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By *Xiaping Cao, Frank Hong Liu, Yue Zhou*

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Xiaping Cao, Frank Hong Liu, and Yue Zhou[†]

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## Abstract

We study the relation between corporate social responsibility and external financial market development by exploiting the Interstate Banking and Branching Efficiency Act (IBBEA) in the U.S. as the quasi natural experiment. The deregulation leads to a significant and persistent decrease in firm CSR, suggesting firms show "doing good" for the access to finance in the uncompetitive credit market. Firms susceptible of capture by banks prior to IBBEA show more pronounced decline in CSR. We rule out the alternative hypothesis of banking relationship change from lending to transactional basis caused by the deregulation. The evidence suggests that firms' involuntary CSR activities in uncompetitive financial markets are socially inefficient.

**Keywords:** CSR, Bank deregulation, financial constraints

[†] Cao, xiaping@mit.edu, School of Economics, Shenzhen University, China; Liu, h.h.liu@lboro.ac.uk, The School of Business and Economics, Loughborough University, United Kingdom; Zhou, y.zhou.3@research.gla.ac.uk, Adam Smith Business School, University of Glasgow, United Kingdom.

# 1. Introduction

What drives Corporate Social Responsibility (CSR)? Understanding the determinants of CSR is important because CSR helps to establish companies' social capital (Sacconi and Antoni, 2010) and trust among stakeholders (Lins et al., 2017). The answer to this question is closely related to other important questions on how CSR affects firm value. "Shareholder expense" and "shareholder value maximization" are the two competing theories. The empirical evidence is also inconclusive, partly because most existing literature fails to identify the causality relation between CSR and firm value. Several recent empirical studies using a natural experiment in India find that mandatorily increased CSR activities will lead to significant drop in firm value (Manchiraju and Rajgopal, 2017; Dharmapala and Khanna, 2018), which supports the view that firms voluntarily choose CSR levels to maximize firm value, and an enforcement on CSR may trigger negative response from the markets.

In this paper, we present evidence that firms involuntarily engage in CSR activities under certain pressure, and consequently reduce their CSR engagement when such pressure are removed. Specifically, we examine how firms change their CSR activities in response to the reduction in financial constraints due to exogenous change in the lending market. If firms are under pressure from banks to conduct CSR activities, i.e., involuntarily "doing good" for borrowing, we would expect their CSR levels to be decreased once their financial constraints are reduced.

Asymmetric information can cause external financing costly and difficult (Sharpe, 1990; Sufi, 2007). As a complement of firm information disclosure, CSR performance provides a new information stream beyond traditional financial statements. Socially responsible firms are shown to be linked with more transparent and reliable financial information, and lower likelihood of subjecting to regulatory investigation (Spence, 1978; Benabou and Tirole, 2010; Kim et al., 2012). Empirical researches find that firms behave in CSR are rewarded externally, e.g. better external financing, lower financing cost and improved competitiveness (Cheng et al., 2014; Goss and Roberts, 2011; Flammer, 2015). However, the engagement in CSR activities can be involuntary when there is strong demand from the external environment (Cao et al., 2019). The involuntary choice to spend resources on CSR essentially results in an underinvestment and social welfare loss. Once the external pressure on CSR is alleviated permanently, firms will reduce CSR levels significantly.

Empirically, we exploit the staggered deregulation of interstate bank branching laws in the United States. The Interstate Banking and Branching Efficiency Act (IBBEA), which allowed unrestricted interstate banking, was passed by the U.S. Congress in 1994. The deregulation process varied from different states and lasted until 1997 when IBBEA was formally legalized across the country. Rice and Strahan (2010) find that more bank branches were opened and competed with one another due to IBBEA. Existing evidence suggests that this increase in competition expands the viability of credit within a state, lowers the cost of capital therein and increase access to bank financing (Krishnan et al., 2015; Rice and Strahan, 2010). As such, we conjecture that prior to IBBEA, firms in the U.S. tend to be captured by banks who have exclusive lending relationship due to lack of competition. Firms have strong incentives to invest more in CSR to please the lending banks, and such incentives will then be reduced after the enforcement of IBBEA, which alleviates financial constraints for these firms, especially external-finance-dependence firms.

We construct the tests using this deregulation event as the plausibly exogenous increases in the credit supply of state-level finance. For CSR measure, we employ an improved measure introduced by Carroll et al. (2016) which is called *D-SOCIAL-KLD* index. Compared to traditionally CSR measure - KLD index, this measure uses the same underlying dataset rather than simply adding up the binary indices, thus offering more reliable comparison of firms. Besides, the new measure differentiates firms that have identical scores on additive scale by treating every underlying CSR indicator differently. Empirical tests show that firms in the states that are completely open to interstate branching decrease 32.8% of their CSR after the branching deregulation compared to those in the states with the most restrictions on interstate branching. This result is robust in analysis controlling for firm level characteristics, state fixed effect, year fixed effect, and different sample period.

Although the staggered deregulation of interstate bank branching laws provides the plausibly exogenous changes to banking competition, there may exist a pre-existing trend of firms' CSR change, which is parallel to the bank deregulation change. To address this potential concern about reverse causality, we examine the dynamic effect of interstate banking deregulation on firms' CSR performance. We do not find any pre-existing trend in the changes of firm CSR performance prior to deregulation. The decrease in CSR performance occurred on the year of bank deregulation, suggesting the effect is immediate. Further, such a decrease in CSR performance after the deregulation continues to remain statistically significant for at least five years after the banking deregulation, with an increasing magnitude over time.

Another potential endogeneity of our results is that an omitted variable coinciding with the branching deregulation could be the true underlying cause of the change in CSR performance. If this is the case, the change in CSR before and after the banking deregulation may reflect merely an association rather than a causal effect. To address this concern, we conduct a placebo test. We employ a falsified deregulation year and randomly assign it to different states. Therefore, if an unobservable shock happens at approximately the same time as the deregulation events, it should show the great impact in the testing framework and drive the similar results. On the contrary, if no such shock exists, our artificial deregulation to the assigned but randomly chosen states should yield insignificant results in the baseline regression. Indeed, we cannot find a significant result from this placebo test, which indicates that it is unlikely that an omitted variable unrelated to the branching deregulation drives the decrease of CSR performance. Therefore, our strategy of using staggered banking deregulation across states should be exogenous to the decreasing CSR performance.

Next, we attempt to rule out an alternative explanation on bank relationship lending for our main findings. While the bank deregulation leads to a reduction in firm financial constraints, it may also result in a change in bank's lending methods. Banks tend to rely more on "soft information", i.e., relationship lending prior to the deregulation. Post-deregulation, banks would shift to more "hard information", i.e., transactional lending due to large bank's entry. If CSR performance were used by firms to signal their long-term focus and differentiate themselves to increase transparency (Spence, 1978; Benabou and Tirole, 2010), they may have more incentives to do so prior to the deregulation when relationship lending dominates, and these incentives will be reduced under the transactional lending method. Above all, it is their "hard information" shown in financial balance sheets that matters more after the deregulation. If the true mechanism is through relationship lending channel rather than financial constraints, we would expect this effect to be stronger for the states with more relationship lending prior to the deregulation. It is empirically challenging to measure the two different lending methods over the two periods. As such, we focus on the role of small banks in different states and assume that small banks rely more on "soft information" (DeYoung et al., 2004) while large banks rely more on "hard information" (Elyasiani and Goldberg, 2004). We fail to find that the CSR reduction effect is more pronounced in the states with more small banks after the deregulation, which is against this alternative explanation.

Finally, we provide the direct evidence on the channel of financial constraints through which firms' CSR activities are reduced after the bank deregulation. We would expect that the effects of the bank deregulation on firm CSR levels become more intensified for firms more

external-financial-dependence. We first use three proxies to measure the level of external-financial-dependence level: firms age, WW index and SA index (Barrot, 2016; Whited and Wu, 2006; Hadlock and Pierce, 2010; Cornaggia et al., 2015). On top of that, we conduct an additional test conditional on firm's financial strength, including firm size, leverage, cash holding, payout and collateral (Barrot, 2016). All the results confirm our predictions.

This paper contributes to the research on finance and economics in several ways. We provide a clean setting on the exogenous increase in banking competition caused by regulations and show firms significantly reduce CSR activities afterwards. This is the first paper linking firm CSR with financial environment related to lending market. Goss and Roberts (2011) investigate the impact of CSR performance on the cost of bank loans and suggest that banks charge more for loans to firms with social responsibility activities concerns but do not reward firms with CSR strengths. Hong et al. (2012) argue that goodness is costly and goodness is a complement to profits, and firms do so only when they have financial slack. We provide evidence that firms more susceptible of capture by banks exhibit more pronounced decrease in CSR when such capture is dismantled by IBBEA. The exogenous event with IBBEA in the lending market allows us to reveal that banks with market monopolistic power may cause firms to invest excessively in CSR. Once banks' market monopoly power disappears, firms will make optimal decision in CSR by suppressing excessive investment. The evidence suggests that CSR is socially inefficient in uncompetitive markets.

Our paper provides new empirical results to support recent studies on CSR. Although there are a growing number of studies on why firms engage in CSR activities (Barnea and Rubin, 2010; Cespa and Cestone, 2007; Elfenbein et al., 2012; Jensen, 2001), most researchers either consider CSR from shareholder view (Friedman, 1962) or stakeholder interest (Jones, 1995). Flammer (2015) provides evidence viewing "CSR as a competitive strategy" and finds that the product market competition affects CSR performance. These papers emphasize that CSR is the outcome of managerial decisions related to incentives or corporate governance. Differently from the literature on the economic role of CSR to maximize firm or stakeholder value, we consider CSR as a strategical investment caused by the firms' financial constraints due to lack of competition in banking. One related paper is Dharmapala and Khanna (2018) that analyzes CSR activity using quasi-experimental variation created by Section 135 of India's Companies Act of 2013.[1] Indian firms used to invest more than 2% prior to the Act but decreased their

[1] The Act requires firms satisfying specific size or profit thresholds spend a minimum of 2% of their net profit on CSR.

CSR spending after the Act coming into effect. In this sense, CSR needs to be studied in the joint consideration of managerial incentives, corporate governance and regulatory environment. The evidence in this paper suggests that CSR serves as "doing good for borrowing" when firms operate in uncompetitive lending market facing bank capture.

The rest of paper is organized as follows. Section 2 summarizes the data, variable constructions and sample statistics. Section 3 reports the main regression results and discusses their implications. Section 4 concludes the paper.

## 2. Hypothesis development

To derive the theoretical predictions on the firms CSR performance and the impact from external lending market development, we draw from different strands of the literature. We begin this section by introducing the background of the bank deregulation and the research on the real effect and consequence of the deregulation. Next, we discuss the nature of CSR and how CSR activities may be affected by some exogenous shock. In the end, we put forward two contradictory predations based on the discussions made in this section.

A cluster of studies in finance examine the impact of the deregulation on banks and the spillover effect on firms. Prior to the interstate deregulation, interstate bank branching was not allowed until the passage of the Interstate Banking and Branching Efficiency Act of 1994 (IBBEA). IBBEA effectively permitted bank holding companies to enter other states without permission and to operate branches across state lines. The deregulation increases competition/consolidation of banks and reduce the share of small bank at state level (Black and Strahan, 2002). The competition in local banking markets also affects the market structure of non-financial sectors, as the consequence of the bank expansion, the rate of new incorporation increases (Black and Strahan, 2002). Potential entrants in markets with concentrated banking face greater difficulty gaining access to credit than in markets in which banking is more competitive (Cetorelli and Strahan, 2006). Furthermore, firms in states more open to branching enjoy a lower interest rate than firms operating in less open states; firms in open states are more likely to borrow from banks (Rice and Stranhan, 2010). Also, banking competition fosters the innovation and business productivity especially for small firm, which benefited from the greater credit supply provided by banks (Krishman et al, 2014; Cornaggia et al, 2015).

Current research argues that financial condition is a key factor impacting CSR performance. According to the resource-based view, firms must devote resources to generate

CSR characteristics (McWilliams and Siegel, 2001; Waddock and Graves, 1997; Johnson and Greening, 1999). The resources include capital, materials and services, such as special equipment and machinery. Human resource is also needed to implement policies and manage practices which are relevant to CSR. Previous studies suggest that firms' financial performance is positively related to CSR activities (Cambell, 2007). Empirical findings in Hong et al. (2012) suggest that financial constrained firms do less CSR activities and their goodness will be temporarily increased once their financial constraints were temporarily relaxed. The IBBEA deregulation served as an exogenous shock to bank competition, which increases the credit supply and provides firms with greater access to external bank financing. If firm's CSR performance is positively associated with the spare resources they have, firms should be more likely to invest in CSR when the financial resource are relaxed due to increase in credit supply. Therefore, we have the following prediction:

***$H_a$**: The IBBEA deregulation have positive impact on firm CSR.*

On the other hand, based on profit-maximizing view, CSR is treated as a strategical investment that is used to meet corporate strategical needs. Firms engaging in CSR activities are likely to be rewarded, since CSR can be used to differentiate themselves from competitors (McWilliams and Siegel, 2001; Campbell, 2007; Flammer, 2015). Flammer (2015) suggests that CSR as a product differentiation strategy for domestic firms to compete against their foreign rivals, which responds to the tariff reductions that increases competition in local market. Besides, better CSR performance indicates more transparency, lower level of informational asymmetry between firms and investors, and lower the likelihood of negative regulatory, legislative, or fiscal action. For example, Goss and Roberts (2011) find that lower CSR performance firms face higher loan spreads and shorter maturities. Cheng et al. (2014) find that firms with better CSR performance face significantly lower capital constraints. However, a recent study by Dharmapala and Khanna (2018) suggest that when the rewarding of CSR activities is not held the same level as before, firm's voluntary engagement in CSR activities will reduce. The Section 135 of India's Company Act of 2013 requires firms who meet specific size or profit thresholds to spend a minimum of 2% of their net profit on CSR. Their study finds that for firms initially spending less than 2% increase their CSR activity after the implementation of act. In the setting provided in our paper, when the banking market is less competitive, firms are more likely to be captured by banks. Firms are induced to engage in CSR activities to differentiate themselves from their peers to gain better access to finance. However, with the bank deregulation, more availability of credit supply eases the bank

financing access, rendering firms less likely to be captured by banks. Therefore, we have the following prediction which is contradictory to the previous one:

***$H_b$**: The IBBEA deregulation have negative impact on firm CSR.*

# 3. Sample selection and summary statistics

## 3.1. Data

To assess the effect of branch deregulation on CSR performance, we gather data on the timing of deregulation from Rice and Strahan (2010). CSR performance index is obtained from Carroll et al. (2016), and firm and banking specific characteristics are from the Compustat. We merge these three datasets and keep observations only when consolidated data is available. We further restrict our observation with available data throughout the IBBEA deregulation, although several states further deregulated banking sectors after 1997 by removing the barriers set before. To enrich our sample's observation firms with available data throughout the further deregulation are also included. We exclude all financial industry firms (SIC from 6000 to 6999). The total number of observations in the baseline analysis is 4,696 with 364 unique companies from 1994 to 2009.

## 3.2. Measure of CSR

We derive our CSR measure from Carroll et al. (2016). Previous researchers have suggested several measures for CSR performance, and the most used one is Kinder, Lydenberg, Domini, & Co. (KLD) index. This dataset includes more than 80 binary indicators across eight broad dimensions related to CSR, including the environment, community, human rights, employee relations, diversity, product attributes, governance and involvement in controversial business issues, etc. KLD refers to indicators as 'strengths', which proxies social responsibility, and other indicator as 'concerns', which proxies social irresponsibility. From 1991 to 2000, the dataset covers only those firms in the S&P 500 and Domini 400 Social index. From 2001 onward, KLD expanded its coverage to include all firms that were among the 1,000 largest in the United States. In most cases, researches construct the CSR proxy by subtracting all binary "concerns" index from all binary "strength" index, which is the 'net' KLD index (Cornett et al., 2016; Goss and Roberts, 2011; Hong and Kacperczyk, 2009), or by adding up all "strengths" or "concerns" index along these dimensions as the proxies (Flammer, 2015; Kacperczyk, 2009). Although these methods have been widely used in academics, some raise questions on the precision of the KLD index. First, constructing CSR index by using additive indices means each observable is treated as equally weighted, but this may not be true in many cases. Besides,

using "net" KLD index fails to provide a valid measure of CSR since the "strengths" and "concerns" lack convergent validity (Mattingly and Berman, 2006). In addition, Entine (2003) argues that KLD Index may lead to bias of firms CSR performance because the differences in different industries are not considered.

A consus is raised by Carroll et al. (2016) with the introduction of an improved measurement technique that treats these observables in test questions with different weights, which is called *D-SOCIAL-KLD* index. This approach produces a better measure of CSR performance which offers a more reliable comparison across firms than simply adding up the binary indices. By modelling firm behaviour over time in a single space which accounts for dynamic behaviour, we can make comparisons among firms, or groups of firms over time. Compared with KLD index, *D-SOCIAL-KLD* index offers a much more nuanced measure of CSR, especially for firms with large number of potentially "offsetting" strengths and concerns, or cluster around the modal zero value. In sum, *D-SOCIAL-KLD* index are likely to provide more meaningful empirical results when to make over-time comparisons within a given firm, or across different types of firms. We derive the dataset of firm-year *D-SOCIAL-KLD* index directly from the website[2] that is now publicly available.

### 3.3. Measure of deregulation and control variables

Banks were not allowed to open interstate branches until the passage of the Interstate Banking and Branching Efficiency Act of 1994 (IBBEA). IBBEA effectively permitted bank holding companies to enter other states and to operate branches across state lines. It was passed in 1994 but states had the discretion to set up their interstate bank branching regulations under the IBBEA any time before 1997 (Krishnan et al., 2015; Rice and Strahan, 2010). Specifically, states could set barriers on interstate branching in terms of four aspects: (1) the minimum age of the target institution; (2) *de novo* interstate branching; (3) the acquisition of individual branches; and (4) a state-wide deposit cap. Following Rice and Strahan (2010), we use these four aspects of state powers to build the *Deregulation* index. We add one to the index when a state removed any of the four barriers as described[3]. Therefore, the *Deregulation* index can range from zero to four with zero indicating the most restrictive stance toward interstate entry and four indicating the most open stance toward interstate entry.

[2] The data is available from http://socialscores.org/

[3] See Rice and Stranhan (2010) for a detailed discussion on the institutional background and the construction of the index.

In our analysis, we control for a vector of firm-level characteristics that may affect corporate social responsibility performance. Following previous literature (Flammer 2015; Godfrey et al. 2009;), we compute all variables for firm $i$ over its year $t$. The control variables include Log total assets (the logarithm value of total assets), Leverage (total debt divided by total assets), Cash ratio (cash holding to total assets), Market-to-Book ratio (market value to book value) and ROE (return on equity).

### 3.4. Summary statistics

Table 1 provides the summary statistics of the variables used in this research. *CSR* is our dependent variable, which is *D-SOCIAL-KLD* index with a mean of 2.759 and standard deviation of 2.743. The key independent variable is the *Deregulation index*, with the average value 1.845, indicating that states on average have nearly two barriers when they open their local markets to outside banks. In terms of control variables, the average size of firm in our sample is around $13 billion and the median size is $3.9 billion. The *Age* of firm is measured as ln (Age+1), and the data of age is the establishment date of the firm and obtained from Loughran and Ritter (2004). In our sample, the average age is 21 years since the establishment date. The average rate of *Relationship Lending* is 5.56%, which is measured by the sum of all bank assets held by banks with total assets below $100 million divided by the sum of all bank assets in the state-year. These figures are similar to the previous studies (Cheng et al., 2014; Cornaggia et al., 2015; Flammer, 2015).

## 4. Empirical results

### 4.1. Empirical strategy

Our main econometric model focuses on the relationship between bank deregulation and corporate social responsibility. The empirical specification we estimate is as follows:

$$Y_{it} = \alpha + \beta Deregulation_{jt} + \delta Z_{it} + Year_t + Firm_i + \varepsilon_{it} \quad (1)$$

The independent variable $Y_{it}$ is a measure of corporate social responsibility of firm $i$ located in state $j$ and year $t$. The variable of interest is $Deregulation_{jt}$, which is the bank deregulation index proxy for state *j* in year *t*. The coefficient, $\beta$, indicates the impact of bank deregulation level on corporate social responsibility. A positive and significant $\beta$ suggests that greater deregulation improves the performance of corporate social responsibility, while a negative and significant $\beta$ means that deregulation exert a negative effect on corporate social responsibility. $Z_{it}$ is a set of controls that includes *Log total assets, Leverage, Cash ratio, MV*

*ratio* and *ROE*. We control for year fixed effects in $Year_t$ for nation-wide shocks and trends which may potentially influence corporate social responsibility performance, such as economic cycle, national changes in regulations and laws etc. We also control for firm fixed effects in $Firm_i$ for time invariant, unobserved firm characteristics which effect firm's performance on social responsibility. $\varepsilon_{it}$ is the error term. We cluster standard errors at the firm level.

### 4.2. Deregulation and corporate social responsibility: baseline results

We report the regression results of specification (1) in Table 2. Our interested coefficient is $\beta$, which indicates the relationship between bank deregulation and CSR performance. Overall, the results show that bank deregulation is negatively related to CSR performance. Column (1) reports the results of the basic specification of Equation (1). We find that the coefficient estimate on the bank competition is negative and significantly at 1% level. In Column (2), we add a cluster of firm characteristics variables, including *Log total assets*, *Leverage*, *Cash ratio, MV ratio* and *ROE*. The magnitude of the coefficient is similar to the results in column (1). The regression analysis suggests that firms located in states which completely open to interstate branching decrease around 32% of their CSR performance compare with firms located in states with the most restrictions on interstate branching.

In terms of control variables, we find that larger firms tend to have higher CSR performance. The explanation can be that larger firms tend to have lower average costs for providing CSR attributes than smaller firms but benefit more due to the scale economics and the visibility, thereby have greater incentives to invest on CSR (McWilliams and Siegel, 2000). Besides, we also find firms leverage is positively related to CSR performance. Since CSR disclosure increase the data availability and reduces the informational asymmetry between firms and investors (Cheng et al. 2014). Firms with better CSR performance are easier to attract external financing, thus increase their leverage. These results are consistent with previous empirical researches (Godfrey et al., 2009; Waldman et al., 2006; Cheng et al., 2014).

### 4.3. Deregulation and the CSR: endogeneity tests

Although the staggered deregulation of interstate branching represents an exogenous shock to banking competition, state-level factors that manifest differently across states could affect the timing of deregulation in different states (Kroszner and Strahan, 1999). To ensure there is no trend before the event date, we next examine the dynamics of the relation between bank deregulation and CSR. We do this by including a series of dummy variables in the

Equation (1) to trace out the year-by-year effects of interstate deregulation on the CSR performance. We employ the regression as following:

$$Y_{it} = \alpha + \beta_{-4}Deregulation_{j\,t-4} + \beta_{-3}Deregulation_{j\,t-3} + \beta_{-2}Deregulation_{j\,t-2} + \beta_0 Deregulation_{j\,t} + \cdots + \beta_5 Deregulation_{j\,t+5} + \delta Z_{it} + Year_t + Firm_i + \varepsilon_{it} \quad (2)$$

where $i$ indexed firm, $j$ indexes state and $t$ indexed the year. In specification 3, we replace the deregulation index with dummy variables for each year from four years before to five years after. The deregulation dummy variables, $Deregulation_{j\,t}$ set to one in year $t$ where the state in which firm is located adopts interstate bank branching deregulation brought about by IBBEA and zero otherwise. $Deregulation_{j\,t-n}$ ($Deregulation_{j\,t+n}$ ) equals to one for state $j$ in the $n$th year before (after) deregulation. $Deregulation_{j\,t-4}$ ($Deregulation_{j\,t+5}$) includes years up to and including the fourth (fifth) years before (after) bank deregulation. The omitted year in this regression is the year before banking deregulation (t-1), therefore we can estimate the dynamic effect of bank deregulation on the CSR performance relative to the year before deregulation. Similar method has been applied in previous studies (Beck et al., 2010; Chava et al., 2013; Cornaggia et al., 2015)

Figure 1 plots the coefficients of *Deregulation* and their associated 95% confidence intervals as represented by the vertical bars of Equation (2), which includes a series of dummy variables corresponding to pre-treatment lead (years up to and including $t_{-4}$ and $t_{-2}$) and post-treatment lags ($t_0$,…, $t_4$, and years $t_5$ and all subsequent years). We also report the regression results in Table 3. We notice that the coefficients on the deregulation dummy variables are insignificantly different from zero for all the years before deregulation. If bank deregulation caused a change in CSR performance but not vice versa, then the CSR performance in the year before deregulation should be statistically indistinguishable from all other years prior to deregulation. This is exactly what we observe from Figure 1, which means the reverse causality is of little concern in our setting. Next, we observe that there is a statistically significant decrease in CSR performance after the bank deregulation, and such decrease continues to remain for at least five years after banking deregulation and the magnitude is increasing over time.

Another concern that prevents us from drawing a causal interpretation of banking competition on CSR performance from our baseline regressions is the omitted variables problem: unobservable shocks or variables that are omitted from our analysis but coincide with

national level deregulatory events could drive our results. To address this concern, we conduct placebo tests to check whether our results disappear when we falsify the deregulation year instead of the actual deregulation year. Following Cornaggia et al. (2015), we randomly assign state into deregulation years according to the empirical distribution provided by Rice and Strahan (2010). By doing so, we can maintain the distribution of deregulatory years from our baseline specification, but it disrupts the proper assignment of deregulation years to states. Therefore, if an unobserved national shock occurs at approximately the same time along the deregulation, we should still observe a significant result from the regression with falsified regulation years. However, if no such shock exists, then the artificial assigned deregulation year should show insignificant when we run the baseline regression. The results are report in the column (1) of Table 4. We find that the coefficient estimates of *Deregulation* are statistically insignificant.

Overall, the tests above for reverse causality and omitted variables bias support that notion that the increased bank competition due to the branching deregulation has a causal and negative effect on firms' corporate social responsibility performance.

### 4.4. Subsample test

Another concern may result from our choice of sample period, which covers the 2007-09 financial crisis period. We hence conduct a robust test to exclude the financial crisis period and keep our sample period from 1994 to 2005. The results are reported in the column (2) of Table 4. The significant level and the magnitude of *Deregulation* are almost unchanged compared with the baseline regression results.

## 5. Alternative explanation

As we argue in the previous sections, the increased competition among banks after the deregulation results in greater credit supply for firms and makes firms less likely be captured by monopoly banks. However, these results can also be explained from the perspective of relationship lending, that is, reduced relationship lending but increased transactional lending after the deregulation. CSR performance has been treated as a 'soft' information and can represent firm's reputation and reliability to some extent (Brammer and Pavelin, 2006). Under relationship lending, the lender base lending decision in substantial part on 'soft' information, e.g., the information about character and reliability of the firm. Several studies find that large banks will specialize in standardized loans based on 'hard information', such as financial statement and credit score, while small banks tend to focus on non-standardized relationship-

based loans using 'soft' information (Cole et al., 2004; Elyasiani and Goldberg, 2004). The deregulation enhanced competition and consolidation in banking, leading to a decline of small banks (Black and Strahan, 2002), while small banks are the key provider of personalized service and relationships based on soft information (DeYoung et al., 2004). As the consequence, banking organisations grow larger through consolidation after the interstate banking deregulation, less likely to choose to make relationship loans (Berger and Udell, 2002; Uchida et al., 2012). At the same time, the increased competition of banks after the deregulation makes it easier for borrowers to switch lenders, which reduces the incentive to invest in relationships at outset (Black and Strahan, 2002). Under this situation, CSR performance, which has been treated as a 'soft' information to build the relationship with lenders, now becomes less impactful in lending negotiations. We thus expect that the reduction of CSR performance following the banking deregulation happens through the channel of the reduction in relationship lending.

To empirically test this conjecture, we employ the following specification:

$$Y_{it} = \alpha + \beta Deregulation_{jt} + Deregulation_{jt} \times RL_{jt} + RL_{jt} + \delta Z_{it} + Year_t + Firm_i + \varepsilon_{it} \quad (3)$$

Where *RL* (*relationship lending*) is the percentage of the sum of all bank assets held by banks with total assets below $100 million divided by the sum of all bank assets in the state-year. It represents the likelihood of relationship lending at state level. If deregulation reduces CSR performance through the channel of relationship lending, we should expect an intensified impact of bank deregulation on firm CSR if the states rely more on relationship lending prior to the deregulation, i.e., we should observe a significantly positive coefficient of the interaction term between deregulation and share of small banks.

We run the specification (3) and the results are reported in column (3) of Table 4. We do not find that the interaction term and RL is significant, indicating that the impact of the bank deregulation on firm CSR is independent of the bank lending method. Therefore, these results rule out this alternative explanation.

# 6. Mechanism: How bank deregulation affects CSR performance

In the previous sections, we find that there is a negative relationship between bank deregulation and CSR performance. We conduct a serial of tests to demonstrate that our results are robust. We argue that the increased competition among banks after deregulation create

greater credit supply and lax financial constraints of firms, and consequently firms are less likely be captured by banks and hence engage in less CSR activities. We also rule out the alternative explanation that our results are driven by reduced relationship lending after the bank deregulation. In this section, we provide direct evidence that the channel through which bank competition affects CSR performance is through the reduction of firms' financial constraints after the bank deregulation.

Following previous studies (Barrot, 2016; Cheng et al., 2014; Cornaggia et al., 2015; Hadlock and Pierce, 2010), we adopt three different measures of firm external financial dependence. The first measure is *Age*, measured as the logarithm value of firms age plus one. Older firms tend to be less dependence on external finance. The second measure is *WW index* introduced by Whited and Wu (2006). Higher value of the *WW index* indicates that the firm faces more financial constraints. Lastly, we follow Hadlock and Pierce (2010) to construct the *SA index* to measure the level of financial constraints, and greater value means greater financial constraints. We employ the following specification:

$$Y_{it} = \alpha + \beta_1 Deregulation_{jt} \times Bottom + \beta_2 Deregulation_{jt} \times Top + \delta Z_{it} + Year_t + Firm_i + \varepsilon_{it} \quad (4)$$

Where *Bottom* and *Top* are two dummy variables. *Bottom* (*Top*) equals to one for firm whose external financial dependence level is in the bottom (top) half of the sample distribution at the year before deregulation or zero otherwise in term of the three external financial dependence proxies: i) *Age*; ii) *WW index* and iii) *SA index. Bottom (Top)* indicates firms are more (less) external financial dependent. The coefficient estimate on the interaction term between *Deregulation* and *Bottom (Top)* reflects the different effects of bank competition on CSR performance for companies at different level of external financial dependence. We would expect that firms which are more reply on external financing take more advantage of the greater access to credit after the banking deregulation and thereby decrease significantly of their CSR activities.

We report the results from regression specification Equation (4) in Table 5. Overall, we observer the coefficient on the interaction between *Deregulation* and *Bottom* are all significantly negative. Compare to their counterparties, firms which is more external financial dependence tend to reduce their CSR activities by 8.9% to 31.2% as reported from column (1) to column (3) in table 5. We observe no significant evidence on less external financial

dependent firms, although the coefficients across these three columns of *Deregulation* and *Top* are all negative. These results are consistent with our expectation.

To further support the channel of financial constraints, we conduct an additional test conditional on firm financial strength according to financial ratios (Barrot, 2016). By doing so, we first measure financial strength by ranking firms based on *Size*, *Leverage, Cash holding, Payout* and *Collateral,* in the year before the deregulation. We follow the same procedure above and run the regression respectively. *Bottom* (*Top*) equals to one for firms in the bottom (top) half of the sample distribution at the year before deregulation or zero otherwise in term of (1) *Size* (logarithm value of total assets), (2) *Leverage*, measured by 1 minus debt to total assets ratio; (3) *Cash*, measured by cash holding to total assets; (4) *Payout*, measured by cash dividends to cash holding and (5) *Collateral*, measured by total net property, plant and equipment to total assets. The bottom (top) halves of all these variables represent firms are more (less) financial constrained. We would expect the firms which are more financially constrained before the shock would experience greater decline on CSR performance compared to their less financially constraint counterparties.

Table 6 presents the estimation of the effect of the bank competition on CSR performance conditional on the five proxies of financial strength. In general, financially more constrained firms experience 9.5% to 12.6% decrease in their CSR performance. While for financially less constraint firms, they do not experience any decrease in their CSR performance (as all the interaction term between *Deregulation* and *Top* are insignificant). This result further confirms the financial constraint as the channel to explain our main results.

Overall, the evidence reported in this section indicates that the reduction of firms' social responsibility after the banking deregulation will be amplified if firms are more financial constrained. These results provide direct evidence that the impact of bank competition on firms' CSR performance works through the credit supply channel.

# 6. Conclusion

A growing literature on CSR attempts to understand CSR activities of firms according to incentives or conflict of interest among stakeholders. One difficulty on this important topic that insiders or managers make endogenous decisions of CSR. We first time show that CSR can be a result of credit market frictions. Banking competition is an important element in a well-functioning capital market to alleviate credit rationing and capture in lending relationship.

However, banking competition is not necessarily a natural outcome of market but often a consequence of regulations. In this research, we study whether bank competition casts any economic effects on CSR performance by exploiting a regulatory change in banking industry as the exogenous shock to banking competition. This research design allows us to document a causal effect of external banking environment on CSR.

The interstate branching deregulation has led to an increase in competition among banks to supply credit. We employ the exogenous staggered deregulation of state-level branching laws to identify changes in banking competition. The interstate banking deregulation results in a drop of CSR performance at individual firm-level, with the magnitude both economically and statistically important. Our results hold in a serial of endogenous tests and robustness tests, confirming the negative impact of interstate deregulation on CSR is likely causal. To provide further evidence of the channels through which deregulation affect CSR, we test that whether firms will react differently conditional on variations in financial constraints level and relationship lending. We show that the deregulation results in the negative change in CSR performance is unlikely to explain by the reduced relationship lending after deregulation. While such negative effects will be amplified if firms are more financially constrained. Our results support the view that firms use CSR as a strategical investment to accessing bank financing when credit supply is likely to be rationed due to lack of competition. The interstate branching deregulation expands access to credit and relaxes firms' financial constraints, which allows firms to make investments in CSR without "window dressing" themselves to please banks to credit.

There are several important contributions that this paper makes. First, our study highlights that a competitive credit market is important, especially for firms that reply heavily on external financing. Policy makers and regulators should continue to make reforms to dismantle market frictions and enhance competitions in financial market to increase access of credit. Second, we offer novel empirical evidence to suggest that firms' CSR activities are not socially efficient when borrowers are susceptible for being captured by lending groups. In this sense, CSR needs to be considered jointly with institutional development and financial market frictions.

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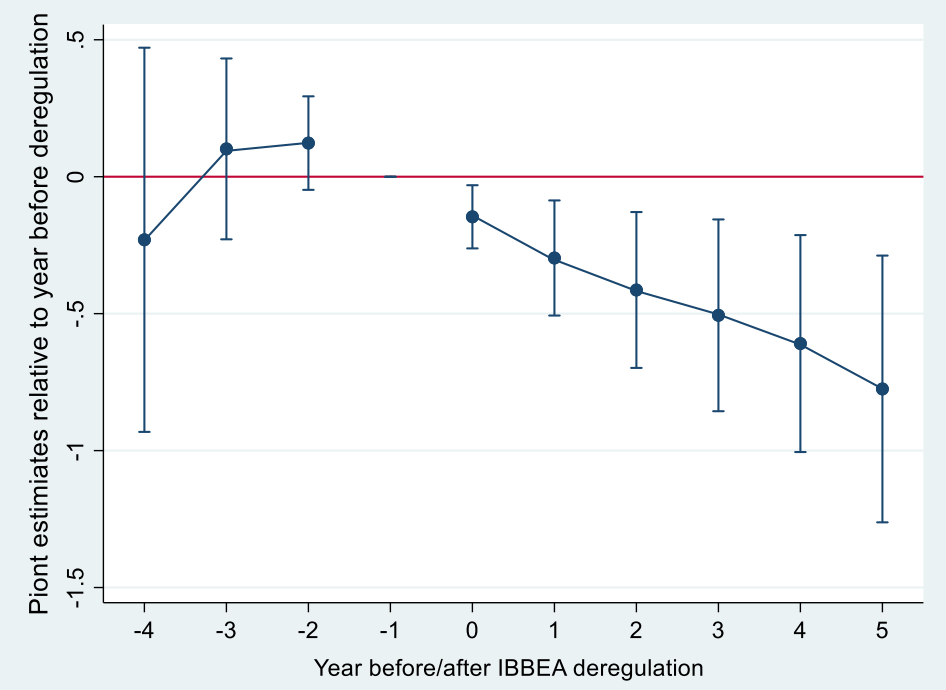
Figure1. The dynamic impact of deregulation on firm CSR




This figure presents the dynamic impact of interstate deregulation on CSR performance. The impact of deregulation on CSR is presented by the connected dots; the vertical bars correspond to 95% confidence intervals with firm-level clustered standard error. All estimates are relative to the year before deregulation. Specifically, we report estimated coefficients from the following regression:
$Y_{it} = \alpha + \beta_{-4}Deregulation_{j\,t-4} + \beta_{-3}Deregulation_{j\,t-3} + \beta_{-2}Deregulation_{j\,t-2} + \beta_0 Deregulation_{j\,t} + \cdots + \beta_5 Deregulation_{j\,t+5} + \delta Z_{it} + Year_t + Firm_i + \varepsilon_{it}$.
$Y_{it}$ is CSR performance measure derives from Carroll et al. (2016) of firm $i$ in year $t$. $Deregulation_{jt}$ is a dummy variable set to one if the state $j$ in which firm is located adopts IBBEA in in year $t$ and zero otherwise. $Deregulation_{j\,t-4}$ is set to one for years up to and including four years prior to interstate banking deregulation and zero otherwise. $Deregulation_{j\,t+5}$ is set to one for all years five years after interstate banking deregulation and zero otherwise. The omitted variable in this regression is the year before banking deregulation (*t-1*). $Year_t$ and $Firm_i$ are year and firm fixed effects, respectively.

Table 1
Summery statistics
This table reports summary statics for the firm-year observations during 1991 -2007 in this paper's sample, including dependent, independent and control variables. The dependent variable is CSR performance and the data comes from Carroll et al. (2016). Deregulation is the index of bank competition level followed by Rice and Strahan (2010). Definitions of the variables are in Appendix.

| Variables | N | Mean | P50 | Sd | P25 | P75 |
|---|---|---|---|---|---|---|
| CSR | 4,696 | 2.759 | 2.900 | 2.743 | 0.803 | 4.697 |
| Deregulation | 4,696 | 1.845 | 1 | 1.501 | 1 | 3 |
| Log Total assets | 4,696 | 8.193 | 8.280 | 1.683 | 7.132 | 9.413 |
| Leverage | 4,696 | 0.245 | 0.239 | 0.173 | 0.128 | 0.344 |
| Cash ratio | 4,696 | 0.0775 | 0.0449 | 0.0940 | 0.0158 | 0.103 |
| MV ratio | 4,696 | 3.505 | 2.599 | 16.32 | 1.632 | 4.140 |
| ROE | 4,696 | 0.177 | 0.141 | 1.913 | 0.0705 | 0.218 |
| Age | 4,696 | 2.961 | 3.091 | 0.919 | 2.398 | 3.555 |
| WW index | 4,696 | -0.404 | -0.414 | 0.167 | -0.471 | -0.352 |
| SA Index | 4,696 | -3.709 | -3.513 | 1.485 | -4.771 | -2.628 |
| Relationship Lending ($100 million) | 4,696 | 0.0565 | 0.0312 | 0.0680 | 0.0139 | 0.0718 |

Table 2: Baseline results and dynamic results.
This table reports OLS regression estimates for baseline regression. The dependent variables is CSR performance and this measure derives from Carroll et al. (2016). Deregulation is the index of bank competition level followed by Rice and Strahan (2010). Column (1) reports the baseline regression results without any controls, and we include several firm-level characteristic variables as control variables in column (2). Firm-clustered robust standard errors are reported in parentheses. *,** and*** indicate significance level at 10%, 5% and 1%, respectively.

| | (1) | (2) |
|---|---|---|
| Dependent variable | CSR | CSR |
| Deregulation | -0.079** | -0.081** |
| | (0.036) | (0.035) |
| Log Total assets | | 0.369*** |
| | | (0.112) |
| Leverage | | 0.880*** |
| | | (0.300) |
| Cash ratio | | 0.596 |
| | | (0.433) |
| MV ratio | | 0.001 |
| | | (0.001) |
| ROE | | -0.003 |
| | | (0.008) |
| _cons | 0.515*** | -2.511*** |
| | (0.078) | (0.869) |
| Year fixed effect | Yes | Yes |
| Firm fixed effect | Yes | Yes |
| N | 4696 | 4696 |
| adj. R-sq | 0.674 | 0.684 |

Table 3: Endogeneity test: dynamic results

This table reports the trend in IBBEA deregulation and CSR in the pre-event and post event window. The dependent variables is CSR performance and this measure derives from Carroll et al. (2016). $Deregulation_{jt}$ is a dummy variable set to one if the state j in which firm is located adopts IBBEA in in year $t$ and zero otherwise. $Deregulation_{j\,t-4}$ is set to one for years up to and including four years prior to interstate banking deregulation and zero otherwise. $Deregulation_{j\,t+5}$ is set to one for all years five years after interstate banking deregulation and zero otherwise. The omitted variable in this regression is the year before banking deregulation (t-1). Firm-clustered robust standard errors are reported in parentheses. *,** and*** indicate significance level at 10%, 5% and 1%, respectively.

| Dependent variable | CSR |
|---|---|
| *Deregulation* $_{j\,t-4}$ | -0.230 |
| | (0.357) |
| *Deregulation* $_{j\,t-3}$ | 0.102 |
| | (0.168) |
| *Deregulation* $_{j\,t-2}$ | 0.123 |
| | (0.087) |
| *Deregulation* $_{j\,t}$ | -0.146** |
| | (0.059) |
| *Deregulation* $_{j\,t+1}$ | -0.297*** |
| | (0.107) |
| *Deregulation* $_{j\,t+2}$ | -0.414*** |
| | (0.145) |
| *Deregulation* $_{j\,t+3}$ | -0.506*** |
| | (0.178) |
| *Deregulation* $_{j\,t+5}$ | -0.609*** |
| | (0.201) |
| *Deregulation* $_{j\,t+5}$ | -0.775*** |
| | (0.248) |
| _cons | -2.762*** |
| | (0.834) |
| Control variables | Yes |
| Year fixed effect | Yes |
| Firm fixed effect | Yes |
| N | 4696 |
| adj. R-sq | 0.686 |

Table 4: Robustness test and alternative explanation

This table reports OLS regression estimates of baseline with randomized deregulation years. The dependent variables is CSR performance and this measure derives from Carroll et al. (2016). Deregulation is the index of bank competition level followed by Rice and Strahan (2010). Column (1) is the placebo test, we randomly assign state into deregulation years according to the empirical distribution provided by Rice and Strahan (2010). Column (2) report the results of robust test. We include sample from year 1994 to 2005 only and run the baseline specification. Column (3) reports the regression results of interactions between bank deregulation and the level of relationship lending which measures by the percentage of the sum of all bank assets held by banks with total assets below $100 million divide by the sum of all bank assets in the state-year. Firm-clustered robust standard errors are reported in parentheses. *,** and*** indicate significance level at 10%, 5% and 1%, respectively.

| | Dependent variable: CSR | | |
|---|---|---|---|
| | Placebo test | Sample period: 1994-2005 | Alternative explanation: Relationship Lending |
| | (1) | (2) | (3) |
| Deregulation | 0.048 | -0.072** | -0.076* |
| | (0.043) | (0.032) | (0.039) |
| RL(Relationship lending) | | | 0.555 |
| | | | (1.340) |
| Deregulation * RL | | | -0.197 |
| | | | (0.596) |
| Log Total assets | 0.365*** | 0.403*** | 0.368*** |
| | (0.112) | (0.126) | (0.112) |
| Leverage | 0.873*** | 0.712*** | 0.882*** |
| | (0.299) | (0.270) | (0.300) |
| Cash ratio | 0.545 | 0.536 | 0.592 |
| | (0.433) | (0.436) | (0.433) |
| MV ratio | 0.001 | 0.002 | 0.001* |
| | (0.001) | (0.001) | (0.001) |
| ROE | -0.003 | -0.013** | -0.003 |
| | (0.008) | (0.005) | (0.008) |
| _cons | -2.473*** | -2.616*** | -2.558*** |
| | (0.867) | (0.982) | (0.882) |
| Year fixed effect | Yes | Yes | Yes |
| Firm fixed effect | Yes | Yes | Yes |
| N | 4,696 | 3,459 | 4,696 |
| adj. R-sq | 0.683 | 0.646 | 0.684 |

Table 5: External financial dependence with alternative proxies: Age, WW index, and SA index

This table report OLS regression estimates the impact of banking deregulation on CSR performance. The dependent variables is CSR performance and this measure derives from Carroll et al. (2016). Deregulation is the index of bank competition level followed by Rice and Strahan (2010). Bottom (Top) is a dummy variable equals to one for firm whose external financial dependence level is in the bottom (top) half of the sample distribution at the year before deregulation or zero otherwise in term of the three external-financial-dependence proxies: i) Age; ii) WW index and iii) SA index. Bottom (Top) indicates firms are more (less) external financial dependent. Firm-clustered robust standard errors are reported in parentheses. *,** and*** indicate significance level at 10%, 5% and 1%, respectively.

| | Dependent variable: CSR | | |
|---|---|---|---|
| | Age | WW index | SA index |
| | (1) | (2) | (3) |
| Deregulation *Bottom | -0.312* | -0.130** | -0.089** |
| | (0.160) | (0.053) | (0.039) |
| Deregulation *Top | -0.058 | -0.028 | -0.050 |
| | (0.036) | (0.041) | (0.072) |
| Log Total assets | 0.389*** | 0.383*** | 0.365*** |
| | (0.107) | (0.111) | (0.112) |
| Leverage | 0.843*** | 0.871*** | 0.883*** |
| | (0.304) | (0.295) | (0.299) |
| Cash ratio | 0.543 | 0.582 | 0.593 |
| | (0.428) | (0.431) | (0.435) |
| MV ratio | 0.001* | 0.001 | 0.001 |
| | (0.001) | (0.001) | (0.001) |
| ROE | -0.003 | -0.003 | -0.003 |
| | (0.008) | (0.008) | (0.008) |
| _cons | -2.620*** | -2.597*** | -2.482*** |
| | (0.837) | (0.860) | (0.868) |
| Year fixed effect | Yes | Yes | Yes |
| Firm fixed effect | Yes | Yes | Yes |
| N | 4696 | 4696 | 4696 |
| adj. R-sq | 0.686 | 0.685 | 0.684 |

Table 6. External financial dependence with alternative proxies: additional evidence

This table report OLS regression estimates the impact of banking deregulation on CSR performance. The dependent variables are CSR performance and this measure derives from Carroll et al. (2016). Deregulation is the index of bank competition level followed by Rice and Strahan (2010). Bottom and Top are dummies, equals one for firms in the bottom (top) half of the sample distribution at the year before deregulation in terms of (1) Size (logarithm value of total assets), (2) Leverage, measured by 1 minus debt to total assets ratio; (3) Cash, measured by cash holding to total assets; (4) Payout, measured by cash dividends to cash holding and (5) Collateral, measured by total net property, plant and equipment to total assets. The bottom (top) halves of all these variables represent firms are more (less) financial constrained. Firm-clustered robust standard errors are reported in parentheses. *,** and*** indicate significance level at 10%, 5% and 1%, respectively.

| | Dependent variable: CSR | | | | |
|---|---|---|---|---|---|
| | Size | Leverage | Cash | Payout | Collateral |
| | (1) | (2) | (3) | (4) | (5) |
| Deregulation *Bottom | -0.103* | -0.117*** | -0.095** | -0.128*** | -0.126** |
| | (0.054) | (0.038) | (0.045) | (0.049) | (0.050) |
| Deregulation *Top | -0.056 | -0.034 | -0.064 | -0.058 | -0.047 |
| | (0.041) | (0.054) | (0.046) | (0.043) | (0.044) |
| Log Total assets | | 0.365*** | 0.353*** | 0.372*** | 0.371*** |
| | | (0.111) | (0.113) | (0.110) | (0.111) |
| Leverage | 0.940*** | | 0.828*** | 0.853*** | 0.863*** |
| | (0.327) | | (0.295) | (0.296) | (0.300) |
| Cash ratio | 0.204 | 0.402 | | 0.578 | 0.597 |
| | (0.438) | (0.430) | | (0.435) | (0.431) |
| MV ratio | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| ROE | -0.003 | -0.001 | -0.002 | -0.003 | -0.003 |
| | (0.008) | (0.009) | (0.008) | (0.008) | (0.008) |
| _cons | 0.294*** | -2.272*** | -2.342*** | -2.526*** | -2.515*** |
| | (0.106) | (0.848) | (0.874) | (0.859) | (0.866) |
| Year fixed effect | Yes | Yes | Yes | Yes | Yes |
| Firm fixed effect | Yes | Yes | Yes | Yes | Yes |
| N | 4696 | 4696 | 4696 | 4696 | 4696 |
| adj. R-sq | 0.677 | 0.682 | 0.684 | 0.685 | 0.685 |

# Appendix

Table A1. Variable definitions

| Variable | Definition |
|---|---|
| *CSR* | The *D-SOCIAL-KLD* index (Carroll et al., 2016) proxies firm's CSR performance at the year *t*.. |
| *Deregulation* | Four minus Rice-Strahan index of interstate banking deregulation based on Rice and Strahan (2010). The deregulation index ranges from 0 (least deregulated,) to 4 (most deregulated) based on regulation changes at a state level.t |
| *Log Total assets* | Natural logarithm value of total assets measured at the year *t*. |
| *Leverage* | The leverage ratio measured as the book value of debt divided by book value of total assets at the year *t*. |
| *Cash ratio* | The cash holding of company scaled by the book value of total assets at the year *t*. |
| *MV ratio* | The ratio of the market value of equity to the book value of equity at the year *t*. |
| *ROE* | Return-on-equity ratio defined as the net income scaled by book value of equity at the year *t*. |
| *Age* | The natural logarithm value of years the corporation has existed since the founding year plus one. The funding year obtain from Loughran and Ritter (2004) data set. |
| *WW index* | WW index is based on Whited and Wu (2006), defined as $(-0.091 * \text{CF}) - (0.062 * \text{DIVPOS}) + (0.021 * \text{TLTD}) - (0.044 * \text{LNTA}) + (0.102 * \text{ISG}) - (0.035 * \text{SG})$, where the CF is the ratio of cash flow to assets; DIVPOS is an indicator that takes the value of 1 if the firm pays cash dividends; TLTD is the ratio of long-term debt to total assets; LNTA is the natural logarithm of total assets; ISG is the firm's three-digital industry sale growth; and SG is firm sales growth. |
| *SA Index* | SA index is based on Hadlock and Pierce (2010), $SA\ Index = -0.737 * Ln(assets) + 0.043 * Ln(assets)^2 - 0.04 * Age$ . |
| *Relationship Lending* | The sum of all bank assets held by banks with total assets below $100 million divided by the sum of all bank assets in the state-year. |

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School of Management, University of St Andrews
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