Corporate culture and enforcement actions in banking[+]

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Abstract

Enforcement actions are a key tool for supervisors to reduce moral hazard behavior at all banks, not just the sanctioned ones. Do regulatory supervisor actions influence bank culture? Using a sample of enforcement actions in the US between 2006 and 2013, we find little evidence that supervisory actions influence bank culture enough to cause changes in their behavior.

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"*It might sound surprising to a skeptical public, but culture was always a vital part of Goldman Sachs's success. It revolved around teamwork, integrity, a spirit of humility, and always doing right by our clients. The culture was the secret sauce that made this place great and allowed us to earn our clients' trust for 143 years … I am sad to say that I look around today and see virtually no trace of the culture that made me love working for this firm for many years*."

Greg Smith, Why I am leaving Goldman Sachs, op-ed, *New York Times*, p. A27, March 14 2012.

Following the financial crisis of 2008, the popular press, practitioners, and financial regulators have argued that corporate culture strongly influences bank risk-taking behavior and plays a key role in influencing banking stability.[1] Although regulators have advocated that supervisors consider the bank's risk culture during the supervision process[2], there are few papers that empirically investigate whether supervisory actions will indeed have an effect on bank corporate culture.

That is the question we investigate in this paper. Specifically, we examine if regulatory supervisory actions influence bank culture using a large sample of enforcement actions performed by the three U.S. authorities, the Federal Reserve System (FRS), the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC) for a sample of 397 U.S. banks between 2006 and 2013. There are however, three major issues that we face in empirically addressing this question.

[1] For example, the Financial Stability Board (FSB) stated "Weaknesses in risk culture are often considered a root cause of the global financial crisis, headline risk and compliance events" (FSB, 2014, Guidance on Supervisory Interaction with Financial Institutions on Risk Culture - A Framework for Assessing Risk Culture, p. 1). Similarly, HSBC notes in a letter written to the Financial Stability board on January 2014 that "establishing and maintaining a strong link culture is of fundamental importance in ensuring the sustainable success of an organization and to the reestablishment of trust of financial institutions and the banking sector" (Answer to the FSB Consultative document – Guidance on Supervisory Interaction with Financial Institutions on Risk Culture - A Framework for Assessing Risk Culture, 2014, page 1).

[2] In 2012, the FSB stressed the importance of exploring ways to assess risk culture at financial institutions, particularly at Systemically Important Financial Institutions (SIFIs) (FSB, Intensity and Effectiveness of SIFI Supervision – Progress Report to the G20 Ministers and Governors, November 2012, pages 3 - 4). On 18 November 2013, the Financial Stability Board (FSB) published its consultative document "Guidance on Supervisory Interaction with Financial Institutions on Risk Culture". About 30 parties provided written comments by 31 January 2014 and the FSB issued a final report "Guidance on Supervisory Interaction with Financial Institutions on Risk Culture: A Framework for Assessing Risk Culture" in April 2014.

The first is defining regulatory activities that are likely to have an impact on bank's activities and culture. Although there are a large number of regulatory tools, in this paper, we focus on enforcement actions because they are recorded, motivated, and publicly disclosed. In contrast, other supervisory actions such as recommendations, or requests for additional capital, are usually confidential. In particular, bank severe enforcement actions are high visibility actions, typically triggered directly by high risk-taking behavior at the bank or by a lack of risk controls. Hence the link between enforcement actions and bank culture is particularly stark. In this paper, we manually classify each FRS enforcement action from 2006 to 2013 (available on the press release section of the FRS website), using categories provided by Caiazza et al. (2014). This allows us to compare the effect of several kinds of enforcement actions on corporate culture.

The second is generating objective estimates of bank culture at the bank level. As Guiso, Sapienza, and Zingales (2006) note, economists have traditionally been reluctant to discuss culture as a determinant of economic phenomena perhaps because the notion of culture is nebulous, and raises numerous measurement issues in empirical research. Nonetheless, in what has been labeled the "culture revolution" by Zingales (2015), there has been a burgeoning interest in measuring culture objectively. Prior research has typically proxied for culture using either socio-demographic measures at the country levels (including religious identity, nationality, gender, blood donations, etc.) or social capital measures. In comparison, a relatively small handful of papers analyze corporate culture at the firm level (see for example, Fiordelisi and Ricci, 2014, and Guiso, Sapienza and Zingales, 2015). In this paper, we draw on Fiordelisi and Ricci (2014) in measuring cultural dimensions at the firm level. We define our cultural dimensions using a well-established framework in organizational behavior research (Cameron et al., 2006) and quantify corporate culture by assessing bank's 10-K reports through a text analysis approach. Text analysis has been used in various papers (see for example, Antweiler and Frank, 2004, Tetlock, 2007, Li, 2008, Tetlock et al., 2008, Loughran and McDonald, 2011, or Fiordelisi and Ricci, 2014) to quantify the information content of internet message boards, firm-specific news stories, and 10-K reports, and other sources.

The third is related to our identification strategy. In particular, addressing both endogeneity and reverse causality is important in our empirical methodology. For example, finding that a sanctioned bank's post-sanction performance (or risk-taking level) is negatively related to the

bank's pre-sanction performance (or risk-taking level) could be driven by a simple regression to the mean explanation instead of having a causal interpretation of sanctions on risk-taking. Previous papers on this topic attempt to deal with endogeneity and reverse causality issues using an instrumental variable approach. For example, Danisewicz et al. (2014) use an instrumental variable (IV) approach to estimate the influence of enforcement actions in the US on the unemployment rate, personal income growth, firm size and establishment per capita. Specifically, the authors use data for both severe actions (written agreements, cease and desist orders, prompt corrective actions, deposit insurance threats) and less severe actions (actions that extend exclusively to banks' personnel such as fines, civil money penalties, suspension, removal, and prohibition orders). They address the endogeneity problem by using lags of the first differences for a dummy variable for the less severe enforcement actions as instruments for the lag of the severe enforcement actions. Delis, Staikouras, and Tsoumas (2015) use the opening of a new branch by the same bank as an instrumental variable on the basis that it increases the probability of breaching the law-on-the-books due to changes in its operational structure.

Our approach differs substantially from these approaches since it is difficult to find a theoretically defendable IV variable that affects enforcement actions without being related to the bank risk culture. Enforcement actions (also labeled as "sanctions") are more likely to be endogenous treatments aimed at correcting bank behavior. In addition, an enforcement action is unlikely to be random (see Bertrand et al., 2004), being strongly driven by changes in banks' fundamentals. However, given the relatively recent emphasis on risk culture, measures of bank risk cultures are unlikely to be determinants in the decision to launch an enforcement action. Our identification strategy is therefore composed of three steps. First, for every bank in our sample, we calculate the probability (propensity score) of receiving a severe enforcement action, given a vector of covariates. Second, we posit that supervisory interventions influence the bank's activities and culture of both sanctioned and unsanctioned *similar* banks. Using a Propensity Score Matching technique (PSM), we match sanctioned banks with unsanctioned banks with similar propensity score values. Finally, we analyze the link between the propensity score calculated in the first step and changes in bank's activities and corporate culture of *non*-sanctioned banks.

We show that high bank risk taking and lower performance drive supervisory sanctions. Specifically, we provide evidence that low regulatory capital ratios, low performance, and high

credit-risk indicators tend to attract enforcement actions. These balance sheet fundamentals are likely to proxy for financial fragility, and the Supervisory Authority is relatively more likely to intervene in these banks to preserve the stability of the whole industry. Importantly, we show that banks with high probability of being sanctioned (i.e. non-sanctioned banks, with an ex ante risk of being sanctioned) tend to become more conservative and prudent along internal cultural dimensions. However, we also show that this change in culture appears unrelated to changes in bank activity, risk ratios or capital adequacy ratios.

Our paper makes two major contributions. To the best of our knowledge, we are the first paper to provide evidence of the influence of enforcement actions on corporate culture. This issue is likely to be of interest of policy makers, supervisors, practitioners, and academics since as the Financial Stability Board argues[3], corporate culture plays a key role in determining banks' risk appetite. Second, prior papers have assessed the causes and consequence of enforcement action only on the sanctioned bank. In contrast, we also analyze the enforcement actions' effect on non-sanctioned banks by explicitly computing the *ex ante* likelihood that the bank will be sanctioned. This is important because enforcement actions aim to reduce moral hazard at all banks, not just the sanctioned ones.

The rest of this paper is organized as follows. Section 1 presents our definitions of corporate culture and formulates our research hypotheses. The sample and the variables used in our empirical design are described in Section 2. Section 3 outlines our identification strategy and section 4 discusses the empirical results. We test the robustness of our results in section 5 and section 6 presents our conclusions.

1. Theory and Hypotheses

Our paper bridges two strands of the extant literature on corporate finance. The first strand assesses the effect of supervision on bank behavior while the second investigates the influence of corporate culture on firm policy

In the first strand, a large number of papers have analyzed the impact of regulation on bank behavior focusing on various issues such as lending (see for example, Ongena, Popov, and Udel,

[3] See *Principles for an Effective Risk Appetite Framework*, Financial Stability Board, 2013.

2013, Carlson, Shan, and Warusawitharana, 2013, or Lepetit, Saghi-Zedek and Tarazi, 2015), risk-taking (Fiordelisi, Marquez-Ibanez, and Molyneux, 2011, Harris and Raviv, 2014), economic growth (Jayaratne and Strahan, 1996, Berger and Hannan, 1998, Kroszner and Strahan, 1999), as well as developing financial sectors across the globe (Beck, Loayza, and Levine 2000; Bart, Caprio, and Levine, 2004).

The focus on the effect of supervision on bank behavior at the micro level is more recent. A few papers analyze the problem of supervisory inconsistency (Agarwal et al., 2014 in the US; Carretta et al., 2015 in Europe). A few other papers analyze the effects of enforcement actions on bank's behavior. On a micro-level, Delis and Staikouras (2011) document how sanctions lead to a decrease in banks' risk indicators while Gilbert and Vaughan (2001) find that depositors do not show a significant reaction to formal announcements of enforcement actions. In addition, Delis, Staikouras, and Tsoumas (2013) show that supervisory interventions focused on internal control and risk management failures appear to be well-timed in restraining increases in risk-weighted assets ratios without affecting bank fundamentals. At the macro-level, Danisewicz et al. (2014) show that enforcement actions negatively affect personal income growth, firm size, and number of establishments, and are associated with an increase in the unemployment rate. Lambert (2015) shows how sanction activity is weakened by lobbying activity in the banking sector, suggesting lobbying allows banks to obtain preferential treatment.

In the second strand, Guiso, Sapienza, and Zingales (2015) argue that the finance literature has almost ignored the role corporate culture plays in corporate actions, perhaps because the notion of culture is somewhat nebulous with attendant measurement issues in empirical research. Nonetheless, recent research has begun to explore the empirical link between culture and various economic phenomena using novel approaches to measuring culture (see for example, Bernhardt, Hughson, and Kutsoati, 2006, Guiso, Sapienza, and Zingales, 2009, 2015, Luttmer and Singhal 2011, and Fiordelisi and Ricci, 2014). However, most of these papers infer corporate culture by examining socio-demographic aspects at the country level (such as religion, nationality, gender, etc.) or social capital measures. A relative handful of papers measure corporate culture at the firm level.

Among the exceptions, Fiordelisi and Ricci (2014) draw on organization behaviour research (Cameron et al., 2006) to quantify corporate culture by assessing official documents using

a text analysis approach. They use this classification to examine the impact of culture on CEO turnover, especially in the case of poor firm-specific performance. Guiso, Sapienza, and Zingales (2015) measure corporate culture by using a novel data set developed by the Great Place to Work Institute, based on surveys of employees of more than 1,000 U.S. firms. They study the dimensions of corporate culture that are related to firm performance (measured by the Return on Sales and the Tobin's *q*) and show that integrity is positively correlated with financial performance and attractiveness of job offerings, and is negatively correlated with the degree of unionization.

Our paper bridges these two streams of literature. Our identification strategy is based on estimating the enforcement actions' effect on non-sanctioned banks by computing their ex ante perception of being sanctioned. First, we analyze corporate culture for all US listed banks using a text analysis approach. Following Cameron et al. (2006), we focus on four types of corporate culture (termed culture dimensions): control, competition, collaboration, and creation. We aggregate these dimensions into internal and external dimensions. The Cameron et al. framework in turn, draws on the competing values framework (CVF) in Quinn and Rohrbaugh (1983), an organizational taxonomy widely used in the literature (Ostroff et al., 2003; Hartnell et al., 2011; Schneider et al., 2013). Figure 1 summarizes the attributes of the corporate culture orientation proposed by Cameron et al. (2006).

There are two internally oriented culture types. The first is the *collaboration-oriented culture* (termed "clan culture type" in the CVF), which focuses on its employees, attempts to develop human competencies, and strengthen organizational culture by building a consensus. The underlying logic is that human affiliation to groups produces positive affective employee attitudes directed toward the organization. The goal of this culture is to develop cooperative processes and attain cohesion through consensus and broad employee involvement, e.g., clarifying and reinforcing organizational values, norms, and expectations, developing employees and cross-functional work groups, implementing programs to enhance employee retention, and fostering teamwork and decentralized decision making. Companies with this culture usually focus on hiring, developing, and retaining their human resource base. The other internally oriented culture is the *control-oriented culture* (also called "hierarchy culture"), which is supported by an organizational structure driven by control mechanisms. The corporate aim is creating value through internal improvements in efficiency, the implementation of better processes (e.g., by the extensive use of

processes, systems, and technology) and quality enhancements (such as statistical process control and other quality control processes). Companies with this culture usually make extensive use of standardized procedures and emphasize rule reinforcement and uniformity.

The other two types of culture are externally oriented. The first is a *competition-oriented culture* (termed "market culture type" in the CVF). This type of culture focuses on the organization's external effectiveness by pursuing enhanced competitiveness and emphasizing organizational effectiveness, fast response, and customer focus. These companies usually attach the highest priority to customers and shareholders and judge success based on such indicators as market share, revenues, meeting budget targets, and profitability growth. The other external culture type is a *creation-oriented culture* (termed "adhocracy" in the CVF), which focuses on creating future opportunities in the marketplace through innovation in the organization's products and services. The organization encourages entrepreneurship, vision, and constant change, e.g., allowing for freedom of thought and action among employees. Rule breaking and reaching beyond barriers are common characteristics of the organization's culture. These companies usually aim to develop innovative product-line extensions, radical new process breakthroughs, new technologies and innovations in distribution and logistics that redefine entire industries.

Our analysis is based on the general hypothesis that internal and external culture types respond to enforcement actions in different ways. We loosely follow Hartnell et al. (2011), who link CVF culture types to three effectiveness categories: employee attitudes (e.g., employees' commitment and satisfaction), operational effectiveness (e.g., organizations' innovative processes and products), and financial effectiveness (i.e., organizations' ability to achieve profits, growth, and, in general, measures of success).

Hartnell et al. (2011) argue that externally oriented cultures (the competition- and creation-oriented cultures) are more likely to exhibit strong positive associations with financial effectiveness. These companies are inclined to integrate external environmental information to construct clear and coherent goals to increase organizational members' attention toward profitable activities (Cameron et al., 2006; Chao et al., 1994). Specifically, a highly competition-oriented culture tolerates change and instability and even trumpets these values. Hence it is likely for these companies that changing everything (e.g. due to enforcement actions and to the risk of being sanctioned) would be perceived as a natural step. A highly creation-oriented culture also exhibits

a positive link with financial effectiveness, e.g., through a team empowerment mechanism (Chen et al., 2007). In contrast, internally oriented cultures (as the control- and collaboration-oriented cultures) are likely to be less reactive to external environment influences (such as enforcement actions).

Based on the assumptions in Hartnell et al. (2011), we therefore hypothesize that banks with externally oriented cultures react to the enforcement action (if sanctioned) and the threat of receiving an enforcement action (if not sanctioned) by modifying their culture. Since the enforcement action has a "negative" content and meaning, we predict that the enforcement action (and also the probability of receiving an enforcement action) will reduce the external orientation of the banks' cultures. Conversely, we posit that banks with an internally oriented culture have low incentives to react to the enforcement action (and also the threat of receiving an enforcement action) by modifying their culture. In fact, an enforcement action (or the probability of receiving a sanction) is more likely to lead internally oriented banks to increase their internal focus. In addition, we posit that banks with flexible cultures are more likely to be able to change their cultures. Hence banks with externally *flexible* oriented cultures (labeled "create" by Cameron et al. (2006)) have a higher ability to react (and are quicker in reacting) to the enforcement action (or the threat of receiving an enforcement action) than banks with external and *stable* cultures (labeled "compete" cultures by Cameron et al. 2006).

2. Data and Variables

This section describes our data on enforcement actions, corporate culture, and balance sheet variables. We collect data from various sources. We collect enforcement actions data from 2006 to 2013 from the SNL financial database. We obtain 3,368 company filings for a sample of 526 U.S. listed banks by downloading the 10-K reports from the SEC Edgar database, from 2004 to 2013. This gives us a unique dataset of 59,456 year-observations, combining supervisory and accounting information. A severe enforcement action occurs in 2,116 year-observations, at a frequency of approximately 3.56%.

For each of these filings, we run a text analysis to estimate each cultural dimension identified by Cameron et al. (2006). Since information about corporate culture dimensions is not available for every bank, the second step reduces our sample to 2,678 year-observations, covering

513 banks. We obtain bank financial data from the Consolidated Report of Condition and Income (usually known as Call Reports) from 2004 to 2013. Every supervised financial institution has to provide these regulatory filings quarterly and the Supervisory Authority usually relies on this flow of information to assess supervised institutions.

2.1 Enforcement actions

We focus on enforcement actions performed by the FDIC, the OCC, and the FRS on U.S. listed banks between 2006 and 2013. These actions are differentiated into severe (i.e. written agreements, cease and desist orders, prompt corrective actions, or deposit insurance threats) and less severe (civil money penalties and sanctions against personnel) sanctions. As in Danisewicz et al. (2014) and Lambert (2015), we focus on severe enforcement actions since these are likely to have the largest impact on bank culture.

There are several types of severe actions. First, "written agreements" are agreements between the two parties (supervisor and bank), who jointly establish all corrective measures the bank needs to adopt. To illustrate, in 2012, the FRS reached a written agreement with Patapsco Bank, stating *"Within 60 days of this Agreement, the Bank shall submit to the Reserve Bank and the Commissioner an acceptable written plan to strengthen credit risk management practices. The plan shall, at a minimum, address, consider, and include: (a) Strategies to limit and reduce concentrations in commercial real estate credit; and (b) strategies to minimize credit losses and reduce the level of problem assets*." Second, "cease and desist orders" are unilateral measures imposed by the authority to the bank after hearings, to repair unsound or unsafe practices. For example, the OCC issued the following order against the First National Bank of South Florida, in 2010: *"The Bank shall achieve by September 30, 2010, and thereafter maintain the following capital levels: (a) Tier 1 capital at least equal to nine percent (9%) of adjusted total assets; and (b) Total risk based capital at least equal to thirteen percent (13%) of risk-weighted assets."* Third, "prompt corrective actions" are issued to banks that are significantly undercapitalized. The purpose of this action is to restore regulatory capital levels. For example, the OCC notified Citizens National Bank in 2009: *"Not later than May 15, 2009, the Bank shall submit to the Director of Special Supervision ("Director") a fully executed binding agreement to: (a) Sell enough shares or obligations of the Bank so that the Bank will become "adequately capitalized" by June 30,*

2009; (b) Merge with or be acquired by another financial institution, financial holding company, or other entity whereby the resulting depository institution would be at least "adequately capitalized". Finally, "deposit insurance threats" are issued before receivership, leading to the sale or the termination of the charter. We create a dummy variable called *sanction*, taking the value 1 if the bank receives a severe enforcement action in a given year, and 0 otherwise.

2.2 Corporate culture variables

We adapt the corporate culture framework used by Cameron et al. (2006). This framework has four main corporate culture orientations. The first two types are internally oriented: *collaborate-* and *control- oriented* cultures. The other two types are externally oriented: *creation* and *competition* corporate cultures.

To translate the above culture types into objective categories, we use a text analysis approach. The use of text analysis has been rapidly growing recently in the academic literature (see for example Antweiler and Murray, 2004; Hoberg and Hanley, 2010; Hoberg and Phillips, 2010; Li, 2008; Loughran and McDonald, 2011; Tetlock, 2007; or Tetlock et al, 2008). Text analysis measures the frequency of words belonging to a certain category in official documents (10-K reports, in our case). We use standard financial reporting language as a measure of the bank's corporate culture. Specifically, for all four types of corporate culture, we define a set of synonyms using a two-step procedure (Carretta et al. 2011), in order to avoid subjectivity problems. In the first step, the synonyms are those suggested by Cameron et al. (2006). In the second step, all the selected words are looked up in the Harvard IV-4 Psychosocial Dictionary to identify other synonyms. The percentage of the selected words belonging to a certain orientation expresses the corporate culture estimate. We compute a score for all four culture dimensions for every bank using all US listed banks' official documents (10-K reports) from 2005 to 2011.

In our analysis, we first focus on external oriented cultures since these banks are the most likely to be reactive to external events such as enforcement actions. In addition, since flexible cultures are more likely to be able to modify their cultures, we distinguish "external and flexible cultures" (labeled "Create" cultures by Cameron et al., 2006) from "external and stable cultures" (labeled "Compete" cultures by Cameron et al., 2006).

2.3 Other variables

We use various accounting and financial items to measure bank activities and risks that we believe are likely to be influenced by enforcement actions. Specifically, we use various measures of bank activities, capital and risk and scale these variables by total assets to account for the size differences between banks. The liquid asset ratio (total liquid assets over total assets) captures the amount of assets that banks can quickly convert into cash. The loan ratio (total loans over total assets), performing loan ratio (total performing loans over total assets), and non-performing loans ratio (Non-Performing Loans over total assets) capture the importance and the quality of lending activities in the bank. The risk-weighted assets (RWA) ratio (total RWA over total assets) measure the bank's overall risk from the supervisory authorities standpoint and the Tier 1 ratio (total Tier 1 capital over total assets) quantifies bank regulatory capital levels. All these variables are defined inn Table 1.

Table 2 reports summary statistics for the number of enforcement actions (Panel A), and the main variables used in the paper (Panel B). All banks in our sample are commercial banks where the lending component dominates total assets (63.1% of total assets on average), with a mean non-performing loan ratio of 1.1%. The mean liquid asset ratio is 6.7% while the Tier 1 capital ratio is 10.5%.

Panel C in Table 2 compares descriptive statistics for the sample of banks where we are able to estimate corporate culture dimensions. Specifically, we divide the sample according to the dominant corporate culture dimension (i.e. the dimension with the highest culture score). Not entirely surprisingly, externally oriented banks have a greater proportion of risk-weighted assets than internally oriented banks (a mean difference of 1.55%, statistically significant at the 1% confidence level), have a higher loan-asset ratio (0.88% mean difference statistically significant at the 10% level), and \a higher proportion of non-performing loans (-0.43% mean difference statistically significant at the 1% level). The highest levels of non-performing loans are at banks with external stable cultures, perhaps because they attempt to obtain wider market shares by being less severe in screening borrowers.

3. Methodology

In order to study the effect of enforcement actions on bank culture, we use a multi-step procedure. First, we focus on banks that received a severe enforcement action by estimating the change in bank's activity, risk, and capital adequacy ratios in the years preceding and following the sanction. We do so by estimating the following fully saturated model:

$$Y_{i,j,t} = \beta_0 + \sum_{s=-3}^{-2} \gamma_s \, Pre - Sanction(-s)_{i,j,t} + \sum_{s=0}^{3} \gamma_s \, Sanction(+s)_{i,j,t} + \delta_i + \delta_{j\times t} + \varepsilon_{i,t} \quad (1)$$

where the dependent variable $Y_{i,j,t}$ (i indexes bank, j the state where it is registered, and t the year of measurement) is either a measure of bank activities (specifically, total loans and liquid assets ratios), risk (risk-weighted assets ratio), or capital adequacy (Tier 1 capital ratio). *Pre-Sanction* is a dummy variable that takes a value one if it is 's' years before the bank received an enforcement action and zero otherwise. For example, *Pre-Sanction -3* is an indicator variable that equals one if it is three years before the bank received a severe enforcement action and *Sanction 3* equals one if it is three years after the bank received a severe enforcement action. The model is fully saturated with the year immediately before a bank received the sanction as the excluded category. Therefore, the coefficients on *Sanction(-s)* [*Sanction(s)*] compare the level of the dependent variable 's' years before [after] the bank received a severe enforcement action. The inclusion of bank fixed effects (δi) ensure that each indicator is estimated using only within firm variation in the dependent variable, and time dummies, ($\delta t \times j$), control for state × time level trends.

In the second step, we estimate the change in bank's culture in the years preceding and following the enforcement action by estimating a fully saturated model similar to model (1), but after replacing the dependent variable with our culture estimates (*internal* vs. *external oriented* and *external stable vs external flexible*).

In the third step, we interact enforcement action variables with corporate culture changes in order to estimate the variation in bank's activities, risk and capital adequacy in the years preceding and following the sanction. Specifically, we implement the following fully saturated model:

$$
\begin{aligned}
Y_{i,j,t} = \beta_0 + \sum_{s=-3}^{-2} \theta_s High\ \Delta Culture_{i,j,t} \times\ Pre - sanction(-s)_{i,j,t} \\
+ \sum_{s=0}^{3} \theta_s High\ \Delta Culture_{i,j,t} \times\ Sanction(s)_{i,j,t} \\
+ \sum_{s=-3}^{-2} \varphi_s \left(1 - High\ \Delta Culture_{i,j,t}\right) \times\ Pre - sanction(-s)_{i,j,t} \\
+ \sum_{s=0}^{3} \varphi_s \left(1 - High\ \Delta Culture_{i,j,t}\right) \times\ Sanction(s)_{i,j,t} + \text{Culture} + \delta_i \\
+ \delta_{j \times t} + \varepsilon_{\text{i,t}}
\end{aligned}
\tag{2}
$$

where the dependent variable $Y_{i,j,t}$ (as before, *i* indexes bank, *j* the state where it is registered, and *t* the year of measurement) is as in (1) either a measure of bank activities, risk, or capital adequacy. $High\ \Delta Culture_{i,j,t}$ is a dummy variable that takes a value one if the yearly change of the corporate culture dimension for the ith bank is ranked in the fourth quartile at time t, zero otherwise. All regressions include bank- and state-time fixed effects.

Enforcement actions are unlikely to be exogenous shocks since supervisory interventions are driven by bank breaches of supervisory requirements and violations. It is also plausible to posit that sanctioned banks will modify their behavior after the sanction, to avoid any possible new supervisory intervention. Hence, we next focus only on banks that were not targets of enforcement actions.

To measure the spillover effect, we analyze the effect of enforcement actions on those banks which were not the target of such actions. Specifically, we adopt a Propensity Score Matching (PSM) approach, a non-parametric estimation procedure. This technique allows us to estimate the propensity sore, the ex-ante probability of receiving an enforcement action, given a vector of covariates. The PSM technique also allows us to reduce the number of non-treated units (banks that did not receive an enforcement action) to a sub-sample which is likely to be a reasonable counterfactual with characteristics homogeneous to the treated units (banks that received an enforcement action).

We first run a probit regression in the model (2) with a sanction as our binary dependent variable (S), including the following balance sheet variables as regressors (i.e. a vector of variables labeled as *V*): risk-weighted assets ratio (RWA), Tier 1 capital (T1), liquidity (LIQ), net income (NI), non-performing loans (NPL), performing loans (PL), leverage ratio (LEV), Return on Assets (ROA). We also control for state-time fixed effects. This procedure is repeated separately for each year from 2006 to 2013.

$$\Pr(S_i = 1 | V_i) = \Phi(\omega_0 + \omega_1 T1_i + \omega_2 NI_i + \omega_3 RWA_i + \omega_4 PL_i + \omega_5 NPL_i + \omega_6 LEV + \omega_7 LIQ_i + \omega_8 ROA_i + \delta_{j\times t}) \quad (3)$$

Once we compute the propensity score for all the banks in our sample in year *t*, we match each treated bank with its five nearest neighbors who did not receive an enforcement action in the same year. To estimate this spillover effect, we adopt the following fully saturated model:

$$Y_{i,j,t} = \beta_0 + \sum_{s=-3}^{-2} \gamma_s \, Neighbor(-s)_{i,j,t} + \sum_{s=0}^{3} \gamma_s \, Neighbor(s)_{i,j,t} + \delta_i + \delta_{j\times t} + \varepsilon_{i,t} \quad (4)$$

The dependent variable is defined as before, as either a measure of bank activities, risk, capital adequacy. *Neighbor* is an indicator variable that takes a value one if it is '*s*' years before (after) the bank has been classified as a nearest neighbor to enforced banks. As usual, firm- and state-time fixed effects are also included. We repeat model (4) after replacing the dependent variable with our culture estimates (*collaborate-, compete-, control-, and create-*). In the final step, we interact the *Neighbor* indicator variable with the bank corporate culture, to estimate any effect on banks' activities, risk and capital adequacy using the following regression model:

$$
\begin{aligned}
Y_{i,j,t} = \beta_0 + \sum_{s=-3}^{-2} \theta_s High\ \Delta Culture_{i,j,t} \times\ Neighbor(-s)_{i,j,t} \\
+ \sum_{s=0}^{3} \theta_s High\ \Delta Culture_{i,j,t} \times\ Neighbor(s)_{i,j,t} \\
+ \sum_{s=-3}^{-2} \varphi_s \left(1 - High\ \Delta Culture_{i,j,t}\right) \times\ Neighbor(-s)_{i,j,t} \\
+ \sum_{s=0}^{3} \varphi_s \left(1 - High\ \Delta Culture_{i,j,t}\right) \times\ Neighbor(s)_{i,j,t} + \delta_i\ + \delta_{j\times t} \\
+ \varepsilon_{i,t}
\end{aligned}
\tag{5}
$$

where the variables are defined as before.

4. Results

In section 4.1, we report results on the unconditional relation between bank culture and enforcement actions by focusing on banks that received the actions. In Section 4.2, we report the results from the PSM technique, based on the k-nearest neighbor method. We shift our focus to banks that did not receive an enforcement action using the estimated propensity score (for the probability of receiving an enforcement action) given a vector of covariates (risk and performance indicators generally driving US regulatory interventions) in Section 4.3.

4.1. The unconditional relationship between culture and enforcement

In Table 3, we report coefficients from model (1) above in our full sample, including both listed and non-listed banks. Controlling for bank and time-state fixed effects, Panel A shows that relative to the year immediately preceding the sanction, pre-sanction indicator variables for other years are unrelated to the total Risk Weighted Asset ratio, Liquid Asset ratio, and Loan ratio (models 1, 2, and 3). In contrast, in the post-sanction period, the risk-weighted asset ratio and loan ratio go down,

while the liquid asset ratio increases simultaneously. These results are economically significant. The mean value of the risk weighted asset ratio across all banks in our sample is 0.6777. Hence, there is a 4.1% (-0.0276/0.6777) decrease in the risk weighted asset ratio in the year after the sanction is imposed, relative to the sample mean (the decrease is 3.7% two years after the sanction). There is a similar decline in lending activities: the loan ratio declines by 3.01% in the year after the sanction is imposed, 4.8% after two years and 1.8% after three years relative to the sample mean. Conversely, there is an increase of 25.07% in the liquid asset ratio relative to the sample mean in the year after the sanction and of 21.0% after two years. This is consistent with the hypothesis that sanctions affect bank behavior: after an enforcement action, banks reduce their risk by reducing lending activities (that absorbed capital as the credit risk increases) and increase the level of liquid assets (that are considered less risky by regulator). In addition, sanctions work quickly: the level of lending activities is unaffected relative to year -1 three years after the sanction was imposed.

We next analyze the unconditional effect of enforcement actions and corporate culture focusing on US listed banks. In Table 4, the dependent variable is bank culture. Controlling for bank, time, and state fixed effects, we show that relative to the year immediately preceding the sanction, pre-sanction indicator variables for other years are largely unrelated to the bank culture for the years immediately preceding the sanction. In contrast, in the post-sanction period, the level of emphasis on both internal and external cultures in the 10-K reports drop almost immediately (models 1 and 2). Again these results are economically significant. Relative to the year before the sanction, the percentage of words reflecting internal culture dimensions declines by 11.9% (in year t+1), 9.0% (t+2), and 11.1% (t+3) relative to the sample mean.[4] The drop in external culture emphasis however, is largely restricted to the external and stable culture banks. The external and flexible culture banks significantly increase their emphasis on their culture in the years of and immediately after the sanction.

In our third step, we test if bank culture influences the effect of sanctions on bank performance and risk-taking. Specifically, we re-estimate model 1 after interacting enforcement action variables with bank internal- and external culture changes. We define $High\ \Delta Culture_{i,j,t}$

[4] Corporate culture is quite stable over time. The annual growth rates are -1.1%, 3.2%, 2.5%, and 2.4% for the collaborate culture, the compete culture, the control culture, and create culture dimensions respectively.

as a dummy variable that takes a value one if the yearly change of the corporate culture dimension for the ith bank is ranked in the fourth quartile at time t, zero otherwise. We term these banks as culture-sensitive. We interact this dummy variable with the pre-sanction variables and post-sanction variables. The results are reported in Table 5.

We find that regardless of the culture dimension, the banks with the highest changes in culture appear to react strongly in the period immediately after the sanction. For example externally-oriented culture-sensitive sanctioned banks (high Δculture) reacted almost immediately to the sanctions, reducing their risk weighted ratios in both the year of the sanction and the year immediately after. In contrast, banks with lower external culture sensitivity continue to reduce their risk-weighted ratios every year up to 3 years after the announcement of the sanction. Similar effects show up when we examine the liquidity ratios and loan ratios. High culture sensitive banks reduce both their liquidity ratios and increase lending activities. Finally low external culture sensitive banks reduce tier-1 asset ratios in the years after the sanction. These results contrast with those for internally oriented banks. Internally oriented banks react slightly more slowly than externally oriented banks (most of the reaction appears in year 1 as opposed to the year of the sanction). Similar to externally oriented banks, high internal culture-sensitive banks also reduce their levels of risk-weighted assets (and their level of Tier 1 assets) and increase their lending ratios. However, in contrast to externally oriented banks, they significantly increase the levels of their liquid assets.

4.2 Finding matching banks

In this section, we use the PSM methodology to find comparable untreated units (banks which did not receive an enforcement action) to those banks that received an enforcement action. The association between units is based on similar levels of propensity scores, given a vector of covariates (i.e. risk and performance indicators generally driving US regulators' interventions), as detailed in model (3). This procedure allows us to determine the sign and the effect of the balance sheet determinants on enforcement actions. Hence, we report in Table 6 the results of a cross-sectional probit regression, performed each year from 2006 to 2013.

In each year, we find a strong positive relationship between non-performing loans and the probability of being subject to an enforcement action (significant at the 1% level). Since banking regulation is typically centered on risk indicators, it is not surprising that we find that higher levels of non-performing loans increase the probability of receiving an enforcement action. In addition, the probability of receiving an enforcement action also increases when the level of risk-weighted assets increases (significant at 1% level in four of 8 years). This result is intuitive: if the asset side has a high-risk regulatory profile, regulatory intervention to improve credit administration and financial soundness is more likely. We also find a strong negative relationship (significant in six of 8 years) between the probability of being sanctioned and net income, an indicator of financial soundness. Finally there is a positive (and significant in six of 8 years) relationship between intervention and leverage ratio, an indicator of financial distress.

Goodness-of-fit diagnostics of our model are illustrated in the Receiver Operating Characteristic (ROC) curves in Figure 2 for each year. These enable us to evaluate the performance of our prediction model by comparing the true positive rate (the rate of sanctioned banks accurately predicted: labeled "sensitivity") and the false positive rate (the rate of non-sanctioned banks accurately predicted: labeled "1 – specificity") at various threshold settings. Focusing on the probability of receiving an enforcement action by one of the three main US banking-related authorities (i.e. FRS, OCC, and FDIC), the area under the ROC curve is more than 0.8 in each year (except 2006). Moreover, if we select the empirical frequency of enforcement actions in our sample as a threshold, the sensitivity is greater than 80% in every year, while specificity is higher than 60% in almost all years. Panel B of Table 6 reports the results of balancing tests to verify if the treated (sanctioned banks) and control groups (non-sanctioned banks) present comparable mean values of the vector X of covariates, in each year. There are no significant differences in terms of mean values of covariates between treated and control groups, and hence the balancing property appears to be satisfied.

4.3 Non-sanctioned banks: The enforcement action effect on bank culture

Since enforcement actions are unlikely to be exogenous, we next focus only on banks that did not receive enforcement actions (labeled as "non-treated"). We assess the effect of enforcement actions on non-sanctioned banks as a function of the probability of being sanctioned. Specifically,

our core independent variable is a dummy variable that takes the value 1 if the bank is among the top five similar banks (estimated using nearest-neighbor matching on a propensity score) and 0 otherwise. As dependent variables, we use the same bank activity used to investigate the unconditional relationship between culture and enforcement in Section 4.1.

We make two identifying assumptions. First, we assume that enforcement actions have a spillover effect on non-sanctioned banks with similar features to the sanctioned ones (labeled as "matched banks") by reducing their risk-taking. Second, we assume that enforcement actions lead to a corporate culture change for banks that received an enforcement action.

Controlling for bank and time-state fixed effects, Panel A in Table 7 shows that relative to the year immediately preceding the sanction, pre-sanction indicator variables for other years are largely unrelated to the activity, risk or capital adequacy ratios in models 1-4, while the non-performing loans ratio declines sharply in model 6, perhaps why these banks escaped sanctions. In contrast, in the post-sanction period, both the risk-weighted assets and performing loans ratio decline significantly, while simultaneously the liquid assets and tier 1 ratios increase. After a bank received an enforcement action, matched banks appear to reduce their risk-weighted assets in proportion of total assets. This is achieved by a simultaneous increase in the proportion of liquid assets (that are considered less risky by regulators) and an increase in Tier 1 capital ratio. We also note that the performing loans of matched banks decline from the year of the sanction up to three years after the sanction year. This decline is likely to be due to two complementary reasons: banks may be more selective in granting loans (i.e. a real effect). In addition, they may also change their reporting standards becoming stricter in reporting non-performing loans (i.e. a reporting effect). Our results suggest that the decline in performing loans for the matched banks is due to both factors: we find an increase of the non-performing loans ratio (suggesting the adoption of more stringent reporting rules for non-performing loans) and an increase of liquid assets (suggesting that matched banks built up their level of liquid assets instead of lending).

Although the magnitude of estimated coefficients for matched banks is lower than those estimated for sanctioned banks, economically they remain significant. The mean value of the risk weighted asset ratio across all banks (excluding the sanctioned banks) in our sample is 0.6762. Hence, there is a 1.2% (-0.0079/0.6762) decrease in risk weighted asset ratio in the year after the sanction is imposed relative to the sample mean (the decrease is 2.2% two years after the sanction).

There is a similar decline in lending activities: the loan ratio declines by 1.1% in the year after the sanction is imposed, 3.1% after two years and 2.4% after three years relative to the sample mean. Conversely, there is a 6% increase in the liquid asset ratio relative to the sample mean in the year after the sanction and a 12% increase after two years. The matched banks also increase their tier 1 capital ratio by 1.9% in the year after the sanction, by 3.1% at t+2 and 2.3% at t+3 relative to the sample mean.

Overall, our results strongly show that matched banks react to enforcement actions in a very similar way to banks that were really sanctioned showing a spillover effect of enforcement actions on matched banks.

We next analyze the effect of enforcement actions on the culture of matched banks. In Table 8, the dependent variable is bank culture. The spillover effect on the culture of matched banks is much weaker than the effect on bank activities. The post-sanction indicator variables are only significant for the internal culture oriented banks one year after the sanction. For banks with an external orientation, the effect is insignificant immediately after the sanction but appears to show up three years after the sanction year. In addition, this change appears restricted to the external and flexible culture matched banks. There is no effect on the cultures of external and stable banks. The results are economically significant. Relative to the year before the sanction, the percentage of words reflecting the term creation in the internal-culture dimension increases by 5.23% (in year *t*+2) relative to the sample mean, while words referring to external culture dimensions increase by 4.23% (in year *t*+3).

In our final step, we test if bank culture influences the effect of sanctions on matched bank's activities. Specifically, we estimate equation (5) in section 5 using matched banks in place of the sanctioned banks. Similar to the previous case for sanctioned banks, we interact the main variable of interest ($High\ \Delta Culture_{i.j.t}$) with the pre-sanction variables and post-sanction variables for each of the culture dimensions. The results are reported in Table 9. Panel A reports results for external oriented cultures while Panel B reports results for internal cultures.

The culture at matched banks does not appear to play a significant role in influencing the relationship between bank activities and enforcement actions. Across all models in Table 9, matched external culture sensitive banks do not appear to change their activities or risks significantly after a similar bank receives a sanction. The one exception is for the loan ratio (Panel

A, column 3), which appears to be driven by a drop in performing loans. There is little impact on non-performing loans. Our results for internal culture sensitive banks are broadly similar.

6. Conclusions

Do supervisory actions influence bank culture? We show that they do not appear to. While supervisory enforcement actions lead sanctioned banks to reduce their risk taking by increasing liquid assets and reducing lending, and also change the corporate culture of sanctioned banks. Hoewever though there appears to be a spillover effect to cultural effects at non-sanctioned banks, the effect on culture is lower and there does not appear to be a significant effect on their activities or risk taking behavior. Overall, our results cast doubt on the possibility that supervisory actions can influence bank culture enough to cause material changes to their behavior.

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Table 1: Variable descriptions

This table reports the descriptions and the symbols of all variables used in the paper. Data are from **(*)** Call Reports, (¥) SNL Financial, (+) 10K reports from the SEC Edgar database, (#) US department of justice, (±) Bureau of Economic Analysis, (★) authors' calculations.

Variable name	Description
High ΔCulture Change	Dummy variable that takes value one if the yearly culture variation is ranked in the 4th quartile (i.e. banks with the largest rate of changes), 0 otherwise
Risk-Weighted Assets	The natural log of the Regulatory Risk-Weighted Assets
Risk-Weighted Assets ratio*	The ratio between Risk-weighted assets (net of deductions) and Total assets
Liquid Assets	The natural log of the total amount of cash balances and balances due from other depository institutions
Liquid Asset Ratio*	The ratio between cash and balances due from other depository institutions and Total assets
Tier 1 capital	The natural log of the Tier 1 regulatory capital
Tier 1 ratio*	The ratio between Tier 1 regulatory capital and Total assets
Net Income	The natural log of the net income
Return on Assets*	The ratio between net income and Total assets
Leverage ratio*	The ratio between Total debt and Equity capital
Sanction	All severe sanctions: Set equal to 1 if the bank has received a severe enforcement action by US authorities (FRS, OCC, FDIC), 0 otherwise

Table 2: Descriptive statistics

This table reports descriptive statistics. Panel A reports the number of enforcement actions performed by the Federal Deposit Insurance Corporation (FDIC), Office of the Comptroller of the Currency (OCC, and the Federal Reserve System (FRS). Data on enforcement actions are taken from SNL Financial. Severe actions consist of cease and desist orders, written agreements, prompt corrective actions and deposit insurance threats. Less severe actions consist of civil money penalties, suspensions and fines. *Panel B* reports descriptive statistics for the variables used in the paper. *Panel C* reports descriptive statistics for the banks according to the dominant culture: data are reported for each dominant culture and in aggregate. (+) Data reported are the p-values.

Panel A – Number of enforcement actions performed by the FDIC. OCC. and FRS

	All actions	Less severe	Severe
2006	253	170	83
2007	242	157	85
2008	405	213	192
2009	718	240	478
2010	920	320	600
2011	589	288	301
2012	494	237	257
2013	337	208	129
Total	3.958	1.833	2.125

Panel B - Descriptive statistics for the main variables used in the paper

Variable	N	Mean	S.D.	Min	Max
Internally Oriented Cultures	3368	2.9641	0.4784	0.0000	7.4700
Externally Oriented Cultures	3368	3.9069	0.6311	0.0000	7.6900
Compete Oriented Culture	3368	3.1280	0.5879	0.0000	7.6900
Create Oriented Culture	3368	0.7789	0.1867	0.0000	1.9800
Risk Weighted Assets / Total Assets	75031	0.6777	0.1381	0.3147	0.9818
Liquid assets / Total Assets	75139	0.0670	0.0674	0.0068	0.3683
Total Loans / Total Assets	75175	0,6310	0,1615	0,1538	0,9181
Performing Loans / Total Assets	75030	0.6201	0.1583	0.1617	0.9091
Non-Performing Loans / Total Assets	75030	0.0113	0.0162	0.0000	0.0933
Tier 1/ Total Assets	75094	0.1051	0.0422	0.0459	0.3377

Panel C: Descriptive statistics for the banks whose estimates of culture were available

	(1) Externally Oriented cultures	**(2) Internally-Oriented cultures**	**Both (1) and (2)**	**$H_1^{(+)}$ mean(1)-mean(2)<0**	**$H_2^{(+)}$ mean(1)-mean(2) ≠0**	**H_3 mean(1)-mean(2)>0**
Risk Weighted Assets / Total Assets	0.7335	0.7180	0.7261	0.9998	0.0005	0.0002
Liquid assets / Total Assets	0.0467	0.0432	0.0450	0.9845	0.0311	0.0155
Total Loans / Total Assets	0.6724	0.6636	-0.4265	0.9668	0.0663	0.0332
Performing Loans / Total Assets	0.6574	0.6531	0.6553	0.8201	0.3597	0.1799
Non-Performing Loans / Total Assets	0.0148	0.0105	0.0127	1.0000	0.0000	0.0000
Tier 1/ Total Assets	0.0888	0.0885	0.0886	0.6699	0.6602	0.3301
No. of Observations	1522	1396	2918			

(*cont'd*)	**(3) External Flexible culture**	**(4) External Stable culture**	**Both (3) and (4)**	**$H_1^{(+)}$ mean(3)-mean(4)<0**	**$H_2^{(+)}$ mean(3)-mean(4) ≠0**	**H_3 mean(3)-mean(4)>0**
Risk Weighted Assets / Total Assets	0.6941	0.7454	0.7244	0.0000	0.0000	1.0000
Liquid assets / Total Assets	0.0442	0.0483	0.0466	0.0481	0.0962	0.9519
Total Loans / Total Assets	0.6499	0.6788	0.6670	0.0000	0.0000	1.0000
Performing Loans / Total Assets	0.6366	0.6635	0.6525	0.0000	0.0001	1.0000
Non-Performing Loans / Total Assets	0.0132	0.0152	0.01440	0.0099	0.0199	0.9901
Tier 1/ Total Assets	0.0901	0.0879	0.0888	0.9443	0.1114	0.0557
No. of Observations	613	886	1499			

Table 3: The effect of enforcement actions on bank activities and risks

This table reports coefficients from model (1). The sample is composed of all US banks (both listed and non-listed) between 2005 and 2013. If one of these banks received a severe enforcement action from FDIC, OCC, and FRS, the variable "sanction" takes the value of 1, 0 otherwise. *Pre-Sanction* is a dummy variable that takes a value one if it is '*s*' years before the bank received an enforcement action and zero otherwise. *Sanction* is a dummy variable that takes a value one if it is '*s*' years after the bank received an enforcement action and zero otherwise. The model is fully saturated with the year immediately before a bank received the sanction as the excluded category. All variables are defined in table 2. Standard errors are clustered at the bank level. ***, **, and * indicate statistical significance at the 1, 5, and 10% levels respectively.

	(1) *Risk Weighted Assets / Total Assets*	(2) *Liquid Assets / Total Assets*	(3) *Total Loans/ Total Assets*	(4) *Tier 1 / Total Assets*
Pre-Sanction (-3)	0.0040	0.0010	0.0019	0.0024*
	(0.0047)	(0.0040)	(0.0047)	(0.0013)
Pre-Sanction (-2)	-0.0007	0.0003	0.0039	-0.0002
	(0.0033)	(0.0031)	(0.0033)	(0.0010)
Sanction (0y)	-0.0146***	0.0101***	-0.0146***	-0.0052***
	(0.0033)	(0.0029)	(0.0035)	(0.0009)
Post-Sanction (+1)	-0.0276***	0.0168***	-0.0190***	-0.0030**
	(0.0054)	(0.0050)	(0.0053)	(0.0014)
Post-Sanction (+2)	-0.0251***	0.0141**	-0.0303***	0.0011
	(0.0064)	(0.0055)	(0.0062)	(0.0018)
Post-Sanction (+3)	-0.0063	-0.0007	-0.0112*	0.0046**
	(0.0078)	(0.0057)	(0.0063)	(0.0019)
Bank Fixed Effects	Yes	Yes	Yes	Yes
Time×State Effects	Yes	Yes	Yes	Yes
Observations	12,492	12,505	12,51	12,5
R-squared	0.1737	0.1419	0.1564	0.0586

Table 4: The effect of enforcement actions on the culture at sanctioned banks

This table reports coefficients from the model (1). The sample is composed of US listed banks between 2005 and 2013. If one of these banks received a severe enforcement action from FDIC, OCC, and FRS, the variable "sanction" takes the value of 1, 0 otherwise. *Pre-Sanction* is a dummy variable that takes a value one if it is '*s*' years before the bank received an enforcement action and zero otherwise. *Sanction* is a dummy variable that takes a value one if it is '*s*' years after the bank received an enforcement action and zero otherwise. The model is fully saturated with the year immediately before a bank received the sanction as the excluded category. All variables are defined in table 2. Cultural definitions are in Figure 1. Standard errors are clustered at the bank level. ***, **, * indicate statistical significance at the 1, 5, 10% levels respectively.

	(1)	(2)	(3)	(4)
Culture type	Internal	External	External & Stable	External & Flexible
Pre-Sanction (-3)	-0.0489	-0.2979**	-0.3527***	0.0548
	(0.0915)	(0.1225)	(0.1217)	(0.0397)
Pre-Sanction (-2)	-0.0172	-0.1232	-0.1230	-0.0003
	(0.0719)	(0.0773)	(0.0934)	(0.0393)
Sanction (0y)	-0.0026	-0.1919**	-0.2909***	0.0990***
	(0.0624)	(0.0806)	(0.0735)	(0.0314)
Post-Sanction (+1)	-0.3523***	0.0052	-0.2187**	0.2239***
	(0.0973)	(0.1220)	(0.1087)	(0.0701)
Post-Sanction (+2)	-0.2669*	0.1601	-0.2059	0.3660***
	(0.1398)	(0.2033)	(0.1877)	(0.1089)
Post-Sanction (+3)	-0.3299***	0.2951**	0.1475	0.1477
	(0.1067)	(0.1281)	(0.1208)	(0.0932)
Bank Fixed Effect	Yes	Yes	Yes	Yes
Time × State Effect	Yes	Yes	Yes	Yes
Observations	432	432	432	432
R-squared	0.5481	0.5523	0.6020	0.6543

Table 5 – The effect of enforcement actions on bank activities after interacting with bank culture

This table reports coefficients from model (5). The sample is composed of US listed banks between 2005 and 2013. If one of these banks received a severe enforcement action from FDIC, OCC, and FRS, the variable "sanction" takes the value of 1, 0 otherwise. *Pre-Sanction* and Sanction dummies are defined in Table 3. The variable $High\ \Delta Culture_{i.j.t}$ is a dummy variable that takes a value one if the yearly change of the corporate culture dimension for the ith bank is ranked in the fourth quartile at time t. zero otherwise. We interact this dummy variable with the pre-sanction variables and post-sanction variables. The model is fully saturated with the year immediately before a bank received the sanction as the excluded category. All variables are defined in table 2 and culture dimensions in Figure 1. Standard errors are clustered at the bank level. ***, **, and * indicate statistical significance at the 1, 5, and 10% levels respectively.

	External culture dimensions				*Internal culture dimensions*			
	Risk Weighted Assets / Total Assets	*Liquid Assets / Total Assets*	*Total Loans/ Total Assets*	*Tier 1 /Total Assets*	*Risk Weighted Assets / Total Assets*	*Liquid Assets / Total Assets*	*Total Loans/ Total Assets*	*Tier 1 /Total Assets*
High ΔCulture × Pre-Sanction (-2)	0.0391	-0.0287	0.0191	-0.0043	-0.1096***	-0.0148	0.0111	-0.0051
	(0.0319)	(0.0264)	(0.0800)	(0.0167)	(0.0141)	(0.0367)	(0.0100)	(0.0067)
(1-High ΔCulture) ×Pre-Sanction (-2)	-0.0743***	0.0271	-0.0284	-0.0135	-0.0330	0.0175	-0.0082**	-0.0025
	(0.0203)	(0.0216)	(0.0351)	(0.0116)	(0.0325)	(0.0261)	(0.0039)	(0.0136)
High ΔCulture ×Sanction (0)	-0.0353**	-0.0029	-0.0391*	-0.0065	-0.0112	-0.0224**	0.0169*	-0.0104*
	(0.0138)	(0.0103)	(0.0235)	(0.0056)	(0.0169)	(0.0112)	(0.0098)	(0.0054)
(1-High ΔCulture) × Sanction (0)	-0.0515**	0.0147	-0.0004	-0.0244***	-0.0514	0.0398	0.0225**	-0.0297**
	(0.0212)	(0.0122)	(0.0270)	(0.0079)	(0.0312)	(0.0266)	(0.0114)	(0.0129)
High ΔCulture × Post-Sanction (+1)	-0.1435**	-0.1261*	0.2387***	0.0166	-0.1950***	0.1143***	0.0265***	-0.0827***
	(0.0558)	(0.0663)	(0.0813)	(0.0109)	(0.0416)	(0.0199)	(0.0081)	(0.0111)
(1-High ΔCulture) ×Post-Sanction (+1)	-0.0816***	0.0110	-0.0392	-0.0229**	-0.0954***	0.0092	0.0337***	-0.0226*
	(0.0245)	(0.0176)	(0.0430)	(0.0104)	(0.0291)	(0.0237)	(0.0111)	(0.0115)
High ΔCulture × Post-Sanction (+2)	-0.0359	-0.1350***	0.2512***	0.0016	-0.0908*	0.0238	0.0157	-0.0194
	(0.0420)	(0.0382)	(0.0944)	(0.0171)	(0.0469)	(0.0303)	(0.0146)	(0.0152)
(1-High ΔCulture) ×Post-Sanction (+2)	-0.1281***	0.0483*	-0.0663	-0.0260*	-0.1345***	0.0518*	0.0215	-0.0231
	(0.0325)	(0.0274)	(0.0447)	(0.0140)	(0.0387)	(0.0308)	(0.0132)	(0.0169)
High ΔCulture × Post-Sanction (+3)	0.0098	-0.0904***	0.1843**	-0.0093	-0.1807***	0.0636***	0.0143*	-0.0064
	(0.0361)	(0.0297)	(0.0787)	(0.0154)	(0.0515)	(0.0237)	(0.0085)	(0.0128)
(1-High ΔCulture) ×Post-Sanction (+3)	-0.1370***	0.0275*	-0.0982*	0.0152	-0.0562*	-0.0400	0.0090	0.0031
	(0.0447)	(0.0141)	(0.0525)	(0.0135)	(0.0339)	(0.0542)	(0.0149)	(0.0116)
Culture level	0.0391	-0.0287	0.0191	-0.0043	0.0051	0.0077	0.0088	0.0032
	(0.0319)	(0.0264)	(0.0800)	(0.0167)	(0.0377)	(0.0295)	(0.0064)	(0.0094)
Bank Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	0.3970	0.2862	0.3865	0.2297	494	494	494	494
R-squared	0.6177	0.5845	0.6507	0.5114	0.3954	0.2217	0.3674	0.2327

Table 6 – Matching sanctioned and unsanctioned banks

Panel A reports propensity score matching variables. The propensity score is calculated year by year by running model (3). We use *k*-nearest neighbor method with *k*=5. The sample is composed of all US banks (both sanctioned and non-sanctioned) between 2006 and 2013. The dependent variable is a dummy variable taking the value 1 if the bank has received a severe enforcement action by US authorities (FRS, OCC, and FDIC), and 0 otherwise. The independent variables are summarized in Table 2. Standard errors are clustered at the bank level and are reported in brackets. Panel B reports the results from a balancing test of the mean values of covariates for both sanctioned and unsanctioned banks matched on PSM. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

Panel A – Propensity score matching: coefficient estimates

	2006	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
Risk Weighted								
Assets/Tot. Assets	0.9840*	0.4683	1.0513*	1.6957***	1.5368***	1.5478***	0.6916	1.4987***
	(0.5343)	(0.5710)	(0.5554)	(0.4844)	(0.4396)	(0.5260)	(0.4934)	(0.5194)
Liquidity	0.1251	0.0655	-0.0318	-0.0117	0.1541***	0.1079**	0.1690***	0.0994
	(0.0801)	(0.0796)	(0.0681)	(0.0527)	(0.0461)	(0.0517)	(0.0549)	(0.0627)
Performing Loans	-0.0464	-0.1728	-0.2414	-0.4105**	-0.1662	-0.3567*	-0.0942	-0.6008***
	(0.1675)	(0.1765)	(0.2385)	(0.1787)	(0.1897)	(0.2110)	(0.2004)	(0.1669)
Non-Performing Loans	0.1313***	0.2298***	0.3143***	0.4711***	0.5767***	0.3396***	0.4052***	0.1233***
	(0.0442)	(0.0482)	(0.0459)	(0.0534)	(0.0460)	(0.0463)	(0.0522)	(0.0454)
Tier 1 Capital	0.2439	-0.0257	0.2572	-0.0140	-0.4692**	0.2262	-0.1618	0.7780***
	(0.1954)	(0.2010)	(0.2506)	(0.1855)	(0.2095)	(0.2174)	(0.2133)	(0.1967)
Net Income	-0.3140***	-0.1187	-0.1653**	-0.0510	-0.1163**	-0.2528***	-0.2082***	-0.1820**
	(0.1013)	(0.1070)	(0.0761)	(0.0729)	(0.0573)	(0.0625)	(0.0632)	(0.0908)
Leverage ratio	0.0247	0.0175	0.0665**	0.1622***	0.0723***	0.1060***	0.0773***	0.1306***
	(0.0263)	(0.0285)	(0.0297)	(0.0196)	(0.0224)	(0.0255)	(0.0241)	(0.0262)
Return on Assets	78.2123	16.7632	-26.5477	-60.3689	11.9940	109.0873***	59.4739	73.2418
	51.7606	56.4896	53.2085	-57.3025	41.9231	41.6409	43.7796	54.7431
State Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4.838	5.467	5.604	5.099	5.231	4.502	5.574	4.654

Panel B: The balancing test between treated and control groups

2006 Variable	Mean Treated	Control	t-test t	p>t	2007 Treated	Mean Control	t-test t	p>t
RWA/TA	0.74427	0.74619	-0.08	0.933	0.73641	0.74188	-0.24	0.811
LIQ	9.5741	9.4948	0.26	0.797	8.6356	8.7343	-0.41	0.685
PL	12.57	12.436	0.43	0.667	11.694	11.795	-0.39	0.699
NPL	7.5024	7.3984	0.31	0.756	7.2244	7.231	-0.02	0.982
T1	10.615	10.495	0.4	0.691	9.7924	9.9365	-0.6	0.550
NI	6.8505	6.6951	0.42	0.678	5.8786	6.0368	-0.5	0.618
LEV	9.6597	9.4939	0.33	0.742	9.0466	8.7967	0.52	0.602
ROA	0.00294	0.00285	0.28	0.783	0.00261	0.00271	-0.28	0.779
2008 Variable	**Mean Treated**	**Control**	**t-test t**	**p>t**	**2009 Treated**	**Mean Control**	**t-test t**	**p>t**
RWA/TA	0.7921	0.7928	-0.05	0.964	0.7709	0.76017	0.90	0.371
LIQ	9.1333	9.1940	-0.31	0.760	9.2024	9.1823	0.12	0.904
PL	12.380	12.454	-0.36	0.718	12.065	12.02	0.32	0.751
NPL	8.5101	8.5116	-0.01	0.995	8.7215	8.706	0.08	0.934
T1	10.332	10.419	-0.46	0.648	9.9356	9.9129	0.17	0.868
NI	6.0324	6.0552	-0.09	0.931	5.5283	5.3472	1.00	0.319
LEV	9.6213	9.4354	0.60	0.546	11.511	11.525	-0.04	0.969
ROA	0.0019	0.0017	0.77	0.444	0.0015	0.0014	0.62	0.533
2010 Variable	**Mean Treated**	**Control**	**t-test t**	**p>t**	**2011 Treated**	**Mean Control**	**t-test t**	**p>t**
RWA/TA	0.7392	0.73633	0.33	0.744	0.71244	0.7088	0.29	0.770
LIQ	9.5776	9.4947	0.64	0.525	9.974	10.193	-1.07	0.287
PL	11.941	11.817	1.11	0.268	12.171	12.305	-0.69	0.490
NPL	8.8787	8.6865	1.34	0.181	9.0396	9.0629	-0.1	0.921
T1	9.9057	9.7899	1.06	0.291	10.208	10.409	-1.03	0.306
NI	5.4105	5.2234	1.26	0.207	5.7389	5.8929	-0.59	0.559
LEV	10.534	10.454	0.30	0.763	10.335	9.9626	0.92	0.356
ROA	0.0015	0.0015	0.46	0.643	0.00175	0.00189	-0.66	0.512
2012 Variable	**Mean Treated**	**Control**	**t-test t**	**p>t**	**2013 Treated**	**Mean Control**	**t-test t**	**p>t**
RWA/TA	0.6747	0.6675	0.49	0.622	0.68705	0.68051	0.31	0.760
LIQ	10.439	10.431	0.03	0.973	11.145	10.964	0.46	0.648
PL	12.381	12.395	-0.06	0.950	13.073	12.934	0.37	0.712
NPL	9.2994	9.2784	0.09	0.928	9.3826	9.2183	0.39	0.698
T1	10.392	10.446	-0.23	0.816	11.294	11.119	0.46	0.649
NI	6.0785	5.9815	0.33	0.739	7.1391	6.9381	0.43	0.668
LEV	10.765	10.484	0.63	0.531	9.3910	9.7608	-0.57	0.570
ROA	0.0015	0.0015	0.46	0.643	0.0022	0.0023	-0.04	0.969

Table 7 – The spillover effect of enforcement actions on bank activities

This table reports coefficients from equation (4) in section 3. The sample is composed of all US banks (both listed and non-listed) between 2005 and 2013 that did not receive a severe enforcement action. Our core independent variable is the variable *Matched*. i.e. a dummy variable that takes the value of 1 if the bank is selected in a given year among one of the top five similar banks (estimated using 5-nearest neighbor matching on a propensity score (ps-match2) obtained using the model 3) of a bank that received a severe enforcement action in the same year (labeled as "matched bank") and 0 otherwise. As dependent variables, we use the same bank activity variables used to investigate the unconditional relationship between culture and enforcement carried out whose results are reported in the Table 3. *Pre- Matched(-s)* is a dummy variable that takes a value one if it is '*s*' years before the bank was selected as "matched bank" and zero otherwise. *Post- Matched(+s)* is a dummy variable that takes a value one if it is '*s*' years after the bank selected as "matched bank" and zero otherwise. The model is fully saturated with the year immediately before a bank received the sanction as the excluded category. All variables are defined in tables 1 and 2. Standard errors are clustered at the bank level. ***, **, * indicate statistical significance at the 1.5.10% levels respectively.

	(1) *Risk Weighted Assets / Total Assets*	(2) *Liquid Assets / Total Assets*	(3) *Total Loans/ Total Assets*	(4) *Tier 1 /Total Assets*	(5) *Performing Loans/ Total Assets*	(6) *Non-Performing Loans/ Total Assets*
Pre-Sanction (-3)	0.0050*	-0.0042*	0.0008	0.0015	0.0040	-0.0031***
	(0.0030)	(0.0023)	(0.0030)	(0.0009)	(0.0031)	(0.0007)
Pre-Sanction (-2)	0.0003	0.0000	0.0022	-0.0002	0.0038	-0.0017***
	(0.0026)	(0.0021)	(0.0024)	(0.0007)	(0.0025)	(0.0006)
Sanction (0y)	-0.0029	0.0066***	-0.0033	0.0000	-0.0096***	0.0063***
	(0.0026)	(0.0020)	(0.0022)	(0.0005)	(0.0023)	(0.0006)
Post-Sanction (+1)	-0.0079**	0.0043*	-0.0069**	0.0020**	-0.0102***	0.0032***
	(0.0033)	(0.0026)	(0.0031)	(0.0008)	(0.0031)	(0.0009)
Post-Sanction (+2)	-0.0148***	0.0086***	-0.0192***	0.0033***	-0.0216***	0.0023**
	(0.0038)	(0.0030)	(0.0036)	(0.0010)	(0.0037)	(0.0009)
Post-Sanction (+3)	-0.0085**	0.0028	-0.0150***	0.0024*	-0.0160***	0.0007
	(0.0038)	(0.0028)	(0.0038)	(0.0013)	(0.0039)	(0.0008)
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time×State Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,829	11,842	11,847	11,837	11,829	11,829
R-squared	0.1506	0.1265	0.1409	0.0418	0.1713	0.1168

Table 8 – The effect of enforcement actions on the culture of non-sanctioned banks

This table reports coefficients from equation (4) in Section 3. The sample is composed of US listed banks between 2005 and 2013 that did not receive a severe enforcement action. Our core independent variable is the variable *Matched*. i.e. a dummy variable that takes the value of 1 if the bank is selected in a given year among one of the top five similar banks (estimated using 5-nearest neighbor matching on a propensity score (ps-match2) obtained using the model 3) of a bank that received a severe enforcement action in the same year (labeled as "matched bank") and 0 otherwise. As dependent variables, we use the same bank activity variables used to investigate the unconditional relationship between culture and enforcement carried out whose results are reported in the Table 3. *Pre-Matched* is a dummy variable that takes a value one if it is '*s*' years before the bank was selected as "matched bank" and zero otherwise. *Post- Matched* is a dummy variable that takes a value one if it is '*s*' years after the bank selected as "matched bank" and zero otherwise. The model is fully saturated with the year immediately before a bank received the sanction as the excluded category. All variables are defined in tables 1 and 2. Standard errors are clustered at the bank level. ***, **, * indicate statistical significance at the 1.5.10% levels respectively.

	(1)	(2)	(3)	(4)
Culture type	Internal	External	External & Stable	External & Flexible
Pre-Sanction (-3)	-0.0250	-0.1652**	-0.1950**	0.0299
	(0.0394)	(0.0798)	(0.0787)	(0.0203)
Pre-Sanction (-2)	-0.0101	-0.1387**	-0.1159*	-0.0228
	(0.0434)	(0.0690)	(0.0672)	(0.0186)
Sanction (0y)	0.0574	-0.1208	-0.1072	-0.0136
	(0.0445)	(0.0985)	(0.0984)	(0.0246)
Post-Sanction (+1)	0.1525***	-0.0893	-0.0609	-0.0284
	(0.0585)	(0.0921)	(0.0886)	(0.0359)
Post-Sanction (+2)	0.0322	0.1155	0.1078	0.0077
	(0.0421)	(0.0877)	(0.0835)	(0.0315)
Post-Sanction (+3)	-0.0799	0.1706**	0.0389	0.1317**
	(0.0952)	(0.0710)	(0.0691)	(0.0567)
Bank Fixed Effect	Yes	Yes	Yes	Yes
Time × State Effect	Yes	Yes	Yes	Yes
Observations	407	407	407	407
R-squared	0.4732	0.5267	0.4788	0.6826

Table 9 – The spillover effect of Enforcement Actions on bank activities by accounting for the control culture

This table reports coefficients from equation (5) in Section 3. The sample is composed of US listed banks between 2005 and 2013 that did not receive a severe enforcement action. Our core independent variable is the variable *Matched*. i.e. a dummy variable that takes the value of 1 if the bank is selected in a given year among one of the top five similar banks (estimated using 5-nearest neighbor matching on a propensity score (ps-match2) obtained using the model 3) of a bank that received a severe enforcement action in the same year (labeled as "matched bank") and 0 otherwise. *Pre-Matched* (-*s*) is a dummy variable that takes a value one if it is '*s*' years before the bank was selected as "matched bank" and zero otherwise. *Matched(+s)* is a dummy variable that takes a value one if it is '*s*' years after the bank selected as "matched bank" and zero otherwise. The variable $High\ \Delta Culture_{i.j.t}$ is a dummy variable that takes a value one if the yearly change of the corporate culture dimension for the ith bank is ranked in the fourth quartile at time t, zero otherwise. We interact this dummy variable with the pre-sanction variables and post-sanction variables for each of the external and internal cultures (respectively, in Panel A and B). The model is fully saturated with the year immediately before a bank received the sanction as the excluded category. All variables are defined in tables 1 and 2. Standard errors are clustered at the bank level. ***, **, * indicate statistical significance at the 1.5.10% levels respectively.

Panel A – External cultures	(1) *Risk Weighted Assets / Total Assets*	(2) *Liquid Assets / Total Assets*	(3) *Total Loans/ Total Assets*	(4) *Tier 1 / Total Assets*	(5) *Performing Loans/ Total Assets*	(6) *Non-Performing Loans/ Total Assets*
High ΔCulture × Pre-Matched(-2)	-0.0374	0.0072	0.0075	-0.0081*	0.0056	0.0062***
	(0.0239)	(0.0120)	(0.0120)	(0.0042)	(0.0121)	(0.0020)
(1-High ΔCulture) ×Pre- Matched (-2)	0.0043	0.0117	-0.0232*	-0.0005	-0.0216	-0.0047**
	(0.0166)	(0.0144)	(0.0134)	(0.0063)	(0.0134)	(0.0021)
High ΔCulture × Matched (0)	-0.0443	0.0083	-0.0673***	-0.0055	-0.0580**	-0.0061
	(0.0414)	(0.0222)	(0.0250)	(0.0101)	(0.0255)	(0.0045)
(1-High ΔCulture) × Matched (0)	-0.0279	0.0110	-0.0237	-0.0077	-0.0340	0.0060**
	(0.0271)	(0.0278)	(0.0209)	(0.0114)	(0.0224)	(0.0028)
High ΔCulture × Post- Matched (+1)	0.0241	-0.0139	0.0041	-0.0124	-0.0058	0.0062
	(0.0333)	(0.0275)	(0.0222)	(0.0137)	(0.0214)	(0.0049)
(1-High ΔCulture) ×Post- Matched (+1)	-0.0162	-0.0100	0.0162	-0.0037	0.0164	0.0032
	(0.0167)	(0.0130)	(0.0170)	(0.0044)	(0.0169)	(0.0031)
High ΔCulture × Post- Matched (+2)	-0.0235	-0.0046	-0.0066	-0.0052	-0.0177	0.0094
	(0.0327)	(0.0289)	(0.0198)	(0.0089)	(0.0188)	(0.0060)
(1-High ΔCulture) ×Post- Matched (+2)	-0.0314	0.0277	-0.0257	-0.0078	-0.0180	-0.0041
	(0.0277)	(0.0273)	(0.0230)	(0.0089)	(0.0226)	(0.0042)
High ΔCulture × Post- Matched (+3)	-0.0162	0.0016	-0.0015	-0.0021	-0.0131	0.0092**
	(0.0283)	(0.0137)	(0.0174)	(0.0068)	(0.0197)	(0.0041)
(1-High ΔCulture) ×Post- Matched (+3)	-0.0213	-0.0185	-0.0147	-0.0085	-0.0218	0.0056**
	(0.0268)	(0.0247)	(0.0288)	(0.0090)	(0.0304)	(0.0026)
Culture level	-0.0066	0.0028	0.0145	0.0160*	0.0115	0.0011
	(0.0252)	(0.0138)	(0.0214)	(0.0090)	(0.0245)	(0.0048)
Bank Fixed Effects	YES	YES	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	465	465	465	465	465	465
R-squared	0.4885	0.4964	0.6409	0.4457	0.6411	0.5897

Panel B – Internal cultures	(1) *Risk Weighted Assets / Total Assets*	(2) *Liquid Assets / Total Assets*	(3) *Total Loans/ Total Assets*	(4) *Tier 1 / Total Assets*	(5) *Performing Loans/ Total Assets*	(6) *Non-Performing Loans/ Total Assets*
High ΔCulture × Pre-Matched(-2)	-0.0027	-0.0201	0.0077	-0.0146	0.0117	-0.0018
	(0.0386)	(0.0204)	(0.0227)	(0.0108)	(0.0210)	(0.0044)
(1-High ΔCulture) ×Pre- Matched (-2)	-0.0035	0.0128	-0.0215*	-0.0008	-0.0194	-0.0036**
	(0.0160)	(0.0125)	(0.0125)	(0.0054)	(0.0124)	(0.0018)
High ΔCulture × Matched (0)	-0.0611	-0.0499	0.0234	-0.0119	0.0136	0.0130
	(0.0810)	(0.0458)	(0.0478)	(0.0175)	(0.0457)	(0.0088)
(1-High ΔCulture) × Matched (0)	-0.0411*	0.0228	-0.0300*	-0.0081	-0.0383**	0.0055**
	(0.0232)	(0.0222)	(0.0181)	(0.0106)	(0.0187)	(0.0028)
High ΔCulture × Post- Matched (+1)	-0.0466	0.0542*	-0.0062	-0.0008	-0.0237	0.0147**
	(0.0568)	(0.0323)	(0.0347)	(0.0152)	(0.0346)	(0.0071)
(1-High ΔCulture) ×Post- Matched (+1)	-0.0145	-0.0117	0.0123	-0.0058	0.0123	0.0024
	(0.0170)	(0.0120)	(0.0161)	(0.0050)	(0.0160)	(0.0036)
High ΔCulture × Post- Matched (+2)	0.0367	0.0140	0.0639*	0.0047	0.0549	0.0057
	(0.0544)	(0.0383)	(0.0366)	(0.0123)	(0.0355)	(0.0049)
(1-High ΔCulture) ×Post- Matched (+2)	-0.0423*	0.0238	-0.0200	-0.0062	-0.0191	0.0015
	(0.0236)	(0.0221)	(0.0202)	(0.0080)	(0.0197)	(0.0035)
High ΔCulture × Post- Matched (+3)	0.0318	-0.0200	0.0289	-0.0174	0.0138	0.0124
	(0.0384)	(0.0214)	(0.0331)	(0.0120)	(0.0399)	(0.0097)
(1-High ΔCulture) ×Post- Matched (+3)	-0.0326*	-0.0012	-0.0198	-0.0039	-0.0235	0.0040
	(0.0185)	(0.0161)	(0.0192)	(0.0069)	(0.0193)	(0.0029)
Culture level	0.0253	0.0416	-0.0187	0.0192	-0.0016	-0.0108*
	(0.0625)	(0.0342)	(0.0380)	(0.0142)	(0.0358)	(0.0056)
Bank Fixed Effects	YES	YES	YES	YES	YES	YES
Time Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	465	465	465	465	465	465
R-squared	0.4920	0.5020	0.6366	0.4340	0.6440	0.6783

Figure 1 – Corporate culture dimensions

This table illustrates the corporate culture dimensions from Cameron et al. (2006) used in our study. Panel A illustrates the original competing values framework (CVF). Panel B defines the four culture dimensions constructed by Cameron et al. (2006) building on the CVF framework. while Panel C reports the bags of words used in the text analysis to capture each culture dimension. The word bags were obtained in two steps. First. we selected the synonyms suggested by Cameron et al. (2006) to identify each culture dimension. Second. all words selected in the first step were cross-referenced with the Harvard IV-4 Psychosocial Dictionary to identify other synonyms. All suffixes are accepted for words ending with an "*". In this way. we are able to include as many words as possible with close meaning without reporting all of them.

Panel A: The Competing Values Framework

Flexibility and discretion

	Clan **Thrust** Collaborate **Means** Cohesion. participation. communication. empowerment **Ends** Morale. people development. commitment	**Adhocracy** **Thrust** Create **Means** Adaptability. creativity. agility **Ends** Innovation and cutting-edge output	
Internal focus and integration			**External focus and differentiation**
	Hierarchy **Thrust** Control **Means** Capable processes. consistency. process control. measurement **Ends** Efficiency. timeliness. smooth functioning	**Market** **Thrust** Compete **Means** Customer focus. productivity. enhancing competitiveness **Ends** Market share. profitability. goal achievement	

Stability and control

Source: Hartnell et al. (2011. p.679). figure 1. adapted from figure 3.1 in Cameron et al. (2011)

Panel B: The four culture types in the competing values framework

Culture type	Assumptions	Beliefs	Values	Artefacts (behaviours)	Effectiveness criteria
Collaborate (Clan)	Human affiliation	People behave appropriately when they have trust in. loyalty to. and membership in the organisation	Attachment. affiliation. collaboration. trust. and support	Teamwork. participation. employee involvement. and open communication	Employee satisfaction and commitment
Create (Adhocracy)	Change	People behave appropriately when they understand the importance and impact of the task.	Growth. stimulation. variety. autonomy. and attention to detail	Risk-taking. creativity. and adaptability	Innovation
Competition (Market)	Achievement	People behave appropriately when they have clear objectives and are rewarded based on their achievements	Communication. competition. competence. and achievement	Gathering customer and competitor information. goal-setting. planning. task focus. competitiveness. and aggressiveness	Increased market share. profit. product quality. and productivity
Control (Hierarchy)	Stability	People behave appropriately when they have clear roles and procedures are formally defined by rules and regulation	Communication. Reutilization. Formalization. and consistency	Conformity and predictability	Efficiency. timeliness and smooth functioning

Source: adapted from Hartnell et al. (2011. p.679). figure 2

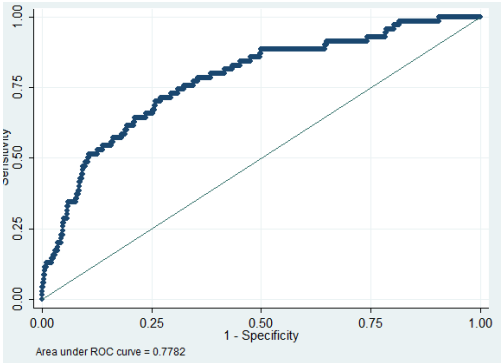
Panel C: Bag of words

Dimensions	Synonyms
Collaborate	capab*. co-*. cohes*. collab*. collectiv*. commit*. competenc*. conflict*. consens*. cooperat*. coordin*. cultur*. decentr*. employ*. empower*. engag*. expectat*. facilitator*. help*. hir*. human*. interpers*. involv*. life*. long-term*. loyal*. mentor*. mutual*. norm*. parent*. partic*. partner*. people*. relation*. retain*. reten*. skill*. social*. team*. teamwork*. tension*. train*. value*. work group*
Compete	achiev*. acqui*. aggress*. agreem*. attack*. budget*. challeng*. charg*. client*. compet*. customer*. deliver*. direct*. driv*. excellen*. expand*. fast*. goal*. growth*. hard*. initiat*. invest*. market*. monit*. mov*. outsourc*. performanc*. position*. pressur*. profit*. rapid*. reputation. result*. revenue*. satisf*. scan*. share*. signal*. speed*. strong. superior. target*. win*
Control	boss*. bureaucr*. cautio*. certain*. chief*. conservat*. control*. detail*. document*. efficien*. error*. fail*. inform*. logic*. method*. outcom*. predictab*. procedur*. productiv*. qualit*. regular*. solv*. standard*. uniform*
Create	adapt*. begin*. chang*. creat*. discontin*. dream*. elabor*. entrepre*. envis*. experim*. fantas*. freedom*. futuri*. idea*. init*. innovat*. intellec*. learn*. new*. origin*. pioneer*. predict*. radic*. risk*. start*. thought*. trend*. unafra*. ventur*. vision*

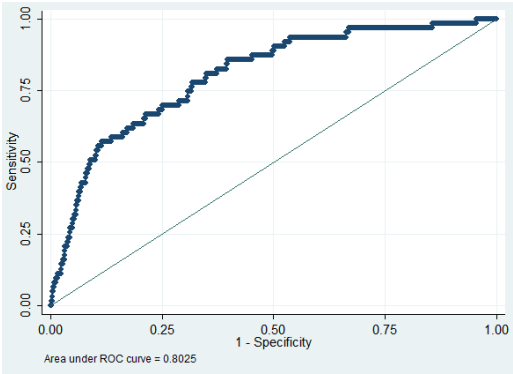
Figure 2: Goodness-of-fit diagnostics for the propensity score matching exercise

This figure reports the Receiver Operating Characteristic (ROC) curves to illustrate the goodness-of-fit of predictive propensity scores (ps-match2) obtained using the model 3, related to the probability of receiving an enforcement action by the Federal Reserve System (FRS), the Office of the Comptroller of the Currency (OCC), and the Federal Deposit Insurance Corporation (FDIC) as its discrimination threshold is varied. The ROC curve is obtained by plotting the true positive rate (labeled as "sensitivity") against the false positive rate (labeled as "1 – specificity") at various threshold settings. The ROC curve is thus the sensitivity as a function of fall-out.

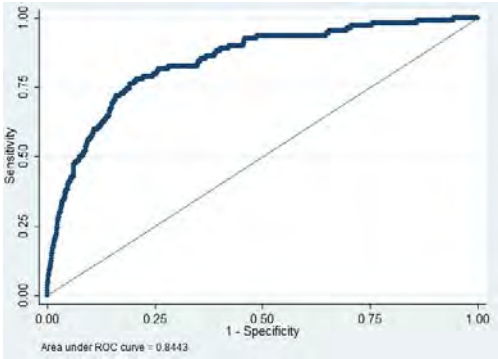
2006



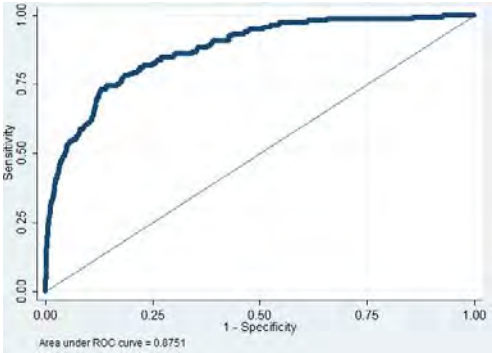
2007



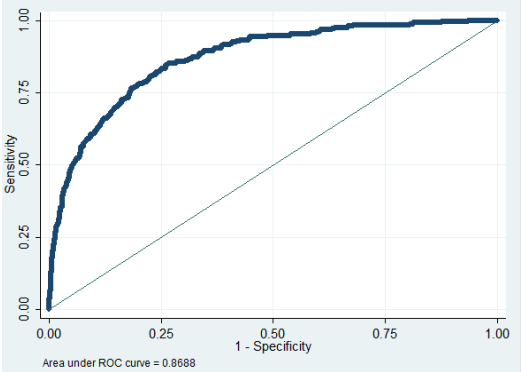
2008



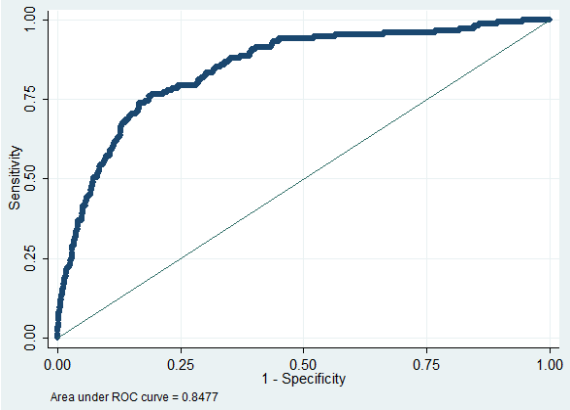
2009



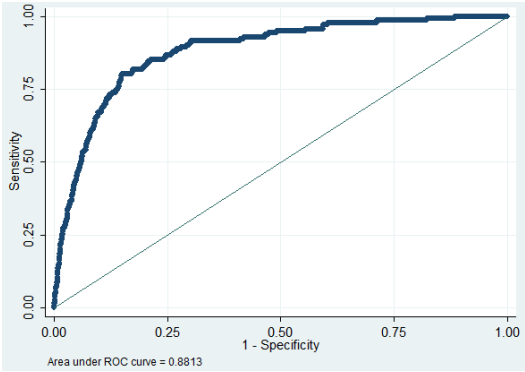
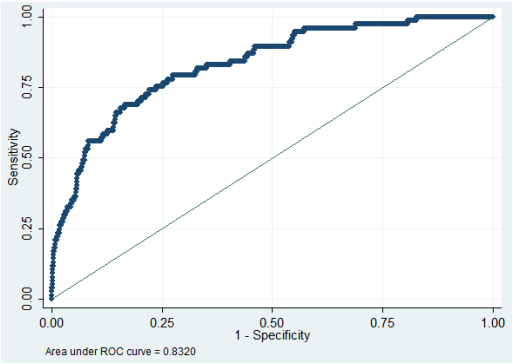
2010



2011



2012



2013