The spillover effect of enforcement actions on bank risk-taking

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Abstract

Enforcement actions (sanctions) aim to penalize guilty companies and provide examples to other companies that bad behavior will be penalized. A handful of papers analyze the consequences of sanctions in banking for sanctioned companies, while no papers have investigated the spillover effects on non-sanctioned banks. Focusing on credit-related sanctions, we show the existence of a spillover effect: non-sanctioned banks behave similar to sanctioned banks, depending on their degree of similarity, offloading problematic loans and reducing their lending activity.

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1. Introduction

The global financial crisis was due to both incomplete regulation and ineffective supervision (Barth et al., 2013; U.S. Financial Crisis Inquiry Commission, 2011). An increasing number of papers have analyzed the impact of regulation on bank behavior, focusing on various issues, such as lending (Lepetitet al., 2015; Ongena et al., 2013; Jiang Li and Shao, 2010), risk-taking (Harris and Raviv, 2014), economic growth (Jayaratne and Strahan, 1996; Berger and Hannan, 1998; Kroszner and Strahan, 1996) and developing financial sectors across the globe (Beck et al. 2000; Barth et al., 2004).

Surprisingly, less emphasis has been placed on supervision than on regulation, with only a handful of papers empirically assessing the effects of supervision on bank behavior. This is mainly due to a lack of data: most supervisory actions (such as recommendations, requests for capital add-ons, reports from on-site inspections, off-site analysis, etc.) are not ultimately enforced and thus usually remain confidential. As such, the few papers available on the subject (Delis et al., 2017; Delis and Staikouras, 2011; Danisewicz et al., 2017) focus on supervisory enforcement actions (i.e., publicly disclosed actions) in empirically investigating the effectiveness of supervision. Delis et al. (2017) examine the impact of formal enforcement actions on the safety and soundness of sanctioned banks in terms of bank capital, risk, and performance. Delis and Staikouras (2011) analyze the role of bank supervision in controlling bank risk among sanctioned banks, finding that the relationship between sanctions and risk is linear and negative. Denisewicz et al. (2017) examine the relationship between enforcement action with respect to single-market banks and contractions of bank lending and liquidity creation. In the research papers examined, the effectiveness of enforcement action (also labeled "sanctions" in this paper) is measured only in terms of behavioral changes (lending activity, risk-taking, capitalization) of sanctioned banks. In reality, sanctions have two complementary goals: first, to penalize the guilty banks; second, to provide an example to other banks that bad behavior will be penalized. All existing papers have analyzed the consequence of sanctions, but none have investigated the cross-effects on non-sanctioned banks.

Our paper contributes to the literature by analyzing whether sanctions increase bank stability and, more importantly, whether enforcement actions against competitors influence the risk-taking of non-sanctioned banks. Therefore, the main purpose of our paper is not to estimate the (endogenous and perhaps obvious) consequences of enforcement actions on sanctioned banks

but the consequences on other banks that share common risk features. Specifically, we posit that a non-sanctioned bank cares about enforcement actions taken against other similar banks.

This point is crucial for regulatory and supervisory authorities, which must take into account the effects of enforcement actions on all banks in the system before issuing and publicly disclosing them. A central issue linked to spillover effects on unsanctioned banks, in fact, concerns the publication of sanctions on the Supervisory Authority website. In the U.S., enforcement actions for violations of laws, rules or regulations are published on the Office of the Comptroller of the Currency website in useful Excel files; thus, some papers have focused on the U.S. banking system (Delis et al., 2017). Unfortunately, the situation in the European banking system is more variegated: only a few National Central Banks (NCBs) publish enforcement actions (see Delis and Staikouras, 2011), while most prefer that supervisory measures remain confidential. Since November 2014, European banking supervision has undergone an epochal change, with the creation of the Single Supervisory Mechanism (SSM) for significant banks. To date, no studies of the spillover effects of the publication of enforcement actions against unsanctioned banks within the European banking system have appeared.

We obtain two major results. First, credit risk-related sanctions lead sanctioned banks, in the year following the imposition of sanctions, to retire problematic loans, reduce their lending orientation, reduce their Tier 1 capital and increase their Tier 2 capital. Second, non-sanctioned banks tend to modify their risk-taking in response. Interestingly, we provide empirical evidence that non-sanctioned banks behave more similarly to sanctioned banks, the more similar they are to the sanctioned banks. This is an important result, as it shows that enforcement actions influence not only the stability of sanctioned banks but also that of banks that share common features with sanctioned banks.

Our paper focuses on the Italian banking system, which provides an ideal case study for several reasons. First, Italian banks currently have a huge problem with Non-Performing Loans (NPLs) and exhibit substantial stability problems. As reported by the Bank of Italy (2017), the gross value of non-performing loans in June 2016 was 356 billion euros (i.e., 17.7% of customer loans),and their value net of provisions was 191 billion euros (i.e.,10.4% of customer loans): as a benchmark, this means that the uncovered value of NPLs is equal to 11.7% of Italian GDP in 2015 (and the gross value of NPLs is 21.8% of Italian GDP in 2015). Of course, this creates problems for the stability of the Italian banking system. The Italian Government allocated 20

billion euros in December 2016 (1.2% of Italian GDP) to rescue Banca Monte dei Paschi di Siena (the oldest European bank, founded in 1492, and the third largest Italian bank, with assets of 164 billion euros in June 2016) and help other large banks with very high levels of NPLs. In the previous year, in December 2015, the Italian Government launched a bank resolution fund of 3.6 billion euros to restructure four small-medium bank lenders (Banca Marche, Cassa di Risparmio di Ferrara, Cassa di Risparmio di Chieti and Banca Etruria), which were taken under Bank of Italy control in the past year, as they were insolvent (see Financial Times, 2015). Given the magnitude of the NPL problems, one may question whether the Bank of Italy's credit-related enforcement actions over the last decade have been effective. Second, Italy is an interesting case because the Bank of Italy (the sole entity responsible for supervising Italian banks through November 2014) is one of the oldest banking supervisors in the world and has traditionally been active in controlling Italian banks through both off-site and (especially) on-site inspections. For example, the Governor of the Bank of Italy observed in his concluding remarks for 2010, "*with the Bank of Italy's supervisory role, our country has been able to count on a solid tradition. We have strengthened the most valid aspects of that tradition: the principles of a rigorous supervisory approach that was never converted to the "light touch"; supervision ready to persuade if possible, to prescribe if necessary, within the limits of law, performed by well-prepared and upright public servants*" (Bank of Italy, 2011, page 17). As such, the Bank of Italy has two separate and independent departments that perform off-site analysis and on-site inspections. In our study, we calculated the number of on-site inspections between 2005 and 2013at 927 (i.e., approximately 20% of Italian banks received on-site inspections during these years). Additionally, we found that 328 banks in our sample had been formally sanctioned and that 3,588 bank employees (including members of Boards of Directors, Senior Managers, Audit Committee members and Chief Executive Officers) received personal sanctions. The Bank of Italy recorded and made public information about all its enforcement actions, with detailed explanations of the reasons for them, in a monthly bulletin. We were thus able to manually collect data on enforcement actions taken, which we classified into five categories based on their reasons (general organizational failure; credit risk failure; omitted credit risk disclosure; reporting and disclosure failure; and residual sanctions). Given the tradition of the Bank of Italy, one may ask whether the Bank of Italy's credit-related enforcement actions during the last decade were effective? Third, the Italian banking system is one of the most important in Europe:

at the end 2015, Italy was the fourth largest banking market for deposits (10.7% of European deposits), total assets (EUR 4.0 trillion, 9% of total European banking assets) and number of employees (299,684 employees)[1]. As such, Italy represents an ideal case study: it is one of the main European banking industries (its instability would create instability for the whole European market), it has a poor-quality lending portfolio, and it has a strong tradition of supervisory on-site inspections and enforcement actions.

The main challenge in assessing the impact of enforcement actions on bank behavior is an endogeneity problem. For example, a study assessing variations in a sanctioned bank's post-performance (or risk-taking levels) is likely to find a statistical change, but the variation might be due to the bank's pre-sanction performance (or risk-taking levels). Similarly, performance (or risk-taking) variations are likely to be driven by (unmeasured) factors, so there is likely to be an omitted variables problem. Some previous papers have attempted to address endogeneity and the reverse causality problem by using an instrumental variable approach. For instance, Danisewicz et al. (2017) used the first difference of a dummy variable indicating enforcement actions classified as "less severe", a variable that assembles all measures taken against a bank's personnel and individuals (civil money penalties, suspensions, fines, etc.). The authors assumed that these "less severe actions" would likely not be affected by the local economy (the dependent variable) and thus would not impact a bank's behavior. Delis et al. (2017) used the opening of a new branch in a bank's business as an instrumental variable, stating that it increases the probability of breaching the "law-on-the-books," due to changes in its operational structure.

We aim to study the effects of sanctions on sanctioned banks and the possible existence of spillover effects on banks that are unsanctioned but have features similar to those of sanctioned banks. We address the first question, using an approach similar to that of previous studies, i.e., an instrumental variables approach, because of possible endogeneity arising from the impossibility of observing the counterfactual - i.e., what would have been the behavior of a sanctioned bank if it had not been sanctioned? We answer the second question by calculating a proximity index, indicating the degree of similarity between non-sanctioned and sanctioned banks.

The remainder of the paper is structured as follows. First, we review previous studies and develop our research hypotheses (section 2). Second, we describe our data and variables (section

[1] Source of data: European Banking Federation (2015).

3) and identification strategy (section 4). We then discuss our main results (section 5). Conclusions are drawn in section 6.

2. Supervision in banking: theory and hypothesis development

Banking supervision, which consists of various tools, such as remote controls (i.e., off-site surveillance systems) and spot checks (i.e., on-site inspections), aims to ensure banks' compliance with regulations. Although on-site and off-site supervisory tools are generally used in all banking systems, the mix of these tools differs across countries and depends on the supervisory styles adopted. For example, a "light-touch approach" is common in Northern European countries, such as the UK: "*Before the financial crisis Britain's Financial Services Authority (FSA) did, indeed, try to impose the lowest possible burden and cost on a prized industry*" (the Economist, 2012) and "*The lack of clarity in certain specific aspects of the existing mandates allowed the 'light touch' ethos to grow, though the FSA did not generally use that term*" (IMF, 2011, page 10). In Southern European Countries, such as Italy, the supervisory style has not been as light, and both off-site and on-site tools have been adopted.

Our paper does not investigate the effectiveness of a "light" or "heavy" touch; rather, we focus on the Italian experience to assess whether enforcement actions (a publicly available outcome of supervision) were effective. The Bank of Italy has traditionally monitored the safety and soundness of the banking system through a combination of on- and off-site surveillance programs. Off-site supervision tools are regularly used by supervisory authorities, with the objectives of ensuring that intermediaries comply with existing regulations, monitoring the evolution of business management, and verifying the effectiveness of interventions in eliminating deficiencies or abnormalities fostered by bank management (Bank of Italy, 2008). Off-site supervision is based on data publicly disclosed by banks and, especially, private information provided to supervisory authorities (e.g., financial data, ICAAP reports, compulsory regulatory reporting, mandatory disclosures relating to the detention of significant shareholdings, etc.). At the same time, the Bank of Italy has relied heavily on "on-site" inspections, which are the cornerstone of the supervisory process. Supervisors engage in three different types of inspections: 1) full-scope investigations, which seek to analyze the overall business of a bank, with specific reference to risks relevant to the supervisory authority; 2) targeted/thematic inspections, i.e., inspections related to specific areas of activity, areas of risk or operational or

technical aspects; and 3) follow-up inspections, which aim to verify the effectiveness of corrective actions undertaken by banks or solicited by supervisors.

Similar to the US banking system, on-site full scope examination in Italy encompasses an audit procedure that focuses on capital adequacy (C), asset quality (A), management (M), earnings (E), liquidity (L) and sensitivity to market risk (S), similarly to the US CAMELS rating system. Under the US CAMELS system, however, the methodology is largely publicly available, consisting, e.g., of composite and component ratings based on a one-to-five scale, where a composite rating of one or two implies that any identified weaknesses are minor and can be handled routinely by the board of directors and management, whereas a composite rating of three or four suggests a combination of moderate to severe weaknesses. By contrast, there is little public disclosure in Italy. Once an inspection is drawn up, a summary report (with indications of findings and observations) is delivered to the top management of the bank for the appropriate counter-arguments and subsequent interventions. In cases where it is required by law, interested individuals will be notified of a process of assessment relating to punishable administrative offenses (Bank of Italy, 2012). The findings of on-site examinations and of off-site monitoring play an influential role in decisions to take enforcement action.

Similar to most bank supervision systems, enforcement actions in Italy can be informal (i.e., actions not legally enforceable or publicly available, such as commitments, board resolutions, approved safety and soundness plans, and memoranda of understanding) and formal (i.e., actions statutorily authorized or mandated that are legally enforceable and publicly disclosed, such as cease and desist orders, written agreements, civil money penalties, prompt corrective action directives, safety and soundness orders, capital directives, and suspension, removal, and prohibition orders). Formal enforcement actions can be taken when analysis of a bank's data (similarly to US CAMELS rating) signals problems in bank management but also when there are significant problems or weaknesses in its systems and controls observed in on-site inspections.

In this paper, we focus on formal enforcement actions related to credit risk. Most Italian banks are lending-orientated. Therefore, we posit that such actions will have the most bearing on banks' financial safety and soundness. Specifically, we expect that these enforcement actions influence bank behavior by minimizing incentives to undertake excessive credit risk activities through at least three basic channels (Delis et al., 2017). First, a formal enforcement action

signals adverse information (i.e., the supervisor holds private information on a targeted bank's condition), and this is likely to enhance market discipline and so reduce a bank's risk appetite. Second, formal enforcement actions can impose direct costs on a bank's management (e.g., requiring an increase in human and technical resources devoted to credit-risk management, changes in the internal-rating system, a new assessment of credit-worthiness criteria, etc.) that also constrain excessive risk-taking. Third, noncompliance with formal enforcement actions carries serious penalties, which in turn increase the likelihood that such actions will generate behavioral changes.

The main aim of our paper is to examine the impact of formal and credit-related enforcement actions on banks' capital and risk among both sanctioned and non-sanctioned banks. Enforcement actions not only aim to penalize guilty banks but also provide examples to all banks in the industry that bad behavior will be penalized. Several paper shave analyzed the consequences of sanctions, but none have investigated the cross-effects of sanctions on non-sanctioned banks. Specifically, Delis and Staikouras (2011), using an international sample over the 1998–2008 period, examine the relationship between enforcement outputs (on-site audits and sanctions) and bank risk. Based on 155 sanctions, they find that supervisory sanctions contribute considerably to constraining bank risk. Delis et al. (2017), based on a US sample, also show negative associations between enforcement actions (enacted by the FDIC, OCC and FRB between 2000 and 2010) and various bank indicators (post-sanction) such as capital, risk and performance. Shive and Forster (2016) and Lambert (2017) show that riskier banks are more likely to be subjected to enforcement actions in the U.S. but that the effects differ for those that lobby politicians and supervisors. Regarding the consequences of enforcement actions, Danisewicz et al. (2017) analyze Call Report data on all commercial and savings banks in the U.S. over the 1999–2011 period. They find that the issuance of enforcement actions negatively affects economic growth at the county level.

After analyzing the effects of enforcement actions on sanctioned banks, our paper examines the existence of spillover effects on banks that are unsanctioned but share similar features with sanctioned banks. This is crucial information for regulatory and supervisory authorities, who must take into account possible effects on all banks in the system before issuing enforcement actions.

3. Data and variables

Data were collected from various sources: enforcement actions were manually collected from the Bank of Italy monthly supervision bulletins between 2005 and 2013 and aggregated on an annual basis (Bank of Italy, 2005-2013); and accounting data were collected from the Italian Banking Association database on an annual basis.

3.1 Supervisory variables

We classified sanctions using various dummy variables that take values of 1 if a bank received a given type of sanction in year *t* and 0 otherwise. We created a variable for each of the following sanctions: 1) deficiencies in organizational and internal controls - *general organizational failure* - S_1; 2) faults in the organization, internal controls and management related to lending, e.g., inaccuracy in the credit process and analysis of borrowers' creditworthiness -*credit risk failure* - S_2; 3) lack of reporting on impaired loans and loan loss provisions to the supervisory authority - *omitted credit risk disclosure* - S_3; 4) all cases of inaccurate or missing reports -*reporting and disclosure failure* - S_4(such as (a) inaccurate or missing reports on a large loan to the Supervisory Board,(b) inaccurate or missing reports to the Central Credit Register on any loans,(c) any late communications to the supervisory authority,(d) deficiencies in the process of reporting and control of consolidated reports, and (e) inaccurate or missing communications to customers regarding regulations); 5) residual sanctions (S_5). Each of these variables indicates the number of sanctions issued. We also define credit-risk related sanctions as a dummy variable that takes value of 1 if a bank received S_2 and/or S_3 and zero otherwise. We summarize the definitions of the variables used in the empirical analysis in Table 1.

< INSERT HERE TABLE 1>

After matching all the data, we obtained a sample of 328 banks that had been subject to enforcement actions. The total number of sanctioned banks is inferior to the total number of individual enforcement actions because some banks received more than one sanction in the period analyzed. We address the multiple sanctions problem by including only observations of sanctions related to credit risk (S_2 and S_3) or disclosure failure (S_1 and S_4); in all other cases, we

drop observations to attain a cleaner dataset. To face potential confounding effects[2], we also drop observation at time *t+1* for banks that received an enforcement action at time *t*. As reported in Table 2, Panel A, the most frequent sanction is related to 'general organizational failure' (225 cases), followed by deficiencies in the credit process (206 cases). Sanctions related to credit risk (S2 and S3) were the most numerous, comprising 310 cases. In 2011, we observed the largest number of banks (44) sanctioned for credit risk (CRS), followed by 2007 and 2005.

As shown in Panel B of Table 2, the largest number of observations concerns cooperative banks, followed by commercial banks and saving banks. The number of foreign banks is negligible.

< INSERT HERE TABLE 2>

3.2. Bank-level and macroeconomic variables

Data relating to accounting and financial information were selected from the Italian Banking Association database. As shown in Table 2, we group our variables in three categories: supervisory variables, independent variables and dependent variables.

The effects of sanctions are analyzed by focusing on various indicators of bank risk, capital adequacy and activities, as in previous research (Delis et al. 2017). First, we calculate a regulatory risk indicator, i.e., the ratio of regulatory risk-weighted assets to total assets (*RWA*). We then define two measures of bank credit portfolio quality the ratio of non-performing loans to a bank's regulatory capital (*NPL1*) and the ratio of non-performing loans to a bank's total loans (*NPL2*). We capture liquidity risk with the Liquidity Ratio (*LIQ*), i.e. the ratio of cash due from banks to total demand deposits. We measure banks' capital adequacy with two indicators, namely, the ratio of Tier 1 capital to risk-weighted assets (*TIER1*) and the ratio of Tier 2 capital to risk-weighted assets (*TIER2*). Finally, we measure banking activities by examining credit orientation (i.e., the ratio of total loans to total assets) and bond investment (government bonds + local government bonds + short-term corporate bonds and corporate bonds) / (total assets - tangible fixed assets - intangible fixed assets).

[2] We would like to thank one of the referees for making this suggestion.

We also included various control variables related to bank profitability (Return on Assets, ROA), size (the logarithm of Total Assets), cost efficiency (operating cost over the intermediation margin), exposure to the interbank market in terms of both credit and debt volume (*CRI* and *DBI*, denoting, respectively, the ratio of credits to the interbank market to Total credit and the ratio of debt to the interbank market to Total debt). We also measure bank stability using Z-scores, which have been extensively used in the banking literature (as in Houston et al., 2010; Demirgüç-Kunt and Huizinga, 2010; Laeven and Levine, 2009; Fiordelisi and Mare, 2014, among others). The Z-score is a proxy for a bank's distance to default (i.e., the number of standard deviations by which a bank's profitability must fall to devour its entire capital buffer) and is calculated as:

$$Z_{it} = \frac{\frac{E}{TA_{it}} + ROA_{it}}{\sigma\left(ROA\right)_{jt}} \tag{1}$$

where the *i* subscript denotes the cross-sectional dimension across banks; the *j* subscript denotes the Italian regions (20 regions); *t* denotes the time dimension; $Z_{i,t}$ is the Z-score; $\frac{E}{TA_{it}}$ denotes the leverage ratio (i.e., the share of total equity (E) in total assets (TA)), ROA is the return on assets, and σ(ROA) is the one- year regional time varying standard deviation of the return on assets.[3] A high Z-score implies a lower default probability. Because the Z-score is highly skewed, we smoothed the extreme values by taking the logarithmic transformation of the variable, following Laeven and Levine (2009) and Schaeck and Cihak (2012).

In Panels C and D of Table 2, we report some descriptive statistics of dependent and independent variables used in our empirical analysis. The core business of Italian banks is mostly lending (the mean value of the loans to customers on total assets ratio is 76%) and this lending orientation is also associated with high credit risk levels: non-performing loans represent (on average) 31% of regulatory capital and 4% of total loans. Regarding capital levels, the mean*TIER1*ratio is 17% and Tier 2 ratio is 1.2%. The mean return on assets is 5% and operating efficiency (measured by operating cost to income ratio) is (on average) 70%. Market funding covers 23% of total assets.

[3]If a bank presents branches in more than one region, the standard deviation for each year is calculated at the national level using all available data.

3.3 Preliminary inspections

In this section, we run some preliminarily investigation to analyze if there are some differences in risk-taking in means between sanctioned and non-sanctioned banks. Specifically, we report in the Table 3 the t-tests for differences in means among our dependent variables (Panel A) and independent variables (Panel B).

As expected, the two groups of banks (i.e. the ones receiving an enforcement action in a given year and the ones that did not receive any sanctions? in that year) have different mean levels of risks. Specifically, sanctioned banks display a higher mean level (significant at the 1% level) of non-performing loans (*NPL1*, and *NPL2)* and regulatory risk (*RWA*) than non-sanctioned banks. Interestingly, non-sanctioned banks have a greater TIER1 capital (significant at the 1% level) than sanctioned banks focusing on the *TIER1* ratio, but lower *TIER2*capital (significant at the 5% level). Finally, non-sanctioned banks have a greater amount of credits on the total assets (TLTA) than the sanctioned banks (significant at the 10% level). The means of the other variables are not statistically different within the two groups of banks. In Table 4, we report the correlations among our variables.

< INSERT HERE TABLES 3 and 4>

4. Identification strategy

We adopt a two-step identification strategy: first, we present our econometric approach (section 4.1); then we explain our instrumental variable and identification strategy (section 4.2). Finally, we present the methodology for calculating the spillover effect (section 4.3).

4.1Econometric model

Empirically, we seek to estimate the effects of credit enforcement actions on several measures of bank activity. In doing so, we address the endogeneity problem that arises from the fact that we cannot observe how sanctioned banks might have behaved had they not been subject to formal enforcement actions. If we do not take into account possible endogeneity, least-squares-based methods are biased and inconsistent.

Following past papers that have examined the impact of an endogenous event on various aspects of banking, we use a two-stage Instrumental Variables (IV) model. In the first step, following Angrist (2001), we estimate a linear regression of the endogenous regressor on the instruments by least squares as follows:

$$CRS_{it} = \alpha_0 + \beta_0 Z_{it} + \gamma_0 X_{it-1} + \mu_{it} \quad (1)$$

In the second step, we regress the outcome on the predicted value of the endogenous regressor, using least squares:

$$Y_{it+1} = \alpha_1 + \beta_1 \hat{CRS}_{it} + \gamma_1 X_{t-1} + e_{it+1} \quad (2)$$

where *CRS* is a dummy variable that takes a value of one if the bank is sanctioned for credit risk (i.e., if S_2 or S_3takes a value of 1) and zero otherwise; *Z* are the instrumental variables; and the *Xs* are the exogenous variables, i.e., a vector of bank-level variables. To overcome the missing variables problem, we estimate a model with fixed effects for bank specialization (to account for time invariant differences among bank categories), and years (to consider the effects of differences among years over the sample period). We also cluster standard errors at the bank level.[4]

We consider five different dependent variables that may be affected by credit risk sanctions: *i)* the ratio of total non-performing loans to regulatory capital (*NPL1*); *ii)* the ratio of Tier 1 capital to risk-weighted assets (*TIER1*); *iii)* the ratio of Tier 2 capital to risk-weighted assets (*TIER2*); *iv)* the ratio of risk-weighted assets to total assets (*RWA*); and *v)* the ratio of total loans to total assets (*TLTA*).

Additionally, we employ three other dependent variables: *vi)* the ratio of total non-performing loans to total assets (*NPL2*); *vii)* the ratio of total bonds to total assets, excluding tangible and intangible fixed assets (*BOND*); and *viii)* the ratio of liquidity and interbank credit to total assets (*LIQ*). *NPL2* is an alternative measure of non-performing loans; *BOND* measures the share of securities among total assets to investigate whether the weight of securities among

[4] In estimating our empirical models, we dropped the observation at time *t+1*for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for making this suggestion.

total assets grows in the year following sanction; *LIQ* is a placebo dependent variable that we assume does not vary with credit risk sanctions. All independent variables are lagged one year. We provide definitions of all the variables in Table 1.

Equations (1) and (2) are simultaneously estimated, with error terms assumed to be jointly normally distributed. The coefficient of interest isb_1, which measures the effect of sanctions on banks not directly subject to sanctions.

The fundamental problem for the reliability of the results relates to the choice and validity of the instruments. We consider this problem in more detail in the next section.

4.2 Instrumental variables and identification strategy

The instrumental variables estimates become important in the presence of endogeneity and reverse causality, i.e., in contexts where exogeneity may not hold. The presence of omitted variables, measurement errors and simultaneity can negatively affect the results of the estimates. The IV approach can resolve this problem if the following assumptions hold: *i)* the IV are correlated with the endogenous regressors (relevance criterion), i.e., E [Z'X] ≠ 0; *ii)* the IV are not correlated with the error term (exogeneity, also called the orthogonality condition), i.e., E[Z'U] = 0; and *iii)* the IV do not directly affect the dependent variable (exclusion criterion). If *ii)* and *iii)* hold, the instruments are valid. If *i)* holds, but the correlations between the instruments and the endogenous regressors are small, the instruments are valid but weak.

The choice of instruments is therefore crucial. We select two instruments: the sanction imposed for general organizational failure (S_1) and the sanction imposed for disclosure failure (S_4). These two variables are satisfactory from both a theoretical and empirical standpoint. Specifically, our dependent variable is related to bank credit risk-taking (e.g., the Non-performing Loan Ratio, the Total loan ratio, the Risk Weighted asset ratio) and capital adequacy (the Tier 1 and Tier 2 ratios). Because Italian banks are mostly lending-oriented commercial banks, the RWA and the Tier 1 and Tier 2 ratios are more closely related to credit risk than to other financial risks taken by banks. Thus, there is no reason to expect that sanctions imposed for general organizational failure (S_1) and for disclosure failure (S_2) directly relate to bank credit risk or capital levels. This theoretical expectation is also supported by empirical data: the correlation with our endogenous variable is high (the supervisory authority often simultaneously sanctions

banks for credit risk, general organizational failure and disclosure failure), while the correlation with our dependent variables is low, as they are directly related to credit risk.

As we have two instrumental variables and only one endogenous variable, we can implement the Sargan-Hansen test of over-identifying restrictions: under the joint null hypothesis that the instruments are valid, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation, the test statistic follows a chi-squared distribution in the number of over-identifying restrictions.

4.3 The spillover effect

Our second (and main) question addresses the spillover effect: do enforcement actions against competitors influence the risk-taking of non-sanctioned banks? We expect that banks that are "closer" to sanctioned banks may undertake actions to reduce the risk of being sanctioned. In this case, sanctions issued by a supervisory authority could achieve the dual purpose of punishing problematic banks and discouraging other banks from engaging in problematic behavior, thereby incentivizing virtuous behavior.

To test our hypothesis, we measure the distance between each non-sanctioned bank and the mean of sanctioned banks. Specifically, we use the square root of the Mahalanobis distance, which has been widely adopted in finance to measure distances between firms. The Mahalanobis distance, a measure of distance in multidimensional space, has several interesting properties: *i)* it accounts for covariance among variables; and *ii)* it reduces to the Euclidean distance for uncorrelated variables with unit variance. It is obtained as:

$$D_{i,\mathrm{E}(s)}(X)=\sqrt{\left(X_i-E(X_s)\right)' C^{-1}\left(X_i-E(X_s)\right)} \quad (3)$$

where *X* consists of *TIER1*, *TIER2*, *TLTA*, *SIZE*, *ROA*, *LIQ*, and *Z-SCORE* at time *t*, and the subscript *i* indicates an unsanctioned bank.

We normalize the Mahalanobis distance so that the variables considered have a common variation field, using the following formula:

$$\text{Mahalanobis}=\frac{\text{Mahalanobis-min(Mahalanobis)}}{\text{max(Mahalanobis)-min(Mahalanobis)}} \quad (4)$$

Once we measure the distance of each unsanctioned bank from sanctioned banks, we again run equations (1) and (2), focusing only on unsanctioned banks and replacing the dummy variable measuring sanctions with the Mahalanobis distance. We also use as an instrument the lagged value of the Mahalanobis distance[5].

5. Results

In this section, we discuss our empirical findings. First, we show the effects of enforcement actions on sanctioned banks - the banks that are the direct targets of such actions - (section 5.1) and we perform several robustness checks (section 5.2). We then show the effects of enforcement actions on non-sanctioned banks (section 5.3).

5.1 The effects of enforcement actions on sanctioned banks

Table 5 shows the results for the five dependent variables. We report the second stage of the regressions and the value of the coefficients and standard errors of the two instrumental variables in the first stage.

< INSERT HERE TABLE 5>

Our variable of interest is the credit risk sanction (*CRS*). As shown in column 1 of Table 5, enforcement actions for credit risk-related reasons are followed (after one year) by an increase in the value of non-performing loans compared with regulatory capital (*NPL1*), an effect that is statistically significant at the 1% level. The high value of the estimated coefficient suggests that when banks are sanctioned, they off-load non-performing loans in an effort to clean their balance sheets. This approach naturally results in a higher value of non-performing loans in the year following sanction and at the same time leads to more truthful accounting. Specifically, *NPL1* increases by 0.24 points. This result contrasts with previous research (e.g., Delis et al., 2017), partly because different accounting principles were adopted and partly due to the different intensities of the financial crises that have affected Italy. As a result of a higher volume of NPLs, in fact, there was a larger volume of loan loss provisioning that banks that were already troubled could not support. Basically, it is believed that many banks delayed the classification of

[5] In this case, because the number of instruments equals the number of endogenous variables, we cannot run the Sargan-Hansen test for over-identifying restrictions.

problematic loans. However, correct classification becomes inevitable when a sanction is imposed.

Consistent with this result, we find (column 2) a similar effect with respect to the ratio banks' risk-weighted assets to total assets (*RWA*). A credit risk sanction causes an increase in *RWA*, although the impact is smaller, at just 0.05 points. The coefficient is statistically significant at the 5% level. Although this result may appear counterintuitive—one would expect that sanctioned banks would react by reducing their *RWA*, as in Delis et al. (2017)—this is consistent with our findings regarding *NPL1*. Specifically, our results suggest that sanctioned banks become riskier from a regulatory perspective (as captured by *RWA*) as they clean up their balance sheets (captured by *NPL1*). We also observe that banks experiment with a reduction in Tier 1 capital (column 3) and an increase in Tier 2 capital (column 3): these results are consistent with the higher non-performing loans ratio and the higher risk weighted assets ratio, suggesting that banks could not increase their Tier1 capital to cover credit losses and so increased their Tier2 capital, probably by issuing subordinated loans. In sum, there is a statistically significant impact on willingness to lend (*TLTA*), as the total loan ratio falls by 0.06 points. This reduction probably depends on a reduction in performing loans in the balance sheets that is not offset by an increase in new loans. This result is consistent with the hypothesis that enforcement actions reduce banks' ability to intermediate between loans and deposits (Danisewicz et al., 2017).

Overall, our results strongly suggest that credit risk-related sanctions lead banks, in the year following sanctions, to offload problematic loans and reduce their lending orientation, behavior associated with a reduction in Tier 1 capital and an increase in Tier 2 capital.

Turning to the instrumental variables, both S_1 and S_4 are always statistically significant at the 1% level, with positive signs in the first stage. This shows that the penalty for credit risk is positively associated with sanctions linked to organizational and general disclosures failure. All five estimations reject the under-identifying restrictions test: we reject the null hypothesis that the IV is uncorrelated with the endogenous regressor at the 1% level. We also reject the null hypothesis of weak instruments at the 1% level, excluding instruments that are weakly correlated with the endogenous regressor. Finally, in all our estimations, we cannot reject the hypothesis of over-identifying restrictions. Thus, the instruments are valid. In Table 6, we follow-up on these results by estimating the effects of sanctions on three other variables, namely, the ratio of non-performing loans to total loans (*NPL2*), the ratio of a bank's exposure to government bonds to its

non-fixed assets (*BOND*), and the ratio of a bank's highly liquid assets (i.e., cash and interbank credit) to total assets (*LIQ*). Using these three measures, we achieve different objectives. The first variable enables us to run a robustness check: specifically, we measure bank loan portfolio quality differently, so that we can check the consistency of the results reported in Table 5. The second variable allows us to complement our analysis of lending: specifically, if sanctioned banks really want to reduce their risk-taking, their reduction in lending should be associated with an increase in safe assets. We expect banks, whether sanctioned or not, to increase their purchases of government bonds, absorbing less regulatory capital than loans. The third variable, i.e. highly liquid assets (cash and interbank credit), is a sort of placebo variable, as the credit risk-related sanction son which we focus are not expected to affect a bank's liquidity management.

< INSERT HERE TABLE 6>

As shown in column 1 of Table 6, credit risk-related sanctions affect *NPL2*in a way that is strongly consistent with their effect on*NPL1*, as seen in Table 5, although the impact is smaller. As such, our conclusions are not influenced by the measure selected to account for loan portfolio quality. In column 2, we show that in the following period, sanctioned banks increase their purchases of securities (riskless or less risky assets) relative to loans, but this is only significant at the 10% level. This confirms our conclusion from Table 5: when banks are sanctioned, they complement their decline in lending with an increase in their holdings of government bonds to reduce their risk-taking. In column 3, we show that credit risk-related sanctions have no statistically significant effect on the liquidity ratio.

5.2 Some Robustness checks

We perform several robustness checks. First, we test whether market discipline affects the behavior of sanctioned banks relative to non-sanctioned ones. We then examine the effects of financial crises on sanctioned banks.

Market discipline (*MKTDIS*) is calculated as the ratio of market funding to total assets[6]. We interact this variable with credit risk sanction to examine whether market discipline increases the effects of sanctions.

< INSERT HERE TABLE 7>

As shown in Table 7, a higher market-funding ratio is associated with a decline of non-performing loans (NPL1), and an increase in lending activities (TLTA). The overall effect of a higher market-funding ratio is a positive link with the risk weighed asset ratio (RWA): this suggests that banks tend to collect market-funds to finance risky business investments (such as loans, which have high supervisory risk-weights) rather than other assets (e.g. liquid assets) with low supervisory risk-weights. This is not surprising since collecting markets are not a non-zero cost source of funds (therefore banks need to provide investors with adequate coupons to successfully place their instruments). Consequently, banks have to invest these funds in a profitable (and risky) way. The variable of main interest is the interaction variable between CRS and MKTDIS. The interaction is highly significant in three of five models. The effect of sanctions, combined with market discipline, is to increase the number of non-performing loans (*NPL1*), the risk weighed asset ratio (*RWA*), and the total loans ratio (*TLTA*). Once a sanction is implemented, the market forces banks to clean their balance sheets more thoroughly, leading to an increase in risky assets and a reduction in total loans. The interaction variable for *TIER1* and *TIER2*is not significant, but market discipline leads to a decrease in *TIER1* and an increase in *TIER2*, in line with the results in Table 5.

< INSERT HERE TABLE 8>

The effect of the interaction between market discipline and credit risk sanctions is statistically significant and relevant in terms of magnitude of the coefficient. Additionally (as shown in Table 7), the interaction between market discipline and the second variable for non-performing loans (*NPL2*) is significant, confirming the regulators' view expressed in Pillar 3 of Basel 3. Conversely, the interaction between market discipline and credit risk sanctions is not

[6] We would like to thank one of the referees for this suggestion.

significant when we use bond and liquid ratios (respectively, *BOND* and *LIQ*) as dependent variables.

In the second robustness check, we test the effect of financial crises[7]. Specifically, we investigate whether the 2007 financial crisis played a role in banks' reactions to enforcement actions. We therefore interact the credit risk sanction variable with a dummy variable that captures the crisis (i.e., a variable that assumes a value of 1 in the more problematic years of the financial crisis in Italy following the 2007 credit crisis through the end of the sovereign debt crisis in 2012).

< INSERT HERE TABLE 9>

The results in Table 9 confirm and bolster our basic estimations. During the financial crisis, the effects of sanctions are stronger on non-performing loans (*NPL1*), risk weighted assets (*RWA*), total loans (*TLTA*) and, as shown in Table 10, *NPL2*.

< INSERT HERE TABLE 10>

5.3 The enforcement actions' effects on unsanctioned banks

In this section, we provide empirical evidence pertaining to whether enforcement actions against competitors influence the risk-taking of non-sanctioned banks. Specifically, we posit that a non-sanctioned bank cares about enforcement actions taken against other similar banks and modifies its own risk-taking in response.

We repeated the analysis of models (1) and (2), now focusing only on banks not subjected to enforcement actions and replacing the sanction variables with the square root of the Mahalanobis distance. The interpretation of the latter variable is straightforward: as the Mahalanobis distance of a bank increases, the bank increasingly differs from sanctioned banks. Because we are positing that non-sanctioned banks that are "similar" to sanctioned banks behave in a similar manner, we expect that the estimated coefficient for this variable is statistically significant and takes a sign opposite that of the sanction dummy.

[7] We would like to thank one of the referees for suggesting us this additional test.

< INSERT HERE TABLE 11>

In column (1) of Table 11, we find a negative and statistically significant coefficient for the Mahalanobis distance: this suggests that the more distant a non-sanctioned bank is from sanctioned banks, the more it reduces its ratio of non-performing loans to regulatory capital. Accordingly, non-sanctioned banks that are close to sanctioned banks increase their NPL ratios, a result that is strongly consistent with our result in Table 5 that sanctioned banks increase their NPL ratios. Overall, this suggests that non-sanctioned banks similar to sanctioned banks clean their balance sheets by offloading non-performing loans. This is also a possible spillover effect of sanctions: non-sanctioned banks bring problematic loans to light in anticipation of regulatory intervention. Interestingly, non-sanctioned banks appear to encounter the same difficulties as sanctioned banks in increasing their Tier1 ratios. In fact, the more distant a bank is from sanctioned banks, the greater is its ability to increase its Tier1 ratio. This effect is consistent with our previous findings for sanctioned banks.

In terms of the Risk Weighted Asset ratio, the Mahalanobis distance shows a positive link: as a bank becomes more distant from sanctioned banks, it increases its Risk-Weighted Asset Ratio. This result is intuitive (non-sanctioned banks reduce their *RWA*, the more similar they are to sanctioned banks, as they load non-performing loans) but inconsistent with our finding regarding sanctioned banks (which increase their *RWA*). This suggests that the process of cleaning their balance sheets (captured by the *NPL1*) is less comprehensive for non-sanctioned banks than for sanctioned banks: non-sanctioned banks can reduce their *RWA*, while sanctioned bank increase theirs.

Finally, we observe a positive link between the Mahalanobis distance and the total loan ratio: the more distant a bank is from sanctioned banks, the greater are its lending activities. This result is intuitive: non-sanctioned banks reduce their lending by larger amounts, the more similar they are to sanctioned banks.

These results are confirmed by analyzing other variables of interest, as reported in Table 12.

< INSERT HERE TABLE 12>

The effect of non-performing loans on non-sanctioned banks similar to sanctioned banks is confirmed by the second variable of interest, the ratio of non-performing loans to total loans (*NPL2*). This result reinforces the effect of similarity on the behavior of non-sanctioned banks that are "close" to sanctioned banks and confirms our results in Table 6. This effect is also confirmed for *BOND*: the positive sign of the coefficient, which is highly significant and of the same magnitude as the corresponding coefficient in Table 6, indicates that non-sanctioned banks that are similar to sanctioned banks increase their portfolio of bonds. Moreover, the data indicate that such banks increase their liquidity.

Overall, our results provide empirical evidence that there is a spillover effect: non-sanctioned banks care about the enforcement actions taken against other similar banks and modify their own risk-taking behavior in response. Our results, which clearly show that banks become more prudent after sanctions, support public disclosure of enforcement actions.

6. Conclusion

By focusing on the Italian banking industry (an ideal case study, given the magnitude of NPLs and the tradition of the Bank of Italy in supervising banks through on-site inspections and enforcement actions), our paper examines the effects of enforcement actions on banks. We show that credit risk-related sanctions lead banks, in the year following the imposition of sanctions, to offload problematic loans and reduce their lending orientation, behavior associated with a reduction in Tier 1 capital and an increase in Tier 2 capital. We also provide empirical evidence that non-sanctioned banks behave more similarly to sanctioned banks; the more similar they are to sanctioned banks.

Our results are particularly relevant to supervisory authorities, as the question of whether corrective supervisory actions should be publicly disclosed—to show that bad behavior by banks is punished, leading to more prudent behavior—or remain confidential—to prevent panic and reduce the risk of a systemic crisis—has been subject to debate. Our results favor public disclosure of enforcement actions, as even non-sanctioned banks modify their behavior and risk-taking in response to enforcement actions. This conclusion supports the Single Supervisory Mechanism (SSM) approach to enforcement actions, whereby *"The European Central Bank shall publish on its website without undue delay, and after the decision has been notified to the*

supervised entity concerned, any decision imposing an administrative penalty […] including information on the type and nature of the breach and the identity of the supervised entity concerned, unless publication in this manner would either: (a) jeopardize the stability of the financial markets or an on-going criminal investigation; or (b) cause, insofar as it can be determined, disproportionate damage to the supervised entity concerned"(ECB, 2014 art.132).

References

Angrist J. D., 2001. Estimation of Limited Dependent Variable Models with Dummy Endogenous Regressors. Journal of Business &Economic Statistics, 19, 2-28.

Bank of Italy, 2008. Guida per l'attività di vigilanza, Circolare n. 269, 7 Maggio 2008, www.bancaditalia.it.

Bank of Italy, 2012. Disposizioni di vigilanza in materia di sanzioni e procedura sanzionatoria amministrativa, 18 December 2012, www.bancaditalia.it.

Bank of Italy, 2005-2013. Supervisory Bulletin, between 2005 and 2013, www.bancaditalia.it.

Bank of Italy, 2011. The Governor's Concluding Remarks. Ordinary Meeting of Shareholders Rome, 31 May 2011.

Bank of Italy, 2017. Intervento del Governatore della Banca d'Italia Ignazio Visco, 23° Congresso ASSIOM Forex.

Barth, J.R., Caprio, G. Jr., Levine, R., 2013. Bank regulation and supervision in 180 countries from 1999 to 2011. Journal of Financial Economic Policy 5, 111-219.

Barth, J.R., Caprio, G., Levine, R., 2004. Bank regulation and supervision: What works best?. Journal of Financial Intermediation 13, 205-248.

Beck, T., Loayza, N., Ross L., 2000. Financial Intermediation and Growth: Causality and Causes.Journal of Monetary Economics 46, 31-77.

Berger, A.N., Hannan, T., 1998. The efficiency cost of market power in the banking industry: A test of the 'Quiet Life' and related hypotheses. Review of Economics and Statistics 80, 454-465.Danisewicz, P., McGowan, D., Onali, E., Schaeck, K., 2017. The real effects of regulatory enforcement actions: evidence from U.S. counties. Journal of Financial Intermediation,forthcoming.

Delis, M.D., Staikouras, P., Tsoumas, C., 2017. Formal enforcement actions and bank behavior. Management Science 63(4), 959-987.

Delis, M.D., Staikouras, P.K., 2011. Supervisory Effectiveness and Bank Risk. Review of Finance 15, 511-543.

Demirgüç-Kunt, A., Huizinga, H., 2010. Bank activity and funding strategies: The impact on risk and returns. Journal of Financial Economics 98, 626-650.

European Banking Federation, 2015. European banking sector: facts and figure, 2015.

European Central Bank (ECB), 2017. Annual Report on supervisory activities 2016, Frankfurt, www.bankingsupervision.europa.eu.

European Central Bank (ECB), 2014. Regulation of the European Central Bank, SSM Framework Regulation, ECB/2014/17, www.bankingsupervision.europa.eu.

Financial Times, 2015. Italy bank rescues spark bail-in debate as anger at Renzi grows, 22 December.

Fiordelisi, F., Mare, D., 2014. Competition and Financial Stability in European Savings banks. Journal of International Money and Finance 45, 1-16.

Harris, M., Raviv, A., 2014. How to get banks to take less risk and disclose bad news. Journal of Financial Intermediation23, 437-470.

Houston, J., Lin, C., Lin, P., Ma, Y., 2010. Creditor rights, information sharing, and bank risk taking. Journal of Financial Economics 96, 485-512.

International Monetary Fund (IMF), 2011. United Kingdom: The future of Regulation and Supervision Technical Notes, IMF Country Report n. 11/230.

Jayaratne, J., Strahan, P.E., 1996. The finance-growth nexus: Evidence from bank branch deregulation. The Quarterly Journal of Economics 111, 639–670.

Jiang, W., Li, K., Shao, P., 2010. When Shareholders Are Creditors: Effects of the Simultaneous Holding of Equity and Debt by Non-Commercial Banking Institutions.Review of Financial Studies 23, 3595-3637.

Kroszner, R., Strahan, P., 1996. Regulatory Incentives and the Thrift Crisis: Dividends, Mutual-to-Stock Conversions, and Financial Distress. Journal of Finance 51, 1285–1219.

Laeven, L., Levine, R., 2009. Bank governance, regulation and risk taking. Journal of Financial Economics 93, 259–275.

Lambert, T. 2017. Lobbying on Regulatory Enforcement Actions: Evidence from U.S. Commercial and Savings Banks, Management Science, forthcoming.

Lepetit, L., Saghi-Zedek, N., Tarazi, A. 2015. Excess control rights, bank capital structure adjustments, and lending. Journal of Financial Economics 115, 574-591.

Matousek, R., Rughoo, A., Sarantis, N., Assaf, A.G., 2015. Bank performance and convergence during the financial crisis: Evidence from the 'old' European Union and Eurozone.Journal of Banking and Finance 52, 208-216.

Ongena, S., Popov, A., Udell, G.F., 2013. When the cat's away the mice will play: Does regulation at home affect bank risk-taking abroad?. Journal of Financial Economics 108, 727-750.

Schaeck, K., Cihak, C., 2012. Banking competition and capital ratios. European Financial Management 18, 836-866.

Shive, S.A., Forster, M.M., 2016. The Revolving Door for Financial Regulators. Review of Finance 21(4), 1445-1484.

The Economist, 2012. Light touch no more. Britain's financial regulators are getting much tougher", 1st December.

U.S. Financial Crisis Inquiry Commission, 2011. The financial crisis inquiry report, U.S. Government Printing Office, Washington D. C.

Table 1 – Variable Description

This table reports variables used in the empirical analysis and a description of the calculation procedure.

Variables	Symbol	Description
Supervisory variables[8]		
Sanction 1	S_1	A dummy variable that takes a value of 1 if a bank received an enforcement action with reference to deficiencies in organization and internal controls (*general organizational failure*) in the year, and zero otherwise
Sanction 2	S_2	A dummy variable that takes a value of 1 if a bank received an enforcement action with reference to deficiencies in the credit process (*credit risk failure*) in the year, and zero otherwise
Sanction 3	S_3	A dummy variable that takes a value of 1 if a bank received an enforcement action with reference to impaired loans and loan loss provisions not reported to the Supervisory Authority (*omitted credit risk disclosure*) in the year, and zero otherwise
Sanction 4	S_4	A dummy variable that takes a value of 1if a bank received an enforcement action with reference to violation of disclosure regulations to customers or lacking in reporting, communication to the Supervisory Authority other than credit risk (*reporting and disclosure failure*) in the year, and zero otherwise
Sanction 5	S_5	A dummy variable that takes a value of 1if a bank received an enforcement action in the year with reference to reasons other than those pertaining to sanctions 1 to 4, and zero otherwise (*residual sanctions*)
Credit Sanction	CRS	A dummy variable that takes a value of 1 if S_2 or S_3 takes a value of 1,and 0 otherwise
Bank dependent variables		
Liquidity Ratio	LIQ	(Cash + interbank credits) / Total asset
Non-performing Loans Ratio 1	NPL1	Non-performing loans / Regulatory capital
Non-performing Loans Ratio 2	NPL2	Non-performing loans / Total loans
Risk-weighted Asset Ratio	RWA	Risk-weighted assets / Total assets
Tier 1 Ratio	TIER1	Tier 1 / Risk-weighted assets
Tier 2 Ratio	TIER2	Tier 2 / Risk-weighted assets
Total Loans Ratio	TLTA	Total loans / Total asset
Bond Investment Ratio	BOND	(Government bonds + local government bonds + short-term corporate bonds and corporate bonds) / (total assets - tangible fixed assets - intangible fixed assets)
Market discipline	MKTDIS	Market funding/ total assets
Crisis	CRISIS	A dummy variable that takes a value of 1for years 2008, 2009, 2010, 2011,and 2012 and zero otherwise
Mahalanobis distance	MAHA	The normalized square root of the square distance between a vector of covariates of each non-sanctioned bank and the centroid of sanctioned banks. Covariates are: Tier1, Tier2, Size, ROA, Liquidity ratio, Z-score.
Bank independent variables		
Cost to Income	CTI	Operating costs / Intermediation margin
Credits to interbank market	CRI	Credits to interbank market / Total credits
Debts to interbank market	DBI	Debts to interbank market / Total debts
Return on Assets	ROA	Before-tax profits / Total assets
Size	SIZE	Natural logarithm of total assets
Z score	Z-SCORE	Natural logarithm of: [(Total equity / Total assets TA)+ ROA] / Standard deviation of ROA
Commercial bank	CMB	A dummy variable taking a value of 1 if bank is a commercial bank and zero otherwise
Cooperative bank	COB	A dummy variable taking a value of 1 if the bank is a Cooperative bank and zero otherwise
Savings bank	SVB	A dummy variable taking a value of 1 if the bank is a Savings bank and zero otherwise
Foreign bank	FRB	A dummy variable taking a value of 1 if the bank is a foreign bank and zero otherwise

[8] Running the estimation, we drop the observation at time t+1 for sanctioned banks. Specifically, let assume that a bank *i* receive an enforcement action in a given year (i.e. any of the sanctions from S_1 to CRS), we drop the bank *i* observation at time t+1 to avoid possible confusion in our results. We would like to thank one of the referees for giving us this suggestion.

Table 2 – Descriptive statistic of sanction variables

Panel A presents descriptive statistics of enforcement variables for sanctioned banks; Panel B presents those related to independent variables; Panel C and D variables are at the bank and macro-level. Definitions of all variables are provided in Table 1. Reported values are winsorized at the 99th and at 1st percentile.

Panel A – Sanctioned banks through years

Years	Total	CRS	Non-sanctioned	S_1	S_2	S_3	S_4	S_5
2005	37	29	615	23	23	15	2	4
2006	22	17	650	12	13	14	6	6
2007	51	39	641	29	33	17	8	8
2008	28	20	663	16	16	10	2	6
2009	29	16	674	21	15	9	1	5
2010	42	30	623	31	28	16	9	14
2011	61	44	590	55	42	11	8	11
2012	27	14	574	22	13	4	5	4
2013	31	24	539	16	23	8	4	7
Total	**328**	**233**		**225**	**206**	**104**	**45**	**65**

Panel B – Bank specialization

Years	CMB	COB	SVB	FRB
2005	194	426	30	2
2006	209	433	29	1
2007	220	439	33	0
2008	221	435	35	0
2009	243	423	36	1
2010	216	416	33	0
2011	202	412	33	1
2012	178	385	34	1
2013	162	374	31	0

Panel C – Dependent variables

Variable	N	Mean	SD	Min	Median	Max
BOND	5,191	0.1629	0.1285	0.0000	0.1416	0.5823
LIQ	5,194	0.0126	0.0126	0.000	0.0067	0.1195
NPL1	5,159	0.3120	0.3357	0.000	0.2136	1.8943
NPL2	5,194	0.0404	0.0386	0.000	0.0291	0.2041
RWA	5,194	0.6547	0.2082	0.000	0.6709	1.2031
TIER1	5,194	0.1728	0.1264	0.000	0.1406	0.8953
TIER2	5,130	0.0123	0.0186	-0.0007	0.0036	0.0858
TLTA	5,194	0,7599	0.1348	0.3047	0.7797	0.9779

Panel D – Independent variables

Variable	N	Mean	SD	Min	Median	Max
CTI	4,903	0.7048	0.2996	0.2018	0.6637	2.7542
CRI	5,194	0.1621	0.1903	0.0087	0.0992	0.9867
DBI	5,182	0.1513	0.2187	0.0000	0.0608	0.9966
ROA	5,846	0.0052	0.1189	-0.0566	0.0065	0.0325
MKTDIS	5,194	0.2306	0.1302	0.0000	0.2299	0.4820
SIZE	5,846	13.1614	1.7100	10.0890	12.9096	18.1914
Z-SCORE	5,832	2.1096	0.9671	-0.6141	2.1813	3.9711
MAHA	5,124	0.1008	0.1664	0.0000	0.0423	1.0000

Table 3 – Difference in mean

This table presents t-tests for dependent variables (panel A) and independent variables (Panel b) related to the significance of the difference in mean values between sanctioned and non-sanctioned banks. Definitions of all variables are provided in Table 1. All tests take into account different variances between the two groups. *** indicates significance of 1 percent or less; ** between 1 and 5 percent;* between 5 and 10 percent.

Panel A – Dependent variables

	BOND	**LIQ**	**NPL1*** **	**NPL2*** **	**RWA*** **	**TIER1 *** **	**TIER2** **	**TLTA***
No. of non-sanctioned	4,900	4,903	4,870	4,903	4,903	4,903	4,840	4,903
No. of sanctioned	291	291	289	291	291	291	290	291
Mean of non-sanctioned	0.1623	0.0127	0.3013	0.0391	0.6523	0.1741	0.0122	0.7606
Mean of sanctioned	0.1727	0.0117	0.4931	0.0621	0.6936	0.1512	0.0147	0.7480
Standard error of non-sanctioned	0.0018	0.0003	0.0047	0.0005	0.0030	0.0018	0.0003	0.0019
Standard of error of sanctioned	0.0071	0.0010	0.0238	0.0025	0.0118	0.0060	0.0012	0.0071
Diff in mean	-0.0134	0.0009	-0.1917	-0.0230	-0.0412	0.0229	-0.0025	0.0126
T	-1.4008	0.9405	-7.8857	-8.7111	-3.3851	3.6676	-2.0582	1.7144

Panel B – Independent variables

	CTI	**CRI**	**DBI**	**ROA*** **	**SIZE**	**Log Z-SCORE*** **	**MAHA*** **
No. of non-sanctioned	4,903	4,903	4,889	5,518	5,518	5,505	4,835
No. of sanctioned	291	291	291	328	328	327	289
Mean of non-sanctioned	0.7034	0.1626	0.1510	0.0054	13.1607	2.1188	0.8986
Mean of sanctioned	0.7289	0.1547	0.1569	0.0018	13.1729	1.9536	0.9086
Standard error of non-sanctioned	0.0043	0.0027	0.0031	0.0001	0.0229	0.0130	0.0024
Standard of error of sanctioned	0.0151	0.0110	0.0118	0.0007	0.0998	0.0525	0.0083
Diff in mean	-0.0255	0.0079	-0.0059	0.0037	-0.0122	0.1651	-0.0010
T	-1.6206	0.7529	-0.4828	4.9028	-0.1193	3.0504	-1.1597

Table 4 – Correlation matrix

This table presents correlation matrix between some variables. Definitions of all variables are provided in Table 1. Coefficients statistically significant at the 5% level are reported in bold characters.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	NPL1	1.00																	
2	MKTDIS	-0.02	1.00																
3	RWA	**-0.02**	**0.32**	1.00															
4	TIER1	**-0.24**	**-0.27**	**-0.32**	1.00														
5	TIER2	**0.08**	**0.05**	**-0.15**	**-0.07**	1.00													
6	TLTA	**0.07**	**0.22**	**0.35**	**-0.32**	-0.00	1.00												
7	NPL2	**0.44**	**-0.06**	**-0.05**	**0.05**	0.01	**-0.06**	1.00											
8	BOND	-0.01	-0.01	**-0.02**	0.02	-0.01	**-0.07**	0.00	1.00										
9	LIQ	**0.04**	**-0.09**	**-0.16**	**0.09**	**0.04**	**-0.28**	0.01	0.02	1.00									
10	CTI	**-0.04**	**-0.18**	**-0.10**	**0.28**	0.00	0.00	-0.00	-0.00	**-0.06**	1.00								
11	CRI	**-0.21**	**-0.38**	**-0.47**	**0.39**	0.02	**-0.22**	**-0.07**	-0.00	**0.04**	**0.24**	1.00							
12	DBI	**0.16**	**-0.12**	**-0.20**	0.00	**0.21**	0.01	0.02	-0.02	-0.01	**-0.13**	**0.18**	1.00						
13	ROA	**-0.33**	**0.05**	**0.09**	**-0.10**	**-0.07**	**-0.02**	**-0.16**	0.01	**0.04**	**-0.65**	**-0.08**	**-0.12**	1.00					
14	SIZE	**0.19**	-0.01	**-0.16**	**-0.27**	**0.34**	**0.21**	0.02	**-0.04**	**0.03**	**-0.29**	0.00	**0.45**	**0.06**	1.00				
15	Z-SCORE	**-0.28**	**-0.05**	**0.19**	**0.26**	**-0.17**	-0.01	**-0.02**	-0.01	-0.00	-0.01	0.01	**-0.20**	**0.19**	**-0.35**	1.00			
16	S_1	**0.13**	0.02	**0.04**	**-0.04**	**0.04**	-0.02	**0.04**	-0.00	-0.01	**0.03**	-0.01	0.02	**-0.08**	0.01	**-0.04**	1.00		
17	CRS	**0.15**	**0.05**	**0.06**	**-0.04**	-0.01	-0.02	**0.06**	-0.01	-0.01	0.01	**-0.04**	**-0.03**	**-0.06**	**-0.04**	-0.02	**0.66**	1.00	
18	S_4	**0.07**	0.00	**0.04**	**-0.03**	**0.04**	-0.00	0.02	-0.00	-0.01	0.01	**-0.02**	-0.01	**-0.04**	0.01	-0.02	**0.27**	**0.27**	1.00

Table 5 - The effect of the credit risk enforcement actions

The table reports coefficient estimates and robust standard errors (in parentheses) for the two-stage treatment effects model of equations (1) and (2). The sample period is 2005-2013. The first stage includes all explanatory variables in the second stage. Definitions for all variables are provided in Table 1. The dependent variables in each regression are noted in the first line of the table below. Independent variables are lagged 1 period. We also drop the observation at time *t+1* for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for giving us this suggestion. In the margin, we report coefficients and standard errors for the two instrumental variables. ***indicates significance of 1 percent or less; ** between 1 and 5 percent; * between 5 and 10 percent.

Dependent Variables at time t+1	(1) NPL1	(2) RWA	(3) TIER1	(4) TIER2	(5) TLTA
CRS	0.2572***	0.0600***	-0.0175*	0.0054**	-0.0638***
	(0.0410)	(0.0232)	(0.0102)	(0.0024)	(0.0153)
NPL1		-0.0559***	-0.0435***	0.0007	0.0081
		(0.0121)	(0.0081)	(0.0013)	(0.0097)
RWA	-0.2288***		-0.1512***	-0.0015	0.1876***
	(0.0423)		(0.0166)	(0.0019)	(0.0166)
TIER1	-0.0044***	-0.0032***		-0.0001**	-0.0017***
	(0.0006)	(0.0003)		(0.0000)	(0.0003)
TIER2	0.0909	-0.1722	-0.2741**		-0.4692***
	(0.2805)	(0.1530)	(0.1223)		(0.1254)
TLTA	0.1543***	0.3845***	-0.1851***	-0.0169***	
	(0.0541)	(0.0258)	(0.0232)	(0.0032)	
CTI	-0.3294***	-0.0136	0.0324**	0.0068***	0.0521***
	(0.0444)	(0.0227)	(0.0160)	(0.0022)	(0.0174)
CRI	-0.3931***	-0.2963***	0.0572***	-0.0039	-0.1364***
	(0.0398)	(0.0226)	(0.0186)	(0.0026)	(0.0219)
DBI	-0.0294	0.0236	0.0377***	0.0080***	-0.0140
	(0.0375)	(0.0200)	(0.0123)	(0.0021)	(0.0154)
ROA	-12.4131***	-1.3598**	-0.1290	-0.0838*	-0.2214
	(1.2437)	(0.6133)	(0.3262)	(0.0504)	(0.4286)
SIZE	-0.0089*	-0.0235***	-0.0117***	0.0033***	0.0117***
	(0.0047)	(0.0025)	(0.0016)	(0.0003)	(0.0018)
Z-SCORE	-0.0251***	0.0411***	0.0303***	-0.0011***	0.0027
	(0.0062)	(0.0029)	(0.0022)	(0.0003)	(0.0023)
Constant	1.1706***	0.6884***	0.5242***	-0.0166***	0.4386***
	(0.0991)	(0.0532)	(0.0369)	(0.0056)	(0.0382)
No. of observations	4,080	4,169	4,085	4,088	4,085
Firm bank specialization	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Tests:					
Underidentification (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification (F-stat)	175.238	170.772	167.469	168.180	167.936
Overidentification (p-value)	0.4236	0.8034	0.7299	0.2243	0.6204
		First Stage			
S_1	0.6217***	0.6000***	0.6036***	0.6117***	0.6043***
	(0.0396)	(0.0392)	(0.0392)	(0.0393)	(0.0392)
S_4	0.2631***	0.2661***	0.2600***	0.2333***	0.2604***
	(0.0783)	(0.0754)	(0.0770)	(0.0761)	(0.0770)

Table 6 - The effect of the credit risk enforcement actions – further estimations

The table reports coefficient estimates and robust standard errors (in parentheses) for the two-stage treatment effects model of equations (1) and (2). The sample period is 2005-2013. The first stage includes all explanatory variables in the second stage. Definitions of all variables are provided in Table 1. The dependent variables in each regression are noted in the first line of the table below. Independent variables are lagged 1 period. We also drop the observation at time *t+1* for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for giving us this suggestion. In the margin, we report coefficients and standard errors of the two instrumental variables. *** indicates significance of 1 percent or less; ** between 1 and 5 percent; * between 5 and 10 percent.

Dependent Variables at time t+1	(1) NPL2	(2) BOND	(3) LIQ
CRS	0.0337***	0.2087	-0.0010
	(0.0048)	(0.1270)	(0.0025)
NPL1		-0.0087	0.0042**
		(0.0168)	(0.0017)
RWA	-0.0098**	-0.1071***	-0.0030
	(0.0043)	(0.0142)	(0.0024)
TIER 1	-0.0002**	0.0002	-0.0001**
	(0.0001)	(0.0002)	(0.0001)
TIER 2	0.0661**	-0.3751***	0.0685***
	(0.0307)	(0.0880)	(0.0206)
TLTA	-0.0346***	-0.6470***	-0.0456***
	(0.0060)	(0.0218)	(0.0042)
CTI	-0.0361***	-0.0285**	-0.0011
	(0.0048)	(0.0126)	(0.0022)
CRI	-0.0479***	-0.0611***	0.0039
	(0.0043)	(0.0132)	(0.0030)
DBI	-0.0079**	0.0278***	-0.0075***
	(0.0039)	(0.0092)	(0.0021)
ROA	-1.3240***	-0.7937***	0.0798
	(0.1319)	(0.2712)	(0.0519)
SIZE	-0.0020***	-0.0078***	-0.0008***
	(0.0005)	(0.0014)	(0.0003)
Z-SCORE	-0.0019***	-0.0053***	0.0017***
	(0.0007)	(0.0018)	(0.0004)
Constant	0.1761***	0.8633***	0.0693***
	(0.0107)	(0.0307)	(0.0062)
No. of observations	4,097	4,085	4,085
Firm bank specialization	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Tests:			
Underidentification (p-value)	0.0000	0.0000	0.0000
Weak identification (F-stat)	172.143	18.048	167.543
Overidentification (p-value)	0.8036	0.5573	0.0513
		Fist Stage	
S_1	0.6128***	-0.0505***	0.6037***
	(0.0395)	(0.0152)	(0.0392)
S_4	0.2683***	-0.0383***	0.2600***
	(0.0780)	(0.0142)	(0.0770)

Table 7 - Market discipline and enforcement actions

The table reports coefficient estimates and robust standard errors (in parentheses) for the two-stage treatment effects model of equations (1) and (2). The sample period is 2005-2013. The first stage includes all explanatory variables in the second stage. Definitions of all variables are provided in Table 1. The dependent variables in each regression are noted in the first line of the table below. Independent variables are lagged 1 period. We also drop the observation at time *t+1* for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for giving us this suggestion. In the margin, we report coefficients and standard errors for the two instrumental variables. *** indicates significance of 1 percent or less; ** between 1 and 5 percent; * between 5 and 10 percent.

Dependent Variables at time t+1	(1) NPL1	(2) RWA	(3) TIER1	(4) TIER2	(5) TLTA
CRS	0.2631***	0.0613***	-0.0161	0.0049**	-0.0658***
	(0.0412)	(0.0237)	(0.0103)	(0.0024)	(0.0151)
MKTDIS	-0.3570***	0.1125***	-0.0465***	0.0185***	0.1359***
	(0.0470)	(0.0224)	(0.0138)	(0.0029)	(0.0182)
CRS*MKTDIS	0.7047***	0.1633***	0.0498*	-0.0053	-0.0835***
	(0.1358)	(0.0598)	(0.0292)	(0.0055)	(0.0324)
NPL1		-0.0525***	-0.0471***	0.0020	0.0181*
		(0.0125)	(0.0082)	(0.0013)	(0.0098)
RWA	-0.2144***		-0.1481***	-0.0027	0.1736***
	(0.0411)		(0.0166)	(0.0019)	(0.0166)
TIER 1	-0.0046***	-0.0029***		-0.0001**	-0.0016***
	(0.0006)	(0.0003)		(0.0000)	(0.0003)
TIER 2	0.3879	-0.2474	-0.2355*		-0.5677***
	(0.2805)	(0.1541)	(0.1228)		(0.1264)
TLTA	0.2233***	0.3659***	-0.1760***	-0.0200***	
	(0.0544)	(0.0264)	(0.0235)	(0.0033)	
CTI	-0.3394***	-0.0019	0.0292*	0.0082***	0.0610***
	(0.0459)	(0.0243)	(0.0161)	(0.0022)	(0.0169)
CRI	-0.4324***	-0.2869***	0.0509***	-0.0015	-0.1174***
	(0.0396)	(0.0227)	(0.0189)	(0.0026)	(0.0218)
DBI	-0.0221	0.0225	0.0379***	0.0079***	-0.0143
	(0.0372)	(0.0203)	(0.0124)	(0.0021)	(0.0154)
ROA	-12.1366***	-1.1027*	-0.1594	-0.0598	-0.0739
	(1.2538)	(0.6649)	(0.3306)	(0.0498)	(0.4223)
SIZE	-0.0079*	-0.0234***	-0.0115***	0.0033***	0.0111***
	(0.0047)	(0.0025)	(0.0016)	(0.0003)	(0.0018)
Z-SCORE	-0.0256***	0.0420***	0.0298***	-0.0009***	0.0038*
	(0.0061)	(0.0029)	(0.0022)	(0.0003)	(0.0023)
Constant	1.1736***	0.6563***	0.5272***	-0.0186***	0.4122***
	(0.0995)	(0.0550)	(0.0370)	(0.0056)	(0.0378)
No. of observations	4,080	4,085	4,085	4,088	4,085
Firm bank specialization	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Tests:					
Underidentification (p-	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification (F-stat)	175.487	167.681	167.394	167.917	168.280
Overidentification (p-value)	0.4969	0.8894	0.6847	0.2039	0.5272
		First Stage			
S_1	0.6211***	0.6022***	0.6020***	0.6102***	0.6032***
	(0.0396)	(0.0391)	(0.0392)	(0.0392)	(0.0391)
S_4	0.2638***	0.2606***	0.2605***	0.2335***	0.2610***
	(0.0781)	(0.0767)	(0.0766)	(0.0759)	(0.0767)

Table 8 - Market discipline and enforcement actions – further estimations

The table reports coefficient estimates and robust standard errors (in parentheses) for the two-stage treatment effects model of equations (1) and (2). The sample period is 2005-2013. The first stage includes all explanatory variables in the second stage. Definitions of all variables are provided in Table 1. The dependent variables in each regression are noted in the first line of the table below. Independent variables are lagged 1 period. We also drop the observation at time *t+1* for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for giving us this suggestion. In the margin, we report coefficients and standard errors for the two instrumental variables. *** indicates a level of significance equal to 1 percent or less; ** between 1 and 5 percent; * between 5 and 10 percent.

Dependent Variables at time t+1	(1) NPL2	(2) BOND	(3) LIQ
CRS	0.0335	0.0846**	-0.0090
	(0.0209)	(0.0418)	(0.0101)
MKTDIS	-0.0357***	0.0730***	-0.0086***
	(0.0053)	(0.0124)	(0.0027)
CRS*MKTDIS	0.0011	-0.2934**	0.0297
	(0.0671)	(0.1321)	(0.0310)
NPL1		0.0223***	0.0036**
		(0.0059)	(0.0018)
RWA	-0.0064	-0.0957***	-0.0024
	(0.0043)	(0.0102)	(0.0024)
TIER 1	-0.0002**	0.0002	-0.0001***
	(0.0001)	(0.0002)	(0.0001)
TIER 2	0.0947***	-0.4139***	0.0753***
	(0.0310)	(0.0837)	(0.0205)
TLTA	-0.0286***	-0.6752***	-0.0445***
	(0.0060)	(0.0182)	(0.0042)
CTI	-0.0387***	-0.0190*	-0.0019
	(0.0051)	(0.0107)	(0.0022)
CRI	-0.0512***	-0.0446***	0.0029
	(0.0044)	(0.0129)	(0.0030)
DBI	-0.0080**	0.0283***	-0.0076***
	(0.0039)	(0.0087)	(0.0021)
ROA	-1.3558***	-0.7195***	0.0689
	(0.1350)	(0.2394)	(0.0529)
SIZE	-0.0019***	-0.0080***	-0.0008***
	(0.0005)	(0.0012)	(0.0003)
Z-SCORE	-0.0022***	-0.0039**	0.0017***
	(0.0007)	(0.0016)	(0.0004)
Constant	0.1783***	0.8482***	0.0710***
	(0.0109)	(0.0286)	(0.0063)
No. of observations	4,097	4,085	4,085
Firm bank specialization	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Tests:			
Underidentification (p-value)	0.0000	0.0000	0.0000
Weak identification (F-stat)	18.381	18.629	18.705
Overidentification (p-value)	0.8745	0.1217	0.0714
	Fist Stage		
S_1	0.1547***	0.1557***	0.1561***
	(0.0283)	(0.0283)	(0.0283)
S_4	0.0916***	0.0919***	0.0916***
	(0.0468)	(0.0466)	(0.0466)

Table 9 - The effect of the credit risk enforcement actions a financial crisis

The table reports coefficient estimates and robust standard errors (in parentheses) for the two-stage treatment effects model of equations (1) and (2). The sample period is 2005-2013. The first stage includes all explanatory variables in the second stage. Definitions of all variables are provided in Table 1. The dependent variables in each regression are noted in the first line of the table below. Independent variables are lagged 1 period. We also drop the observation at time *t+1* for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for giving us this suggestion. In the margin, we report coefficients and standard errors for the two instrumental variables. *** indicates significance of 1 percent or less; ** between 1 and 5 percent; * between 5 and 10 percent.

Dependent Variables at time t+1	(1) NPL1	(2) RWA	(3) TIER1	(4) TIER2	(5) TLTA
CRS	0.2604***	0.0635***	-0.0173*	0.0054**	-0.0644***
	(0.0409)	(0.0235)	(0.0102)	(0.0024)	(0.0153)
CRISIS	-0.0882***	0.0075	0.0100*	0.0020**	0.0342***
	(0.0216)	(0.0083)	(0.0055)	(0.0010)	(0.0071)
CRISIS * CRS	0.2097***	0.0431*	0.0089	-0.0011	-0.0262**
	(0.0461)	(0.0224)	(0.0079)	(0.0020)	(0.0110)
NPL1		-0.0602***	-0.0438***	0.0008	0.0091
		(0.0124)	(0.0081)	(0.0013)	(0.0098)
RWA	-0.2412***		-0.1517***	-0.0014	0.1891***
	(0.0418)		(0.0167)	(0.0019)	(0.0167)
TIER 1	-0.0044***	-0.0031***		-0.0001**	-0.0017***
	(0.0006)	(0.0003)		(0.0000)	(0.0003)
TIER 2	0.0944	-0.1675	-0.2740**		-0.4690***
	(0.2803)	(0.1556)	(0.1223)		(0.1254)
TLTA	0.1622***	0.3888***	-0.1847***	-0.0169***	
	(0.0540)	(0.0261)	(0.0232)	(0.0032)	
CTI	-0.3207***	-0.0132	0.0327**	0.0068***	0.0512***
	(0.0439)	(0.0235)	(0.0160)	(0.0022)	(0.0175)
CRI	-0.3967***	-0.3023***	0.0569***	-0.0038	-0.1355***
	(0.0393)	(0.0227)	(0.0186)	(0.0026)	(0.0220)
DBI	-0.0238	0.0216	0.0380***	0.0080***	-0.0147
	(0.0373)	(0.0203)	(0.0123)	(0.0021)	(0.0155)
ROA	-12.0345***	-1.3382**	-0.1157	-0.0854*	-0.2600
	(1.2282)	(0.6446)	(0.3283)	(0.0506)	(0.4330)
SIZE	-0.0087*	-0.0233***	-0.0117***	0.0033***	0.0116***
	(0.0047)	(0.0025)	(0.0016)	(0.0003)	(0.0018)
Z-SCORE	-0.0235***	0.0411***	0.0304***	-0.0011***	0.0026
	(0.0062)	(0.0029)	(0.0022)	(0.0003)	(0.0023)
Constant	1.1587***	0.6800***	0.5240***	-0.0165***	0.4387***
	(0.0990)	(0.0542)	(0.0369)	(0.0056)	(0.0382)
No. of observations	4,080	4,085	4,085	4,088	4,085
Firm bank specialization	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Tests:					
Underidentification (p-	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification (F-stat)	175.143	167.661	167.250	167.986	167.752
Overidentification (p-value)	0.4650	0.8424	0.7209	0.2220	0.6014
		First Stage			
S_1	0.6215***	0.6036***	0.6032***	0.6114***	0.6039***
	(0.0396)	(0.0392)	(0.0392)	(0.0393)	(0.0392)
S_4	0.2632***	0.2604***	0.2602***	0.2335***	0.2606***
	(0.0782)	(0.0769)	(0.0768)	(0.0761)	(0.0769)

Table 10 - The effect of the credit risk enforcement actions and financial crisis – further estimations

The table reports coefficient estimates and robust standard errors (in parentheses) for the two-stage treatment effects model of equations (1) and (2). The sample period is 2005-2013. The first stage includes all explanatory variables of the second stage. Definitions of all variables are provided in Table 1. The dependent variables in each regression are noted in the first line of the table below. Independent variables are lagged 1 period. We also drop the observation at time *t+1* for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for giving us this suggestion. In the margin, we report coefficients and standard errors for the two instrumental variables. *** indicates significance of 1 percent or less; ** between 1 and 5 percent; * between 5 and 10 percent.

Dependent Variables at time t+1	(1) NPL2	(2) BOND	(3) LIQ
CRS	0.0340***	0.0073	-0.0010
	(0.0048)	(0.0072)	(0.0025)
CRISIS * CRS	-0.0129***	-0.0123**	0.0022
	(0.0024)	(0.0048)	(0.0014)
CRISIS	0.0242***	0.0103	-0.0001
	(0.0044)	(0.0066)	(0.0024)
NPL1		-0.0047	0.0042**
		(0.0054)	(0.0017)
RWA	-0.0113***	-0.0514***	-0.0030
	(0.0042)	(0.0095)	(0.0024)
TIER 1	-0.0002**	-0.0000	-0.0001**
	(0.0001)	(0.0002)	(0.0001)
TIER 2	0.0666**	-0.2158***	0.0685***
	(0.0307)	(0.0752)	(0.0205)
TLTA	-0.0337***	-0.6634***	-0.0456***
	(0.0060)	(0.0173)	(0.0042)
CTI	-0.0351***	-0.0026	-0.0011
	(0.0048)	(0.0098)	(0.0022)
CRI	-0.0484***	-0.0333***	0.0039
	(0.0043)	(0.0124)	(0.0030)
DBI	-0.0072*	0.0020	-0.0075***
	(0.0039)	(0.0084)	(0.0021)
ROA	-1.2790***	0.3373	0.0796
	(0.1314)	(0.2228)	(0.0521)
SIZE	-0.0020***	-0.0076***	-0.0008***
	(0.0005)	(0.0012)	(0.0003)
Z-SCORE	-0.0017***	-0.0001	0.0017***
	(0.0007)	(0.0014)	(0.0004)
Constant	0.1746***	0.8649***	0.0693***
	(0.0107)	(0.0267)	(0.0062)
No. of observations	4,097	4,085	4,085
Firm bank specialization	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Tests:			
Underidentification (p-value)	0.0000	0.0000	0.0000
Weak identification (F-stat)	172.049	167.325	167.325
Overidentification (p-value)	0.8487	0.7476	0.0512
	Fist Stage		
S_1	0.6127***	0.6033***	0.6033***
	(0.0395)	(0.0392)	(0.0392)
S_4	0.2684***	0.2602***	0.2602***
	(0.0780)	(0.0769)	(0.0769)

Table 11 - The effect of the credit risk enforcement actions on non-sanctioned banks

The table reports coefficient estimates and robust standard errors (in parentheses) for the two-stage treatment effects model of equations (1) and (2). The sample period is 2005-2013. The first stage includes all explanatory variables in the second stage. Definitions of all variables are provided in Table I. The dependent variables in each regression are noted in the first line of the table below. All dependent variables are calculated as variations between periods t+1 and t. Independent variables are lagged 1 period. We also drop the observation at time *t+1* for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for giving us this suggestion. ***indicates significance of 1 percent or less; ** between 1 and 5 percent; * between 5 and 10 percent.

Dependent Variables at time t+1	(1) NPL1	(2) RWA	(3) TIER1	(4) TIER2	(5) TLTA
MAHA	-1.0552***	0.2805**	0.2372***	-0.0037	0.2641***
	(0.1743)	(0.1165)	(0.0760)	(0.0118)	(0.0999)
NPL1		-0.0483***	-0.0435***	0.0000	0.0075
		(0.0133)	(0.0087)	(0.0014)	(0.0108)
RWA	-0.2338***		-0.1634***	-0.0027	0.1759***
	(0.0514)		(0.0183)	(0.0023)	(0.0208)
TIER 1	-0.0051***	-0.0036***		-0.0001**	-0.0024***
	(0.0007)	(0.0004)		(0.0001)	(0.0004)
TIER 2	-0.1917	-0.1280	-0.2784**		-0.2724*
	(0.3559)	(0.1795)	(0.1323)		(0.1449)
TLTA	0.1810***	0.3395***	-0.2107***	-0.0170***	
	(0.0628)	(0.0295)	(0.0264)	(0.0038)	
CTI	-0.2375***	-0.0837**	-0.0016	0.0082***	0.0018
	(0.0599)	(0.0330)	(0.0228)	(0.0031)	(0.0287)
CRI	0.1342	-0.4818***	-0.1216**	-0.0032	-0.3225***
	(0.1193)	(0.0755)	(0.0489)	(0.0078)	(0.0628)
DBI	0.2065***	-0.0626*	-0.0053	0.0070**	-0.0839***
	(0.0566)	(0.0322)	(0.0218)	(0.0034)	(0.0285)
ROA	-14.3248***	-2.0386***	0.3198	-0.0950*	0.3207
	(1.4352)	(0.6598)	(0.3526)	(0.0560)	(0.5309)
SIZE	-0.0066	-0.0270***	-0.0120***	0.0036***	0.0098***
	(0.0057)	(0.0028)	(0.0017)	(0.0003)	(0.0022)
Z-SCORE	-0.0381***	0.0441***	0.0296***	-0.0013***	0.0055**
	(0.0070)	(0.0033)	(0.0024)	(0.0004)	(0.0028)
Constant	1.2059***	0.7881***	0.5604***	-0.0173**	0.4900***
	(0.1222)	(0.0604)	(0.0419)	(0.0071)	(0.0478)
No. of observations	3,324	3,331	3,331	3,330	3,331
Firm bank specialization	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Tests:					
Underidentification (p-	0.0000	0.0000	0.0000	0.0000	0.0000
Weak identification (F-stat)	88.697	87.366	88.111	85.238	87.298
		Fist Stage			
Maha (lag)	0.3470***	0.3478***	0.3458***	0.3434***	0.3461***
	(0.0368)	(0.0372)	(0.0368)	(0.0372)	(0.0370)

Table 12 - The effect of credit risk enforcement actions on non-sanctioned banks – further estimations

The table reports coefficient estimates and robust standard errors (in parentheses) for the two-stage treatment effects model of equations (1) and (2). The sample period is 2005-2013. The first stage includes all explanatory variables in the second stage. Definitions of all variables are provided in Table I. The dependent variables in each regression are noted in the first line of the table below. All dependent variables are calculated as variations between periods t+1 and t. We also drop the observation at time *t+1* for each bank that received an enforcement action at the time *t* to face potential confounding effects. We would like to thank one of the referees for giving us this suggestion. Independent variables are lagged 1 period. *** indicates significance of 1 percent or less; ** between 1 and 5 percent; * between 5 and 10 percent.

Dependent Variables at time t+1	(1) NPL2	(2) BOND	(3) LIQ
MAHA	-0.1528***	-0.2310***	-0.9156***
	(0.0223)	(0.0597)	(0.1468)
NPL1		-0.0133**	
		(0.0060)	
RWA	-0.0064	-0.0523***	-0.1874***
	(0.0054)	(0.0109)	(0.0452)
TIER 1	-0.0001	-0.0000	-0.0046***
	(0.0001)	(0.0002)	(0.0006)
TIER 2	0.0396	-0.2483***	-0.3578
	(0.0396)	(0.0822)	(0.2991)
TLTA	-0.0304***	-0.6738***	0.0546
	(0.0073)	(0.0202)	(0.0547)
CTI	-0.0192***	0.0173	-0.1538***
	(0.0068)	(0.0144)	(0.0478)
CRI	0.0360**	0.1114***	0.1534
	(0.0148)	(0.0379)	(0.1029)
DBI	0.0260***	0.0494***	0.1835***
	(0.0071)	(0.0173)	(0.0469)
ROA	-1.5909***	-0.0343	-10.7338***
	(0.1504)	(0.2500)	(1.1839)
SIZE	-0.0011*	-0.0064***	-0.0001
	(0.0006)	(0.0013)	(0.0050)
Z-SCORE	-0.0036***	-0.0022	-0.0322***
	(0.0008)	(0.0017)	(0.0062)
Constant	0.1647***	0.8754***	0.9303***
	(0.0133)	(0.0295)	(0.1032)
No. of observations	3,337	3,331	3,355
Firm bank specialization	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Tests:			
Underidentification (p-value)	0.0000	0.0000	0.0000
Weak identification (F-stat)	88.840	86.551	85.379
	Fist Stage		
Maha (lag)	0.3473***	0.3439***	0.3399***
	(0.0368)	(0.0369)	(0.0367)