Corporate Social Responsibility and Bank Liquidity Creation during Financial Crises

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Funding: Authors acknowledge the financial support by the Ministry of Science and Technology of Taiwan (MOST 110-2410-H-002-070)

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Abstract

Using a sample of U.S banks, this paper investigates how corporate social responsibility (CSR) banks react to shocks of financial crises in their liquidity creation. It shows that banks with better CSR performance reduce more liquidity creation in crises. This effect is stronger for banking crises and for banks with lower Z-scores or higher earnings volatility prior to the crises. In addition, the results are mainly driven by bank CSR performance related to community and employee relations. These results are consistent with the notion that banks with good CSR performance reduce liquidity creation to avoid financial distress, which would seriously hurt their employees and the communities they serve.

JEL classification: G21; M14
Keywords: liquidity creation, corporate social responsibility, banking crises, market crises, distress risk

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1. Introduction

This paper studies how banks' corporate social responsibility (CSR) performance affects their liquidity creation during financial crises. CSR has become an important issue for businesses, and the current consensus is that firms should carry out social responsibilities in addition to profit maximization. These responsibilities include protecting the environment, improving gender equality, and taking good care of stakeholders other than shareholders, such as employees, customers, suppliers, and the communities where firms are located.[1] A belief behind this consensus is that these parties benefit as firms consider their welfare rather than just that of shareholders when making decisions, thereby enhancing social welfare in general.

Take commercial banks, for example. It is often argued that an important trigger for the 2008 financial crisis was that banks took excessive risk before the crisis occurred. For banks, taking excessive risk benefits their shareholders at the expense of taxpayers, because most governments provide implicit guarantees regarding bank liabilities. When bank liabilities are fairly priced, a bank's shareholders enjoy greater government

[1] Whether firms should care about objectives other than profit maximization has been widely debated. For example, Friedman (1970) argues that "there is one and only one social responsibility of business—to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game." On the other hand, Hart and Zingales (2017) propose that it is more efficient for firm managers to consider social responsibilities when they make decisions if their shareholders care about these issues.

subsidies if it takes greater risk.[2] If banks had cared more about their social responsibilities and had taken less unsound risk, the crisis might not have occurred.[3]

It may be possible, however, that CSR does not always enhance welfare, and that firms' emphasis on CSR may create unexpected adverse consequences for society. This paper investigates one such possibility by studying the relation between banks' CSR performance and their changes in liquidity creation during financial crises. Because liquidity creation increases a bank's liquidity risk, the bank's distress risk in financial crises may rise if it creates more liquidity. When the bank becomes financially distressed, some of its important stakeholders, including its employees and the communities it serves, will be hurt. Therefore, banks that care more about stakeholders may be more reluctant to create liquidity in times of financial crisis.

This issue is important from the perspective of banking policy. As has been well documented in the literature (Diamond and Dybvig, 1983; Diamond and Rajan, 2001; Berger and Bouwman, 2009; Acharya and Mora, 2015), liquidity creation is a core function of banks. By offering borrowers long-term loans and allowing depositors with liquidity needs to withdraw early, banks can improve social welfare. Bank liquidity creation is especially important during financial crises, when the aggregate liquidity is tight. More liquidity creation by banks can reduce the liquidity constraints of economic agents and therefore alleviate the negative impacts of financial crises on the economy. Any force leading to a reduction in bank liquidity creation during a financial crisis is likely to reduce welfare because it hurts borrowers and delays the recovery of the economy.

[2] Using cross-country data of large banks, Beltratti and Stulz (2012) find that banks with a more independent board (whose decisions were more aligned with shareholder interests) took higher risk before the 2008 crisis broke out, and had worse financial performance in the crisis.

[3] Consistent with this argument, Leung et al. (2019) show that banks reduce risk-taking after stakeholder-friendly legislation is enacted.

It is not theoretically clear whether banks with better CSR performance (CSR banks hereafter) would create more or less liquidity in financial crises. As argued above, CSR banks may have stronger incentives to shrink liquidity creation in crises because they care more about the welfare of their employees and communities. On the other hand, because borrowers are also bank stakeholders, CSR banks should have greater incentives to provide liquidity to borrowers during financial crises. Moreover, CSR banks should also have better ability to provide liquidity in crises. As shown in Godfrey et al. (2009) and Lins et al. (2017), undertaking socially responsible activities allows CSR firms to accumulate social capital and gain support from stakeholders, which enables them to better weather crises. Therefore, CSR banks may create more liquidity than their peers during financial crises.

We examine this question empirically. Our sample contains all the U.S. listed banks for which data are available from the FR Y-9C, Call Reports and the Environmental, Social, and Governance ratings data in the MSCI ESG STATS database (formerly KLD). The sample period starts in 1996Q1 and ends in 2013Q4.[4] We use the cat fat measure in Berger and Bouwman (2009) as the proxy for bank liquidity creation.[5] Using data from the MSCI ESG STATS database, we compute banks' CSR scores, both the strengths of and concerns for bank CSR activities in three dimensions: community, employee relations, and diversification. We exclude the environment, human rights, and product categories in the database because these categories are either less relevant to the issue we study, less

[4] For i = 1,2,3,4, *Qi* represents the *i*th quarter of a year.
[5] Please see Section 3 for an explanation for the cat fat measure.

applicable,[6] or less available during our sample period.[7,8] We also exclude the corporate governance category in the database because it is more relevant to shareholders than to other stakeholders. For the definitions of financial crises, following Berger and Bouwman (2013), we identify one banking crisis, two market crises, and two normal times (non-crisis periods) in our sample period.[9] We define the four quarters prior to a crisis as its pre-crisis period.

We examine whether banks with better CSR performance prior to crises increase or decrease liquidity creation in crises. We also investigate whether the impact of CSR on bank liquidity creation in crises differs for banks with different pre-crisis risk characteristics. To address possible endogeneity issues, we employ the two-stage least squares (2SLS) regressions and propensity score matching (PSM) analysis to verify the results. In further analysis, we examine which components of bank CSR performance and liquidity creation are driving the main results, how CSR affects banks' risk adjustments during crises, and whether our results are robust to the definitions of important control variables and normal times.

Our main empirical results are as follows. In the subprime crisis of 2008, a bank's CSR performance was negatively associated with its changes in liquidity creation. This

[6] For example, the items "product quality and safety" in the product category and "controversies with indigenous peoples and labor standards in the supply chain" in the human rights category are less applicable to banks. Lins et al. (2017) also point out that they exclude the product category because it contains a number of elements that are outside the scope of CSR.

[7] For example, the item "Access to finance" was created after 2010, and only two observations in our sample period have a value of 1 for this item. The item "Customer Relations" was created in 2012, which is later than our last pre-crisis period. In addition, as mentioned in Cornett et al. (2016), they exclude the environment and human rights categories in robustness tests because few banks have ratings on these two categories.

[8] In unreported results, we include the environment, product, and human rights categories in the computation of CSR scores, and the results are qualitatively similar.

[9] As defined in Berger and Bouwman (2013), banking crises are those originating in the banking sector, while market crises originate in the capital markets. The banking crisis that we identify is the subprime crisis of 2008. The first market crisis includes the Russian debt crisis and the failure of Long-Term Capital Management in 1998, and the second includes the burst of the dot-com stock bubble and the 9/11 attack between 2000 and 2002.

effect is more significant for banks with lower pre-crisis Z-scores and higher pre-crisis earnings volatility. The results for market crises are similar, but weaker. Results from the 2SLS regressions and PSM analysis confirm that the main results are robust. The negative effect of bank CSR on liquidity creation is mainly driven by their CSR performance in the community and employee relations categories, and is more significant for banks' liquidity creation on assets and off-balance-sheet items. In addition, CSR banks had more decreases in loan commitments, credit risk, and Community Reinvestment Act (CRA) loans during the subprime crisis of 2008. These results are consistent with the notion that CSR banks reduce liquidity creation in financial crises to lower distress risk because of the concern that their employees and the communities they serve would be hurt if they become financially distressed.

This paper has policy implications. Its results suggest that, while encouraging banks to improve CSR performance can reduce their exposure to risk, it may also lower their incentive to provide liquidity in banking crises. To mitigate this problem, the government may need to inject more capital or provide greater liquidity support to banks with better CSR performance during financial crises.

This paper contributes to several strands of literature. First, it sheds new light on the impact of CSR on banks, which has not been extensively examined in the literature. Chih et al. (2010), Wu and Shen (2013), and Cornett et al. (2016) study how CSR affects bank performance, and the results are mixed.[10] Complementing these papers, our findings show that CSR affects not only bank performance, but also their liquidity creation in financial crises.

[10] While Chih et al. (2010) find no significant effect, both Wu and Shen (2013) and Cornett et al. (2016) show that CSR significantly improves bank performance.

Second, this paper also contributes to the literature on bank liquidity creation. Several papers have studied the determinants and/or impacts of bank liquidity creation. Berger and Bouwman (2009) find that liquidity creation is positively associated with bank value, but the relation between them depends on bank size. Distinguin et al. (2013) and Horváth et al. (2014) propose that bank capital ratio can affect liquidity creation and vice versa. Berger et al. (2016) find that regulatory intervention reduces bank liquidity creation, but capital support does not. Berger and Bouwman (2017) show that monetary policy has a statistically significant, but economically minor effect on the liquidity creation of small banks, and that off-balance-sheet liquidity creation can predict financial crises. Berger and Sedunov (2017) show that liquidity creation enhances economic output. Huang et al. (2018) suggest that managerial optimism increases bank liquidity creation. Contributing to this literature, our paper shows that CSR is negatively associated with bank liquidity creation in financial crises.

Third, various papers have examined how CSR affects firm risk. The majority find that firms with greater concern for stakeholders have lower risk (Orlitzky and Benjamin, 2001; Lee and Faff, 2009; Luo and Bhattacharya, 2009; Verwijmeren and Derwall, 2010; Bae et al., 2011; Jo and Na, 2012; Oikonomou et al., 2012; Harjoto and Laksmana, 2018; Benlemlih et al., 2018). Leung et al. (2019) demonstrate that banks significantly reduce risk-taking after the enactment of stakeholder-friendly legislation. Consistent with these papers, our results suggest that CSR banks reduce liquidity creation to a greater extent in times of financial crisis, thereby decreasing their liquidity risk.

Finally, several papers in the literature (for example, Beltratti and Stulz, 2012; Lins et al, 2017; Berger and Bouwman, 2013) empirically examine how important characteristics of non-financial firms or banks (such as corporate governance, social capital, and bank capital ratio) affect them in financial crises. Since financial crises are

critical shock events to society, studying the factors that can influence the firms' or banks' responses to these shocks has valuable implications. Complementing these papers, our paper shows that banks with better CSR performance reduce more liquidity creation in crises.

In the literature, Zheng et al. (2023) also study the relation between bank CSR performance and liquidity creation in financial crises, and find that they are positively correlated in market crises, but are not significantly correlated in the 2008 crisis.[11] The research questions, empirical methodology, and the empirical results of our paper are all different from theirs. Our focus is to compare CSR banks with their peers on how they adjust liquidity creation during financial crises, so we use the *change* in liquidity creation as the dependent variable of the regressions. By contrast, Zheng et al. (2023) use the *level* of liquidity creation as the dependent variable, and examine its relation with bank CSR performance.[12] Our main result that banks with better CSR performance reduced more liquidity creation in crises is also different from theirs.

The remainder of this paper is structured as follows. Section 2 develops empirical hypotheses; Section 3 describes the data and research methodology and reports summary statistics; Section 4 provides the main empirical results; Section 5 conducts additional analyses; and Section 6 presents conclusions.

[11] Zheng et al. (2023) also use the sample of U.S. banks. Their main result is that bank CSR performance and liquidity creation are positively associated in the period between 1991 and 2016.

[12] Specifically, our empirical model studies how the pre-crisis bank CSR performance affects the *change* in liquidity creation between the crisis and pre-crisis periods, while Zheng et al. (2023) examine the relation between the *level* of liquidity creation and bank CSR performance using a panel-data model with fixed effects.

2. Hypothesis Development

While liquidity creation is a core function of banks that can enhance bank value (Bryant, 1980; Diamond and Dybvig, 1983; Kashyap et al., 2002; Gatev and Strahan, 2006, 2009; Berger and Bouwman, 2009), it also increases bank risk (Diamond and Rajan, 2000, 2001, 2005; Allen and Gale, 2004; Gatev et al., 2009; Imbierowicz and Rauch, 2014; Fungáčová et al., 2015; Berger and Bouwman, 2017). When determining the amount of liquidity to create, banks trade off between the value that liquidity creation generates and the risk that it brings. This tradeoff is especially critical during financial crises, when survival may become a serious concern for banks.

The level of a bank's concern for its social responsibilities can affect its liquidity creation decisions during financial crises. On one hand, during bad economic times when overall liquidity is tight, CSR banks should have stronger incentives than their peers to provide liquidity to borrowers, who are their stakeholders. Thus, they should create more liquidity during financial crises. CSR banks should also be better able to provide liquidity in crises. As shown in Godfrey et al. (2009), engaging in CSR activities creates an insurance-like effect for firms, which allows them to better weather bad times. Lins et al. (2017) find that firms with higher CSR scores had higher stock returns during the 2008 financial crisis because their CSR activities enabled them to accumulate social capital and won them the trust and support of stakeholders. Moreover, firms with better CSR performance have lower risk because they are more transparent (Dhaliwal et al., 2011; Ghoul et al., 2011; Jo and Na, 2012; Cheng et al., 2014; Kim et al., 2014), have fewer legal suits (Orlitzky and Benjamin, 2001; Ghoul et al., 2011; Oikonomou et al., 2012), have lower agency problems (Cheng et al., 2014; Ferrell et al., 2016), have better stakeholder alignments (Orlitzky and Benjamin, 2001; Oikonomou et al., 2012; Mishra

and Modi, 2013; Harjoto and Laksmana, 2018), and focus more on risk management (Lee and Faff, 2009; Luo and Bhattacharya, 2009). Therefore, banks with higher CSR scores should be less concerned about financial distress and should have greater capacity to provide liquidity during financial crises.

On the other hand, however, CSR banks may be more reluctant to provide liquidity in financial crises. Shareholders often prefer banks to take high risks because their payoff is a call option and banks often enjoy implicit guarantees from the government. Socially responsible banks care not only for the interests of their shareholders, but also for those of other stakeholders; hence, their preference for risk taking is lower. Leung et al. (2019) find that banks significantly reduce risk taking after the enactment of stakeholder-friendly legislation. Bae et al. (2011) show that employee-friendly firms maintain low debt ratios. Verwijmeren and Derwall (2010) find that firms with good track records in employee well-being significantly lower debt ratios to reduce their probability of bankruptcy. These results suggest that CSR banks may become more conservative in financial crises because they have greater concern for their employees and the customers they serve, who will suffer if the banks become financially distressed. Because the credit quality of borrowers deteriorates and overall liquidity is tighter during crises than in normal times, providing liquidity service is riskier for banks during crises. It has also been well documented that banks with lower liquidity must make more costly adjustments in financial crises (Ivashina and Scharfstein, 2010; Cornett et al., 2011; Acharya and Mora, 2015). As a result, CSR banks may reduce liquidity creation in times of financial crisis due to their concerns for the welfare of stakeholders.[13]

[13] According to a report in Wall Street Journal (November 9, 2009, titled "Banks Choosing Treasury Bonds Over Loans"), when asked in a quarterly survey about their lending attitude regarding extending credit during the subprime crisis, "loan officers said decreased loan demand and deteriorating credit quality were

The above discussions provide no clear theoretical prediction on how CSR affects bank liquidity creation during financial crises, which leads to our first set of opposing empirical hypotheses:

Hypothesis 1a. *Banks with higher pre-crisis CSR scores have higher increases in liquidity creation during financial crises.*

Hypothesis 1b. *Banks with higher pre-crisis CSR scores have lower increases in liquidity creation during financial crises.*

The riskiness of a bank may affect the relation between its CSR performance and liquidity creation in financial crises. The higher the level of risk that a bank assumes prior to a financial crisis, the more likely it is to become financially distressed during the crisis. Banks with higher risk levels thus have more concerns about financial distress and are consequently less willing to create liquidity. As mentioned, CSR banks enjoy greater trust and support of stakeholders in crises and they focus more on risk management. As a result, they should have fewer concerns about financial distress and have strong incentives to create liquidity, even if they assume higher risk. On the other hand, CSR banks should become more conservative and less willing to create liquidity when they have higher risk if their concern for how their financial distress will affect stakeholders is genuine. These discussions lead to the following set of opposing hypotheses.

driving the contraction in business lending. Most banks also said they expected their lending standards across all loan categories would remain tighter than average until at least the second half of 2010." We expect that CSR banks would shrink lending to an even greater extent because of the concern that their stakeholders would be hurt if they became financially distressed.

Hypothesis 2a. *The effect of a bank's pre-crisis CSR score on its liquidity creation during financial crises is more* ***positive*** *for banks with higher pre-crisis risk.*

Hypothesis 2b. *The effect of a bank's pre-crisis CSR score on its liquidity creation during financial crises is more* ***negative*** *for banks with higher pre-crisis risk.*

3. Data and Research Methodology

Our sample includes all the U.S. listed banks with FR Y-9C, Call Reports and Environmental, Social, and Governance ratings data in the MSCI ESG STATS database. The sample period is from 1996Q1 to 2013Q4. Following Berger and Bouwman (2013), one banking crisis, the subprime crisis of 2008, and two market crises occurred in this period. The first market crisis comprises the Russian debt crisis and the Long-Term Capital Management bailout in 1998, and the second includes the burst of the dot-com stock bubble and the 9/11 attack between 2000 and 2002. As in Berger and Bouwman (2013), we create two fake crises, one from 2004Q3 to 2006Q2 and the other from 2012Q1 to 2013Q4, to represent normal times. This setting allows us to compare the relation between bank CSR performance and their liquidity creation in financial crises with that in normal times. Following Chen et al. (2021), we define the four quarters prior to a crisis as the pre-crisis period, and study the effects of bank CSR performance in pre-crisis periods on the changes in their liquidity creation during crises. Please refer to Appendix A for details on the crisis and pre-crisis periods.

The MSCI ESG STATS database uses indicators to evaluate the strengths and concerns of a company's CSR performance in seven categories: community, environment,

diversity, employee relations, human rights, product, and governance.[14] For a strength or concern item in a category, a value of 1 is assigned to a bank if the specific criterion for that item is met for the bank, and 0 otherwise.[15] The numbers of the items in different categories may be different, and the number of items may change every year. Following the literature (Servaes and Tamayo, 2013; Di Giuli and Kostovetsky, 2014), we exclude the corporate governance category when measuring bank CSR performance, since corporate governance is more relevant to shareholders than to other stakeholders. Instead, we use the CSR score in the corporate governance category as a control variable. We also exclude the environment, human rights, and product categories because they are less relevant to the issues we study, and many of the items in them do not apply to banks.[16] We retain the community, employee relations, and diversity categories to reflect the degree to which a bank cares about its stakeholders.

For a bank, the strength (concern) score for a category in a certain year equals the total value of strengths (concerns) that the bank receives divided by the maximum number of strength (concern) items for that category in that year. This implies the strength (concern) score for a category is between zero and one for each bank-year. We then sum the strength (concern) scores across the three categories to obtain the CSR strength (concern) score. We denote CSR strength and concern scores by *CSR_STR* and *CSR_CON*, respectively. Our main CSR measure, *CSR*, is equal to *CSR_STR* minus *CSR_CON*.

[14] The indicators in MSCI ESG STATS database evolve every year. At the end of 2013, there were a total of 75 indicators in the seven categories.

[15] For example, *Employee involvement* is a strength item, which evaluates whether a company strongly encourages worker involvement and whether ownership through stock options is available to a majority of employees. Another example is *Retirement Benefits Concern*, which is a concern item and evaluates whether the company has an inadequate retirement benefits program.

[16] In unreported results, we include these three categories when calculating bank CSR performance, and the results remain qualitatively unchanged.

Our measure for bank liquidity creation is *LC*, the cat fat measure in Berger and Bouwman (2009), scaled by *GTA* (gross total assets). When computing the cat fat, loans are classified by category, and both on- and off-balance-sheet activities are included. Please see Appendix B for the detailed definition of *LC*. We use the following regression model to test Hypotheses 1a and 1b:[17]

$$\Delta LC/GTA_{i,t} = \alpha_0 + \alpha_1 CSR\_S_{i,pre-t} \times BC_t + \alpha_2 CSR\_S_{i,pre-t} \times MC_t + \alpha_3 CSR\_S_{i,pre-t} \times NT_t + \delta_1 Control_{i,pre-t} + \eta_t + \varepsilon_{i,t}. \quad (1)$$

In the above equation, $\Delta LC/GTA_{i,t}$ is the difference in quarterly average *LC/GTA* between the crisis and pre-crisis periods, where *t* takes values from 1 to 5, representing a crisis.[18] $CSR\_S_{i,pre-t}$ is bank *i*'s quarterly average *CSR* score (*CSR*, *CSR_STR*, or *CSR_CON*) in the pre-crisis period. *BC*, *MC*, and *NT* are the dummy variables for the subprime crisis of 2008, market crises, and normal times, respectively. $Control_{i,pre-t}$ is a set of control variables and η_t is crisis fixed effects. Following Berger and Bouwman (2009), we include *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by *GTA*), *ZScore* (Z-score, which is the sum of return on assets and the ratio of equity to *GTA* divided by the standard deviation of return on assets),[19] *EarnVol* (the standard deviation of a bank's quarterly return on assets over

[17] In terms of using pre-crisis bank characteristics to explain bank behavior or performance during crises, our empirical setting is similar to that of Berger and Bouwman (2013) and Chen et al. (2021).

[18] The crises corresponding to *t* ranging from 1 to 5 are: Market Crisis I, Market Crisis II, Normal Time I, Banking Crisis, and Normal Time II, respectively. We do not include bank fixed effects in our model for the following reasons. First, about one-third of banks appeared in our sample only once. Including fixed effects will reduce the sample size by about 14%. Second, in unreported results, we test the significance of bank fixed effects, and cannot reject the null hypothesis that all the bank-specific effects are zero. Third, the bank fixed effects are the within estimators. When they are used, the relations between a bank's variation in the dependent variable and those in the independent variables are estimated. Because what we study is whether banks with different CSR scores differ in changes in liquidity creation in a crisis, there is no need to include bank fixed effects. In unreported results, we include bank fixed effects and rerun the regressions, and the results remain qualitatively unchanged.

[19] *GTA* (gross total assets) equals total assets plus allowance for loan and lease losses and the allocated transfer risk reserve.

the previous twelve quarters multiplied by 100), *lnGTA* (the natural logarithm of *GTA*), *Concentration* (the Herfindahl-Hirschman Index (HHI) of six loan categories) as control variables.[20] As Diaz and Huang (2017) show, corporate governance can affect bank liquidity creation, so we also control *Cgov*, which is a bank's corporate governance score in MSCI ESG STATS.[21] We also control for bank ROA because a bank's profitability may be correlated with both its capacity to conduct CSR activities and its liquidity creation.[22] As in Berger and Bouwman (2009), we orthogonalize *CreditRisk* and *ZScore* to reduce potential multicollinearity concerns.[23] All variables are winsorized at the 1% and 99% to avoid the outlier problem. Detailed definitions of all variables used in the paper are provided in Appendix C.

To test Hypotheses 1a and 1b, our foci are α_1 and α_2, the coefficients of $CSR\_S_{i,pre-t} \times BC_t$ and $CSR\_S_{i,pre-t} \times MC_t$, respectively, when the whole sample is used to estimate Equation (1). If they are positive (negative), banks with higher pre-crisis CSR scores produce more (less) liquidity in financial crises, so Hypothesis 1a (1b) is supported.

For testing Hypotheses 2a and 2b, we use two proxies for a bank's risk-taking in the pre-crisis period. The first is the bank's Z-score (i.e., *ZScore*). In the banking literature, Z-score is often used as a reverse measure of a bank's overall risk-taking level (for example, Beltratti and Stulz, 2012), i.e., the higher the Z-score, the less risky is the bank.

[20] The six loan categories include commercial real estate, residential real estate, construction and industrial, consumer, agriculture, and others.

[21] The way for calculating *Cgov* is similar to that for calculating *CSR*, except that only the corporate governance category is considered when *Cgov* is calculated.

[22] For example, Berger and Bouwman (2009) find that liquidity creation is positively correlated with bank value.

[23] As explained in Berger and Bouwman (2009), we regress *CreditRisk* on *EarnVol*, *ZScore*, and all control variables, and use the residuals of this regression to represent the part of *CreditRisk* that is not explained by these independent variables. *ZScore* is orthogonalized in a similar way.

Our second proxy for bank risk is the bank's pre-crisis earnings volatility (*EarnVol*). We divide the sample into two subsamples according to the median of the pre-crisis *ZScore* or *EarnVol*.[24] Hypothesis 2a (2b) is supported if α_1 and α_2 are more positive (negative) in the subsample with lower *ZScore* or higher *EarnVol*.

We also examine (i) how bank performance in individual CSR categories affects liquidity creation, and (ii) how bank CSR performance affects different components of liquidity creation, in financial crises. For the former, we rerun Equation (1), but replace *CSR_S* with each of the three components of *CSR*: *Community*, *Employee*, and *Diversity*, which are the differences between the strength and concern scores for the community, employee relations, and diversity categories, respectively. For the latter, we rerun Equation (1), but replace Δ*LC/GTA* with the changes in the ratios of *LC*'s components (assets, liabilities and equity, and off-balance-sheet activities) to *GTA*.

Table 1 presents the summary statistics. From Panel A of the table, the average change in bank liquidity creation (Δ*LC/GTA*) is 1.3% for all crisis periods (including the two fake crises). For the components of liquidity creation, the average Δ*LC_A/GTA*, Δ*LC_LE/GTA*, Δ*LC_OBS/GTA* across the crises are 1.2%, 0.1%, and 0.1%, respectively, which means that changes in bank liquidity creation in crises derive mainly from the assets side. For independent variables, the mean of pre-crisis *CSR* is –0.054, while those of *CSR_STR* and *CSR_CON* are 0.173 and 0.227, respectively. For the components of CSR scores, the means of the pre-crisis *Community*, *Employee*, and *Diversity* are 0.022, 0.008, and –0.083, respectively. The means of pre-crisis *Capital*, *CreditRisk*, *ZScore*, *EarnVol*, and *GTA* are 0.123, 0.737, 221.345, 0.132, and 50.810 billion US dollars, respectively.

[24] We do not orthogonalize *ZScore* when using it to construct the subsamples.

Panel B of Table 1 shows the means and standard deviations of the variables in different types of crises. The table shows that the change in bank liquidity creation is highest during normal times and lowest during the subprime (i.e., the banking) crisis. In the subprime crisis, the mean changes in the asset, liabilities and equity, and off-balance-sheet components of liquidity creation are 0.007, −0.007, and −0.017, respectively. This result is consistent with Acharya and Mora (2015), who find that loan commitments were withdrawn and transformed into bank loans during the subprime crisis. The average pre-crisis *CSR* for the banking crisis, market crises, and normal times are −0.038, 0.271, and −0.115, respectively.[25]

Panel C of Table 1 reports the means and standard deviations of the variables for the Low (bottom 30%), Medium (middle 40%), and High (top 30%) pre-crisis *CSR* score groups. During the banking crisis, the High *CSR* group experienced lower changes in liquidity creation (−0.037) than the Low *CSR* group (−0.010). If we examine the composition of liquidity creation, banks in the Low CSR group on average have higher changes in liquidity creation on the assets side during market and banking crises than those in the high CSR group, suggesting that the former take more risk in financial crises.

[Please insert Table 1 here]

Finally, to have a preliminary and visionary understanding of the relationship between bank CSR performance and the change in liquidity creation in financial crises, we plot them in Figure 1. As shown in the figure, banks with better CSR performance seem to have more negative changes in liquidity creation in crises.

[Please insert Figure 1 here]

[25] The MSCI ESG STATS dataset originally covered only the largest companies, but have increased their coverage to include smaller ones since 2002. Because both market crises occurred before 2002, the sample size of the market crisis subsample is the smallest, while the average asset size is the largest.

4. Basic Regression Results

In this section, we investigate how CSR affects bank liquidity creation. Table 2 reports the OLS regression results of Equation (1) using the whole sample. From Model 1, when the independent variable is *CSR*, the coefficient of *CSR*×*BC* is −0.035, which is significant at the 1% level. This result supports Hypothesis 1b, suggesting that banks with higher CSR scores reduced more of their liquidity creation during the subprime crisis of 2008. For economic significance, a one-standard-deviation increase in *CSR*, which is 0.315, reduced liquidity creation by 1.103% (−0.035×0.315). Given that the average quarterly change in liquidity creation during the subprime crisis is −1.7%, this is equivalent to a 64.8% (1.103/1.7) drop, which is economically significant.

From Model 1 of Table 2, the coefficient of *CSR*×*MC* is −0.035, which is significant at the 10% level. This result also supports Hypothesis 1b.[26] Therefore, an increase in *CSR* reduces bank liquidity creation in both the subprime and market crises. As for control variables, *ROA*, *CreditRisk* and *Concentration* are significantly and negatively associated with the change in bank liquidity creation, while other variables have no significant effects.

As shown in Models 2 and 3 of Table 2, the negative effect of *CSR* on liquidity creation during the subprime crisis mainly came from the strength component of the CSR performance. The coefficient of *CSR_STR*×*BC* is −0.049, which is significant at the 1% level, while that of *CSR_CON*×*BC* is insignificant. This finding implies that banks with better CSR strengths prior to the subprime crisis experienced greater reduction in liquidity

[26] For economic significance, a one-standard-deviation increase in *CSR* reduces liquidity creation by 1.11% (−0.033×0.337). Given that the average quarterly change in liquidity creation during market crises is 0.4%, this reduction is also economically significant.

creation during the crisis. For market crises, the coefficients of both *CSR_STR*×*MC* and *CSR_CON*×*MC* are insignificant.

[Please insert Table 2 here]

To test Hypotheses 2a and 2b, we split the sample into two subsamples according to whether a bank's pre-crisis *ZScore* or *EarnVol* is higher than the median of that variable for a crisis, and rerun Equation (1). The results are shown in Table 3. Models 1 and 2 report the results for banks with low and high pre-crisis *ZScore*, respectively, and Models 3 and 4 report those for banks with low and high pre-crisis *EarnVol*, respectively. From the table, the coefficients of *CSR*×*BC* in Models 1 and 4 are significantly negative, while those in Models 2 and 3 are insignificant, which is consistent with Hypothesis 2b. That is, the negative impact of *CSR* on bank liquidity creation in the subprime crisis is more significant for banks with lower pre-crisis Z-scores and higher pre-crisis *EarnVol*. For market crises, the coefficient of *CSR*×*MC* in Models 1 and 4 is negatively significant at the 10% level, while those in Models 2 and 3 are insignificant. As to normal times, we do not find any significant result for the coefficient of *CSR*×*NT*. This is intuitive. Since there is no real shock in fake crises, CSR banks have no need to adjust liquidity creation in these periods.

As also shown in Table 3, the difference in the coefficient of *CSR*×*BC* between the low and high *ZScore* subsamples is –0.073, which is significant at the 1% level, and that between the low and high *EarnVol* subsamples is 0.066, which is significant at the 5% level. For market crises, the difference in the coefficient of *CSR*×*MC* between the low and high *ZScore* subsamples is insignificant, and that between the low and high *EarnVol* subsamples is 0.717, which is significant at the 10% level.

Overall, the results in Table 3 support Hypothesis 2b, suggesting that the negative impact of *CSR* on bank liquidity creation is stronger for banks with higher pre-crisis risk.

Moreover, the support is stronger for the banking than market crises. One possible explanation is that, because of the different origins of the respective crises, bank financial conditions are weaker in banking than in market crises and thus the threat of financial distress is more serious for banks in the former than in the latter. Because the adverse effects of bank financial distress on their stakeholders are more important for CSR banks, they tend to be more conservative during banking than during market crises. Another possible explanation is that the statistical power of the results for market crises is weaker because the sample size for market crises is smaller than that for the banking crisis.[27]

[Please insert Table 3 here]

In sum, the results in Tables 2 and 3 show strong evidence that banks with better CSR performance reduce liquidity creation in financial crises, and this result is especially evident for the subprime crisis of 2008. In addition, the negative effect of CSR on liquidity creation is more significant for riskier banks. These results support Hypotheses 1b and 2b. An interesting observation is that, as seen in Tables 2 and 3, all but one coefficient of *CSR_S×NT* (*CSR×NT*, *CSR_STR×NT*, and *CSR_CON×NT*) are statistically insignificant. These results imply that CSR performance does not affect bank liquidity creation in non-crisis times.

5. Additional Analyses

In this section, we conduct additional tests to explore the channels for the main results and check the robustness of our results. First, we employ a 2SLS regression system and the PSM analysis to alleviate endogeneity concerns. Second, to have a better understanding of the channels through which bank CSR performance influences liquidity

[27] From Panel B of Table 1, the numbers of observations for the subprime crisis and market crises are 171 and 56, respectively.

creation, we examine how bank CSR performance in each of the individual CSR categories (community, employee relations, and diversity) affects liquidity creation, and how bank CSR performance affects different components of bank liquidity creation (assets, liabilities and equity, and off-balance-sheet activities). In addition, we investigate the effects of bank CSR performance on banks' risk adjustments during crises. Third, we examine whether CSR banks increase or decrease CRA loans in crises to see whether avoiding financial distress or helping moderate- or low-income neighborhoods is more important for CSR banks in bad times. To save space, for the regression results in this section whose dependent variables involve liquidity creation, we report only the coefficients of the independent variables that contain CSR scores.

5.1 The two-stage least square (2SLS) regressions

In the paper, we use banks' pre-crisis CSR performance to predict the changes in liquidity creation during financial crises, so our results are free from endogeneity problems caused by simultaneity. However, there may exist other endogeneity concerns, such as omitted variables or measurement error. We conduct the 2SLS regressions to address these concerns. Following Cornett et al. (2016), we use a dummy variable for whether a bank's headquarters are located in a Democratic-leaning state as the instrumental variable (IV) for *CSR*. According to Di Giuli and Kostovetsky (2014), Democratic Party-leaning firms spend $20 million, or roughly 10% of net income, more on CSR than Republican-leaning firms without recovering these expenditures through increased sales.[28] Applying this concept, Cornett et al. (2016) construct a measure of external political environment, which is the first principal component of three variables

[28] A possible reason for why leaning toward the Democratic Party is related to CSR is that the Democratic Party places more emphasis on CSR-related issues, such as environmental protection, anti-discrimination laws, employee protection, and helping the poor and disadvantaged.

representing the degree to which a state tilted toward the Democratic Party in the most recent presidential, congressional, and state government elections.[29] We define this measure as *Political*, which should be a good instrument for bank CSR scores because it is positively associated with *CSR* and no strong evidence suggests that a state's political leaning has a direct effect on bank liquidity creation (not through its impact on *CSR*).[30]

We rerun all the models in Tables 2 and 3 using 2SLS regressions and treat the three interactions between the CSR score and crisis dummies as endogenous.[31] The results are shown in Table 4. As shown in the table, the results are similar to those in Tables 2 and 3. That is, Hypotheses 1b and 2b are still supported for both the banking crisis and market crises, but the support becomes weaker for market crises. As explained, the threat of bank distress is more serious for banks in crises originating in the banking sector than in those originating in the capital markets. Therefore, banks' pre-crisis Z-scores and *EarnVol* have a weaker impact on the relationship between *CSR* on bank liquidity creation in market crises than in banking crises.

[Please insert Table 4 here]

5.2 The PSM analysis

[29] The three variables are: (a) the proportion of the votes received by the Democratic candidate in the presidential election, (b) 0.5 × proportion of senators who are Democrats + 0.5 × proportion of congresspersons who are Democrats, and (c) 0.5 × an indicator that equals one if the state governor is a Democrat + 0.25 × an indicator that equals one if the state legislature's upper chamber is controlled by the Democratic Party + 0.25 × an indicator that equals one if the state legislature's lower chamber is controlled by the Democratic Party. Data on US election results are from the website: www.uselectionatlas.org.

[30] Appendix D reports the first-stage results. To test the hypothesis that all the coefficients of instrumental variables are zero, we also report the Angrist-Pischke *F*-statistic of excluded instruments (Angrist and Pischke, 2009). The results show that all the associated *p*-values are less than 1 percent, indicating that the weak instrument problem is not a concern.

[31] In the first step, we regress *CSR* on *Political* and control variables to obtain the predicted value $\widehat{CSR}$. We then use the interactions between the predicted value and crisis dummies ($\widehat{CSR}$×*NT*, $\widehat{CSR}$×*BC*, and $\widehat{CSR}$×*MC)* as the instruments for *CSR*×*NT*, *CSR*×*BC*, *CSR*×*MC*, respectively. Woodridge (2010) suggests that, under certain conditions, this method provides the optimal instruments. See Theorem 8.5 (Optimal Instruments) in Section 8.6 (p.231) and the discussions in Section 6.4.1 (pp.144-145) of Woodridge (2010).

In this subsection, we use PSM to test the robustness of our results against endogeneity concerns (Rosenbaum and Rubin, 1983; Shipman et al., 2017).[32] For each crisis, we define treatment banks as those whose pre-crisis CSR scores are above the median of the crisis, and define the remaining banks as control banks. For each treatment bank, we find a matched bank among control banks using the nearest neighbors method (n = 1). Specifically, using the same independent variables in Equation (1), we estimate a logit model and use the estimated probability to find the nearest neighbor.[33]

Table 5 shows the results of the PSM analysis. The "Treatment – Matched" in the table is the mean difference in Δ*LC/GTA* between the treatment and matched banks. We report the *p*-values computed using the robust Abadie-Imbens standard errors (Abadie and Imbens, 2016). Panel A of the table contains the results for the subprime crisis of 2008. As shown in the first row of the panel, the difference in liquidity creation between the treatment and matched groups is negative and significant at the 5% level, supporting Hypothesis 1b that banks with a higher CSR score reduced more liquidity creation during the subprime crisis. To test Hypotheses 2a and 2b, we first sort treatment banks into two groups using the pre-crisis median of the sorting variable (*ZScore* or *EarnVol*), and then conduct the PSM analysis for each of the two groups. The results are shown in Rows 2 to 5 of the panel. The difference in change in liquidity creation between the treatment and matched banks is significantly negative at the 1% level for the low *ZScore* and high *EarnVol* groups, and is insignificant for the high *ZScore* and low *EarnVol* groups. These results support Hypothesis 2b. Compared to matched banks, treatment banks significantly

[32] PSM deals with the endogeneity issues caused by "functional form misspecification" and thus provides a further robustness check on the results.

[33] To confirm the quality of the matching, we compare the post-matching differences in matching variables between the two groups (treatment and matched banks), and find that the differences are insignificant. We also check whether the trends of these two groups are parallel, and cannot find any pre-crisis trend difference in liquidity creation between the two groups. These results are available from the authors upon request.

reduced liquidity creation if they had lower Z-scores or higher *EarnVol* prior to the subprime crisis.

Panels B and C of Table 5 report the PSM results for market crises and normal times, respectively. In Panel B, the difference in liquidity creation between the treatment and matched groups for the whole sample is insignificant, and is significantly negative at the 10% level for the low *ZScore* and high *EarnVol* groups. In addition, it is significantly positive at the 10% and 5% level for the high *ZScore* and low *EarnVol* groups, respectively. These results do not support Hypothesis 1, but still support Hypothesis 2b that banks with higher pre-crisis risk reduce more liquidity creation in market crises. Note that the sample size for market crises is small, so these results should be interpreted cautiously. In Panel C, none of the differences in the change in liquidity creation between treatment and matched banks is statistically significant, implying that banks' pre-crisis CSR performance has no significant effect on the change in liquidity creation in normal times. This result is consistent with the results in Table 2. As mentioned, since there is no real shock in fake crises, CSR banks have no need to change liquidity creation in these periods.

Overall, the PSM results in Table 5 are consistent with our main results. They suggest that Hypothesis 2b is supported for the subprime crisis of 2008 and market crises, and Hypothesis 1b is supported for the former. As argued before, the insignificant results for market crises may be due either to the fact that the threat of bank distress is lower in market crises, or to the smaller sample size for market crises.

[Please insert Table 5 here]

5.3 Individual CSR categories

From the results in Table 2, Hypothesis 1b is supported, which means banks that care about CSR reduce more liquidity creation in crises. It is interesting to ask which categories of bank CSR performance drive the results. To investigate this issue, we rerun Equation (1), but replace *CSR* with the following variables: *Community*, *Employee*, and *Diversity*, which are a bank's CSR scores in the community, employee relations, and diversity categories, respectively. The results are shown in Table 6. From Models 1 to 3 of the table, when only one of the three category CSR performance variables is included in the regression, the coefficients of *Community*×*BC* and *Employee*×*BC* are significantly negative at the 5% and 1% level, respectively, and that of *Community*×*MC* is significantly negative at the 10% level. All the other coefficients of independent variables that contain CSR performance are insignificant. In Model 4, all three category CSR performance variables are included in the regression, and the coefficients of *Community*×*BC*, *Employee*×*BC*, and *Community*×*MC* remain significantly negative. These results suggest that CSR banks reduce liquidity creation in financial crises because they care about their employees and the communities they serve, which is consistent with the economic intuitions behind Hypotheses 1b and 2b.

[Please insert Table 6 here]

5.4 *Components of LC*

To enhance our understanding of how *CSR* affects bank liquidity creation in crises, we next examine the impact of bank CSR performance on different components of liquidity creation. As mentioned above, we split *LC* into three components: assets (*LC_A*), liabilities and equity (*LC_LE*), and off-balance-sheet activities (*LC_OBS*), and replace Δ*LC/GTA* in Equation (1) with Δ*LC_A/GTA*, Δ*LC_LE/GTA*, and Δ*LC_OBS/GTA*, which are respectively the differences in *LC_A/GTA*, *LC_LE/GTA*, and *LC_OBS/GTA* between the crisis and pre-crisis periods. The results are shown in Table 7. As shown in the table,

when the dependent variable is Δ*LC_A/GTA*, the coefficient of *CSR*×*BC* is –0.021 and that of *CSR*×*MC* is –0.028, which are significantly negative at the 5% and 1% levels, respectively. When the dependent variable is Δ*LC_OBS/GTA*, the coefficient of *CSR*×*BC* is –0.014, which is significantly negative at the 5% level. All the other coefficients of the independent variables that contain CSR performance are insignificant. These results imply that CSR banks reduce their liquidity creation in assets and off-balance-sheet items in crises.

[Please insert Table 7 here]

5.5 Risk adjustments

As mentioned, our main empirical results are consistent with the notion that CSR banks reduce liquidity creation in financial crises to avoid becoming financially distressed. If this claim is correct, CSR banks should reduce more risk in crises. In this subsection, we examine CSR banks' risk-adjustment behavior during financial crises. Using Δ*Loans* (the change in the ratio of total loans to *GTA*), Δ*Commitments* (the change in the ratio of loan commitments to *GTA*), and Δ*CreditRisk* (the change in *CreditRisk*) as the proxies for banks' risk adjustments, we run Equation (1), but replace the dependent variable Δ*LC/GTA* with these variables.

The results are shown in Table 8. From the table, banks with better CSR performance reduced more loan commitments and credit risk during the subprime crisis of 2008. The corresponding coefficients of *CSR*×*BC* are significantly negative at the 1% and 5%, respectively. They also reduced more loans and credit risk in market crises. The corresponding coefficients of *CSR*×*MC* are significantly negative at the 10% and 1%,

respectively. These results imply that CSR banks do reduce more risky assets and loan commitments than peers in financial crises, which is consistent with our story.[34]

[Please insert Table 8 here]

5.6 Community Reinvestment Act loans

The Community Reinvestment Act (CRA) of 1977 requires the Federal Reserve and other federal banking regulators to encourage banks to provide financial services to low- and moderate-income neighborhoods. CSR banks should have stronger incentive to make CRA loans (the loans that fit the purpose of the CRA)[35] during financial crises because they care more about the communities they serve and borrowers with economic disadvantages need more financial assistance in crises. On the other hand, making CRA loans is highly risky in crises because borrowers of these loans are more likely to default in bad times due to their economic disadvantages. Investigating how CSR performance affects banks' CRA loans in crises would give us a better idea on the relative importance of avoiding financial distress to CSR banks during crises.

We run Equation (1) but replace the dependent variable $\Delta LC/GTA$ with the change in CRA loans. We collect the CRA loan data from the Federal Financial Institutions

[34] The result that banks with better CSR performance did not reduce more loans in the surprise crisis (the corresponding coefficient of $CSR \times BC$ is insignificant) seems not supporting our claim. One possible explanation is that, as Ivashina and Scharfstein (2010) and Cornett et al. (2011) point out, banks were unable to reduce loans in the subprime crisis as many of their borrowers drew down funds on loan commitments when liquidity was tight in the crisis. Also note that this result is not necessarily inconsistent with the result that CSR banks reduced more liquidity creation in assets during the subprime crisis. Banks might reduce loans classified as illiquid assets and increase loans classified as semi-illiquid assets to reduce liquidity creation in assets.

[35] For more detailed information about CRA loans, please refer to the following website: https://www.minneapolisfed.org/article/2018/defining-low--and-moderate-income-and-assessment-areas

Examination Council (FFIEC) Web site.[36] Because only yearly data are available, we adjust the definitions of crisis and non-crisis periods accordingly.[37]

The results are in Table 9. Model 1 shows that banks with better CSR performance reduced more of CRA loans during the subprime crisis, but we do not find significant results for market crises and normal times. In Models 2 and 3, the dependent variables are CSR strength (*CSR_STR*) and concerns (*CSR_CON*), respectively. The results show that the banks with higher CSR strength reduced more of their CRA loans in the 2008 crisis. From these results, it seems that in banking crises, lowering the probability of financial distress is more important than helping borrowers in low- and moderate-income neighborhoods for CSR banks.

[Please insert Table 9 here]

5.7 Other robustness tests

In addition to the empirical results presented above, we undertake several additional robustness tests. To save the space, these results are not reported in the paper. In our main analysis, we use the ratio of tier-1 capital to Basel I risk-weighted assets as the proxy for bank capital. To test the robustness of our results, we rerun the regressions in Tables 2 and 3 using the BIS ratio as the alternative proxy for the bank capital ratio. The results are similar to those in Tables 2 and 3.

In our main analysis, we use a bank's CSR performance in the corporate governance category in the MSCI ESG STATS database as the proxy for its corporate governance

[36] https://www.ffiec.gov/cra/craproducts.htm

[37] We use the data of 1998, 2000-2002, 2004-2005, 2007-2009, and 2012-2013 as the crisis periods for the first market crisis, second market crisis, first normal time period, banking crisis, and second normal time period, respectively, and we use the data of 1997, 1999, 2003, 2006, and 2011 as the pre-crisis periods for these crises, respectively. After dropping observations without CRA loan data, the sample size reduces to 560.

performance. We rerun the regressions in Tables 2 and 3, using the entrenchment index (*Eindex*) in Bebchuk et al. (2009) as the alternative proxy for corporate governance. The higher the *Eindex*, the worse is a bank's corporate governance performance. Again, the results are similar to those in Tables 2 and 3.

Finally, in the main analysis, we follow Berger and Bouwman (2013) and define the two normal time periods as 2004Q3-2006Q2 and 2012Q1-2013Q4. To examine whether our results are sensitive to the definitions of normal times, we change the normal time periods to 2003Q4 to 2005Q3 and 2011Q1 to 2012Q4, and rerun the regressions in Tables 2 and 3. Our main results still hold.

6. Concluding remarks

This paper examines the relation between bank CSR performance and their liquidity creation in financial crises. It finds that banks with better CSR performance reduce more liquidity creation than their non-CSR peers in financial crises. The negative impact of CSR performance on bank liquidity creation is stronger for banks with higher risk prior to crises, i.e., banks with lower pre-crisis Z-scores and those with higher pre-crisis earnings volatility. These results are stronger during the banking crisis, when the threat of financial distress is more serious for banks. In addition, the results are mainly driven by banks' CSR performance in the community and employee relations categories. The results are consistent with the notion that banks with better CSR performance reduce liquidity creation in crises because of their concern that the communities they serve and their employees will be hurt if they become financially distressed. The results in this paper not only shed new light on the determinants of bank liquidity creation, but also enhance our understanding of how CSR may affect banks. They suggest that encouraging banks to improve CSR performance comes with both benefits and costs, i.e., although such

encouragement can reduce the banks' incentive to pursue unsound risk, it may also lower their incentives to provide liquidity in times of financial crisis.

Funding We acknowledge the financial support by the Ministry of Science and Technology of Taiwan (MOST 110-2410-H-002-070).

Declarations

Conflict of Interests: The authors declare that they have no relevant or material financial interests that relate to the research described in this paper.

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Appendix A

Table A The definitions of pre-crisis and crisis periods within our sample period

Name of the crisis	Pre-crisis period	Crisis period
Market Crisis I	1997Q3-1998Q2	1998Q3-1998Q4
Market Crisis II	1999Q2-2000Q1	2000Q2-2002Q3
Normal Time I	2003Q3-2004Q2	2004Q3-2006Q2
Banking Crisis	2006Q3-2007Q2	2007Q3-2009Q4
Normal Time II	2011Q1-2011Q4	2012Q1-2013Q4

Appendix B

Table B The definition of liquidity creation ("cat fat" in Berger and Bouwman, 2009)

Assets		
Illiquid assets (weight=1/2)	Semiliquid assets (weight= 0)	Liquid assets (weight= –1/2)
Commercial real estate loans (CRE)	Residential real estate loans (RRE)	Cash and due from other institutions
Loans to finance agricultural production	Consumer loans	All securities (regardless of maturity)
Commercial and industrial institutions loans	Loans to depository institutions	Trading assets
Other loans and lease financing receivables	Loans to state and local governments	Fed funds sold
Other real estate owned (OREO)	Loans to foreign governments	
Customers' liability on bankers' acceptances		
Investment in unconsolidated subsidiaries		
Intangible assets		
Premises		
Other assets		
Liabilities plus equity		
Liquid liabilities (weight =1/2)	Semiliquid liabilities (weight=0)	Illiquid liabilities (weight= –1/2)
Transactions deposits	Time deposits	Bank's liability on bankers' acceptances
Savings deposits	Other borrowed money	Subordinated debt
Overnight federal funds purchased		Other liabilities
Trading liabilities		Equity
Off-balance sheet guarantees (notional values)		
Illiquid guarantees (weight=1/2)	Semiliquid guarantees (weight=0)	Liquid guarantees (weight= –1/2)
Unused commitments	Net credit derivatives	Net participations acquired
Net standby letters of credit	Net securities lent	
Commercial and similar letters of credit		
All other off-balance sheet liabilities		
Off-balance sheet derivatives (gross fair values)		
		Liquid derivatives (weight=–1/2)
		Interest rate derivatives
		Foreign exchange derivatives
		Equity and commodity derivatives

$catfat_{i,t}$ = *+½ Illiquid assets - ½ Liquid assets*
+½ Liquid liabilities - ½ Illiquid liabilities -½ Equity
+½ Illiquid guarantees -½ Liquid guarantees -½ Liquid derivatives

Appendix C

Table C Variable definitions and data sources

Variable	Definition	Data Source
Dependent variables		
Δ*LC/GTA*	The average *LC/GTA* in the crisis period minus that in the pre-crisis period. *LC/GTA* is the cat fat measure in Berger and Bouwman (2009) divided by *GTA*.	Bouwman's website
Δ*LC_A/GTA*	The average *LC_A/GTA* in the crisis period minus that in the pre-crisis period. *LC_A/GTA* is the assets part of the cat fat measure divided by *GTA*.	Bouwman's website
Δ*LC_LE/GTA*	The average *LC_LE/GTA* in the crisis period minus that in the pre-crisis period. *LC_LE/GTA* is the liabilities and equity part of the cat fat measure divided by *GTA*.	Bouwman's website
Δ*LC_OBS/GTA*	The average *LC_OBS/GTA* in the crisis period minus that in the pre-crisis period. *LC_OBS/GTA* is the off-balance sheet activities part of the cat fat measure divided by *GTA*.	Bouwman's website
ΔLoans	The average ratio of loans to *GTA* in the crisis period minus that in the pre-crisis period.	FR Y-9C, Call Reports
ΔCommitments	The average ratio of loan commitments to *GTA* in the crisis period minus that in the pre-crisis period.	FR Y-9C, Call Reports
ΔCreditRisk	The average *CreditRisk* in the crisis period minus that in the pre-crisis period, where *CreditRisk* is the Basel I risk-weighted assets divided by *GTA*.	FR Y-9C, Call Reports
ΔCRA_Loans	The average ratio of CRA loans to *GTA* in the crisis period minus that in the pre-crisis period.	FFIEC CRA website
Independent variables		
BC	A dummy variable for the banking crisis that takes a value of 1 between 2007Q3 and 2009Q4. This period is defined as in Berger and Bouwman (2013) as the subprime crisis period.	
MC	A dummy variable for market crises. Following Berger and Bouwman (2013), *MC* equals 1 in 1998Q3 and 1998Q4 when the Russian debt crisis occurred and the Long-Term Capital Management was bailed out. It also equals 1 between 2000Q2 and 2002Q3 when the dot-com stock bubble burst and September 11 attack occurred.	
CSR	*CSR_STR* minus *CSR_CON*.	MSCI ESG STATS and own calculation
CSR_STR	The sum of CSR strength scores across the 3 categories: community, employee relations, and diversity. For each bank-year, the CSR strength score for a category is the bank's number of strengths in that category divided by the maximum number of strengths for that category in the year.	MSCI ESG STATS and own calculation
CSR_CON	The sum of CSR concern scores across the 3 categories: community, employee relations, and diversity. For each bank-year, the CSR concern score for a category is the bank's number of concerns in that category divided by the maximum number of concerns for that category in the year.	MSCI ESG STATS and own calculation
Community	CSR score for the community category, calculated in a similar way as *CSR*.	
Employee	CSR score for the employee relations category, calculated in a similar way as *CSR*.	
Diversity	CSR score for the diversity category, calculated in a similar way as *CSR*.	

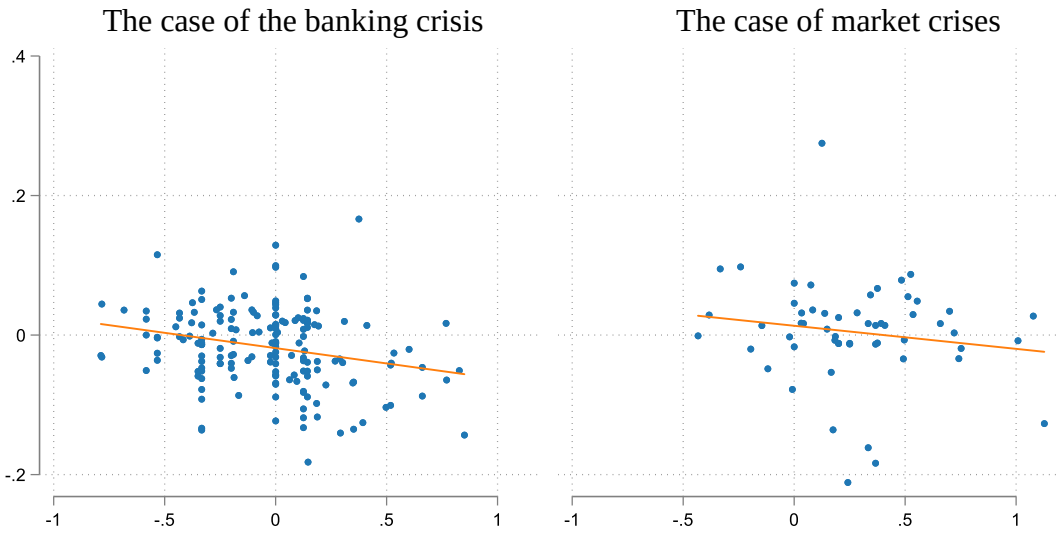
Variable	Definition	Data Source
Control variables		
ROA	The net income divided by *GTA.*	FR Y-9C, Call Reports
Capital	The tier-1 capital divided by Basel I risk-weighted assets.	FR Y-9C, Call Reports
BIS	The total capital divided by Basel I risk-weighted assets.	FR Y-9C, Call Reports
CreditRisk	The Basel I risk-weighted assets divided by *GTA*.	FR Y-9C, Call Reports
ZScore	The sum of the return on assets (ROA) and the ratio of equity capital to *GTA* divided by the standard deviation of ROA.	FR Y-9C, Call Reports
EarnVol	The standard deviation of quarterly return on assets over the previous twelve quarters multiplied by 100.	FR Y-9C, Call Reports
LnGTA	The natural logarithm of *GTA* (total assets plus allowance for loan and lease losses and the allocated transfer risk reserve).	FR Y-9C, Call Reports
Concentration	The Herfindahl-Hirschman Index (HHI) of six loan categories, which are commercial real estate, residential real estate, agriculture, consumer, construction and industrial, and others.	FR Y-9C, Call Reports
Cgov	The CSR score for the corporate governance category in MSCI ESG STATS database.	MSCI ESG STATS and own calculation
Eindex	The entrenchment index based on six firm characteristics provided in the corporate governance database by RiskMetrics (Now ISS). According to Bebchuk et al. (2009), these characteristics are classified as board, golden parachutes, poison pill, supermajority - mergers in percent, vote % required to amend bylaws, and vote % required to amend charter.	Institutional Shareholder Services (ISS)
Instrumental variable		
Political	The first principal component of three variables representing the degree to which a state tilts to the Democratic Party in the latest president, congress, state government elections. The three variables are: (a) the proportion of the votes received by the Democratic candidate in the presidential election, (b) 0.5 × proportion of senators who are Democrats + 0.5× proportion of congressmen who are Democrats, and (c) 0.5 × an indicator that equals one if the state governor is a Democrat + 0.25×an indicator that equals one if the state legislature upper chamber is controlled by the Democratic Party + 0.25×an indicator that equals one if the state legislature lower chamber is controlled by the Democratic Party.	Dave Leip's Atlas of U.S. Presidential Elections (www.uselectionatlas.org) and other online sources such as http://en.wikipedia.org/wiki/United_States_state_legislatures'_partisan_trend.

Appendix D

Table D The First-Stage Results of the Instrumental Variable Analysis

The table shows the first-stage results of the instrumental variable analysis. The sample period is from 1996Q1 to 2013Q4, covering the subprime crisis, two market crises, and normal times (two fake crises). All the continuous variables are winsorized at the 1% and 99% levels. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	(1)	(2)
Dependent variable: *CSR*	*Coefficient*	*t*-stat
Political	0.036***	3.843
ROA	-1.865	-0.187
Capital	0.055	0.111
CreditRisk	0.174	1.546
ZScore	-0.000**	-2.146
EarnVol	0.016	0.250
LnGTA	0.143***	15.587
Concentration	0.426***	4.922
Cgov	0.316***	3.802
Observations	574	
Adj R-squared	0.488	



In the figures, the horizontal axis is a bank's CSR performance (*CSR*), and the vertical axis is a bank's change in liquidity creation (Δ*LC/GTA*) in financial crises. Each dot represents an observation, and the red solid lines are the fitted values from regressing Δ*LC/GTA* on *CSR*. The left figure plots the case of the 2008 banking crisis, and the right figure plots the case of two market crises.

Figure 1. Bank CSR Performance and the Change in Liquidity Creation

Table 1 Summary Statistics

Panel A reports summary statistics for the five crises (including two fake crises). Panels B and C report the means and standard deviations (in parentheses) of important variables by the nature of crises and by banks' CSR performance (Low for the bottom 30%, Medium for the middle 40%, and High for the top 30%) prior to different types of crises, respectively. The banking crisis is the subprime crisis (from 2007Q3 to 2009Q4), and the two market crises are the Russian debt crisis and the Long-Term Capital Management bailout (from 1998Q3 to 1998Q4) and the dot-com stock bubble burst and the 9/11 attack (from 2000Q2 to 2002Q3). Normal times refer to two fake crisis periods (from 2004Q3 to 2006Q2 and from 2012Q1 to 2013Q4). The dependent variables include Δ*LC/GTA*, Δ*LC_A/GTA*, Δ*LC_LE/GTA*, and Δ*LC_OBS/GTA*, which are respectively the differences in the ratios of *LC* (the cat fat measure in Berger and Bouwman, 2009) and its three components (assets, liabilities and equity, and off-balance sheet activities) to *GTA* (total assets plus allowance for loan and lease losses and the allocated transfer risk reserve) between the crisis and pre-crisis periods. All the independent variables are the averages over the four quarters prior to a crisis. *CSR* equals *CSR_STR* minus *CSR_CON*, where *CSR_STR* (*CSR_CON*) is the sum of the scores of CSR strengths (concerns) for the community, employee relations, and diversity categories in MSCI ESG STATS. The control variables include *ROA* (the ratio of net income to *GTA*), *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *BIS* (the ratio of total capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by *GTA*), *ZScore* (the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets), *EarnVol* (the standard deviation of return on assets over the previous twelve quarters multiplied by 100), *LnGTA* (the natural logarithm of *GTA*), *Concentration (*the Herfindahl-Hirschman Index of six loan categories), and *Cgov* (CSR score for the corporate governance category in MSCI ESG STATS, calculated in a similar way as *CSR*). For *LnGTA*, we present the value of *GTA* in billion U.S. dollars. All the continuous variables are winsorized at the 1% and 99% levels.

Panel A. Summary statistics for all the crises (including fake crises)

Variables	*Mean*	*S.D.*	*Q25*	*Median*	*Q75*	*N*
Dependent variables						
Δ*LC/GTA*	0.013	0.057	-0.014	0.017	0.045	574
Δ*LC_A/GTA*	0.012	0.039	-0.010	0.013	0.035	574
Δ*LC_LE/GTA*	0.001	0.025	-0.015	-0.000	0.016	574
Δ*LC_OBS/GTA*	0.001	0.030	-0.010	0.001	0.012	574
Independent variables						
CSR	-0.054	0.383	-0.333	0.000	0.143	574
CSR_STR	0.173	0.287	0.000	0.063	0.200	574
CSR_CON	0.227	0.241	0.000	0.167	0.333	574
Community	0.022	0.140	0.000	0.000	0.083	574
Employee	0.008	0.098	0.000	0.000	0.000	574
Diversity	-0.083	0.290	-0.333	0.000	0.083	574
Control variables						
ROA	0.003	0.001	0.002	0.003	0.004	574
Capital	0.123	0.055	0.099	0.114	0.134	574
BIS	0.142	0.052	0.118	0.132	0.150	574
CreditRisk	0.737	0.127	0.654	0.744	0.813	574
ZScore	221.345	182.054	84.051	176.455	319.435	574
EarnVol	0.132	0.228	0.031	0.055	0.118	574
GTA (in billion U.S. dollars)	50.810	199.951	2.115	4.278	15.938	574
Concentration	0.429	0.165	0.306	0.380	0.515	574
Cgov	-0.013	0.206	-0.188	0.000	0.183	574

Panel B. The means and standard deviations (in parentheses) of important variables by the nature of crises

Periods	*Banking crisis*	*Market crises*	*Normal times*
Dependent variables			
Δ*LC/GTA*	-0.017	0.004	0.030
	(0.056)	(0.074)	(0.047)
Δ*LC_A/GTA*	0.007	0.004	0.015
	(0.043)	(0.034)	(0.038)
Δ*LC_LE/GTA*	-0.007	-0.001	0.005

	(0.027)	(0.015)	(0.024)
Δ*LC_OBS/GTA*	-0.017	0.001	0.009
	(0.025)	(0.058)	(0.020)
Independent variables			
CSR	-0.038	0.271	-0.115
	(0.315)	(0.337)	(0.394)
CSR_STR	0.154	0.430	0.140
	(0.237)	(0.313)	(0.285)
CSR_CON	0.193	0.159	0.255
	(0.211)	(0.195)	(0.257)
Community	0.006	0.110	0.016
	(0.145)	(0.151)	(0.113)
Employee	-0.019	0.127	0.002
	(0.090)	(0.126)	(0.081)
Diversity	-0.024	0.034	-0.133
	(0.217)	(0.221)	(0.314)
Main control variables			
ROA	0.003	0.004	0.003
	(0.001)	(0.001)	(0.001)
Capital	0.116	0.087	0.132
	(0.067)	(0.020)	(0.050)
BIS	0.132	0.122	0.150
	(0.065)	(0.014)	(0.047)
CreditRisk	0.776	0.816	0.705
	(0.114)	(0.164)	(0.116)
ZScore	273.293	237.411	193.152
	(185.555)	(221.506)	(167.330)
EarnVol	0.074	0.062	0.172
	(0.110)	(0.058)	(0.274)
GTA (in billion U.S. dollars)	42.591	101.237	46.721
	(199.010)	(115.664)	(210.149)
Concentration	0.391	0.372	0.456
	(0.138)	(0.142)	(0.176)
Cgov	0.077	-0.176	-0.031
	(0.134)	(0.159)	(0.220)
Observations	171	56	347

Panel C. The means and standard deviations (in parentheses) of important variables by banks' CSR performance prior to different types of crises									
Crisis type	*Banking crisis*			*Market crises*			*Normal times*		
CSR	Low	Medium	High	Low	Medium	High	Low	Medium	High
Dependent variables									
Δ*LC/GTA*	-0.010	-0.010	-0.037	0.041	0.026	-0.007	0.024	0.034	0.030
	(0.049)	(0.051)	(0.062)	(0.049)	(0.057)	(0.060)	(0.041)	(0.046)	(0.044)
Δ*LC_A/GTA*	0.015	0.011	-0.006	0.029	0.012	-0.001	0.004	0.025	0.013
	(0.035)	(0.035)	(0.044)	(0.023)	(0.029)	(0.036)	(0.038)	(0.036)	(0.031)
Δ*LC_LE/GTA*	-0.009	-0.007	-0.007	0.007	-0.002	-0.001	0.014	-0.001	0.003
	(0.019)	(0.020)	(0.028)	(0.022)	(0.011)	(0.015)	(0.021)	(0.021)	(0.027)
Δ*LC_OBS/GTA*	-0.017	-0.013	-0.022	0.004	0.013	-0.004	0.006	0.010	0.013
	(0.019)	(0.018)	(0.032)	(0.011)	(0.037)	(0.036)	(0.013)	(0.019)	(0.023)
Independent variables									
CSR	-0.425	-0.034	0.332	-0.383	-0.023	0.434	-0.502	-0.034	0.423
	(0.119)	(0.120)	(0.216)	(0.050)	(0.106)	(0.246)	(0.161)	(0.102)	(0.269)
CSR_STR	0.015	0.084	0.416	0.117	0.228	0.534	0.014	0.066	0.549
	(0.038)	(0.098)	(0.305)	(0.104)	(0.187)	(0.310)	(0.096)	(0.087)	(0.376)
CSR_CON	0.447	0.118	0.086	0.500	0.251	0.096	0.509	0.100	0.115
	(0.138)	(0.133)	(0.181)	(0.144)	(0.206)	(0.150)	(0.159)	(0.119)	(0.198)
Community	-0.097	-0.012	0.138	-0.167	0.028	0.165	-0.022	-0.006	0.142
	(0.122)	(0.124)	(0.098)	(0.144)	(0.115)	(0.125)	(0.068)	(0.077)	(0.160)
Employee	-0.069	-0.016	0.021	0.117	0.047	0.159	-0.015	-0.014	0.074
	(0.083)	(0.073)	(0.105)	(0.104)	(0.085)	(0.129)	(0.045)	(0.060)	(0.127)
Diversity	-0.262	-0.007	0.172	-0.333	-0.097	0.114	-0.461	-0.014	0.221
	(0.140)	(0.137)	(0.184)	(0.000)	(0.170)	(0.193)	(0.207)	(0.106)	(0.214)
Main control variables									
ROA	0.003	0.003	0.003	0.003	0.004	0.004	0.002	0.003	0.003
	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Capital	0.115	0.111	0.110	0.072	0.084	0.090	0.140	0.125	0.120
	(0.021)	(0.022)	(0.029)	(0.006)	(0.016)	(0.022)	(0.033)	(0.031)	(0.034)
BIS	0.129	0.126	0.130	0.115	0.118	0.124	0.155	0.142	0.145
	(0.019)	(0.019)	(0.024)	(0.008)	(0.012)	(0.014)	(0.031)	(0.028)	(0.032)
CreditRisk	0.770	0.776	0.778	0.920	0.872	0.781	0.696	0.702	0.730
	(0.114)	(0.095)	(0.134)	(0.102)	(0.135)	(0.161)	(0.103)	(0.107)	(0.144)
ZScore	283.950	274.340	258.740	390.310	210.334	219.192	176.251	225.266	147.910
	(172.522)	(188.019)	(187.784)	(400.546)	(196.214)	(130.355)	(166.785)	(169.367)	(140.186)
EarnVol	0.052	0.066	0.107	0.040	0.065	0.063	0.229	0.117	0.159

	(0.037)	(0.081)	(0.178)	(0.024)	(0.038)	(0.066)	(0.301)	(0.198)	(0.196)
GTA (in billion U.S. dollars)	4.500	11.097	137.079	63.758	75.377	114.404	22.917	8.028	185.500
	(7.371)	(27.428)	(373.022)	(29.603)	(65.773)	(132.813)	(198.666)	(13.911)	(369.155)
Concentration	0.361	0.378	0.445	0.307	0.333	0.393	0.517	0.397	0.480
	(0.090)	(0.117)	(0.189)	(0.027)	(0.116)	(0.153)	(0.168)	(0.154)	(0.194)
Cgov	0.134	0.088	0.004	-0.083	-0.200	-0.173	-0.105	0.053	-0.088
	(0.084)	(0.118)	(0.167)	(0.144)	(0.169)	(0.157)	(0.192)	(0.195)	(0.227)
Observations	43	83	45	3	15	38	127	155	65

Table 2 The Effects of Banks' CSR Performance on Liquidity Creation during Financial Crises: OLS Regressions

Table 2 reports the ordinary least squares (OLS) regression results for how CSR performance affects bank liquidity creation during financial crises. The data are collected from FR Y-9C, Call Reports and the MSCI ESG STATS database. The sample period is from 1996Q1 to 2013Q4, covering the subprime crisis, two market crises, and normal times (two fake crises). The dependent variable is Δ*LC/GTA*, the difference in the ratio of *LC* (the cat fat measure in Berger and Bouwman, 2009) to *GTA* (total assets plus allowance for loan and lease losses and the allocated transfer risk reserve) between the crisis and pre-crisis periods. *CSR* equals *CSR_STR* minus *CSR_CON*, where *CSR_STR* (*CSR_CON*) is the sum of the scores of CSR strengths (concerns) for the community, employee relations, and diversity categories in MSCI ESG STATS. *BC* is the dummy variable for the subprime crisis (from 2007Q3 to 2009Q4). *MC* is the dummy variable for market crises (from 1998Q3 to 1998Q4 and from 2000Q2 to 2002Q3). *NT* is the dummy variable for normal times (from 2004Q3 to 2006Q2 and from 2012Q1 to 2013Q4). The control variables include *ROA* (the ratio of net income to *GTA*), *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by *GTA*), *ZScore* (the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets), *EarnVol* (the standard deviation of return on assets over the previous twelve quarters multiplied by 100), *LnGTA* (the natural logarithm of *GTA*), *Concentration (*the Herfindahl-Hirschman Index of six loan categories), and *Cgov* (CSR score for the corporate governance category in MSCI ESG STATS, calculated in a similar way as *CSR*). *CreditRisk* and *ZScore* are orthogonalized to reduce the potential multicollinearity concerns. All the continuous variables are winsorized at the 1% and 99% levels. The *t*-statistics in parentheses are based on standard errors clustered at the firm level (Petersen, 2009). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Dependent variable: Δ*LC/GTA*		
	Model 1	Model 2	Model 3
CSR_S is:	*CSR*	*CSR_STR*	*CSR_CON*
CSR_S×*BC*	-0.035***	-0.049***	0.023
	(-2.617)	(-2.684)	(1.189)
CSR_S×*MC*	-0.035*	-0.026	0.047
	(-1.766)	(-1.190)	(1.509)
CSR_S×*NT*	0.008	-0.007	-0.016
	(0.865)	(-0.507)	(-1.429)
ROA	-4.694**	-4.377**	-4.589**
	(-2.559)	(-2.375)	(-2.483)
Capital	0.098	0.090	0.104
	(1.074)	(0.989)	(1.135)
CreditRisk	-0.050**	-0.052**	-0.047**
	(-2.281)	(-2.461)	(-2.156)
ZScore	-0.000	-0.000	-0.000
	(-1.376)	(-1.291)	(-1.571)
EarnVol	0.010	0.009	0.010
	(0.746)	(0.704)	(0.776)
LnGTA	0.000	0.002	-0.001
	(0.025)	(0.963)	(-0.368)
Concentration	-0.041**	-0.040**	-0.048**
	(-2.133)	(-2.046)	(-2.589)
Cgov	0.002	0.005	0.002
	(0.123)	(0.405)	(0.153)
Observations	574	574	574
Adj. R-squared	0.224	0.218	0.214

Table 3 The Effects of Banks' CSR Performance on Liquidity Creation during Financial Crises for the Subsamples with Different Pre-crisis Z-scores and Liquidity Creation: OLS Regressions

Table 3 reports the ordinary least squares (OLS) regression results for how CSR performance affects bank liquidity creation during financial crises when the whole sample is split into subsamples according to the pre-crisis Z-score (*ZScore*) and earnings volatility (*EarnVol*). The data are collected from FR Y-9C, Call Reports and the MSCI ESG STATS database. The sample period is from 1996Q1 to 2013Q4, covering the subprime crisis, two market crises, and normal times (two fake crises). The dependent variable is Δ*LC/GTA*, the difference in the ratio of *LC* (the cat fat measure in Berger and Bouwman, 2009) to *GTA* (total assets plus allowance for loan and lease losses and the allocated transfer risk reserve) between the crisis and pre-crisis periods. *CSR* equals *CSR_STR* minus *CSR_CON*, where *CSR_STR* (*CSR_CON*) is the sum of the scores of CSR strengths (concerns) for the community, employee relations, and diversity categories in MSCI ESG STATS. *BC* is the dummy variable for the subprime crisis (from 2007Q3 to 2009Q4). *MC* is the dummy variable for market crises (from 1998Q3 to 1998Q4 and from 2000Q2 to 2002Q3). *NT* is the dummy variable for normal times (from 2004Q3 to 2006Q2 and from 2012Q1 to 2013Q4). The control variables include *ROA* (the ratio of net income to *GTA*), *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by GTA), *ZScore* (the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets), *EarnVol* (the standard deviation of return on assets over the previous twelve quarters multiplied by 100), *LnGTA* (the natural logarithm of *GTA*), *Concentration (*the Herfindahl-Hirschman Index (HHI) of six loan categories), and *Cgov* (CSR score for the corporate governance category in MSCI ESG STATS, calculated in a similar way as *CSR*). *CreditRisk* and *ZScore* are orthogonalized to reduce the potential multicollinearity concerns. All the continuous variables are winsorized at the 1% and 99% levels. The *t*-statistics in parentheses are based on standard errors clustered at the firm level (Petersen, 2009). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Δ*LC/GTA*			
	Model 1	Model 2	Model 3	Model 4
Subsample:	Low *ZScore*	High *ZScore*	Low *EarnVol*	High *EarnVol*
CSR×BC	-0.077***	-0.004	-0.009	-0.075***
	(-3.698)	(-0.226)	(-0.524)	(-3.475)
CSR×MC	-0.063*	-0.003	0.006	-0.065*
	(-1.961)	(-0.139)	(0.356)	(-1.929)
CSR×NT	0.000	0.010	-0.004	0.010
	(0.029)	(0.989)	(-0.306)	(0.752)
ROA	-5.901**	-3.751	0.195	-6.061**
	(-2.289)	(-1.020)	(0.055)	(-2.287)
Capital	0.114	0.067	0.050	0.120
	(0.722)	(0.535)	(0.423)	(0.807)
CreditRisk	-0.017	-0.091***	-0.068**	-0.048
	(-0.589)	(-2.715)	(-2.150)	(-1.567)
ZScore	-0.000	-0.000	0.000	-0.000
	(-1.099)	(-0.717)	(0.329)	(-0.720)
EarnVol	0.031	-0.030	0.192	0.020
	(1.518)	(-0.203)	(1.083)	(1.176)
LnGTA	0.004	-0.001	-0.002	0.003
	(1.194)	(-0.530)	(-0.921)	(0.861)
Concentration	-0.025	-0.036	-0.031	-0.047*
	(-0.910)	(-1.388)	(-1.275)	(-1.892)
Cgov	0.009	0.004	0.018	0.006
	(0.448)	(0.215)	(0.888)	(0.283)
Observations	285	289	285	289
Adj. R-squared	0.211	0.242	0.201	0.249

H_0: Coefficients in the Low and High groups are equal

	ZScore		*EarnVol*	
	Low – High	p-value	Low – High	p-value
CSR×BC	-0.073***	0.006	0.066**	0.016
CSR×MC	-0.060	0.129	0.717*	0.072
CSR×NT	-0.010	0.604	-0.014	0.458

Table 4 The Effects of Banks' CSR Performance on Liquidity Creation during Financial Crises: 2SLS Regressions

Table 4 reports the instrumental regression (2SLS) results for how CSR performance affects bank liquidity creation during financial crises. The data are collected from FR Y-9C, Call Reports and the MSCI ESG STATS database. The sample period is from 1996Q1 to 2013Q4, covering the subprime crisis, two market crises, and normal times (two fake crises). Panel A shows the effects of *CSR*, *CSR_STR*, and *CSR_CON* on bank liquidity creation. Panel B shows the effects of *CSR* on bank liquidity creation for the subsamples with different pre-crisis *ZScore* and *EarnVol*. The dependent variable is Δ*LC/GTA*, the difference in the ratio of *LC* (the cat fat measure in Berger and Bouwman, 2009) to *GTA* (total assets plus allowance for loan and lease losses and the allocated transfer risk reserve) between the crisis and pre-crisis periods. *CSR* equals *CSR_STR* minus *CSR_CON*, where *CSR_STR* (*CSR_CON*) is the sum of the scores of CSR strengths (concerns) for the community, employee relations, and diversity categories in MSCI ESG STATS. The instrumental variable for CSR scores is *Political*, the degree to which the state in which the bank's headquarters is located tilts to the Democratic Party. *BC* is the dummy variable for the subprime crisis (from 2007Q3 to 2009Q4). *MC* is the dummy variable for market crises (from 1998Q3 to 1998Q4 and from 2000Q2 to 2002Q3). *NT* is the dummy variable for normal times (from 2004Q3 to 2006Q2 and from 2012Q1 to 2013Q4). The control variables include *ROA* (the ratio of net income to *GTA*), *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by *GTA*), *ZScore* (the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets), *EarnVol* (the standard deviation of return on assets over the previous twelve quarters multiplied by 100), *LnGTA* (the natural logarithm of *GTA*), *Concentration (*the Herfindahl-Hirschman Index of six loan categories), and *Cgov* (CSR score for the corporate governance category in MSCI ESG STATS, calculated in a similar way as *CSR*). *CreditRisk* and *ZScore* are orthogonalized to reduce the potential multicollinearity concerns. To save space, we only report the coefficients of the independent variables that contain CSR scores. All the continuous variables are winsorized at the 1% and 99% levels. The *z*-statistics in parentheses are based on standard errors clustered at the firm level (Petersen, 2009). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A	Dependent variable: Δ*LC/GTA*		
	Model 1	Model 2	Model 3
CSR_S is:	*CSR*	*CSR_STR*	*CSR_CON*
CSR_S×*BC*	-0.140**	-0.208**	0.226
	(-2.471)	(-2.228)	(0.818)
CSR_S×*MC*	-0.156*	-0.168**	-0.454
	(-1.824)	(-2.031)	(-0.227)
CSR_S×*NT*	-0.048	-0.103	-0.047
	(-0.994)	(-1.407)	(-0.153)
Control variables included	Yes	Yes	Yes
Observations	574	574	574

Panel B	Dependent variable: Δ*LC/GTA*			
	Model 1	Model 2	Model 3	
Subsample:	Low *ZScore*	High *ZScore*	Low *EarnVol*	High *EarnVol*
CSR×*BC*	-0.380**	-0.019	-0.023	-0.436**
	(-2.200)	(-0.330)	(-0.362)	(-2.039)
CSR×*MC*	-0.386*	-0.130	-0.052	-0.395*
	(-1.730)	(-0.472)	(-0.361)	(-1.688)
CSR×*NT*	-0.191	0.054	0.020	-0.229
	(-1.497)	(0.644)	(0.218)	(-1.430)
Control variables included	Yes	Yes	Yes	Yes
Observations	285	289	285	289

H0: Coefficients in the Low and High groups are equal

	ZScore		*EarnVol*	
	Low – High	*p*-value	Low – High	*p*-value
CSR×*BC*	-0.361**	0.047	0.413*	0.064
CSR×*MC*	-0.256	0.463	0.342	0.198
CSR×*NT*	-0.244	0.115	0.249	0.174

Table 5 The Propensity Score Matching Results

Panels A to C of Table 5 report the Propensity-Score-Matching (PSM) results for the subprime crisis, market crisis, and normal times (fake crises), respectively. A bank with the top 50% *CSR* in the pre-crisis period of a crisis is classified into the treatment group, and the others (bottom 50% *CSR*) are classified into the control group. For each bank in the treatment group, a matched bank is selected from the control group. For testing Hypotheses 2, we use *ZScore* and *EarnVol* as the sorting variables, where *GTA* is total assets plus allowance for loan and lease losses and the allocated transfer risk reserve, *ZScore* is the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets, and *LC*/*GTA* is the ratio of *LC* (the cat fat measure in Berger and Bouwman, 2009) to *GTA*. Treatment banks whose sorting variable values are within the top (bottom) 50% of the treatment group are classified into the High (Low) group. The "Treatment – Matched" is the mean difference in Δ*LC/GTA* (the difference in the ratio of *LC* to *GTA* between the crisis and pre-crisis periods) between the treatment and matched banks. Hypothesis 1a(b) is supported if Treatment – Matched is statistically significant and positive (negative). Hypothesis 2a(b) is supported if the Treatment – Matched is significant and positive (negative) in the Low *ZScore* and High *EarnVol* groups. *N* is the number of observations. The corresponding *z*-values are in parentheses. We use robust Abadie-Imbens standard errors to compute the *z*-values (Abadie and Imbens, 2016). All the continuous variables are winsorized at the 1% and 99% levels. *, **, and *** denote significantly different from 0 at the 10%, 5%, and 1% levels, respectively.

Panel A. Banking Crisis			
Sample	Treatment – Matched	*p*-value	*N*
Whole sample	-0.035**	0.011	98
Low *ZScore* group	-0.042***	0.010	52
High *ZScore* group	0.002	0.891	46
Low *EarnVol* group	-0.010	0.602	35
High *EarnVol* group	-0.042***	0.010	47
Panel B. Market Crises			
Sample	Treatment – Matched	*p*-value	*N*
Whole sample	-0.006	0.745	31
Low *ZScore* group	-0.052*	0.094	14
High *ZScore* group	0.028*	0.091	15
Low *EarnVol* group	0.038**	0.050	12
High *EarnVol* group	-0.078*	0.011	12
Panel C. Normal Times			
Sample	Treatment – Matched	*p*-value	*N*
Whole sample	-0.004	0.763	199
Low *ZScore* group	-0.010	0.390	94
High *ZScore* group	0.009	0.439	97
Low *EarnVol* group	-0.001	0.933	89
High *EarnVol* group	0.010	0.467	99

Table 6 The Effects of Banks' Performance in Individual CSR Categories on Liquidity Creation during Financial Crises: OLS Regressions

Table 6 reports results for how the components of the CSR score (*CSR*) affect bank liquidity creation during financial crises. The data are collected from FR Y-9C, Call Reports and the MSCI ESG STATS database. The sample period is from 1996Q1 to 2013Q4, covering the subprime crisis, two market crises, and normal times (two fake crises). The dependent variable is Δ*LC/GTA*, the difference in the ratio of *LC* (the cat fat measure in Berger and Bouwman, 2009) to *GTA* (total assets plus allowance for loan and lease losses and the allocated transfer risk reserve) between the crisis and pre-crisis periods. The main independent variables are *Community*, *Employee*, and *Diversity*, which are banks' CSR performance in the community, employee relations, and diversity categories (calculated in a similar way as *CSR*), respectively. *BC* is the dummy variable for the subprime crisis (from 2007Q3 to 2009Q4). *MC* is the dummy variable for market crises (from 1998Q3 to 1998Q4 and from 2000Q2 to 2002Q3). *NT* is the dummy variable for normal times (from 2004Q3 to 2006Q2 and from 2012Q1 to 2013Q4). The control variables include *ROA* (the ratio of net income to *GTA*), *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by *GTA*), *ZScore* (the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets), *EarnVol* (the standard deviation of return on assets over the previous twelve quarters multiplied by 100), *LnGTA* (the natural logarithm of *GTA*), *Concentration (*the Herfindahl-Hirschman Index (HHI) of six loan categories), and *Cgov* (CSR score for the corporate governance category in MSCI ESG STATS, calculated in a similar way as *CSR*). *CreditRisk* and *ZScore* are orthogonalized to reduce the potential multicollinearity concerns. To save space, we only report the coefficients of the independent variables that contain CSR scores. All the continuous variables are winsorized at the 1% and 99% levels. The *t*-statistics in parentheses are based on standard errors clustered at the firm level (Petersen, 2009). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

The dependent variable is Δ*LC/GTA*	Model 1	Model 2	Model 3	Model 4
CSR component:	*Community*	*Employee*	*Diversity*	*All*
Community×BC	-0.051**			-0.036*
	(-2.594)			(-1.663)
Employee×BC		-0.099***		-0.084**
		(-2.695)		(-2.240)
Diversity×BC			-0.026	-0.019
			(-1.196)	(-0.882)
Community×MC	-0.066*			-0.053*
	(-1.926)			(-1.714)
Employee×MC		-0.014		-0.008
		(-0.214)		(-0.135)
Diversity×MC			-0.044	-0.034
			(-1.582)	(-1.288)
Community×NT	0.014			0.007
	(0.564)			(0.288)
Employee×NT		0.006		-0.002
		(0.192)		(-0.067)
Diversity×NT			0.010	0.008
			(0.850)	(0.718)
Control variables included	Yes	Yes	Yes	Yes
Observations	574	574	574	574

Table 7 The Effects of Banks' CSR Performance on the Components of Liquidity Creation during Financial Crises: OLS Regressions

Table 7 reports the ordinary least squares (OLS) regression results for how banks' CSR performance affects the components of liquidity creation during financial crises. The data are collected from FR Y-9C, Call Reports and the MSCI ESG STATS database. The sample period is from 1996Q1 to 2013Q4, covering the subprime crisis, two market crises, and normal times (two fake crises). The dependent variables are Δ*LC_A/GTA*, Δ*LC_LE/GTA*, and Δ*LC_OBS/GTA*, which are respectively the differences in the ratios of the assets, liabilities and equity, and off-balance sheet activities components of *LC* (the cat fat measure in Berger and Bouwman, 2009) to *GTA* (total assets plus allowance for loan and lease losses and the allocated transfer risk reserve) between the crisis and pre-crisis periods. *CSR* equals *CSR_STR* minus *CSR_CON*, where *CSR_STR* (*CSR_CON*) is the sum of the scores of CSR strengths (concerns) for the community, employee relations, and diversity categories in MSCI ESG STATS. *BC* is the dummy variable for the subprime crisis (from 2007Q3 to 2009Q4). *MC* is the dummy variable for market crises (from 1998Q3 to 1998Q4 and from 2000Q2 to 2002Q3). *NT* is the dummy variable for normal times (from 2004Q3 to 2006Q2 and from 2012Q1 to 2013Q4). The control variables include *ROA* (the ratio of net income to *GTA*), *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by *GTA*), *ZScore* (the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets), *EarnVol* (the standard deviation of return on assets over the previous twelve quarters multiplied by 100), *LnGTA* (the natural logarithm of *GTA*), *Concentration (*the Herfindahl-Hirschman Index (HHI) of six loan categories), and *Cgov* (CSR score for the corporate governance category in MSCI ESG STATS, calculated in a similar way as *CSR*). *CreditRisk* and *ZScore* are orthogonalized to reduce the potential multicollinearity concerns. All the continuous variables are winsorized at the 1% and 99% levels. The *t*-statistics in parentheses are based on standard errors clustered at the firm level (Petersen, 2009). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

The dependent variable is:	Model 1 Δ*LC_A/GTA*	Model 2 Δ*LC_LE/GTA*	Model 3 Δ*LC_OBS/GTA*
CSR×*BC*	-0.021**	0.001	-0.014**
	(-2.214)	(0.257)	(-2.324)
CSR×*MC*	-0.028***	0.004	-0.011
	(-2.793)	(0.641)	(-1.041)
CSR×*NT*	0.001	0.002	0.004
	(0.085)	(0.567)	(1.004)
Control variables included	Yes	Yes	Yes
Observations	574	574	574

Table 8 The Effects of CSR Performance on Banks' Risk Adjustments during Financial Crises

Table 8 reports the ordinary least squares (OLS) regression results for how CSR performance affects banks' risk adjustments during financial crises. The data are collected from FR Y-9C, Call Reports and the MSCI ESG STATS database. The sample period is from 1996Q1 to 2013Q4, covering the subprime crisis, two market crises, and normal times (two fake crises). The dependent variables are Δ*Loans* (change in loans to *GTA*), Δ*Commitments* (change in loan commitments to *GTA*), and Δ*CreditRisk* (change in *CreditRisk*), where "change" means the difference in quarterly average between crisis and pre-crisis periods. and *GTA* is total assets plus allowance for loan and lease losses and the allocated transfer risk reserve. *CSR* equals *CSR_STR* minus *CSR_CON*, where *CSR_STR* (*CSR_CON*) is the sum of the scores of CSR strengths (concerns) for the community, employee relations, and diversity categories in MSCI ESG STATS. *BC* is the dummy variable for the subprime crisis (from 2007Q3 to 2009Q4). *MC* is the dummy variable for market crises (from 1998Q3 to 1998Q4 and from 2000Q2 to 2002Q3). *NT* is the dummy variable for normal times (from 2004Q3 to 2006Q2 and from 2012Q1 to 2013Q4). The control variables include *ROA* (the ratio of net income to *GTA*), *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by *GTA*), *ZScore* (the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets), *EarnVol* (the standard deviation of return on assets over the previous twelve quarters multiplied by 100), *LnGTA* (the natural logarithm of *GTA*), *Concentration (*the Herfindahl-Hirschman Index of six loan categories), and *Cgov* (CSR score for the corporate governance category in MSCI ESG STATS, calculated in a similar way as *CSR*). *CreditRisk* and *ZScore* are orthogonalized to reduce the potential multicollinearity concerns. All the continuous variables are winsorized at the 1% and 99% levels. The *t*-statistics in parentheses are based on standard errors clustered at the firm level (Petersen, 2009). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Model 1	Model 2	Model 3
Dependent variable*:*	Δ*Loans*	Δ*Commitments*	Δ*CreditRisk*
CSR×BC	-0.005	-0.026***	-0.021**
	(-0.497)	(-2.829)	(-2.255)
CSR×MC	-0.031*	-0.022	-0.047***
	(-1.957)	(-1.262)	(-3.645)
CSR×NT	0.003	0.012**	0.001
	(0.480)	(2.319)	(0.180)
ROA	-1.117	-2.875	-3.323**
	(-0.677)	(-1.558)	(-2.326)
Capital	0.034	0.229***	0.213***
	(0.478)	(3.366)	(3.259)
CreditRisk	-0.039**	0.005	
	(-2.080)	(0.288)	
ZScore	-0.000	-0.000*	-0.000
	(-0.687)	(-1.651)	(-0.809)
EarnVol	-0.001	0.005	0.007
	(-0.120)	(0.633)	(0.706)
LnGTA	0.001	0.000	0.002*
	(0.500)	(0.211)	(1.734)
Concentration	0.017	-0.022**	-0.008
	(0.994)	(-2.218)	(-0.646)
Cgov	0.015	-0.011	0.008
	(1.422)	(-0.815)	(0.667)
Observations	574	574	574
Adj. R-squared	0.080	0.352	0.131

Table 9 The Effects of CSR Performance on Banks' CRA Loans during Financial Crises

Table 9 reports the ordinary least squares (OLS) regression results for how CSR performance affects bank CRA loans during financial crises. The data are collected from FR Y-9C, Call Reports, the MSCI ESG STATS database, and the Federal Financial Institutions Examination Council (FFIEC) CRA Web site. The sample period is from 1996Q1 to 2013Q4, covering the subprime crisis, two market crises, and normal times (two fake crises). The dependent variable is Δ*CRA_Loans*, the difference in the ratio of *CRA loans* to *GTA* (total assets plus allowance for loan and lease losses and the allocated transfer risk reserve) between the crisis and pre-crisis periods. *CSR* equals *CSR_STR* minus *CSR_CON*, where *CSR_STR* (*CSR_CON*) is the sum of the scores of CSR strengths (concerns) for the community, employee relations, and diversity categories in MSCI ESG STATS. *BC* is the dummy variable for the subprime crisis (from 2007 to 2009). *MC* is the dummy variable for market crises (1998 and from 2000 to 2002). *NT* is the dummy variable for normal times (from 2004 to 2005 and from 2012 to 2013). The control variables include *ROA* (the ratio of net income to *GTA*), *Capital* (the ratio of tier-1 capital to Basel I risk-weighted assets), *CreditRisk* (Basel I risk-weighted assets divided by *GTA*), *ZScore* (the sum of return on assets and the ratio of equity capital to *GTA* divided by the standard deviation of return on assets), *EarnVol* (the standard deviation of return on assets over the previous twelve quarters multiplied by 100), *LnGTA* (the natural logarithm of *GTA*), *Concentration (*the Herfindahl-Hirschman Index of six loan categories), and *Cgov* (CSR score for the corporate governance category in MSCI ESG STATS, calculated in a similar way as *CSR*). *CreditRisk* and *ZScore* are orthogonalized to reduce the potential multicollinearity concerns. All the continuous variables are winsorized at the 1% and 99% levels. The *t*-statistics in parentheses are based on standard errors clustered at the firm level (Petersen, 2009). *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

	Model 1	Model 2	Model 3
Dependent variable*:* Δ*CRA_Loans*			
CSR_S is:	CSR	CSR_STR	CSR_CON
CSR_S×BC	-0.012**	-0.013**	0.012
	(-2.456)	(-2.516)	(1.515)
CSR_S×MC	0.003	-0.001	-0.008
	(0.588)	(-0.103)	(-1.033)
CSR_S×NT	-0.003	-0.002	0.005
	(-1.349)	(-0.709)	(1.422)
ROA	0.050	0.096	-0.021
	(0.104)	(0.198)	(-0.044)
Capital	0.002	0.000	0.003
	(0.063)	(0.007)	(0.115)
CreditRisk	-0.017**	-0.020***	-0.017**
	(-2.514)	(-2.849)	(-2.476)
ZScore	-0.000	-0.000	-0.000
	(-0.238)	(-0.053)	(-0.365)
EarnVol	0.002	0.002	0.002
	(0.591)	(0.509)	(0.546)
LnGTA	0.002***	0.001***	0.001**
	(3.074)	(2.618)	(2.521)
Concentration	0.007	0.006	0.006
	(1.491)	(1.301)	(1.272)
Cgov	-0.007	-0.008*	-0.006
	(-1.537)	(-1.705)	(-1.311)
Observations	560	560	560
Adj. R-squared	0.091	0.084	0.086