loan-loss provisions were significantly and positively related to the lagged values of nonperforming loans, performing loans, income earned but not collected, and equity capital. Loan-loss provisions were generally negatively related to both the lagged allowances for loan losses and, to a lesser extent, other real estate owned. Similar intuitively appealing results were found for net charge-offs and asset growth models. For the sake of brevity, these results are not discussed further.

We focus instead on the results for the regulatory intervention dummy variables for formal enforcement actions and for CAMELS downgrades to a 4 rating shown in tables 4a and 4b. The findings show that for all estimation periods, formal enforcement actions had a significantly positive effect upon both loan-loss provisions and net loan charge-offs during the quarter in which the formal actions occurred. However, the lagged intervention measures for formal enforcement actions were generally not significantly related to these two performance measures. In addition, formal enforcement actions were generally not significantly related to asset growth for any estimation period. Very similar results were found for the CAMELS downgrade dummy variable. In all estimation periods bank CAMELS downgrades to a 4 rating had a significantly positive effect upon loan-loss provisions and net loan charge-offs and no significant relationship with asset growth.

One can see the relative effect of both types of intervention upon performance by comparing dummy variable coefficients. Table 5 shows that enforcement actions had a larger effect upon loan-loss provisioning than did CAMELS downgrades for the 1978–1985 and 1985–1990 periods but not for the 1990–1998 period.

Table 4a
Effect of Formal Enforcement Actions on Provisions for Loan and Lease Losses

Ordinary Least Squares Regression of the Relationships between Provisions for Loan and Lease Losses and Regulatory Intervention

Explanatory Variable	Estimated Coefficients (Standard Errors)		
	1978–1985	1985–1990	1990–1998
Intercept	-5.5086** (0.4871)	-2.5056** (0.2197)	-0.8759** (0.1995)
Nonperforming loans and leases	0.2581** (0.0189)	0.2820** (0.0111)	0.0971** (0.0098)
Performing loans and leases	0.0559** (0.0073)	0.0324** (0.0032)	0.0243** (0.0031)
Change in nonperforming loans and leases	-0.0007 (0.0006)	0.0003 (0.0003)	0.0002 (0.0003)
Other real estate owned	-0.0898* (0.0410)	0.0079 (0.0163)	-0.0269* (0.0133)
Income earned but not collected	0.4944** (0.0878)	0.1518* (0.0655)	0.2048* (0.0911)
Equity capital	0.4260** (0.0351)	0.1541** (0.0165)	0.0287** (0.0093)
Allowance for loan and lease losses	-0.1766* (0.0763)	-0.2620** (0.0449)	-0.1700** (0.0367)
Enforcement action dummy for current quarter, t	2.8864** (0.3757)	2.7819** (0.2540)	1.1934** (0.2389)
Enforcement action dummy for t – 1	-0.8710* (0.3501)	-0.3585 (0.2505)	-0.1544 (0.2026)
Enforcement action dummy for t – 2	-0.3875 (0.3410)	-0.0119 (0.2450)	0.1025 (0.1908)
Enforcement action dummy for t – 3	-0.5685 (0.3457)	-0.0795 (0.2432)	0.5251** (0.1795)
Number of observations	4,042	8,907	3,865
R Squared	14.3%	11.4%	5.6%
F-statistic	62.52**	105.01**	22.02**

Note: Two asterisks, **, indicate significance at the 1 percent confidence level, while one asterisk, *, indicates significance at the 5 percent confidence level.

For example, for the 1978–1985 period the coefficients in the provisioning model are 2.8864 and 2.5229 for actions and downgrades, respectively. This means that among CAMELS 4-rated banks receiving enforcement actions, loan-loss provisioning rates were nearly 2.9 percent (annualized) greater for those receiving actions during the intervention quarter compared with 2.5 percent greater for downgraded banks.

Comparisons in table 6 indicate that enforcement actions had a somewhat larger positive effect upon charge-off rates in the 1978–1985 and 1985–1990 periods but not for the 1990–1998 period.

Next we consider the effect of regulatory intervention upon banks' efforts to generate new capital, from external as well as internal sources of funds. These results are shown in tables 7 and 8; formal enforcement actions were not significantly related to exter-

nal capital generation in any period. There may be two reasons for this latter result. First, these are problem banks operating during periods of crisis in banking markets. It is clearly difficult, if possible at all, to attract outside equity investors under such circumstances. Second, most FDIC-supervised banks are small community banks whose access to the capital market may be limited, hence, these banks may have had to rely upon dividend reductions to improve equity capitalization.

Formal enforcement actions led to statistically significant reductions in dividends, as a percentage of bank assets, in the year following actions for the 1978–1985 and 1985–1990 periods but not for the 1990–1998 period. Interestingly, results for the influence of CAMELS downgrades on dividend rates were not similar. Rather, downgrades were not significantly related to dividend reductions a year after the downgrade.

Adjustments to the Model

Because of the potential for some overlap between the two intervention measures—CAMELS downgrades and formal enforcement actions—we investigated the separate effects of downgrades without actions and actions without downgrades. This required re-estimating the performance models using alternative intervention dummy-variable specifications. Equation 1 was therefore estimated with six alternative intervention measures used in total: the original two measures discussed above plus four variations on those measures. The six measures are:

- A dummy variable for the quarter in which a bank received one formal action but no other actions during the time period used for model estimation (1978–1985, 1985–1990, or 1990–1998). See tables 5–8.
- A dummy variable for the quarter in which a bank was downgraded to a CAMELS 4 rating regardless of the

Table 4b

Effect of CAMELS Downgrades on Provisions for Loan and Lease Losses

Ordinary Least Squares Regression of the Relationships between Provisions for Loan and Lease Losses and Regulatory Intervention

Explanatory Variable	Estimated Coefficients (Standard Errors)		
	1978–1985	1985–1990	1990–1998
Intercept	-5.5020** (0.4817)	-2.4265** (0.2188)	-0.9574** (0.1983)
Nonperforming loans and leases	0.2681** (0.0187)	0.2795** (0.0110)	0.0960** (0.0097)
Performing loans and leases	0.0506** (0.0072)	0.0294** (0.0032)	0.0238** (0.0031)
Change in nonperforming loans and leases	-0.0010 (0.0006)	0.0002 (0.0003)	0.0001 (0.0003)
Other real estate owned	-0.0357 (0.0411)	0.0280 (0.0164)	-0.0095 (0.0135)
Income earned but not collected	0.4468** (0.0871)	0.1947** (0.0654)	0.1181 (0.0909)
Equity capital	0.3761** (0.0352)	0.1277** (0.0166)	0.0221* (0.0093)
Allowance for loan and lease losses	-0.0964 (0.0760)	-0.2374** (0.0448)	-0.1388** (0.0367)
CAMELS downgrade dummy for current quarter, t	2.5229** (0.2102)	2.0584** (0.1441)	1.4165** (0.1581)
CAMELS downgrade dummy for t – 1	0.6411** (0.2063)	0.0321 (0.1395)	0.2670 (0.1411)
CAMELS downgrade dummy for t – 2	0.1608 (0.2125)	0.0553 (0.1454)	0.1790 (0.1391)
CAMELS downgrade dummy for t – 3	-0.0704 (0.2253)	0.3696* (0.1544)	0.4384* (0.1366)
Number of observations	4,042	8,907	3,865
R Squared	16.1%	12.2%	6.9%
F-statistic	71.52**	113.72**	26.97**

Note: Two asterisks, **, indicate significance at the 1 percent confidence level, while one asterisk, *, indicates significance at the 5 percent confidence level.

Table 5
Effects of Alternative Intervention Measures on Provisions for Loan and Lease Losses

Alternative Intervention Measures Were Used in Full Provisioning Model (Equation 1)
 Comparative Ordinary Least Squares Regression Results for Intervention Variables

Intervention during Current Quarter (t = 0) Dummy Variable	Estimated Coefficients (Standard Errors)		
	1978–1985	1985–1990	1990–1998
All enforcement actions	2.8864** (0.3757)	2.7819** (0.2540)	1.1935** (0.2389)
All CAMELS downgrades to 4 rating in event quarter	2.5229** (0.2102)	2.0584** (0.1441)	1.4165** (0.1581)
Enforcement actions with no downgrades in event quarter	2.3338** (0.8370)	2.4302** (0.3521)	0.6895 (0.4076)
Enforcement actions and downgrades in event quarter	3.0032** (0.4177)	3.0950** (0.3639)	1.4171** (0.2913)
Downgrades in event quarter with an action during estimation interval	2.0533** (0.3450)	2.2631** (0.2645)	0.9681** (0.2252)
Downgrades in event quarter with no actions during estimation interval	2.2538** (0.2295)	1.7985** (0.1648)	1.5712** (0.2094)
Number of observations	4,042	8,907	3,865

Note: Two asterisks, **, indicate significance at the 1 percent confidence level.

Table 6
Effects of Alternative Intervention Measures on Net Loan and Lease Charge-offs

Alternative Intervention Measures Were Used in Full Charge-off Model (Equation 1)
 Comparative Ordinary Least Squares Regression Results for Intervention Variables

Intervention during Current Quarter (t = 0) Dummy Variable	Estimated Coefficients (Standard Errors)		
	1978–1985	1985–1990	1990–1998
All enforcement actions	2.0528** (0.3271)	2.1418** (0.2050)	0.7035** (0.2098)
All CAMELS downgrades to 4 rating in event quarter	2.0477** (0.1828)	1.6871** (0.1162)	1.0331** (0.1391)
Enforcement actions with no downgrades in event quarter	1.4683* (0.7271)	2.3675** (0.2836)	0.6858 (0.3577)
Enforcement actions and downgrades in event quarter	2.1905** (0.3635)	1.8619** (0.2941)	0.6765** (0.2560)
Downgrades in event quarter with an action during estimation interval	1.6660** (0.2999)	1.7626** (0.2135)	0.6550** (0.1978)
Downgrades in event quarter with no actions during estimation interval	1.8511** (0.1996)	1.5111** (0.1329)	1.1645** (0.1841)
Number of observations	4,042	8,907	3,865

Note: Two asterisks, **, indicate significance at the 1 percent confidence level, while one asterisk, *, indicates significance at the 5 percent confidence level.

issuance of a formal action during the estimation period. See tables 5–8.

- A dummy variable for banks receiving a formal action during the quarter but not a downgrade during the same quarter.
- A dummy variable for banks receiving a formal action and a downgrade to CAMELS 4 during the same quarter.
- A dummy variable for banks downgraded to a CAMELS 4 rating in a quarter and receiving one or more formal actions at any time during the estimation period.
- A dummy variable for banks receiving a downgrade to a CAMELS 4 rating during the quarter but not receiving a formal action during the estimation period.

The results from the six intervention measures are summarized in tables 5–8. Those results show that formal enforcement actions that occur without CAMELS downgrades still have a statistically significant, positive effect upon both loan-loss provisioning and net loan charge-offs. Similarly, CAMELS downgrades that occur without formal enforcement actions also have a statistically significant, positive effect upon loan-loss provisioning and net loan charge-offs—albeit often a lesser effect than do formal actions.

Conclusions

This article analyzes the effects that bank regulatory intervention had on the performance of distressed or troubled banks for the years 1978–1998. Regulatory intervention for troubled banks is measured as of the date of the bank examination that produced either CAMELS rating downgrades to problem status or the issuance of a formal enforcement action. The analysis uses both a univariate trend analysis and a regression model to analyze this issue. The results provide evidence on the effectiveness of the su-

Table 7
Effects of Alternative Intervention Measures on External Capital Generation

Alternative Intervention Measures Were Used in External Capital Generation Model (Equation 1) Comparative Ordinary Least Squares Regression Results for Intervention Variables

Intervention during Prior Year (t - 1) Dummy Variable	Estimated Coefficients (Standard Errors)		
	1978-1985	1985-1990	1990-1998
All enforcement actions	0.0904 (0.1870)	-0.0608 (0.1186)	-0.2102 (0.2053)
All CAMELS downgrades to 4 rating in event quarter	-0.2122 (0.1672)	-0.0462 (0.0842)	-0.3548 (0.1882)
Enforcement actions with no downgrades in event quarter	1.0504** (0.3626)	-0.040 (0.1518)	-0.0969 (0.3165)
Enforcement actions and downgrades in event quarter	-0.2156 (0.2102)	-0.0818 (0.1806)	-0.2481 (0.2452)
Downgrades in event quarter with an action during estimation interval	-0.1930 (0.1767)	-0.1254 (0.1244)	-0.2932 (0.2069)
Downgrades in event quarter with no actions during estimation interval	0.1275 (0.1685)	0.0322 (0.0994)	-0.1476 (0.2784)
Number of observations	1,162	2,151	820

Note: Two asterisks, **, indicate significance at the 1 percent confidence level.

Table 8
Effects of Alternative Intervention Measures on Dividends on Common and Preferred Stock

Alternative Intervention Measures Were Used in External Capital Generation Model (Equation 1) Comparative Ordinary Least Squares Regression Results for Intervention Variables

Intervention during Prior Year (t - 1) Dummy Variable	Estimated Coefficients (Standard Errors)		
	1978-1985	1985-1990	1990-1998
All enforcement actions	-0.0760* (0.0353)	-0.0907** (0.0224)	-0.0693 (0.0583)
All CAMELS downgrades to 4 rating in event quarter	-0.0351 (0.0314)	-0.0109 (0.0159)	-0.0121 (0.0532)
Enforcement actions with no downgrades in event quarter	-0.0712 (0.0685)	-0.0874** (0.0289)	-0.0541 (0.0898)
Enforcement actions and downgrades in event quarter	-0.0711 (0.0397)	-0.0839* (0.0342)	-0.0641 (0.0696)
Downgrades in event quarter with an action during estimation interval	-0.0729* (0.0333)	-0.0537* (0.0236)	-0.0705 (0.0587)
Downgrades in event quarter with no actions during estimation interval	-0.0201 (0.0317)	-0.0043 (0.0187)	-0.0163 (0.0782)
Number of observations	1,162	2,151	820

Note: Two asterisks, **, indicate significance at the 1 percent confidence level, while one asterisk, *, indicates significance at the 5 percent confidence level.

pervision of troubled banks during the most severe banking crisis in the United States since the Great Depression.

As expected, the overall findings show that both examiner downgrades in CAMELS ratings and the issuance of formal enforcement actions had important effects on the performance of distressed banks. In order to survive, banks began to change operating policies before the examination in which they were downgraded to problem-bank status or issued a formal enforcement action, but some of these changes became more pronounced if a formal action was issued at the time of the examination. The univariate trend analysis shows that after receiving formal enforcement actions many banks reduced their asset growth rates, increased the rate of external equity capital infusions, increased the rate of net loan charge-offs, increased the rate of loan-loss provisioning, increased nonperforming assets and reduced profitability. To this extent, the findings are consistent with earlier empirical work.

The regression model tests whether these aforementioned changes lead to statistically significant differences in performance between banks that received formal enforcement actions and those that did not. The regression model results show that, in general, in those areas over which bank management has control, enforcement actions lead to statistically significant differences in performance. The areas over which management has a high degree of control include loan-loss provisioning, net loan charge-offs, and cash dividends on common and preferred stock. Conversely, in those areas where bank management has relatively limited control and where external factors play a greater role, enforcement actions did not lead to statistically significant differences in performance. Those areas over which bank management has limited control include external capital injections, and to some degree asset growth. Hence, enforcement actions are more likely to be effective in correcting weaknesses that bank management can control.

Appendix: Sample Selection Bias

Although banks subject to formal actions generally showed the largest reactions to intervention, it is not clear from the preceding analysis how much these differences reflected banks' greater need to fall in line with formal actions as opposed to the possibility that banks receiving actions were in relatively poorer condition than banks that did not receive them. As noted, not all CAMELS 4-rated banks receive formal actions. The expectation is that the banks in the worst financial condition are more likely to receive enforcement actions than are other banks. Thus the post-action changes in bank performance may be more related to who gets served with an enforcement action than with the effects of the action *per se*.

To address this problem, we used the Heckman (1979) sample-selectivity estimation procedure involving two sequential equations. The first equation uses a probit model to identify which banks are selected to receive formal enforcement actions. That is, it is modeled as a bivariate discrete choice model where the event of getting an action for a bank over a given time interval is a function of the bank's financial condition at the start of the period. Alternative selection models were tested, and the most accurate model is as follows:

$$\begin{aligned} \text{Action}_{(j,t)} = & a + b_1 (\text{Annual asset growth rate})_{(j,t-1)} + b_2 (\text{Days since last exam})_{(j,t-1)} + \\ & b_3 (\text{Logarithm of bank assets})_{(j,t-1)} + b_4 (\text{CAMELS} = 2 \text{ dummy})_{(j,t-1)} + \\ & b_5 (\text{CAMELS} = 3 \text{ dummy})_{(j,t-1)} + b_6 (\text{CAMELS} = 4 \text{ dummy})_{(j,t-1)} + b_7 (\text{CAMELS} = 5 \text{ dummy})_{(j,t-1)} \\ & + \text{Error term}_{(j,t)} \end{aligned}$$

The second step in the Heckman model is to determine the *ex post* effects of enforcement actions on the financial performance of the bank. The effect of an action can be modeled as being dependent on the initial condition plus the probability of getting an action. The estimated probability of an action event is measured through lambda—which is derived from the first equation in the Heckman estimation. One can analyze changes in bank performance on the event date by focusing on changes in several performance measures, including the provision for loan and lease losses and net loan charge-offs. The behavioral model estimated with the use of ordinary least squares regression is as follows:

$$\begin{aligned} \text{Performance measure}_{(j,t)} = & a + b_1 (\text{Nonperforming loans})_{(j,t-1)} + \\ & b_2 (\text{Performing loans})_{(j,t-1)} + b_3 (\text{Changes in nonperforming loans})_{(j,t-1)} + \\ & b_4 (\text{Other real estate owned})_{(j,t-1)} + b_5 (\text{Loan income earned but not collected})_{(j,t-1)} + \\ & b_6 (\text{Equity})_{(j,t-1)} + b_7 (\text{Allowance for loan losses})_{(j,t-1)} + \\ & \mathbf{b_8 (\text{Estimated odds of action, or lambda})}_{(j,t)} + \text{Error term}_{(j,t)} \end{aligned}$$

The Heckman estimations were estimated over all FDIC-insured banks, including all CAMELS rating groups. The results for the provisioning and net loan charge-off models show that after the targeting of formal actions toward the weakest banks is controlled for, the odds of receiving an action had no significant effect upon loan-loss provisioning or net loan charge-offs. Another interpretation of this finding is that sample-selectivity bias is not a serious enough problem in our sample to prevent the use of ordinary least squares regressions.¹⁶

¹⁶ The results of estimation of the Heckman model are available from the authors upon request.

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