Enforcement actions and bank behavior

Delis, Manthos D and Staikouras, Panagiotis and Tsoumas, Chris

4 January 2013

Enforcement actions and bank behavior

Manthos D. Delis
Surrey Business School, University of Surrey
Guildford, GU2 7XH, UK.
E-mail address: m.delis@surrey.ac.uk

Panagiotis K. Staikouras
Department of Banking and Financial Management, University of Piraeus
80 Karaoli and Dimitriou, 18534, Piraeus, Greece.
E-mail address: pstaik@unipi.gr

Chris Tsoumas
Department of Banking and Financial Management, University of Piraeus
80 Karaoli and Dimitriou, 18534, Piraeus, Greece.
E-mail address: ctsoum@unipi.gr

Enforcement actions and bank behavior

Abstract

Employing a unique dataset for the period 2000-2010, this paper examines the impact of enforcement actions (sanctions) on bank capital, risk, and performance. We find that high risk-weighted asset ratios tend to attract supervisory intervention. Sanctions whose cause lies at the core of bank safety and soundness curtail the risk-weighted asset ratio, but amplify the risk of insolvency and returns volatility, which implies that these sanctions do not improve the risk profile of the involved banks, possibly because they come too late. Sanctions targeting internal control and risk management weaknesses appear to be well-timed and to restrain further increases in the risk-weighted assets ratio without impairing bank fundamentals. Sanctions against institution-affiliated parties do not seem to affect bank behavior. We suggest that supervisory attention should be placed on the timely uncovering of internal control and risk management deficiencies as this would allow the early tackling of the origins of financial distress.

JEL classification: G01; G21; G28

Keywords: Enforcement actions; banking supervision; capital; bank risk; bank performance

1. Introduction

The financial turmoil that started in 2007 and led to a panic in the fall of 2008 depicted with unparalleled force the weaknesses of the existing financial architecture and underlined the importance of rethinking the current regulatory and supervisory framework, especially in the area of banking. A number of research studies (e.g., Caprio et al., 2008; Delis and Staikouras, 2011; Masciandaro et al., 2011) that focus on the quality of supervision conclude that enforcement, rather than mere adoption of laws and regulations, constitutes the most vital component of effective banking supervision. Along the same line, the Basel Committee corroborates that appropriate remedial actions make up an indispensable ingredient of an efficient supervisory review process under Pillar 2 of the Basel capital adequacy regime (Basel, 2006).

This paper examines the impact that the imposition of sanctions may have on the bank's risk-based capital, overall risk, and performance. The identification of changes in these fundamentals would not only enrich our understanding of the impact of supervisory enforcement on bank risk strategies and performance but also allow the deduction of valuable policy lessons on how to enhance supervisory effectiveness. To carry out this analysis, we employ a unique dataset of enforcement actions imposed on individual U.S. banks over the period 2000-2010. We consider all actions enacted by the three U.S. supervisory bodies of the banking system, namely, the Federal Deposit Insurance Corporation (FDIC), the Office of the Comptroller of the Currency (OCC), and the Federal Reserve Board (FRB). Moreover, we distinguish between different classes (types) of sanctions as these may have a very different impact on bank capital, risk, and performance. Specifically, we differentiate between four types of sanctions according to their potential influence on bank safety and soundness, with class 1

including those actions that are at the core of bank safety and soundness, and class 4 those that are unlikely to bear on banks' safety and soundness. To our knowledge, this is the first study that investigates the effect that both enforcement actions, as a whole, and different types of sanctions may have on key bank fundamentals.

Our empirical strategy follows a well-established literature that considers the impact of an event on various aspects of the involved firm, here, the bank (see, e.g., Dewenter and Malatesta, 2001; Norden and Weber, 2010; Baek et al., 2011). We also complement this econometric analysis with relevant figures showing the evolution of bank fundamentals before and after the enforcement action is imposed. In a nutshell, the results show that enforcement actions are imposed primarily on banks with high levels of risk-weighted assets. Following the imposition of an enforcement action, the risk-weighted assets ratio of the involved bank declines to levels approximately equal to the median of the industry, whereas profitability appears to increase. However, this development comes at a high cost: both the volatility of returns and the risk of insolvency increase.

We obtain a significantly different picture when we decompose sanctions into diverse classes and separately assess the effect of each on the selected response variables. Indeed, we show that supervisors are slow to impose class 1 sanctions although the underlying reason (e.g., impairment of capital or/and liquidity or/and asset quality, etc.) for these sanctions lies at the core of bank safety and soundness. Moreover, banks exposed to class 1 sanctions remain quite unstable afterwards (i.e., the volatility of returns and the risk of insolvency remain at high levels). We also infer that class 2 sanctions tend to be applied in a timely fashion and to exert their disciplinary impact much more smoothly in the sense that they do not impair any of the bank fundamentals examined. As for class 3 sanctions, it appears that they do not significantly

affect the risk strategy of the banks involved, one of the reasons being that this type of sanction is more faintly related to the core of bank safety and soundness. We conclude that supervisors should place timely emphasis on those fields of misconduct covered by class 2 sanctions as this is likely to allow the early detection and tackling of the root causes of much more serious problems at their inception, without prejudicing bank fundamentals.

Section 2 reviews the literature and further highlights the importance of the present study in identifying the impact of enforcement actions on bank capital, risk, and performance. Section 3 discusses how the dataset for the present study is constructed, with an emphasis on enforcement actions. Section 4 presents the empirical method and analyzes the findings. Section 5 concludes by discussing the policy implications of the findings.

2. Context and related literature

Supervisory enforcement through the application of remedial actions in case of regulatory violations constitutes an indispensable ingredient of a credible institutional framework governing the operation of banks (e.g., Mishkin, 2000; Black, 2001). Quite surprisingly, however, empirical research exploring the nexus between supervisory enforcement actions and bank behavior has been scarce, to say the least.

To the best of our knowledge, pending the present paper, no research has gathered raw data on enforcement actions by all three U.S. bank supervisors (FDIC, OCC, FRB) and assessed their correlation with bank behavior after taking into account their classification according to the underlying rationale and their relevance to bank safety and soundness. The latter classification is crucial in determining which types of sanctions are the most effective in promoting prudent banking practices.

The seeds of the discussion can be traced back to the 1991 U.S. General Accounting Office Report on bank supervision, which concludes, from the elaboration of a small sample of 72 formal enforcement actions, that employing the most forceful actions leads to better outcomes in both capital improvement and correcting the causes of capital depletion (U.S. GAO, 1991). In contrast, Peek and Rosengren (1995) suggest that the formal enforcement actions imposed on New England banks between 1989-1993 by the FDIC and the OCC resulted in the shrinkage of loan portfolios and bank lending rather than in capital increases. A FDIC survey (1997) of the FDIC and FRB formal enforcement actions for the period 1980-1994 infers that such actions do affect bank behavior; that is, they cause asset growth decline, dividend rate reductions, and increases in external capital infusions. Using data on FDIC enforcement actions for the period 1980-1996, Curry et al. (1999) find that formal enforcement actions have a more significant impact on areas over which bank management has a high degree of control (i.e., the rates of both loan-loss provisioning and net loan charge-offs increase, and cash dividend distributions decrease) as opposed to areas where external factors play a greater role (e.g., external capital injections and asset growth). Along the same line, the theoretical models of Milne (2002) and Furfine (2001) conclude that the threat of sanctions forces banks to reduce their portfolio risk. Finally, and more relevant to the present work, Delis and Staikouras (2011) build a new panel dataset with information on on-site audits and sanctions for 17 countries over the period 1998-2008 and infer a linear and negative relation between sanctions and bank risk. However, this analysis utilizes the aggregate number of sanctions (at the country level) on a yearly basis and, thus, does not exploit the full information on the impact of sanctions on individual banks.

Our work could also be placed within the broader literature assessing the relationship between "supervisory quality effectiveness" and bank behavior.[1] Kaufman (1995) and Swindle (1995) were among the first to acknowledge that increased supervisory pressure, as approached by the introduction of the prompt corrective action policy and the use of CAMEL ratings, constrains the behavior of undercapitalized banks. Since then, related research has employed various proxies for "supervisory quality effectiveness" (e.g., supervisory power and independence) and has reached mixed inferences regarding the latter's impact on bank performance, soundness, and stability (e.g., Barth et al., 2001; La Porta et al., 2006; Demirgüç-Kunt and Detragiache, 2011). The measures used by this strand of literature determine "supervisory quality" in an indirect manner. This is so because they focus on law on the books *vis-à-vis* actual implementation, or/and build upon the subjective judgment of respondents to questionnaires, or/and use a benchmark (e.g., Basel Core Principles) with an inherently broad content (see also Delis and Staikouras, 2011).

However, none of the above studies utilize the full range of enforcement actions by all supervisory agencies to infer the impact of these sanctions on a series of bank fundamentals at the bank level. Further, the relevant literature so far does not make a distinction based on the different bearing that diverse types of sanction may have on bank safety and soundness, thus missing important insights as to the most effective type of remedial action needed to induce bank discipline. The present study aims to fill this gap in the literature.

[1] From an even wider perspective, our work may be associated with the line of research inferring a negative correlation between stock prices and disclosure of enforcement actions (e.g., Brous and Leggett, 1996; Jordan et al., 1999; Slovin et al., 1999) and the strand of literature that finds no evidence of unusual deposit withdrawals or spread increases following the announcement of formal actions (e.g., Gilbert and Vaughan, 2001).

3. Data

In this section we discuss the data used in the empirical analysis, placing the spotlight on the novel sample of enforcement actions and their categorization. Subsequently, we discuss in some detail the bank-level response variables and provide a brief note on the control variables in our study.

3.1. Enforcement actions

We start with data on all formal enforcement actions that have been enacted by the three main U.S. banking supervisory authorities (FDIC, OCC, and FRB) in the period 2000Q1-2010Q4. Specifically, our sample encompasses: (1) involuntary terminations of insurance, (2) cease and desist orders, (3) written agreements, (4) suspension, removal, and prohibition orders, (5) section 19 letters, (6) civil money penalties, including Call Report penalties, (7) criminal penalties, (8) prompt corrective action directives, (9) safety and soundness orders, (10) capital directives, (11) termination of Federal Reserve System membership orders, (12) regulation Z orders, (13) restitution orders, and (14) revocations of license and placements in conservatorship/ receivership.[2] This is a new hand-collected dataset with a total number of 6,177 sanctions imposed on banks located in the United States.[3] We exclude from our sample the supervisory decisions that do not contain some kind of reprimand for violation of laws and/or regulations (e.g., modification/termination of prohibition orders, denial of acquisition of

[2] See 12 U.S. Code (U.S.C.) §§ 1817(a), 1818, 1829, 1831O, 1831P-1, 2801, and 3907, as well as 12 CFR (Code of Federal Regulations) §§ 3 and 167. For a more detailed explanation for each type of sanction, see:
(i) http://www.fdic.gov/bank/individual/enforcement/edoaction.html,
(ii) http://www.occ.gov/topics/laws-regulations/enforcement-actions/enforcement-actions-types.html, and
(iii) http://www.federalreserve.gov/boarddocs/supmanual/supervision_cbem.htm.

[3] Our analysis does not include federal savings associations (thrifts).

control, voluntary termination of insurance, interlocutory reviews, termination of cease and desist orders, etc).

We examine the information on these actions from the U.S. banking supervisory authorities' websites on a one-by-one basis and look into their underlying rationale. On the basis of their *raison d'être* and relevance for bank safety and soundness, we then break down formal enforcement actions into four classes. As displayed in the Appendix, Class 1 encompasses those actions that are at the core of bank safety and soundness, whereas class 4 comprises those actions that are rather unrelated to bank safety and soundness.

Class 1 encompasses actions that have been taken for violations of the requirements concerning banks' financial soundness (e.g., capital adequacy and liquidity, asset quality, provisions and reserves, large exposures, and exposures to related parties). Class 2 comprises actions that have been taken for violations of the requirements regarding banks' internal organization (e.g., internal control and audit systems, including risk management systems, as well as money laundering, bank secrecy, consumer compliance programs, and foreign assets control). Hence, we generate a separate category from class 1 actions to differentiate between sanctions imposed for breaches of financial soundness *vis-à-vis* those concerning the organizational requirements of banks. Class 3 includes actions that have been imposed for breaches of the requirements concerning the fitness and propriety of banks' board members and senior management, as well as other persons closely connected with banks (institution-affiliated parties). Finally, class 4 encompasses actions that have been taken for residual and, as such, heterogeneous reasons; i.e., they refer to typical infringements of various laws (e.g., Home Mortgage Disclosure Act (HMDA), Flood Insurance Act (FIA), Flood Disaster Protection Act (FDPA), Federal Trade Commission Act (FTCA), and Equal Credit Opportunity Act (ECOA)).

By extension, class 4 sanctions are rather unrelated to bank safety and soundness. For precisely this reason, we only report the evolution of our response variables for class 4 sanctions but do not discuss any policy implications.

In the next step, we match the name, city, and state of each bank exposed to enforcement actions with the relevant accounting data from the commercial bank and bank holding company Call Reports (FFIEC 031/041 and Y-9C Call Reports, respectively). If there is any discrepancy between the information provided in the reports of sanctions and in the Call Reports, we drop the relevant observation. Because the Call Report data are available on a quarterly basis, we match the sanctions' effective dates with the relevant quarters. For example, all sanctions effective from January 1st to March 31st are matched with the first quarter of that year. Whenever two enforcement actions of different classes that are imposed on a single bank become effective in the same quarter, or where the same supervisory decision contains sanctions belonging in more than one class, we keep only the enforcement action of the higher class. This choice is justified as the effect of the most important (for bank safety and soundness) enforcement action outshines that of the less important one. All the above steps reduce our dataset to 4,294 enforcement actions. Further, due to Call Report data availability constraints, our final working sample contains 3,688 enforcement actions imposed on 2,658 distinct banks (i.e., more than one action has been imposed on some banks over the period examined). Of these banks, 2,475 are commercial banks and 183 are bank holding companies.

Table 1 provides (1) descriptive statistics for the number of enforcement actions per year and per regulator (Panel A) and (2) a classification according to the type of these actions (Panel B). In Panel A, the columns correspond to the supervisory authorities, and the rows to the years of the sample. As the figures in Panel A show, the number of sanctions originating from all

three supervisors rises sharply after 2008, indicating the heavy toll that the financial crisis took on banks. However, this also shows, although speculatively, that the supervisors did not quite foresee the seeds of the crisis and did not react proactively. Panel B shows that class 1 sanctions constitute the largest group (about 47% of the total sanctions in the sample), whereas sanctions of type 2 constitute the smallest group.

3.2. Response variables

We examine the impact of enforcement actions on a battery of response variables during a time window of (-4, +4) quarters around the sanction quarter. We use an unbalanced panel dataset that includes all U.S. banks, both those exposed and those not exposed to sanctions. In doing this, the banks exposed to sanctions serve as the treatment group, and those not exposed to sanctions as the control group. Because we use a time window around the event, we employ the accounting data for the period 1999Q1 – 2011Q4 (i.e., we extend our 2000Q1-2010Q4 panel by one year at each end).

We use a number of response variables that characterize the capital, risk, and performance of banks. We provide exact definitions for these variables in Table 2. All of these variables are from the Call Reports. The first variable is the total risk-based capital ratio. We complement this ratio with its decomposition, i.e., the equivalent ratios for Tier 1 and Tier 2 capital. The three ratios are the most widely used by researchers and supervisors to assess the level of bank capital as a fraction of the risk-weighted assets. A higher value for these ratios, especially for the first two, reflects a higher degree of capitalization and a lower probability of insolvency.

To identify whether sanctions have an impact on capital or whether they affect the riskiness of the bank portfolio, we also examine the response of the risk-weighted assets ratio (i.e., the ratio of risk-weighted assets to total assets). In doing this, we examine whether, following the sanction, banks decide to shrink their risky assets instead of raising capital so as to increase their risk-weighted capital base. A change in this ratio would reveal a change in the riskiness of bank assets following the sanction.

The final tests involve the impact of enforcement actions on the risk-related bank performance. The simplest measure of performance is bank profitability, which is usually measured by the ratio of total profits before tax to total assets (ROA). We complement this basic ratio with the standard deviation of bank profits over a period of 12 quarters and the Z-score (explicit definitions are provided in Table 2). These measures reflect both performance and the probability of default and are used quite frequently in the related banking literature (e.g., Demirgüç-Kunt et al., 2008; Delis and Staikouras, 2011).

3.3. Control variables

An analysis of the impact of sanctions on the bank fundamentals discussed in the previous subsection, using conventional regression techniques, requires the use of some control variables to avoid the omitted-variables problem. We start with a large number of bank characteristics pertaining to liquidity, provisions, problem loans, and the availability of deposits. Many of these characteristics have been shown to have a significant impact on bank capital, risk, and performance measures in the banking literature (e.g., Boyd et al., 2006; Demirgüç-Kunt et al., 2008; Flannery and Rangan, 2008). We enhance these measures with variables like bank size and the mix of interest and noninterest income.

After carrying out a number of initial regressions, and using a large number of potential control variables, we resort to the following controls (explicit definitions are provided in Table 2). To measure bank liquidity, we use the ratio of liquid assets to total assets. In our setting, liquid assets include cash and balances due from depository institutions plus the fair value of held-to-maturity U.S. Treasury securities. We include the U.S. Treasury securities as these are short-term securities that are very easily liquidated. As a proxy for provisions for loan losses, we use the ratio of the allowance for loan and lease losses over the total loans and leases that are net of unearned income. Besides the provisions for loan losses, we also control for the actual loan losses, using the ratio of nonaccrual to total loans and leases, net of unearned income. Further, we control for potential changes in the liability side of the bank's balance sheet by using the simple ratio of total deposits to total assets. Finally, we control for bank size and noninterest income by using the log of total assets and the ratio of noninterest income to total income, respectively. We further control for some of our response variables, discussed in Section 3.2, where these variables are not used as dependent variables in the estimated equations. All the bank-level variables are from the Call Reports.

Besides these bank characteristics, we experiment with many structural and macroeconomic variables that may drive our results. In our final regressions, we include three variables common to all banks. The first is the industry's median of the dependent variable, where "industry" refers to all banks operating in the United States for which the Call Reports provide data for each quarter.[4] We simply call this variable "median of dependent variable." We use this variable to capture potential trends in the behavior of all U.S. banks. In doing so, we avoid attributing these trends to the impact of the sanctions on the dependent variables. We

[4] We calculate the median for commercial banks and bank holding companies separately and use the relevant measure for the respective bank (cross section) in the panel regressions.

further discuss this issue in the econometric methodology that follows. The second variable is the federal funds rate, which shows the direction of the Central Bank rate and, as such, the perception of the Fed concerning the state of the macroeconomic environment. The third is the real GDP growth rate (year-on-year), which accounts for the impact of fluctuations in economic activity on the response variables. The last two variables are obtained from the Federal Reserve Bank of St. Louis.

4. Methodology and results

This section analyzes the empirical methodology and the findings concerning the impact of enforcement actions on the banking fundamentals discussed in Section 3. Before we proceed with estimations, and given the richness of the dataset, it is worth visualizing in simple graphs the behavior of our response variables following the sanction. In Figures 1a to 1g, we present the fluctuations in our response variables in the eight quarters before and after the sanction, along with the fluctuations of the respective medians for all banks. We include all types of sanctions in these figures, with the dashed vertical line indicating the time the sanction is enacted.

A quite interesting story emerges right away. As Figures 1a and 1b show, the falling trend in important variables, such as the risk-based capital ratio and the Tier 1 capital ratio, reverses approximately two quarters before the enactment of the sanction. This may be due to the fact that banks react to their falling capital ratios through a self-discipline mechanism (FDIC, 1997). Alternatively, and considering that enforcement actions are generally enacted after a supervisory audit, banks may react proactively because of two reasons. The first is simply because they anticipate the sanction; the second is because formal enforcement actions

may take some time to draft, negotiate, and execute, and this gives banks the time to take corrective action (FDIC, 1997; Brunmeier and Willardson, 2006). In contrast, the Tier 2 capital ratio (Figure 1c) increases to well above the industry's median in the period before the sanction. This shows that troubled banks try to maintain capital levels by raising supplementary capital constituents, such as undisclosed reserves, general provisions, and/or subordinated debt.

Figure 1d reflects one of the most interesting patterns. The banks exposed to enforcement actions have a very high risk-weighted assets ratio well before the sanction is imposed. This ratio starts collapsing about two or three quarters before the sanction. Bearing in mind the supervisory emphasis on asset quality in the context of the Uniform Financial Institutions Rating System (UFIRS),[5] the imposition of enforcement actions should come as no surprise for banks maintaining a comparatively risky portfolio. However, this graph also shows that these very risky banks may not have been exposed to enforcement actions on a timely basis; that is, supervisory response should have been triggered approximately one year earlier.

Moreover, the decline in the risk-weighted assets ratio has important implications for bank profitability and the risk of insolvency. Figures 1e to 1g illustrate the return on assets (ROA), the volatility of the ROA, and the Z-score around the event of the sanction. The respective medians for these three variables are relatively stable, whereas the variables reflecting the behavior of the banks exposed to enforcement actions fluctuate significantly. In particular, the ROA and the Z-score of the banks exposed to enforcement actions start collapsing about two years before the enforcement action, whereas the volatility of the ROA increases significantly. Evidently, the enforcement action finds these banks in almost their worst

[5] Under the UFIRS, each bank is assigned a composite rating based on the supervisory evaluation of six financial and operational components, which are also rated. The component ratings reflect the bank's capital adequacy, asset quality, management capabilities, earnings sufficiency, liquidity position, and sensitivity to market risk (commonly referred to as CAMELS ratings).

shape. After the event, the ROA and the Z-score seem to somewhat stabilize, but the banks do remain highly risky by industry standards.

The figures discussed above already provide a qualitative analysis of our findings but tell us very little about the statistical significance of the observed changes or about the differential effect of the diverse classes of sanctions. To quantify these fluctuations and provide deeper insights, we resort to two different techniques. First, we set out our findings in tandem with a brief discussion regarding the impact of total enforcement actions where appropriate. Subsequently, Section 5 presents a more composite analysis of the findings, along with the associated policy implications, placing special emphasis on the effect of the different sanction classes on the response variables.

4.1. Univariate tests

We first look at the impact of enforcement actions on the capital, risk, and performance of those banks exposed to enforcement actions using univariate tests. This methodology, also employed in several other recent event studies (e.g., Dewenter and Malatesta, 2001; Norden and Weber, 2010; Baek et al., 2011), has the advantage of simplicity and transparency regarding the possible effect of a sanction on the response variables. More specifically, we look at the impact of sanctions on the response variables described in Section 3.2 before and after the sanction quarter. For each sanction, we calculate the averages of the response variable for the periods (t-4) to (t-1) and (t+1) to (t+4), where t is the sanction quarter. The two periods capture the average behavior of the response variable one year before and one year after the sanction, respectively. In this way, we also deal with seasonality in the financial accounting data, which

may influence the results. Subsequently, we compare the means of these averages across sanctions.

Here, we use only those cases where the sanction at time *t* is the only one imposed during the (-4, +4) quarters. Under this restriction, the choice of the event window of (-4, +4) quarters, as opposed to (-8, +8) quarters in the graphs discussed above, is justified for three reasons. First, it reduces the possibility that any change in the response variable could be attributed to events other than the sanction, especially for the cases after the eruption of the crisis in 2008. Further robustness checks on this issue are presented later in this paper. Second, it heavily increases the number of observations for the univariate tests, relative to a choice of a wider event window of, say, (-8, +8) quarters. Third, it minimizes the possibility of survivorship bias, which could affect the results.

Table 3 reports the results of the univariate tests for changes in the capital, risk, and performance of banks around the quarter the sanction is imposed. For these initial tests, we use all types of enforcement actions. The most interesting column is the one reporting the difference between the averages of the relevant response variables before and after the sanction is imposed.

Panel A shows that the differences in the two main variables reflecting the capitalization of banks (the first two ratios) are positive and statistically significant at the 10% level. More specifically, the risk-based capital ratio increases by 0.42 basis points on average (from 0.1455 to 0.1497) for the bank exposed to enforcement actions within one year after the event. The equivalent increase for the Tier 1 ratio is 0.40 basis points. The Tier 2 capital ratio also increases; however, the economic significance of this increase is relatively low. Overall, these findings are in line with the data in Figures 1a to 1c, but the univariate tests show that these changes are only marginally statistically significant.

The most significant fluctuations in banking fundamentals concern the risk-weighted assets and performance. Specifically, as the results in Panel B of Table 3 show, a sanction reduces significantly and within one year the risk-weighted assets ratio of the average bank exposed to the sanction from about 0.732 to about 0.707, which is a considerable decrease for such a small period of time. As shown in the equations with the ROA as the response variable, the enforcement action lowers the profitability of the involved banks. Specifically, the mean ROA of banks exposed to enforcement actions before the event is approximately 0.0015; the value falls to zero after the sanction, indicating that banks exposed to enforcement actions incur significant losses during the time period around the enactment of the sanction. This also extends to increased fluctuations in profitability and higher insolvency risk. Evidently, the risk of insolvency, as measured by the Z-score, is approximately 0.105 points higher on average (i.e., the Z-score is lower) in the first year after the sanction as compared to the year before the sanction. This results from the fluctuations in both the ROA and its volatility (σROA).

In the results presented in Table 4, we distinguish between the different classes of enforcement actions. As expected, the strongest results are related to class 1 sanctions, whereas enforcement actions of classes 2 to 4 do not seem to have a strong effect on our response variables. In particular, Column I shows a very similar story to the one presented in Table 3. The new element is that most of the responses on bank fundamentals are larger and more significant. The increase in the three risk-based capital variables is now statistically significant at the 5% level, and the change is larger. Specifically, the risk-based capital ratio increases by 0.7 points following the enactment of the sanction as opposed to the 0.4-point increase reported in Table 3. In addition, sanctions of class 1 take a very heavy toll on the risk- and performance-related variables. The risk-weighted assets ratio falls by approximately 4.7% within one year,

which is a very large decrease. Further, the ROA, which is already in negative territory for the banks exposed to a class 1 sanction, falls by an additional 0.26 points, whereas the Z-score declines by approximately 9.8% within a single year.

Overall, the findings in Table 4 show that enforcement actions of class 1 lead to quite large fluctuations in bank fundamentals as opposed to the other types of sanctions. For sanctions of classes 2 to 4, almost all the univariate statistics show that the changes in our response variables are statistically insignificant (see Columns II-IV).

4.2. Panel regression analysis

The univariate tests described above, although straightforward, can be criticized on the basis of their not explicitly taking into account other forces, common and/or idiosyncratic, that may drive the results. This is a standard omitted-variables problem that could lead to falsely attributing the behavior of the response variable to the event, while the behavior actually results from fluctuations in omitted variables. Given this consideration, we employ a panel fixed effects model of the form:

$$y_{it} = \delta + \beta_1 Sanction_{i,\tau-4\to\tau-3} + \beta_2 Sanction_{i,\tau-2\to\tau-1} + \beta_3 Sanction_{i,\tau} + \\ + \beta_4 Sanction_{i,\tau+1\to\tau+4} + \sum_{k=1}^{3} \gamma_k Common_{k,t-1} + \sum_{j}^{7} \varepsilon_j Bank_{ji,t-1} + v_i + e_t + u_{it} \qquad (1)$$

In equation (1) y is the response variable for bank i at time t, and τ is the time when the sanction (event) is enacted on the i^{th} bank. Four dummy variables termed *Sanction* enter the main estimated equations. The first equals one for the quarters τ-4 and τ-3 for the bank that was exposed to the sanction at τ. The second equals one for the quarters τ-2 and τ-1, the third equals one for the quarter of the event τ, and the fourth equals one for the quarters τ+1 to τ+4. The reason for this differentiation is the behavior of the bank fundamentals shown in the figures

above, where some of the response variables (e.g., the capital ratios) react prior to the enactment of the sanction. In other words, our modeling choice should reflect, through the relevant coefficient estimates of the dummy variables, the full-time path of the changes in the response variables due to enforcement actions. *Common* is a vector of the three structural and macroeconomic variables described in Section 3.3, and *Bank* the vector of the bank-specific variables. Both enter the equation lagged once. Finally, v refers to bank fixed effects, e to the quarter (time) fixed effects, and u to the remainder disturbance.

Equation (1) is estimated with OLS and robust standard errors clustered by bank. We infer the effect of the sanction on bank fundamentals from simple Wald tests of equality of the forms $\beta_4 - (\beta_1 + \beta_2)/2 = 0$, $\beta_4 - \beta_1 = 0$, $\beta_4 - \beta_2 = 0$, and $\beta_2 - \beta_1 = 0$. These tests reveal the change in the response variables between the relevant periods before and after the sanction. We first look into all types of enforcement actions and, subsequently, differentiate between the four classes.

4.2.1. Results for all classes of enforcement actions

In Table 5 we report the estimation results for all classes of sanctions and for the full sample of sanction cases to avoid introducing selectivity bias. The results reported only partially confirm the findings from the figures and univariate tests. The most significant difference compared to the findings reported in the figures and univariate tests concerns the estimated coefficients of the capital ratios (see Columns I-III). The responses in these ratios are now negative and statistically significant even at the 1% level, denoting that capital ratios actually fall in the year after the sanction. These results illustrate the importance of controlling for other variables in our empirical analysis. In particular, the main driving force of the negative sign comes from the

inclusion of time effects in our model, which shows that capital ratios are sensitive to systemic ongoing events that affect the banking system. However, we should note that the risk-based capital ratio of the average bank exposed to enforcement actions falls by approximately 0.5 basis points (see first row of Panel B in Column I), which is not a very large decrease in absolute economic terms. Moreover, it seems that the risk-based capital ratio does not fall analogously to the risk-weighted assets ratio decline reported below, which implies that banks are cautious not to allow a depletion of their capital matching the risk-weighted assets ratio cutback. Clearly, because the risk-weighted assets are, by definition, lower than the total assets of the bank, a drop in the risk-weighted assets ratio should cause a larger drop in the risk-based capital ratio (where risk-weighted assets is the denominator) in case there is a one-to-one match between a depletion of capital and the reduction in risk-weighted assets.

The changes in the other response variables appear to be consistent with the changes reported in the respective figures and univariate tests. The risk-weighted assets ratio falls by approximately 0.75% on average in the year after the sanction compared to the year before the sanction (see first row of Panel B in Column IV). This implies that for a bank with $100,000 initial worth of such assets, for example, the sanction will decrease this value by $750 within four quarters, which does not seem to be a very large effect in economic terms. The ROA increases by a small percentage from the period just before the sanction (quarters -1 and -2) to the period after the sanction (see third row of Panel B in Column V). Statistical significance is also observed for the effect of the sanction on the Z-score. Between the year before the sanction and the year after the sanction (see first row of panel B in Column VII), the natural logarithm of the Z-score falls by approximately 0.06 points or by 2.4% for the average bank exposed to enforcement actions (if one considers that the average Z-score of the banks exposed to

enforcement actions is 2.51). This is approximately half the effect found in the univariate tests, reflecting once again the importance of including control variables.

A potential concern is the possible presence of endogeneity in the model. Our model controls for common effects, but another type of endogeneity could also be present. Intuitively, a sanction is usually imposed on banks with deteriorating risk-weighted capital, overly risk-taking behavior, and/or unstable performance. Note, however, that in our setting, even if the residuals are correlated with the *Sanction* dummies, our focus is on the Wald test of equality between the pairs of coefficients given above. Given that the endogeneity bias in β_1, β_3, and β_4, if any, would be in the same direction and approximately of the same order (as the dummies are included to capture the same event), the bias in the differences between the three coefficients should be relatively low; i.e., the biases will cancel out at least to some extent (see, for example, the discussion in Kyriazidou, 1997). To verify that this is indeed the case, we additionally use instrumental variables regression as a robustness check.

In particular, we employ a treatment effects model, which is suitable in our case because the endogenous variables (the sanction dummies) are binary variables. For the estimation we use full information maximum likelihood and confirm that the results do not change if we use the two-step estimator. The choice for an instrumental variable was not an easy one. We resort to the use of a dummy variable, named "*opendummy*," which takes a value of one for the quarters 5 to 20 after the (average) quarter during which there is an opening of a new branch for the relevant bank. We do not include the first four quarters to avoid associating the opening of a new branch to bank fundamentals. In this way, we implicitly assume that a bank that has been expanding its business over some time has increased probability of breaching the law-on-the-books due to changes in its operational structure, whereas the opening of a branch does not have

a direct effect on the fundamentals of the banking firm. The first stage probit results (reported in Panel B of Table 6) show that there is indeed a strong correlation between *opendummy* and the sanction dummy. Using simple OLS panel data regressions with fixed and time effects (results available on request), we also confirm that *opendummy* is not strongly correlated with any of our response variables.[6]

We replicate Table 5 using the treatment effects model and report the results in Table 6. The results shown in the two tables, especially those concerning the statistical significance of the Wald tests, are very similar. The economic significance of the differences changes marginally. For example, the risk-weighted assets ratio seems to decrease by 2.05%, which is higher than the 0.75% decline reported in Table 5. However, the trends in bank fundamentals observed in the Wald tests, and shown in Panel C of Table 6, coincide with those presented in Panel B of Table 5. We confirm that this is the case for the rest of the sensitivity analyses and for the analysis of the different classes of sanctions reported below. Thus, and because we are primarily concerned about the trends in our response variables, we conclude that the OLS and the treatment effects models produce similar results, and we resort to the computationally simpler and asymptotically more-efficient OLS estimator for the rest of the regressions reported below.[7]

[6] One could suggest that conceptually, and although we do not find a strong statistical correlation between our response variables and *opendummy*, the opening of a new branch would affect the bank fundamentals for a period longer than one year. On this front, the recent work of Nevo and Rosen (2012) shows that identification with imperfect instruments is feasible as long as (i) the correlation between the instrumental variable and the error term has the same sign as the correlation between the endogenous regressor and the error term, and (ii) the correlation between the endogenous explanatory variable and the instrument is higher than the respective correlation between the instrument and the error term. This is indeed the case in our setting. We also experimented with other instruments, such as the *opendummy* with aces in the periods -13 to -20, the fourth lag of the salaries expenses as a share of total expenses, the fourth lag of real GDP growth, the fourth lag of the median Tier 1 risk-based capital ratio, and the fourth lag of the median noninterest income. When the set of instrumental variables passes the requirements set above, the results of the treatment effects model are essentially unchanged.

[7] We also confirm that the results reported in the rest of the tables below are similar to those produced by the treatment effects model.

As a further sensitivity analysis, we run the regressions reported in Table 5 for the cases where the time window of (-4, +4) quarters for bank *i* is clean of any other enforcement action besides that imposed on this bank in the event's quarter at τ. In other words, we keep only those cases where the sanction at τ is the only one imposed on those particular banks during the (-4, +4) quarters. This exclusion yields 2,420 enforcement actions, down from the 3,688 in the original sample. Table 7 shows the results of this exercise.[8] We observe that the changes in the results are minimal compared to those reported in Table 5 and that all the main implications carry through when using the clean time window.[9]

We carry out two more robustness checks. First, we consider separate subsamples for the periods before and after 2008 and find that the policy implications discussed below remain essentially the same, which indicates that the financial crisis did not change the effect of enforcement actions on bank fundamentals. Second, by using another subsample, we ensure that causality runs from enforcement actions only and cannot be attributed to other firm-specific corporate events that may coincide with the imposition of a sanction. In this subsample, we exclude from the analysis cases such as mergers, either as an acquirer or a target, liquidations, and failures that took place within a time frame of one and a half years around the enforcement action. This subsample contains 3,011 sanction cases, i.e., 677 fewer cases than in the main working sample of 3,688 cases. We also exclude banks that participated in the TARP program after 2008. Once again the results remain unchanged. Owing to space considerations, we do not report the results of the last two sensitivity analyses (available on request).

[8] Due to space considerations, we do not report the coefficient estimates of the control variables from this point onward or the Wald tests for the changes $\beta 4 - \beta 1 = 0$, $\beta 4 - \beta 2 = 0$, and $\beta 2 - \beta 1 = 0$. These estimates are available on request.

[9] We also conducted this analysis for the period (-8, +8) quarters event window for the cases where the event window is clean of any other enforcement action besides that imposed on this bank in the event's quarter at τ. The results remain essentially the same.

4.4.2. *Results for the different classes of enforcement actions*

Table 8 confirms the finding from the univariate tests that the most significant changes in bank fundamentals come from class 1 sanctions. The statistical and economic significance of virtually all the coefficient estimates on the Wald tests show once again the stronger effect of class 1 sanctions compared to the equivalent estimates in Table 5. Most notably, the Wald tests reported in Panel B of Table 8 show that the changes in the risk-weighted assets, the volatility of the ROA, and the Z-score are very large for banks exposed to a class 1 sanction.

Table 8 also reports the results concerning the impact of types 2, 3, and 4 enforcement actions on bank fundamentals. In general, the results show that the impact of these types of sanctions on several response variables is not statistically significant. This includes the response of variables that showed significant variability for sanctions of class 1, such as the risk-weighted assets ratio, the ROA, and the Z-score.

Because the results of the econometric analysis and the figures seem to qualitatively coincide for the risk-weighted assets and the risk of insolvency variables, the discussion of the relevant policy considerations may develop by looking into the evolution of the main bank fundamentals by class of sanction and with respect to the median of the industry. Figure 2 presents this evolution for the risk-weighted assets ratio and the Z-score for the first three classes of enforcement actions relative to the median of the industry in the eight quarters before and after the sanction. We believe that the graphs shed ample light onto the relative effect of sanctions of class 1 versus sanctions of the other classes.

Figure 2a shows that the average risk-weighted asset ratio of banks that receive a class 2 sanction is quite lower than those of banks exposed to a class 1 sanction and somewhat higher

than the median of the industry. Further, it appears that class 2 sanctions are imposed at a time when the risk-weighted assets ratio peaks and that, after the sanction, the risk-weighted assets ratio falls and converges with the industry's median. As far as class 3 sanctions are concerned, it seems that supervisory intervention does not affect the slightly upward trend of the risk-weighted assets ratio, which had started to develop before the application of those enforcement actions.

Figure 2b illustrates approximately the same story. In the pre-sanction period, all banks that were subsequently exposed to enforcement actions have Z-scores below the median, but those that received a class 1 sanction seem to be in a considerably more strenuous position. Notably, the Z-score of banks that got sanctions other that class 1, and especially of those banks that got class 2 sanctions, is lower than the median of the industry two years before the sanction and at a level approximately equal to that of banks that got a class 1 sanction. However, the Z-score of banks that got a class 2 sanction deteriorates at a much lower pace. When the sanction emerges, the Z-score of banks exposed to class 2 sanctions initially falls but starts converging with the industry's median from quarter +2 onward. Akin to the trend of their risk-weighted assets ratio, the Z-score of banks exposed to class 3 sanctions appears unaffected and continues its somehow upward trend, which had commenced before the imposition of sanctions.

5. Conclusions and policy implications

The underlying implications of the results may provide instructive guidance concerning the shaping of bank supervisors' enforcement and audit policy.

To begin with, timely supervisory intervention is of essence in developing an effective enforcement policy. Considering the trend of the response variables for banks exposed to

enforcement actions *vis-à-vis* the industry average during the period preceding the imposition of sanctions, it appears that the supervisory reaction in imposing enforcement actions whose rationale lies at the core of bank safety and soundness (i.e., class 1) came too late. To the obvious question of why the supervisors responded late, the supervisory forbearance literature offers more than one plausible explanation (e.g., Kane, 1989; Gilbert, 1991; Kroszner, 2000; Garcia, 2010). First, supervisors may be captured by regulated banks to serve the latter's private interest as opposed to the public interest, or they may enjoy wide discretionary powers so that they can manipulate the timing of enforcement actions without incurring liability. Second, supervisors may be incited to delay detecting banking irregularities to avoid taking costly action and passing on the "hot potato" to future supervisors, or they may postpone the application of formal enforcement actions due to the prior application and monitoring of informal actions. Finally, supervisors may abstain from criticizing banks during boom periods or may delay their response as a result of searching for potential buyers of ailing banks. Our results add a further, interesting implication to the above reasoning: Contrary to what one may expect, based on pure safety and soundness considerations, violations underlying class 1 sanctions, due to their gravity and the severity of enforcement actions that they may trigger, could increase pressure on supervisors to adopt a more lax attitude. Put in a different way, supervisory alertness may be missing when it is most needed, precisely because it is when financial distress becomes exposed that forces toward forbearance also become stronger.

Turning to the impact of the different classes of enforcement actions on our response variables, it appears that class 1 sanctions do not improve the bank risk profile. Both the risk-based capital ratio and the risk-weighted assets ratio decrease. This implies that although the reshuffling of the asset portfolio leads to a heavy overall decline in the risk-weighted assets

ratio, banks appear somehow prudent not to allow a corresponding depletion of their capital. On the other hand, the cost paid for such a serious plummet in the risk-weighted assets ratio is the increased volatility of returns and an increase in insolvency risk. All in all, therefore, our findings suggest that banks getting class 1 sanctions remain pretty risky.[10]

From the standpoint of statistical significance, class 2 sanctions do not appear to have a noteworthy impact on our response variables. Still, intriguing inferences may arise for supervisors and banks alike from a closer investigation of the trend of the response variables. Looking into our response variables before the imposition of sanctions, it emerges that banks exposed to class 2 sanctions are much more stable than banks of the previous class: their risk-weighted assets and risk-based capital ratios are somehow above median, whereas their risk of insolvency is slightly lower than the industry average. Conceivably, these banks have developed and pursued a much more prudent risk strategy and, thus, have not attracted class 1 supervisory intervention (even in the mistimed fashion already described). Interestingly, class 2 sanctions appear to be well-timed, at least in terms of the bank fundamentals examined; that is, they attach when the risk-weighted assets ratio starts to depart from the industry median, possibly causing supervisory concerns. Moreover, they seem to exert their disciplinary impact much more smoothly in the sense that they do not impair bank fundamentals; i.e., banks' risk-weighted assets ratio and risk of insolvency progressively tend to approximate the median after the event.

In terms of further policy considerations, our results could be extended to support that supervisors should place more emphasis on the area covered by class 2 enforcement actions. Financial ratios and other numerical indicators are lagging guides on bank safety and

[10] One should be mindful of the preceding discussion on the timeliness of supervisory intervention. Our conclusions are based on the reported empirical findings, which reflect the supervisory reaction and bank behavior as they occurred in reality. Hence, there is no way to identify whether it is the type of sanction per se or the timing of its imposition that has the most significant bearing on our inferences.

soundness; by contrast, effective internal control and risk management systems ensure that the bank is in a position to take precautionary measures by timely detecting and weathering excessive risks and financial adversity (Gilbert, 1993; FDIC, 1997 and 1997b). Indeed, the FDIC has indicated since 1997 that, among the UFIRS components, the management rating, which encompasses the adequacy of internal control and risk management systems, is the only rating element to systematically track risk factors that may produce future losses and help banks withstand future adversity (FDIC, 1997b). By focusing on and sanctioning internal organization deficiencies, supervisors would be able to identify the root causes of financial distress at an early stage and, therefore, to act in a preventive and much smoother manner to ensure prudent bank behavior (Seballos and Thomson, 1990; FDIC, 1997; Brunmeier and Willardson, 2006; Garcia, 2010).

A slightly different story emerges for class 3 sanctions against institution-affiliated parties, covering *inter alia* situations of dishonest behavior or professional incompetence. Akin to class 2 sanctions, it is not possible to derive a statistically significant relationship with our response variables. In addition, compared to the industry median, it would again be plausible to argue that overall, we deal with banks with a much more prudent risk profile than those exposed to class 1 sanctions. By examining the changes in banks' behavior pre- and post-sanction, one may notice that the risk-weighted assets ratio exhibits a slight upward trend (both before and after the sanction), which, however, does not by any means cause concerns over banks' risk of insolvency or other bank fundamentals (ROA and risk-weighted capital ratio). In other words, the analysis indicates that banks' risk strategy remains unaffected, as well as that the timeliness of supervisory intervention is of relatively less importance than in class 1 and 2 sanctions (see also Brunmeier and Willardson, 2006). To explain this inference, two caveats should be kept in

mind. First, the underlying cause of class 3 sanctions is pretty distantly related to the core of bank safety and soundness (Brunmeier and Willardson, 2006) as the latter is captured by our response variables. Second, and most importantly, considering that the same managerial deficiencies and inadequate controls that are captured by class 2 sanctions are likely to also lie behind the development of fraud, insider abuse, or even incompetence (FDIC, 1997 and 1997b), it is expected that occurrences of the latter type, which pose a more serious threat to bank safety and soundness, have already been caught by class 2 sanctions.[11]

The present study can be expanded to analyze the response of the market to the enforcement actions, especially during periods of financial turmoil. Further, a more corporate flavor can be given if additional research identifies the interrelationship of the event of the sanction with other corporate events, such as M&As, which are present in our sample. As we have already covered a lot of ground with the response of various bank fundamentals, we leave the above extensions to future research.

[11] More generally speaking, one should be cautious not to overstretch this "seeming unresponsiveness" of banks toward class 3 sanctions. Indeed, dishonesty, fraud, and insider abuse have been documented as major causes of bank failures, including the U.S. bank and thrift failures in 1980-1994 (Graham and Homer, 1988; Seballos and Thomson, 1990; FDIC, 1997 and 1997b). What is more, when bank failures are caused by fraud/insider abuse, losses may develop quickly, and the transition from sound to insolvent condition tends to occur rapidly, leaving no time for other corrective action (FDIC, 1997; Brunmeier and Willardson, 2006). This is consistent with the point made in the main paper that class 2 sanctions also play a key role in the early tackling of internal control and risk management weaknesses, which may foment or facilitate the development of such serious fraud, abuse, or incompetence that bank safety and soundness could be threatened.

References

Baek, J., K. Bae, J. Kang and W. Liu. 2011. Do controlling shareholders' expropriation incentives imply a link between corporate governance and firm value? Theory and evidence. *Journal of Financial Economics*. Forthcoming.

Barth, J., G. Caprio and R. Levine. 2001. The regulation and supervision of banks around the world: a new database. *World Bank Policy Research Paper 2588*.

Basel Committee on Banking Supervision, 2006. International Convergence of Capital Measurement and Capital Standards.

Black, B. 2001. The legal and institutional preconditions for strong securities markets. *UCLA Law Review* 48: 781-855.

Boyd, J, G. De Nicolo and A. Jalal. 2006. Bank risk-taking and competition revisited: New theory and new evidence. *IMF Working Paper 297*.

Brous, P. and K. Leggett. 1996. Wealth effects of enforcement actions against financially distressed banks. *Journal of Financial Research* 19: 561-577.

Brunmeier J. and N. Willardson. September 2006. Supervisory enforcement actions since FIRREA and FDICIA: arbitrary, draconian and inflexible or a model of regulatory restraint? *The Region*.

Caprio, G., A. Demirgüç-Kunt and E. Kane. 2008. The 2007 meltdown in structured securitization: Searching for lessons, not scapegoats. *World Bank Policy Research Working Paper 4756*.

Curry, T., J. O'Keefe, J. Coburn and L. Montgomery. 1999. Financial distressed banks: how effective are enforcement actions in the supervision process?. *FDIC Banking Review 12*: 1-18.

Delis, M. and P. Staikouras. 2011. Supervisory effectiveness and bank risk. *Review of Finance* 15: 511-543.

Demirgüç-Kunt, A. and E. Detragiache. 2011. Basel Core Principles and bank soundness: does compliance matter? *Journal of Financial Stability* 7: 179-190.

Dewenter, K. and P. Malatesta. 2001. State-owned and privately owned firms: An empirical analysis of profitability, leverage, and labor intensity. *American Economic Review* 91: 320-334.

Federal Deposit Insurance Corporation (FDIC). 1997. Bank examination and enforcement. In *History of the Eighties, Lessons for the Future – Vol. I* (Federal Deposit Insurance Corporation), pp. 421-475.

Federal Deposit Insurance Corporation (FDIC). 1997b. The banking crises of the 1980s and early 1990s: summary and implications. In *History of the Eighties, Lessons for the Future – Vol. I* (Federal Deposit Insurance Corporation), pp. 3-86.

Flannery, M. and J. Rangan. 2008. What caused the bank capital built-up of the 1990s? *Review of Finance* 12: 391-429.

Furfine, C. 2001. Bank portfolio allocation: the impact of capital requirements, regulatory monitoring, and economic conditions. *Journal of Financial Services Research* 20: 33-56.

Garcia, G. 2010. Failing prompt corrective action. 2010. *Journal of Banking Regulation* 11: 171-190.

Gilbert, R. 1991. Supervision of under-capitalized banks: is there a case for change?. *Federal Bank of St. Louis Review* 73: 16-30.

Gilbert, R. 1993. Implications of annual examinations for the bank insurance fund. *Federal Bank of St. Louis Review* 75: 35-51.

Gilbert, R. and M. Vaughan. 2001. Do depositors care about enforcement actions? *Journal of Economics and Business* 53: 283-311.

Graham F. and J. Homer. 1988. Bank failure: an evaluation of the factors contributing to the failure of national banks, in *The Financial Services Industry in the Year 2000: Risk and Efficiency*, Proceedings from the Conference on Bank Structure and Competition, Federal Reserve Bank of Chicago, pp. 405-435.

Jordan, J., J. Peek and E. Rosengren. 1999. The impact of greater bank disclosure amidst a banking crisis. *Federal Reserve Bank of Boston Working Paper 1*.

Kane, E. 1989. Changing incentives facing financial services regulators. *Journal of Financial Services Research* 2: 265-274.

Kaufman, G. 1995. FDICIA and bank capital. *Journal of Banking and Finance* 19: 721-722.

Kroszner, R. 2000. The economics and politics of financial modernization. *Federal Reserve Bank of New York Economic Policy Review* 6: 25-37.

Kyriazidou, E. 1997. Estimation of a panel data sample selection model. *Econometrica* 65: 1335-1364.

La Porta R., F. Lopez-de-Silanes, A. Shleifer and W. Vishny. 2006. What works in securities laws? *Journal of Finance* 61: 1-32.

Milne, A. 2002. Bank capital regulation as an incentive mechanism: implications for portfolio choice. *Journal of Banking and Finance* 26: 1-23.

Mishkin F. 2000. Prudential supervision: why is it important and what are the issues?. *National Bureau of Economic Research Working Paper 7926*.

Nevo, A. and A. Rosen. 2012. Identification with imperfect instruments. *Review of Economics and Statistics* 94: 659-671.

Norden, L. and M. Weber. 2010. Credit line usage, checking account activity, and default risk of bank borrowers. *Review of Financial Studies* 23: 3665-3699.

Peek, J. and E. Rosengren. 1995. Bank regulation and the credit crunch. *Journal of Banking and Finance* 19: 679-692.

Seballos L. and J. Thomson. 1990. Underlying causes of commercial bank failures in the 1980s. *Federal Reserve Bank of Cleveland Economic Commentary.*

Slovin, M., M. Sushka and J. Polonchek. 1999. An analysis of contagion and competitive effects at commercial banks. *Journal of Financial Economics* 54: 197-225.

Swindle, C., 1995. Using CAMEL ratings to evaluate regulator effectiveness at commercial banks. *Journal of Financial Services Research* 9: 123-141.

US General Accounting Office (GAO). 1991. Bank supervision: Prompt and forceful regulatory actions needed. Report to the Chairman, Subcommittee on Financial Institutions Supervision, Regulation and Insurance, Committee on Banking, Finance and Urban Affairs, House of Representatives, available at http://www.gao.gov/products/ GGD-91-69.

Table 1. Enforcement actions: Descriptive statistics

Panel A. Number of enforcement actions in the sample according to regulator

	FDIC	OCC	FRB	Total
2000	65	25	30	120
2001	93	31	35	159
2002	95	55	37	187
2003	104	50	40	194
2004	107	49	55	211
2005	117	60	44	221
2006	151	51	48	250
2007	130	65	61	256
2008	206	97	73	376
2009	415	209	124	748
2010	438	338	190	966
Total	1,921	1,030	737	3,688

Panel B. Number of enforcement actions in the sample according to class

	Class of enforcement action				
	1	2	3	4	Total
2000	53	22	40	5	120
2001	63	25	32	39	159
2002	80	25	45	37	187
2003	62	33	65	34	194
2004	65	32	80	34	211
2005	39	34	109	39	221
2006	42	30	125	53	250
2007	48	35	80	93	256
2008	164	42	76	94	376
2009	490	52	78	128	748
2010	637	47	121	161	966
Total	1,743	377	851	717	3,688

Notes: Panel A reports the number of enforcement actions included in the working sample per year and per regulator for the period 2000-2010. Panel B reports the number of enforcement actions in the working sample according to class. These enforcement actions have been imposed on 2,658 different banks from which 2,475 are commercial banks and 183 are bank holding companies.

Table 2. List of variables and definitions

Variable	Definition
A. Response variables	
Risk-based capital ratio	Total qualifying capital allowable under the risk-based capital guidelines / risk-weighted assets (net of allowances and other deductions))
Tier 1 risk-based capital ratio	Tier 1 capital allowable under the risk-based capital guidelines / risk-weighted assets (net of allowances and other deductions))
Tier 2 risk-based capital ratio	Tier 2 capital allowable under the risk-based capital guidelines / risk-weighted assets (net of allowances and other deductions))
Risk-weighted assets ratio	Risk-weighted assets (net of allowances and other deductions) / total assets
Bank profits (ROA)	Income or loss before income taxes and extraordinary items and other adjustments / total assets
Standard deviation of ROA (STDROA)	Standard deviation of ROA, calculated in a rolling 12 quarters window
Z-score	log[(ROA+(equity capital / total assets))/STDROA]
B. Explanatory variables and instrumental variable	
Sanct	Dummy variable equals 1 for the quarter during which an enforcement action is imposed on a bank getting a sanction and 0 otherwise
Liquidity	(Cash and balances due from depository institutions + fair value of held to maturity U.S. treasury securities) / total assets
Provisions	Allowance for loan and lease losses / total loans and leases
Non-performing loans	Total loans and lease finance receivables: nonaccrual / total loans and leases net of unearned income
Bank size	Log(total assets)
Deposits ratio	Total deposits / total assets
Non-interest income	Total non-interest income / (total interest income + total non-interest income)
Median of dependent variable	Cross-sectional median of all banks in each quarter of the respective dependent variable
Federal-funds rate	Effective federal funds rate; source Federal Reserve Bank of St. Louis and authors' calculations
Real GDP growth rate	Change of the real GDP, y-o-y; source Federal Reserve Bank of St. Louis
Opendummy	Dummy variable equals 1 for the quarters 5 to 20 after the (average) quarter during which there is an opening of a new branch for the relevant bank and 0 otherwise; source FDIC and authors' calculations.

Table 3. Banks subject to enforcement actions: Univariate tests for all classes of enforcement actions

		Pre quarters (τ-4) – (τ-1)	Post quarters (τ+1) – (τ+4)	Difference Post – Pre (t-stat.)
A. Capital				
Risk-based capital ratio	Mean	0.1455	0.1497	0.0042*
	St. error	0.0015	0.0017	(1.8473)
	Obs.	2,296		
Tier 1 capital ratio	Mean	0.1330	0.1370	0.0040*
	St. error	0.0015	0.0017	(1.7517)
	Obs.	2,296		
Tier 2 capital ratio	Mean	0.0126	0.0130	0.0004**
	St. error	0.0001	0.0001	(2.5576)
	Obs.	2,126		
B. Risk and performance				
Risk-weighted assets ratio	Mean	0.7321	0.7071	-0.0250***
	St. error	0.0024	0.0023	(-7.4671)
	Obs.	2,296		
ROA	Mean	0.0015	0.0000	-0.0015***
	St. error	0.0003	0.0004	(-3.4041)
	Obs.	2,376		
STDROA	Mean	0.0070	0.0082	0.0012***
	St. error	0.0001	0.0002	(5.6289)
	Obs.	2,277		
Z-score	Mean	2.8609	2.7560	-0.1049***
	St. error	0.0138	0.0178	(-4.6614)
	Obs.	2,079		

Notes: The table reports the univariate tests for the equality of means across sanctions between the average values of the respective variables on the pre-sanction quarters (τ-4) – (τ-1) and the post-sanction quarters (τ+1) – (τ+4) for all classes of enforcement actions imposed in the 2000Q1-2010Q4 period. Only those sanction cases where the sanction at time τ is the only one imposed during the (-4, +4) quarters are examined. For the differences, t-statistics are reported in parentheses. Obs. denotes the number of available observations for each response variable. All variables are explicitly defined in Table 2. The ***, **, and * marks denote statistical significance at the 1, 5 and 10% level, respectively.

Table 4. Banks subject to enforcement actions: Univariate tests per class of enforcement actions

		I			II			III			IV		
		Pre	Post	Diff. Post – Pre	Pre	Post	Diff. Post – Pre	Pre	Post	Diff. Post – Pre	Pre	Post	Diff. Post – Pre.
A. Capital													
Risk-based capital ratio	Mean	0.1347	0.1417	0.0070**	0.1708	0.1681	-0.0027	0.1508	0.1554	0.0046	0.1544	0.1550	0.0006
	St. error	0.0018	0.0027	(2.173)	0.0113	0.0065	(-0.2065)	0.0024	0.0031	(1.1559)	0.0030	0.0028	(0.1562)
	Obs.	1,103			180			444			569		
Tier 1 risk-based capital ratio	Mean	0.1217	0.1283	0.0066**	0.1577	0.1548	-0.0029	0.1387	0.1435	0.0048	0.1427	0.1432	0.0005
	St. error	0.0018	0.0027	(2.0638)	0.0113	0.0066	(-0.2185)	0.0025	0.0032	(1.1786)	0.0031	0.0028	(0.1047)
	Obs.	1,103			180			444			569		
Tier 2 risk-based capital ratio	Mean	0.0132	0.0140	0.0008***	0.0129	0.0131	0.0002	0.0121	0.0119	-0.0002	0.0116	0.0119	0.0003
	St. error	0.0002	0.0002	(2.7751)	0.0005	0.0004	(0.3263)	0.0002	0.0002	(-0.542)	0.0002	0.0002	(1.2223)
	Obs.	1,022			160			412			532		
B. Risk and performance													
Risk-weighted assets ratio	Mean	0.7520	0.7051	-0.0469***	0.7098	0.6996	-0.0102	0.6965	0.6971	0.0006	0.7286	0.7211	-0.0075
	St. error	0.0033	0.0031	(-10.3791)	0.0095	0.0099	(-0.747)	0.0056	0.0055	(0.0783)	0.0048	0.0048	(-1.1011)
	Obs.	1,103			180			444			569		
ROA	Mean	-0.0046	-0.0072	-0.0026***	0.0071	0.0049	-0.0022	0.0071	0.0082	0.0011	0.0068	0.0053	-0.0015**
	St. error	0.0004	0.0005	(-4.3065)	0.0015	0.0014	(-1.0805)	0.0004	0.0009	(1.0853)	0.0004	0.0006	(-2.1894)
	Obs.	1,115			202			478			581		
STDROA	Mean	0.0079	0.0105	0.0026***	0.0073	0.0072	-0.0001	0.0066	0.0066	0.0000	0.0054	0.0055	0.0001
	St. error	0.0002	0.0003	(8.185)	0.0008	0.0006	(-0.0461)	0.0003	0.0004	(-0.0643)	0.0002	0.0002	(0.1813)
	Obs.	1,047			191			474			565		
Z-score	Mean	2.6228	2.3670	-0.2558***	3.0237	2.9791	-0.0446	2.9847	3.0235	0.0388	3.1146	3.1315	0.0169
	St. error	0.0223	0.0295	(-6.9225)	0.0405	0.0530	(-0.6692)	0.0283	0.0277	(0.9812)	0.0184	0.0214	(0.5994)
	Obs.	926			168			437			548		

Notes: The table reports the univariate tests for the equality of means across sanctions between the average values of the respective variables on the pre-sanction quarters (τ-4) – (τ-1) and the post-sanction quarters (τ+1) – (τ+4) per class of enforcement action imposed at τ: a) class 1 in column I; b) class 2 in column II; c) class 3 in column III; d) class 4 in column IV. Sample period is 2000Q1 – 2010Q4. Only those sanction cases where the sanction at time τ is the only one imposed during the (-4, +4) quarters are examined. The differences are defined as Post – Pre, t-statistics are reported in parentheses. Obs. denotes the number of available observations. All variables are explicitly defined in Table 2. The ***, **, and * marks denote statistical significance at the 1, 5 and 10% level, respectively.

Table 5. Panel model: All classes of enforcement actions - all sanction cases

Dependent variable:	I Risk-based capital ratio	II Tier 1 risk-based capital ratio	III Tier 2 risk-based capital ratio	IV Risk-weighted assets ratio	V ROA	VI STDROA	VII Z-score
Panel A. Estimation results							
Intercept	1.5174***	1.5484***	0.0059**	0.1917***	-0.0705***	0.0050	-0.1134
	(23.2136)	(31.5816)	(2.2714)	(4.2917)	(-16.4044)	(1.3549)	(-0.2329)
Sanct $_{(-4, -3)}$	0.0023**	0.0015	0.0003***	0.0077***	-0.0024***	0.0002*	-0.0754***
	(2.5043)	(1.6013)	(5.3940)	(5.8709)	(-11.5105)	(1.6984)	(-7.6244)
Sanct $_{(-2, -1)}$	0.0000	-0.0011	0.0004***	0.0036**	-0.0040*	0.0006***	-0.1884***
	(0.0043)	(-1.1298)	(5.0954)	(2.5458)	(-16.2740)	(4.4077)	(-16.0051)
Sanct	-0.0025*	-0.0033***	0.0002**	0.0014	-0.0046***	0.0011***	-0.2125***
	(-1.8150)	(-2.8677)	(2.2050)	(0.8662)	(-14.5606)	(7.2153)	(-14.6836)
Sanct $_{(+1, +4)}$	-0.0040***	-0.0041***	0.0000	-0.0019	-0.0027***	0.0011***	-0.1886***
	(-3.2389)	(-3.3274)	(0.5406)	(-1.2539)	(-13.1870)	(7.3740)	(-15.5958)
Median of depend. variable $_{t-1}$	-0.7031***	-1.1391***	-0.5951***	0.3425***	1.9528***	2.7393***	1.4513***
	(-4.3413)	(-8.7752)	(-3.0401)	(6.0303)	(20.5121)	(6.6572)	(10.7931)
Federal funds rate $_{t-1}$	-0.0040*	-0.0042**	-0.0001	-0.0051**	-0.0026***	0.0003	-0.0773***
	(-1.6852)	(-1.8814)	(-0.3854)	(-1.9441)	(-6.6153)	(0.9221)	(-2.3722)
Real GDP growth rate $_{t-1}$	0.0546	0.1385	0.0188	0.4355*	-0.1149***	-0.0727	5.6567
	(0.3096)	(0.8399)	(0.9248)	(1.8444)	(-4.2687)	(-1.5421)	(0.9721)
ROA $_{t-1}$	0.3494	0.0905	0.0005	0.2634***		-0.0308	7.3848***
	(1.4160)	(0.7281)	(0.2915)	(5.8756)		(-0.9974)	(8.3056)
Non-performing loans $_{t-1}$	-0.0766**	-0.1000***	-0.0049***	0.0043	-0.1290***	0.0329***	-5.3269***
	(-2.1712)	(-2.9215)	(-3.3404)	(0.1485)	(-28.9076)	(7.8668)	(-23.1859)
Provisions $_{t-1}$	0.4021**	0.1877	0.1199***	-1.1956***	-0.1397***	0.0909***	-10.8053***
	(1.7935)	(1.0028)	(20.0958)	(-9.3481)	(-7.7834)	(7.3026)	(-15.6731)
Bank size $_{t-1}$	-0.0513***	-0.0519***	0.0009***	0.0172***	0.0045***	-0.0010***	-0.0215*
	(-14.9586)	(-16.4080)	(10.2019)	(8.9323)	(12.8293)	(-4.9795)	(-1.8543)
Risk-weighted assets ratio $_{t-1}$	-0.3099***	-0.3132***	0.0008***		0.0062***	0.0008*	-0.2703***
	(-27.3100)	(-34.1581)	(2.5998)		(8.0892)	(1.7053)	(-7.9155)
Non-interest income $_{t-1}$	-0.0074	0.0075	-0.0002	-0.0107	0.0226***	0.0014	0.0508
	(-0.5699)	(0.7862)	(-0.4696)	(-1.5871)	(10.9455)	(1.3922)	(0.9878)
Liquidity $_{t-1}$	0.1010***	0.1110	-0.0005	-0.2664***	-0.0085***	0.0020**	-0.1903***
	(3.3601)	(3.9610)	(-1.4017)	(-25.6181)	(-5.4908)	(2.3812)	(-3.4613)
Deposits ratio $_{t-1}$	-0.5867***	-0.5614***	0.0004	0.1227***	0.0205***	-0.0027*	-0.8397***
	(-17.4281)	(-30.5709)	(1.0954)	(13.7575)	(14.0694)	(-1.8548)	(-13.0737)
Observations	466,192	466,187	395,693	466,289	466,438	436,632	435,249
# of cross-sections	13,487	13,486	12,561	13,503	13,518	12,877	12,864
# of sanctions	3,294	3,294	3,198	3,295	3,297	3,222	3,041

R^2	0.6369	0.8191	0.7003	0.7961	0.3003	0.5412	0.5931
			Panel B. Wald tests				
Sanct $_{(+1, +4)}$ − Sanct $_{(-1, -4)}$	-0.0051***	-0.0043***	-0.0003***	-0.0075***	0.0005**	0.0007***	-0.0568***
Chi-square	22.6188	17.0935	18.7797	40.7378	4.833	36.8116	28.0238
Sanct $_{(+1, +4)}$ − Sanct $_{(-4, -3)}$	-0.0063***	-0.0056***	-0.0003***	-0.0095***	-0.0002	0.0009***	-0.1133***
Chi-square	25.5172	22.2739	13.2202	46.6202	0.6172	39.4569	82.2432
Sanct $_{(+1, +4)}$ − Sanct $_{(-2, -1)}$	-0.0040***	-0.0030***	-0.0003***	-0.0055***	0.0013***	0.0005***	-0.0002
Chi-square	15.1753	9.6801	21.7522	23.9801	22.5687	22.7173	0.0005
Sanct $_{(-2, -1)}$ − Sanct $_{(-4, -3)}$	-0.0023***	-0.0026***	0.0000	-0.0040***	-0.0015***	0.0004***	-0.1130***
Chi-square	9.8278	18.4098	0.6525	18.5244	39.509	20.7882	156.7214

Notes: Panel A reports coefficient estimates and t-statistics (in parentheses). The regressions show the impact of an enforcement action, using banks subject to enforcement actions as the treatment group and the population of banks not subject to enforcement actions as the control group. Estimation method is fixed effects OLS with robust standard errors clustered by bank and time dummies. To include lagged and forward terms, the estimation period is 1999Q1-2011Q4. The explanatory variables are defined in Table 2. All sanctions included in our final working sample, i.e., 3,688 cases are being considered. Sanct $_{(-4, -3)}$ is a dummy variable that takes the value of 1 for the -4 and -3 quarters before the sanction quarter and 0 otherwise. Sanct $_{(-2, -1)}$ is a dummy variable that takes the value of 1 for the -2 and -1 quarters before the sanction quarter and 0 otherwise, Sanct is a dummy variable that takes the value of 1 for the sanction quarter and 0 otherwise. Sanct $_{(+1, +4)}$ is a dummy variable that takes the value of 1 for the +1 through +4 quarters after the sanction quarter and 0 otherwise. In Panel B, Sanct $_{(+1, +4)}$ − Sanct $_{(-1, -4)}$ is the difference between the coefficient of Sanct $_{(+1, +4)}$ minus the average of the coefficients of Sanct $_{(-4, -3)}$ and Sanct $_{(-2, -1)}$ and captures the average response of a bank to an enforcement action for the period 1 year around the event. ***, ** and * denote statistical significance at the 1, 5 and 10% level, respectively.

Table 6. Treatment effects model: All classes of enforcement actions - all sanction cases

Dependent variable:	I Risk-based capital ratio	II Tier 1 risk-based capital ratio	III Tier 2 risk-based capital ratio	IV Risk-weighted assets ratio	V ROA	VI STDROA	VII Z-score
Panel A. Estimation results for the treatment effects model							
Intercept	-0.1041*** (-13.0912)	-0.1829*** (-25.8506)	-0.0099*** (-23.6639)	0.0482*** (6.3532)	-0.0019*** (-8.4117)	-0.0069*** (-23.663)	1.6688*** (37.4937)
Sanct $_{-4}$	0.0030* (1.6577)	0.0022 (1.2069)	0.0005*** (5.0649)	0.0333*** (13.4481)	-0.0035*** (-18.6077)	0.0009*** (7.921)	-0.1242*** (-12.8447)
Sanct $_{-3}$	-0.0001 (-0.0468)	-0.0008 (-0.4312)	0.0005*** (5.0644)	0.0288*** (11.3591)	-0.0039*** (-20.2416)	0.0011*** (10.3643)	-0.1904*** (-19.3203)
Sanct $_{-2}$	-0.0027 (-1.4229)	-0.0030 (-1.5463)	0.0004*** (4.3974)	0.0237*** (9.1632)	-0.0051*** (-26.1350)	0.0014*** (12.6552)	-0.2437*** (-24.2263)
Sanct $_{-1}$	-0.0051*** (-2.6047)	-0.0049** (-2.5056)	0.0001 (1.3170)	0.0183*** (6.9460)	-0.0048*** (-24.4394)	0.0016*** (14.3902)	-0.2514*** (-24.4695)
Sanct	0.3998*** (14.6764)	0.4114*** (15.1363)	-0.0159*** (-9.8921)	0.8978*** (24.5019)	-0.0184*** (-5.0741)	-0.0208*** (-12.7672)	3.4446*** (23.6669)
Sanct $_{+1}$	-0.0066*** (-3.1775)	-0.0060*** (-2.8807)	0 (-0.0246)	0.0111*** (3.9453)	-0.0040*** (-19.1691)	0.0017*** (14.0752)	-0.2486*** (-22.7569)
Sanct $_{+2}$	-0.0064*** (-2.9079)	-0.0057*** (-2.5918)	-0.0002 (-1.5557)	0.0080*** (2.7236)	-0.0038*** (-17.1699)	0.0017*** (13.4854)	-0.2205*** (-19.2232)
Sanct $_{+3}$	-0.0039* (-1.6814)	-0.0032 (-1.3782)	-0.0002* (-1.8817)	0.0028 (0.9145)	-0.0036*** (-15.2562)	0.0018*** (13.3143)	-0.1987*** (-16.5391)
Sanct $_{+4}$	-0.0021 (-0.8670)	-0.0016 (-0.6554)	-0.0002* (-1.7668)	0.0002 (0.0457)	-0.0024*** (-9.5964)	0.0015*** (10.428)	-0.1577*** (-12.3605)
Median of depend. variable $_{t-1}$	5.4485*** (93.3343)	6.7926*** (117.642)	0.8113*** (25.8281)	0.6705*** (67.9891)	-0.1116*** (-24.9829)	1.8532*** (34.162)	0.9890*** (69.5083)
Federal funds rate $_{t-1}$	0.0023*** (23.0386)	0.0011*** (11.252)	0.0001*** (7.6858)	0.0006*** (4.8382)	0.0002*** (24.2045)	0.0001*** (17.9102)	-0.0054*** (-10.2379)
Real GDP growth rate $_{t-1}$	-1.0175*** (-86.5521)	-1.1399*** (-100.2061)	0.0047*** (10.0862)	0.1027*** (7.1308)	0.0548*** -59.2471	-0.0102*** (-19.0208)	-0.5591*** (-11.6666)
ROA $_{t-1}$	0.7399*** (47.7379)	0.7052*** (45.5897)	-0.0145*** (-17.2605)	0.1768*** (8.4530)		0.1316*** (134.794)	-0.7019*** (-7.6795)
Non-performing loans $_{t-1}$	-0.0899*** (-7.2181)	-0.1057*** (-8.5057)	-0.0103*** (-16.5831)	0.3591*** (21.4254)	-0.1498*** (-120.283)	0.0533*** (72.8985)	-5.6492*** (-85.6092)
Provisions $_{t-1}$	1.3976*** (67.1691)	1.2244*** (59.0171)	0.1572*** (143.323)	-0.1560*** (-5.5753)	0.0389*** (18.6604)	0.1055*** (85.5138)	-6.3567*** (-57.4695)
Bank size $_{t-1}$	-0.0169*** (-112.7128)	-0.0175*** (-117.2500)	0.0007*** (91.3975)	0.0148*** (73.7167)	0.0003*** (22.4433)	-0.0002*** (-20.8739)	-0.0631*** (-79.3690)

Risk-weighted assets ratio $_{t-1}$	-0.3397*** (-258.2214)	-0.3406*** (-259.6108)	0.0042*** (61.7216)		0.0015*** (11.6903)	0.0030*** (38.8206)	-0.7672*** (-110.2760)
Non-interest income $_{t-1}$	0.0694*** (36.3169)	0.0663*** (34.7988)	-0.0003*** (-3.1187)	-0.0302*** (-11.7295)	0.0253*** (135.469)	0.0117*** (101.861)	-0.6551*** (-63.6931)
Liquidity $_{t-1}$	0.2105*** (67.0889)	0.2126*** (67.9443)	0.0013*** (7.8178)	-0.4751*** (-114.950)	-0.0084*** (-26.6702)	0.0030*** (15.9878)	-0.1109*** (-6.6560)
Deposits ratio $_{t-1}$	-0.1600*** (-126.6001)	-0.2038*** (-144.0849)	-0.0021*** (-53.0136)	0.0196*** (18.384)	0.0027*** (37.2535)	-0.0013*** (-28.5523)	-0.1760*** (-41.0937)
Panel B. First stage probit results - dependent variable: Sanct							
Intercept	-2.5246*** (-321.3659)	-2.5246*** (-321.3659)	-2.4650*** (-301.300)	-2.5246*** (-321.4274)	-2.5248*** (-321.4073)	-2.5132*** (-315.2200)	-2.5192*** (-313.7039)
Open dummy	0.3066*** (19.5905)	0.3066*** (19.5905)	0.2470*** (15.6206)	0.3065*** (19.5862)	0.3075*** (19.6656)	0.2959*** (18.8499)	0.2976*** (18.8601)
Observations	405,186	405,186	339,603	405,276	405,393	386,859	386,397
R^2	0.0105	0.0105	0.0072	0.0105	0.0106	0.0100	0.0101
Panel C. Wald tests							
Sanct $_{(+1,+4)}$ − Sanct $_{(-4,-1)}$	-0.0035**	-0.0025*	-0.0005***	-0.0205***	0.0009***	0.0004***	-0.0039
Chi-square	5.78	2.90	51.68	107.57	33.13	22.6	0.26
Sanct $_{(+1,+4)}$ − Sanct $_{(-4,-3)}$	-0.0062***	-0.0048***	-0.0006***	-0.0255***	0.0002	0.0007***	-0.0491***
Chi-square	13.03	7.81	52.41	120.79	1.38	44.78	29.54
Sanct $_{(+1,+4)}$ − Sanct $_{(-2,-1)}$	-0.0008	-0.0002	-0.0004***	-0.0155***	0.0015***	0.0001***	0.0412***
Chi-square	0.22	0.01	23.01	41.68	69.89	1.80	19.54
Sanct $_{(-2,-1)}$ − Sanct $_{(-4,-3)}$	-0.0054***	-0.0046***	-0.0002**	-0.0100***	-0.0013***	0.0005***	-0.0902***
Chi-square	7.94	5.87	4.34	15.16	45.16	22.75	80.77

Notes: Panel A reports coefficient estimates and z-statistics (in parentheses). The regressions show the impact of an enforcement action, using banks subject to enforcement actions as the treatment group and the population of banks not being subject to enforcement actions as the control group. The estimated model is a treatment effects model, which is robust to the potential endogeneity of enforcement actions. The first stage regressions are probit regressions with the variable opendummy as the instrumental variable. To include lagged and forward terms, the estimation period is 1999Q1-2011Q4. The explanatory variables are defined in Table 2. All sanctions included in our final working sample, i.e., 3,688 cases are being considered. Sanct is a dummy variable that takes the value of 1 for the event quarter and 0 otherwise. In Panel B, Sanct $_{(+1,+4)}$, Sanct $_{(-4,-1)}$, Sanct $_{(-4,-3)}$ and Sanct $_{(-2,-1)}$ are the averages of the relevant Sanct coefficients. ***, ** and * denote statistical significance at the 1, 5 and 10% level, respectively.

Table 7. Panel model: All classes of enforcement actions - only sanctions with a clean event window (-4,+4) quarters

Dependent variable:	I Risk-based capital ratio	II Tier 1 risk-based capital ratio	III Tier 2 risk-based capital ratio	IV Risk-weighted assets ratio	V ROA	VI STDROA	VII Z-score
Panel A. Estimation results							
Intercept	1.5179*** (23.3067)	1.5499** (31.6810)*	0.0059** (2.2508)	0.1912*** (4.2796)	-0.0694*** (-16.1405)	0.0047 (1.2565)	0.0548 (0.1119)
Sanct $_{(-4, -3)}$	0.0014 (1.2857)	0.0012 (1.1115)	0.0003*** (4.3514)	0.0094*** (6.0851)	-0.0020*** (-9.3807)	0.0000 (0.3609)	-0.0545*** (-4.9313)
Sanct $_{(-2, -1)}$	0.0002 (0.2008)	-0.0002 (-0.1490)	0.0003*** (3.8210)	0.0055*** (3.3977)	-0.0028*** (-12.0681)	0.0003** (2.1779)	-0.1295*** (-10.1270)
Sanct	-0.0001 (-0.0817)	-0.0003 (-0.2298)	0.0002** (2.2978)	0.0016 (0.9535)	-0.0026*** (-8.9709)	0.0003** (2.3738)	-0.1277*** (-8.8897)
Sanct $_{(+1, +4)}$	-0.002 (-1.5202)	-0.0016 (-1.3053)	0.0001 (1.2293)	-0.0013 (-0.8263)	-0.0016*** (-8.0244)	0.0006*** (4.3821)	-0.1307*** (-10.2634)
Control variables	YES	YES	YES	YES	YES	YES	YES
Observations	466,192	466,187	395,693	466,289	466,438	436,632	435,249
# of cross-sections	13,487	13,486	12,561	13,503	13,518	12,877	12,864
# of sanctions	2,272	2,272	2,208	2,272	2,273	2,228	2,197
R^2	0.6369	0.8191	0.7003	0.7961	0.2993	0.5408	0.5903
Panel B. Wald tests							
Sanct $_{(+1, +4)}$ − Sanct $_{(-1, -4)}$	-0.0028**	-0.0021**	-0.0002***	-0.0087***	0.0008***	0.0004***	-0.0387***
Chi-square	6.3688	3.9606	7.4886	50.6232	11.5341	17.5673	13.0526

Notes: Panel A reports coefficient estimates and t-statistics (in parentheses). The regressions show the impact of an enforcement action, using banks who are subject to enforcement actions as the treatment group and the population of banks not being subject to enforcement actions as the control group. Estimation method is fixed effects OLS with robust standard errors clustered by bank and time dummies. Only enforcement actions of all classes for which there is a clean event window of (-4,+4) quarters around the event are examined, i.e., no other enforcement action of any class has been imposed on a bank during the event window. To include lagged and forward terms, the estimation period is 1999Q1-2011Q4. The explanatory variables are defined in Table 2. Sanct $_{(-4, -3)}$ is a dummy variable that takes the value of 1 for the -4 and -3 quarters before the sanction imposed at τ and 0 otherwise. Sanct $_{(-2, -1)}$ is a dummy variable that takes the value of 1 for the -2 and -1 quarters before the sanction imposed at τ and 0 otherwise, Sanct is a dummy variable that takes the value of 1 for the sanction quarter and 0 otherwise. Sanct $_{(+1, +4)}$ is a dummy variable that takes the value of 1 for the +1 through +4 quarters αφτερ the sanction imposed at τ and 0 otherwise. In Panel B, Sanct $_{(+1, +4)}$ − Sanct $_{(-1, -4)}$ is the difference between the coefficient of Sanct $_{(+1, +4)}$ minus the average of the coefficients of Sanct $_{(-4, -3)}$ and Sanct $_{(-2, -1)}$ and captures the average response of a bank to an enforcement action for the period 1 year around the event. ***, ** and * denote statistical significance at the 1, 5 and 10% level, respectively.

Table 8. Panel model: Enforcement actions by class - only sanctions with a clean (-4,+4) quarters event

Dependent variable:	I Risk-based capital ratio	II Tier 1 risk-based capital ratio	III Tier 2 risk-based capital ratio	IV Risk-weighted assets ratio	V ROA	VI STDROA	VII Z-score
Panel A. Estimation results							
Intercept	1.4865*** (10.0770)	1.5143*** (9.7223)	0.0074 (0.9645)	0.1524 (1.1915)	-0.0869*** (-4.3743)	0.0043 (0.5304)	0.1674 -0.1753
Class 1 Sanct $_{(-4,-3)}$	0.0020 (-1.0480)	0.0020 (1.0396)	0.0006*** (4.6161)	0.0162*** (6.6747)	-0.0039*** (-11.0755)	0.0000 (-0.2212)	-0.1140*** (-5.8434)
Class 1 Sanct $_{(-2,-1)}$	-0.0008 (-0.3888)	-0.0015 (-0.8230)	0.0007*** (4.6702)	0.0084*** (3.2554)	-0.0054*** (-13.0070)	0.0005** (2.3215)	-0.2775*** (-11.8601)
Class 1 Sanct	-0.0025 (-1.1307)	-0.0030 (-1.4403)	0.0005*** (3.1532)	0.0013 (0.5096)	-0.0053*** (-9.6906)	0.0007*** (2.9271)	-0.2907*** (-10.7766)
Class 1 Sanct $_{(+1,+4)}$	-0.0065*** (-2.5301)	-0.0058** (-2.4331)	0.0003 (1.8220)	-0.0042 (-1.6742)	-0.0032*** (-8.5667)	0.0012*** (5.2983)	-0.3095*** (-13.0224)
Class 2 Sanct $_{(-4,-3)}$	-0.0040 (-1.1592)	-0.0050 (-1.5223)	0.0002 (0.8633)	0.0041 (0.6882)	-0.0016** (-1.9810)	0.0002 (0.4920)	-0.0108 (-0.3613)
Class 2 Sanct $_{(-2,-1)}$	-0.0038 (-1.0884)	-0.0040 (-1.1900)	0.0001 (0.5587)	0.0046 (0.7642)	-0.0010 (-1.4949)	0.0004 (0.7929)	-0.0334 (-0.9408)
Class 2 Sanct	0.0003 (0.0687)	-0.0002 (-0.0556)	0.0001 (0.4007)	0.0021 (0.2899)	-0.0014 (-1.5115)	0.0000 (0.0658)	-0.0367 (-0.9065)
Class 2 Sanct $_{(+1,+4)}$	-0.0025 (-0.7335)	-0.0031 (-0.9307)	0.0001 (0.2906)	-0.0019 (-0.2901)	-0.0019** (-2.2930)	0.0002 (0.4319)	-0.0296 (-0.7370)
Class 3 Sanct $_{(-4,-3)}$	0.0004 (0.2429)	0.0001 (0.0476)	0.0001 (0.9334)	-0.0001 (-0.0292)	-0.0004 (-1.0472)	0.0004** (1.9409)	-0.0462** (-2.2627)
Class 3 Sanct $_{(-2,-1)}$	0.0017 (0.8635)	0.0015 (0.7492)	0.0000 (0.0604)	0.0002 (0.0647)	-0.0005 (-1.5876)	0.0002 (0.9359)	-0.0297 (-1.4688)
Class 3 Sanct	0.0014 (0.6892)	0.0015 (0.7400)	-0.0001 (-0.3592)	-0.0010 (-0.3129)	0.0002 (0.4706)	0.0002 (0.6878)	-0.0221 (-1.0380)
Class 3 Sanct $_{(+1,+4)}$	0.0016 (0.8568)	0.0020 (1.0337)	-0.0001 (-0.8636)	-0.0008 (-0.2789)	0.0003 (0.7591)	0.0004 (1.5248)	-0.0280 (-1.3741)
Class 4 Sanct $_{(-4,-3)}$	0.0023 (1.6056)	0.0022 (1.5880)	0.0000 (0.2963)	0.0056** (2.2623)	0.0001 (0.1989)	-0.0001* (-1.7606)	0.0176 (1.2243)
Class 4 Sanct $_{(-2,-1)}$	0.0017 (1.2027)	0.0017 (1.2862)	0.0000 (-0.2931)	0.0044* (1.7680)	-0.0005* (-1.8686)	-0.0001 (-1.1008)	0.0070 (0.4789)
Class 4 Sanct	0.0025 (1.6261)	0.0026 (1.7828)	-0.0001 (-0.6343)	0.0040 (1.4994)	-0.0003 (-1.1017)	-0.0001 (-0.6080)	0.0207 (1.3102)
Class 4 Sanct $_{(+1,+4)}$	0.0031** (2.0848)	0.0033** (2.3143)	0.0000 (-0.0693)	0.0038 (1.5007)	-0.0005** (-2.1221)	-0.0002 (-1.5751)	0.0401** (2.4418)
Control variables	YES	YES	YES	YES	YES	YES	YES
Observations	466,192	466,187	395,693	466,289	466,438	436,634	435,251
# of cross-sections	13,487	13,486	12,561	13,503	13,518	12,877	12,864
# of class 1 sanctions	1,087	1,087	1,050	1,087	1,088	1,054	1,025
# of class 2 sanctions	176	176	173	176	176	173	172
# of class 3 sanctions	442	442	423	442	442	440	440
# of class 4 sanctions	567	567	562	567	567	561	560
R^2	0.6369	0.8191	0.7002	0.7961	0.3003	0.5409	0.5922
Panel B. Wald tests							
Class 1 enforcement actions							
Sanct $_{(+1,+4)}$ – Sanct $_{(-1,-4)}$	-0.0071***	-0.0061***	-0.0003**	-0.0164***	0.0014***	0.001***	-0.1138***
Chi-square	11.4475	8.6678	5.0319	71.6623	12.3973	31.1019	32.6437
Class 2 enforcement actions							

Sanct $_{(+1, +4)}$ − Sanct $_{(-1, -4)}$	0.0014	0.0014	-0.0001	-0.0063	-0.0006	-0.0001	-0.0075
Chi-square	0.4085	0.4564	0.3186	1.763	0.5754	0.0534	0.0423
Class 3 enforcement actions							
Sanct $_{(+1, +4)}$ − Sanct $_{(-1, -4)}$	0.0005	0.0012	-0.0002	-0.0009	0.0007*	0.0000	0.0099
Chi-square	0.1046	0.5491	2.3553	0.1312	2.7211	0.0257	0.3844
Class 4 enforcement actions							
Sanct $_{(+1, +4)}$ − Sanct $_{(-1, -4)}$	0.0011	0.0014	0.0000	-0.0011	-0.0003	-0.0001	0.0278**
Chi-square	1.124	1.8413	0.0080	0.3577	1.0192	0.4317	4.0275

Notes: Panel A reports coefficient estimates and t-statistics (in parentheses). The regressions show the impact of an enforcement action, using banks which are subject to enforcement actions as the treatment group and the population of banks not being subject to enforcement actions as the control group. Estimation method is fixed effects OLS with robust standard errors and time dummies. Only enforcement actions of all classes for which there is a clean event window of (-4,+4) quarters around the event are examined, i.e., no other enforcement action of any class has been imposed on a bank during the event window. To include lagged and forward terms, the estimation period is 1999Q1-2011Q4. The control variables are the same as in the previous tables and are not reported due to space considerations. Class X Sanct $_{(-4, -3)}$ is a dummy variable that takes the value of 1 for the -4 and -3 event quarters when an enforcement action of class X has been imposed at the sanction-quarter τ and 0 otherwise. Class X Sanct $_{(-2, -1)}$ is a dummy variable that takes the value of 1 for the -2 and -1 event quarters when an enforcement action of class X has been imposed at the sanction-quarter τ and 0 otherwise. Class X Sanct is a dummy variable that takes the value of 1 for the sanction-quarter when an enforcement action of class X has been imposed at before the sanction imposed at τ and 0 otherwise. Class X Sanct $_{(+1, +4)}$ is a dummy variable that takes the value of 1 for the +1 through +4 event quarters when an enforcement action of class X has been imposed at the sanction-quarter after the sanction imposed at τ and 0 otherwise. In Panel B, Sanct $_{(+1, +4)}$ − Sanct $_{(-1, -4)}$ is the difference between the coefficient of Sanct $_{(+1, +4)}$ minus the average of the coefficients of Sanct $_{(-4, -3)}$ and Sanct $_{(-2, -1)}$ of the relevant enforcement action and captures the average response of a bank to an enforcement action for the period 1 year around the event for this class of sanction. ***, ** and * denote statistical significance at the 1, 5 and 10% level, respectively.

Figure 1. Evolution of response variables around the event of the sanction (-8, +8 quarters)

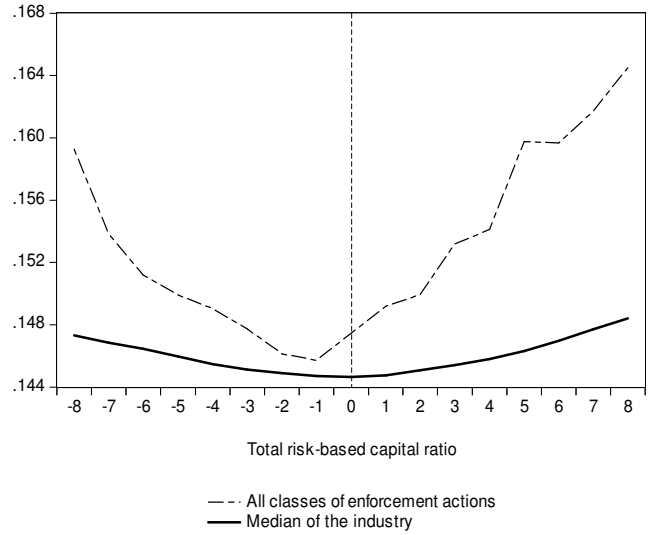

Figure 1a

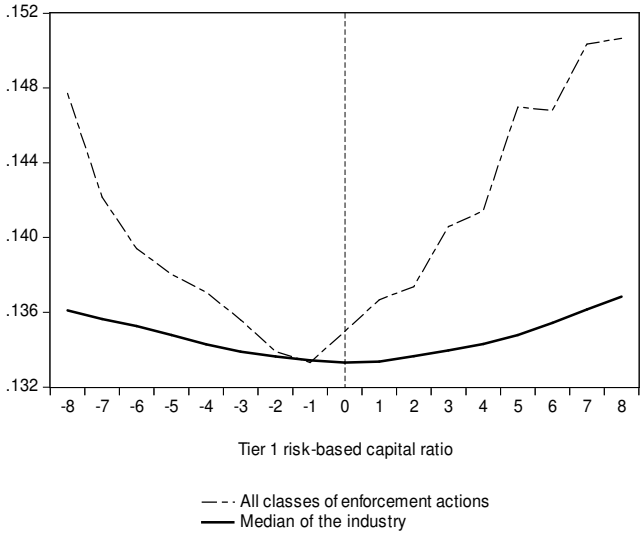

Figure 1b

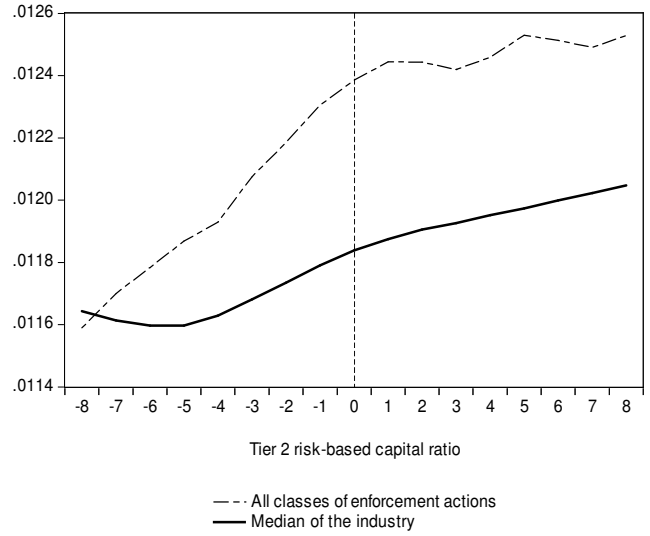

Figure 1c

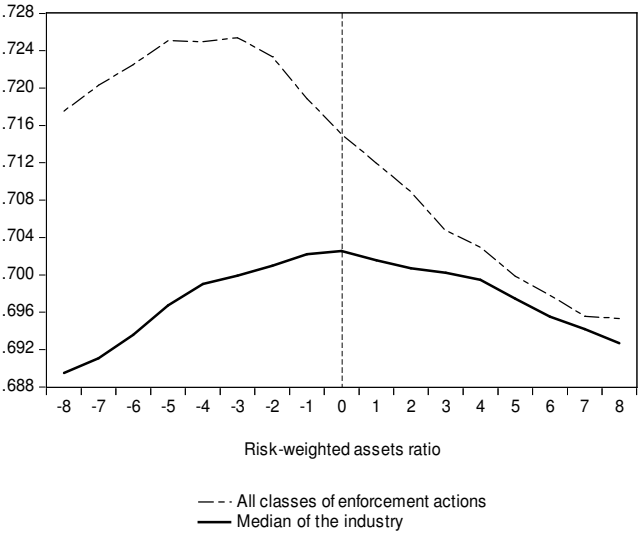

Figure 1d

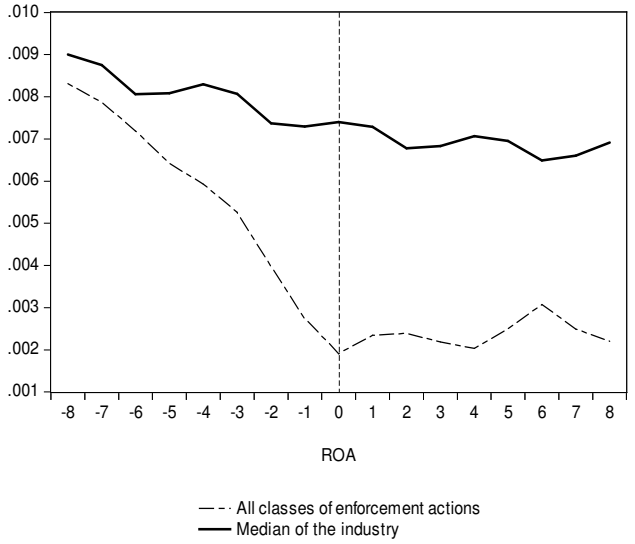

Figure 1e

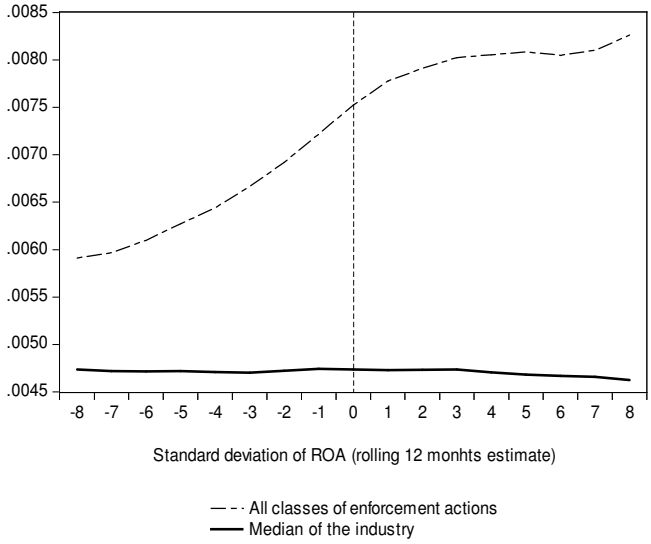

Figure 1f

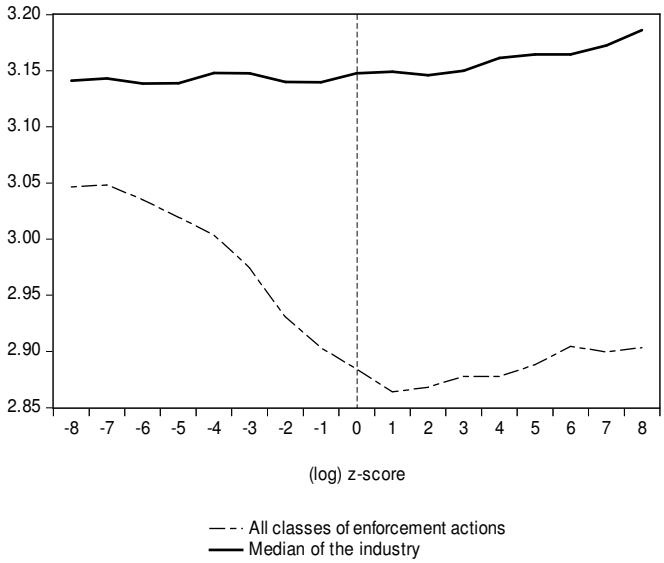

Figure 1g

Figure 2. Evolution of the response variables by class of enforcement action

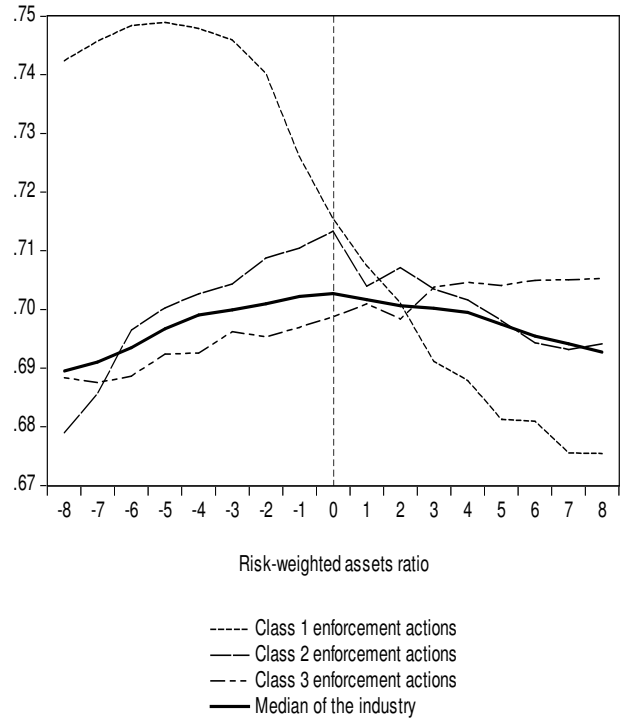

Figure 2a

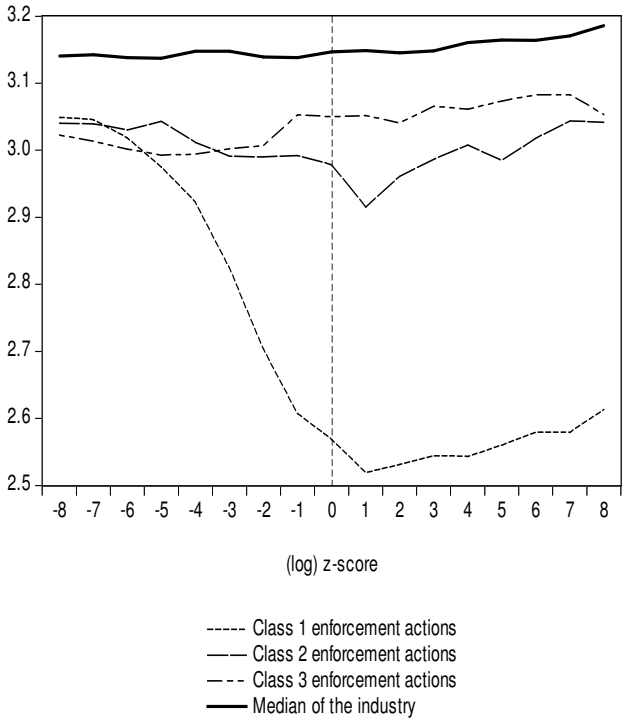

Figure 2b

Appendix. Classification of enforcement actions on a one-by-one basis

Relevance for banks' safety and soundness	Class	Reasons
	1	Capital adequacy and liquidity, asset quality, provisions and reserves, large exposures and exposures to related parties
	2	Internal control and audit systems, money laundering, bank secrecy, consumer protection and foreign assets control
	3	Breaches of the requirements concerning the fitness and propriety of banks' board members and senior management, as well as other persons closely associated with banks (institution affiliated parties)
	4	Typical infringements of specific laws (e.g., Home Mortgage Disclosure Act, Flood Insurance Act, Flood Disaster Protection Act, etc)

Although the classification contains an element of inherent subjectivity, we are confident that it reflects quite accurately the comparative significance of the formal enforcement actions for banks' safety and soundness, taking into account the Basel Committee's categorization and the U.S. regulatory and supervisory practices. More specifically, the 2006 Basel Committee Core Principles for Effective Banking Supervision explicitly delineates the hardcore of the so-called "prudential requirements", or "safety and soundness requirements" (Principles 6 to 18) to encompass, on the one hand, capital adequacy, risk management (including liquidity risk management), quality of assets, adequacy of provisions and reserves, large exposure limits and control of exposures to related parties, as well as, on the other hand, internal control and audit systems, including anti-money laundering mechanisms. At a secondary level – as evidenced by the 2011 Basel Committee Consultative Document on Core Principles for Effective Banking Supervision – prudential requirements also comprise the corporate governance of banks, including the fitness and propriety of Board members, senior management and bank's wider group. The refinement of the taxonomy (i.e., creation of four classes) has been dictated by the need to capture the idiosyncratic features of the U.S. regulatory and supervisory framework in the field and the relevant literature distinguishing between "management-internal control weaknesses", "financial problems", "fraudulent behavior of affiliated parties" and "(typical) violations of laws like FDPA and HMDA" (Curry et al., 1999; Brunmeier and Willardson, 2006).