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경영학박사 학위논문

Two Essays on Bank Lending Behavior

은행의 대출행태에 관한 연구

2023년 2월

서울대학교 대학원

경영학과 경영학 전공

정 성 준

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Abstract

Two Essays on Bank Lending Behavior

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This thesis consists of essays on bank lending behavior: corporate social responsibility (CSR) and prudent banks. The first essay investigates whether CSR metrics accurately reflect firms' material social impacts. Analyzing small business lending during the Great Recession, I find that banks assessed to be socially responsible exerted higher social costs by actively pulling back funds from those in need of liquidity. These banks paid more expenses on immaterial but conspicuous issues during the boom, which helped them earn favorable assessments. Once the downturn arrived, they had less slack with higher operating leverage and squeezed their loans. My results suggest that social welfare could paradoxically decrease as CSR attracts public attention without reliable metrics for firms' social impacts.

The second essay examines lending behaviors of prudent banks around the 2008 financial crisis. Before the 2008 crisis, risky banks showed higher lending ratios, but relatively sound banks with high capital ratios, high core deposit ratios, and low non-performing loan ratios (prudent banks) showed higher excess loan growth rates,

especially in secured real estate loans and household loans. Prudent banks also approved more mortgage loan applications than risky banks did. Such aggressive lending by prudent banks led to higher non-performing loan ratios and lower profitability over time. Analyses with a prudence index confirmed these results. These findings suggest that prudent banks showed excessive loan growth and risk taking before the 2008 financial crisis.

Keywords : Bank lending , Great Recession, Corporate Social Responsibility, Stakeholder theory, Social impact assessment, Risk taking, Bank Performance

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Chapter 1.

Are Socially Responsible Firms Really Responsible?

Main Street Lending during the Great Recession

1. Introduction

In their “Statement on the Purpose of a Corporation” issued in August 2019, the Business Roundtable (BRT), a nonprofit group of major United States public companies’ CEOs, declared that they would “commit to lead their companies for the benefits of all stakeholders—customers, employees, suppliers, communities and shareholders.”¹ The media viewed this statement as a landmark moment in business to move away from shareholder capitalism to stakeholder capitalism. The World Economic Forum followed suit by releasing a manifesto to encourage companies to serve not only the shareholders but all their stakeholders (Schwab 2019). Investors also began to scrutinize “environmental, social, and governance” (ESG) issues more carefully, further incentivizing corporate leaders to internalize their social impacts (Edmans and Kacperczyk 2022). In support of this transition, several recent studies have theoretically shown that social welfare could improve when the social impacts were incorporated into managerial or investment decisions (e.g., Hart and Zingales 2017, Oehmke and Opp 2020).

Yet, after a few years since the statement’s issuance, critics have raised skepticism about the implementation of such stakeholderism. Bebachuk and Tallarita (2020) pointed out that the BRT statement was mostly for “show” rather than actually “delivering value” to stakeholders. Tariq Fancy, former BlackRock Chief Investment Officer for sustainable investing, claimed that ESG investment in many cases boiled down to “marketing hype.”² Investors also raised concerns about the growing risk of green-washing or social-washing, i.e., firms’ disguising themselves as socially responsible when they are not (e.g., Kacperczyk and Peydro 2022).

One of the practical obstacles in implementing stakeholderism is a concrete assessment of the corporations’ actual social impacts (Tirole 2001, Magill et al. 2015, Bebachuk and Tallarita 2020, and Edmans 2021), which cannot be readily identified, observed, or quantified. We still lack a definite metric to assess firms’ social

¹ See <https://www.businessroundtable.org/business-roundtable-redefines-the-purpose-of-a-corporation-to-promote-an-economy-that-serves-all-americans>.

² See <https://www.usatoday.com/story/opinion/2021/03/16/wall-street-esg-sustainable-investing-greenwashing-column/6948923002/>.

performance or corporate social responsibility (CSR), and, as a result, a significant variation exists in the performance scores for a given firm across different rating agencies (Dimson et al. 2020, Berg et al. 2022). This is problematic because, without reliable metrics, it is challenging to distinguish firms that indeed care about their material social impacts from those that merely *appear* to do so. In addition, the present assessment largely depends on self-reported hard information, which can further distort managerial incentives (Edmans 2021). In the worst case, those firms assessed to be socially responsible may paradoxically be less responsible, leading to socially undesirable outcomes if investors, consumers, or states rely on the misleading information for their decision-making and resource allocation.

To explore this possibility, our study focuses on banks’ “Main Street” lending during a credit crunch. In theory, we can clearly characterize CSR as managerial behavior that internalizes *material* externalities on stakeholders, which promotes social welfare (Tirole, 2001). In practice, however, we may not be able to identify such externalities for a particular firm concretely, and even if we do so, assessing the actual impacts on social welfare brought by specific corporate actions (i.e., creation of “social value”) can be challenging. Regarding this issue, the commercial banking industry exhibits several unique features: (i) we *can* distinctly define their most material externality with the most significant impact on the social welfare, but (ii) during good times, we *cannot* readily observe whether the management actually incorporates such aspect into the business decision, which makes their CSR assessment particularly challenging. On the contrary, (iii) once a downturn arrives, we *can* ex-post validate whether the ex-ante assessment made during the good period was indeed accurate and informative.

Evidently, a bank’s primary social role is to provide funds to the right place and *at the right time*, that is, when liquidity-constrained borrowers do not have access to outside funds elsewhere.³ However, this attribute (i.e., mitigation of financial frictions and efficient provisioning of liquidity) mostly reveals itself only in bad

³ Unlike other industries, the typical supply chain concerns do not apply to commercial banking. They are also criticized for paying rather “excessive” compensation to their staff during a boom, leaving too little slack for downturns. The environmental issues, particularly regarding banking activities, e.g., climate risks, green or ESG loans/bonds, were not considered urgent during our sample period.

times and is not readily observable in good times when borrowers are not constrained in general. During the boom, banks, from society's perspective, would rather "spend" too much instead of setting aside slack for possible downturns. Once the downturn arrives, banks tend to exert significant social costs by (overly) pulling back their credit from the real economy, thereby causing a "credit crunch" (Bernanke and Lown 1991). This social cost turned out to be so enormous that the policymakers after the 2007-2008 Global Financial Crisis (GFC) introduced various "macroprudential" rules, to enforce banks to hoard more slack in good times so that they can maintain their flow of credit in case of downturns and mitigate "procyclicality," which would promote social welfare (Hanson et al. 2011).

However, the regulatory framework largely missed this macroprudential perspective prior to the GFC, which opened up a gap between the privately optimal actions of banks and socially desirable ones. In this context, we can first identify banks' material externality (i.e., credit provision to the right place at the right time) and also observe whether some firms internalize it better than others (i.e., more "socially responsible" by channeling more funds to illiquid borrowers), *conditioning on* the realization of liquidity-shortage episodes for the real economy.⁴ However, such an attribute, albeit the most material one, is not observable during a boom when borrowers do not have difficulty in accessing liquidity, which imposes more challenges in measuring banks' CSR ex-ante. As a result, the CSR assessment for banks in good times might mainly reflect non-material yet conspicuous factors (e.g., charitable giving, philanthropy, and employee benefits), and those that invest more in these unessential dimensions may receive better CSR ratings, even if they set aside less slack for times of necessity.⁵

⁴ The following quote by Robert Frost nicely describes the Main Street's long-lasting complaint about banks' social irresponsibility: "A bank is a place where they lend you an umbrella in fair weather and ask for it back when it begins to rain."

⁵ Drempetic et al. (2020) found that firms' ESG scores are mechanically correlated with the amount of voluntarily disclosed information. In discussing the limitation of the current ESG metrics, Porter et al. (2019) criticize that "(t)he carbon footprint of a bank, for example, is not material to a bank's economic performance, nor would reducing its footprint materially affect global carbon emissions. In contrast, banks' issuance of subprime loans that customers were unable to repay had devastating social and financial consequences. Yet ESG reporting gave banks credit for the former and missed the latter altogether, in part because the voluntary and reputation-focused nature of sustainability reports tends to leave out bad news. Such broad and upbeat ESG reporting may make investors and consumers feel good by encouraging corporate window dressing, but it distracts from incentivizing and enabling

Based on the above premise, we argue that, theoretically speaking, banks that better internalize their material externalities (and are thus more socially responsible) should pull back fewer loans from local economies (i.e., “Main Street”) during a credit crunch. We then empirically analyze whether those banks that had received higher CSR ratings right before the crisis indeed cared more about their primary social role by examining banks’ small business lending during the Great Recession. Our study focuses on small business loans because, unlike larger firms, these small borrowers do not have access to liquidity elsewhere when their local banks refuse to lend (Petersen and Rajan 1994, DeYoung et al. 2015, Berger et al. 2017). Interestingly, the results indicate the opposite – lenders that had received better ratings and were supposed to be more “socially responsible” stayed further away from their local small business borrowers’ liquidity problems in reality.

We obtain banks’ CSR performance information from the KLD Stats database and small business lending information from Community Reinvestment Act (CRA) data. Following the conventional approach (e.g., Deng et al. 2013, Albuquerque et al. 2019), we calculate banks’ overall CSR scores⁶ as of 2006, right before the Great Recession started, and compare the trends in small business lending for banks with positive scores (59 *high-CSR* banks) and those with non-positive scores (107 *low-CSR* banks), before and during the Great Recession. As CRA reports borrower locations, we collect MSA-bank level origination information and construct yearly panel data matched with bank characteristics from the FR Y-9C reports.

To identify the credit supply effect, we include MSA*year fixed effects in our difference-in-differences (DID) regression. This absorbs changes in local loan demand (Khwaja and Mian 2008) to compare the lending patterns of different banks in the same local market for a given year. Figure 1 presents the trend in yearly small business loan (*SBL*) growth rates for the two groups of banks. Panel B plots the deviations from the MSA-level yearly averages to account for the demand changes, where we can clearly observe a sharper decline in local lending by *high-CSR* banks

companies to deliver greater social impact on the issues most central to their businesses.”

⁶ Porter et al. (2019) document that many ESG-oriented investors simply use firms’ *overall* performance for screening, (erroneously) assuming better scores across all ESG indicators indicate more prudent and farsighted management.

after 2007, contrary to their CSR rating as of 2006 suggested.

[Figure 1 here]

The regression results also confirm this pattern. The DID estimation, comparing pre- (2003-06) and post-treatment (2007-10), suggests that *high-CSR* banks decreased their *SBL* growth rates further by approximately 30 percentage points. The estimate barely changes when we exclude or only include small “community” banks with assets of less than \$10 billion or control for different business models and the asset-size effect. Our finding is also robust when we examine matched samples with the nearest neighbor based on banks’ total assets.

It is pertinent to reiterate that, in good times, “socially responsible” banks need to set aside more slack to maintain the flow of credit in bad times (Hanson et al. 2011). Thus, while it is possible that some banks pulled back their loans to avoid their own failures with the slack being exhausted during the economic downturn, this still implies that these banks had not been socially responsible ex-ante. Nonetheless, given the significant social costs of actual bank failures, we re-estimate the main regression excluding “weak” (thinly capitalized) banks or the banking crisis period of 2007 and 2008, and still have the same results. In sum, banks perceived to be more socially responsible paradoxically pulled back their funds from local borrowers more actively, particularly during times of necessity.

We next explore why we observe this seemingly contradictory relationship. It cannot be the case that the ratings were simply too noisy because we would then have found a null result. As such, we begin by ruling out several confounding factors that could result in the same empirical pattern. One possibility is that the financial crisis affected the two groups differently. For instance, larger banks faced tougher regulatory requirements after the crisis, and *high-CSR* banks are, on average, larger than *low-CSR* banks, although our results are robust when we only use the subsamples or matched samples with similar asset sizes. Alternatively, *high-CSR* banks might have been financially weaker to begin with, or suffered more losses during the crisis, which could have limited their credit supply. However, our analysis

suggests that these factors do not explain the difference in lending between the two groups.

We argue that this paradoxical relationship emerged because banks that spent rather extravagantly during the boom received better CSR ratings even when they kept a smaller slack to rest on in times of necessity. Despite hoarding more slack, conservative banks in good times can be seen as not actively involved with social issues from the outsiders' standpoint, compared to lavish banks taking more conspicuous actions to promote stakeholder benefits such as better employee benefits or more donations. The rating agencies would then give higher CSR scores to the latter banks, even though they are not addressing the material externalities. States, investors, or other stakeholders might also treat these firms more favorably, which helps them mitigate certain downside risks (e.g., reputational, regulatory, or compliance risks) to promote shareholder benefits ("strategic CSR"). In fact, Figure 2 indicates that our *high-CSR* banks, on average, received fewer regulatory sanctions than *low-CSR* banks before 2007, while the trend got reversed after 2007.

[Figure 2 here]

However, a tradeoff arises between investment in ex-ante risk management and conservation of ex-post operational or financial slack.⁷ Examining the financial statements, we find that *high-CSR* banks indeed spent more operating expenses than *low-CSR* banks pre-treatment, but constricted them more post-treatment. This pattern suggests that their pre-treatment expenditures were somewhat "excessive" and thus forced to be curtailed during the downturn, implying limited lending capacity for these banks.

We further present a possible conflict between serving different stakeholder groups. An action that intends to increase the welfare of specific stakeholders may yet reduce that of other stakeholders, which can *decrease* social welfare depending

⁷ Rampini and Viswanathan (2010) and Rampini et al. (2014) found a trade-off between investing in risk management and financing new projects, which becomes more pronounced when firms are financially constrained. Relatedly, Xu and Kim (2022) found that firms actively trade off the opportunity cost of abating carbon emissions against potential legal risks.

on the opportunity costs and the weights among them. For banks, there can exist a tradeoff between providing more upfront employee benefits during a boom, which is socially undesirable,⁸ and leaving more slack for possible downturns, which is socially desirable. Our *high-CSR* banks indeed spent more on salaries and benefits and had higher ratings in the *Employee Relations* category pre-treatment. However, they significantly reduced spending on salaries and benefits post-treatment while *low-CSR* banks did not do so, which suggests the former banks were more constrained. Since the CSR metric mostly reflects *realized* stakeholder benefits, those banks that spend more on their employees may receive better ratings ex-ante, even if they choose to leave out unrealized and thus unquantifiable, yet more material externalities. In fact, we have similar DID results when banks are sorted using only the information under the *Employee Relations* category, while the effect was less pronounced when sorting using other categories.

Our findings suggest the importance of definitive and reliable metrics to assess firms' social impacts, to induce desirable corporate behaviors and promote social welfare. A tradeoff between the welfare of different stakeholders should necessarily arise for any corporate decision under constraints, but often, it is not evident what the implicit opportunity costs are or which weights to assign between them to assess the net effect. The outsiders customarily focus on specific "obvious" issues such as carbon emission or employee satisfaction, even though they may not be material for some industries, because of the difficulty in assessing unobservable or unrealized features. When firms exploit this limitation, the social value assessment can become misleading, and those who focus more on non-material externalities could be perceived as more socially responsible (Edmans 2021).

Admittedly, the 2006 metric that we adopted is rather crude and less informative than those currently available. However, we do not think this is necessarily a limitation for our purpose; rather, it can help present the possible downside that might arise when the social impacts of business activities cannot be readily assessed. At present, with the outbreak of Covid-19, "social washing" is becoming a growing

⁸ Banks had been criticized for paying "lavish" compensation during a boom ignoring downside risks, which led the regulators to introduce clawback clauses after the GFC.

risk to ESG investors as they put a greater emphasis on the “social” aspect since social issues are much harder to assess even compared to environmental ones.⁹ If investors, consumers, or regulators’ “socially conscious” actions are made based on erroneous metrics (Gibson Brandon et al. 2021), they may end up subsidizing the wrong type, distorting resource allocation, and paradoxically damaging social welfare.¹⁰

This paper is related to several strands of literature. First, we contribute to the literature on corporate social impacts/responsibility. Prior studies mainly examined (i) how CSR/ESG engagements affect various aspects of firms, such as stock returns (e.g., Edmans 2011), cost of capital (e.g., Chava 2014, Bolton and Kacperczyk 2021), consumer satisfaction (e.g., Servaes and Tamayo 2013), employee loyalty (e.g., Lee et al. 2013), and risk management (e.g., Krueger et al. 2020); or (ii) specific factors that affect firms’ CSR/ESG engagement decisions, such as legal origin (e.g., Liang and Renneboog 2017), political environments (e.g., Di Giuli and Kostovetsky 2014), family environment (e.g., Cronqvist and Yu 2017), investor pressure (e.g., Sparkes and Cowton 2004), customer pressure (e.g., Dai et al. 2021), and agency problems (e.g., Masulis and Reza 2015, Ferrell et al. 2016). In making any normative statements regarding CSR/ESG based on the findings of existing studies above, an *implicit* assumption is that relevant stakeholders can readily identify firms that exert better social impacts than others or assess their social value creation. However, a growing number of recent studies document practical challenges in the assessment of firms’ CSR/ESG performance (e.g., Dimson et al. 2020, Gibson Brandon et al. 2021, Berg et al. 2022). Given these observations, we examine a novel question unexplored in the literature, i.e., whether firms *assessed* to be more socially responsible are indeed so, and if not, what factors can cause such a discrepancy.

Relatedly, this study contributes to the literature on the stakeholder theory and its implementation. Several prior studies show that stakeholder considerations in

⁹ See, e.g., <https://www.bloomberg.com/news/articles/2020-04-09/-social-washing-is-becoming-growing-headache-for-esg-investors?sref=qSOSqDIq>.

¹⁰ The European Securities and Markets Authority (ESMA), the EU’s securities markets regulator, recently called for legislative action on ESG assessment tools facing the increased risks of greenwashing, capital misallocation, and product mis-selling (European Securities and Markets Authority 2021).

managerial decisions could, at least in theory, improve social welfare (e.g., Tirole 2001, Magill et al., 2015, Hart and Zingales 2017, Morgan and Tumlinson 2019, Henderson 2020, Oehmke and Opp 2020). However, others raise concerns about its practical implementation and suggest that the stakeholder focus may worsen the managerial agency problems due to the lack of accountability (e.g., Tirole 2001, Magill et al. 2015, Bebchuk and Tallarita 2020, 2022). Our finding suggests that a reliable performance metric would be an absolute requirement for properly implementing the stakeholder theory.

Lastly, this study is related to the literature on the effect of bank lending on the real economy during the Great Recession (e.g., Ivashina and Scharstein 2010, Chodow-Reich 2014), with a specific focus on small business lending (e.g., DeYoung et al. 2015). Small businesses are of particular interest because they are considered to be more bank-dependent while representing roughly half of the private-sector labor force and provide more than 40 percent of the private sector's contribution to the gross domestic product in the United States (Petersen and Rajan 1994, Wiersch and Shane 2013, Berger et al. 2017). Policymakers during the Great Recession had become greatly concerned that the significant decline in small business loans might impair the economic recovery,¹¹ but they, in the end, did not actively intervene in this market by providing, e.g., public loan guarantees or direct subsidies. Consequently, net job losses by small firms were unusually deeper than those by large firms (Montoriol-Garriga and Wang 2011), exerting substantial social costs, which led to a drastically different policy reaction following the pandemic breakout in 2020, such as the Paycheck Protection Program (PPP). In exploring the factors that affected banks' small business loan supply decisions, Bord et al. (2021) found that banks with significant losses reduced their small business lending more; Cortés et al. (2020) found that the stress tests also limited banks' willingness to lend;

¹¹ In his 2011 speech (See <https://www.federalreserve.gov/newsevents/speech/bernanke20100712a.htm>), Ben Bernanke stated that "small businesses are central to creating jobs in our economy; they employ roughly one-half of all Americans and account for about 60 percent of gross job creation... Unfortunately, those businesses report that credit conditions remain very difficult... Clearly, though, to support the recovery, we need to find ways to ensure that creditworthy borrowers have access to needed loans."

and Chen et al. (2017) documented that the decline was particularly pronounced for the four largest banks. Unlike these papers that aim at assessing the aggregate implications, our focus is more micro-oriented, exploring whether banks that were “supposedly” more social-minded indeed behaved so.

2. Theoretical Background

2.1. Stakeholder theory, CSR, and its assessment

In his influential *New York Times Magazine* article, Friedman (1970) claims that the only social responsibility of a business is to increase its profits accruing to shareholders. While this shareholder theory has been widely perceived as a justification of shareholder primacy, it does not imply that externalities arising from corporate activities are irrelevant. Rather, it suggests an efficient division of labor between firms and states. The former exclusively focus on delivering more returns to shareholders, who can then take actions based on their respective social preference. The latter devise relevant policies and institutions to address market failures.

While this dichotomy would be socially desirable in theory, states do not always implement optimal rules and measures to address the material externalities exerted by the firms. The dichotomy above then breaks down, and the social welfare would decrease when the firms simply ignored their social impacts. In such cases, firms are not excused from pursuing profits alone. Social welfare could increase if firms internalize externalities on their stakeholders, i.e., CSR that goes beyond the legal or regulatory requirements of the economy becomes relevant (Tirole 2001, Bénabou and Tirole 2010, Kitzmueller and Shimshack 2012).

Therefore, stakeholder theory argues that firms should consider their material impacts on relevant stakeholders when making managerial decisions. Importantly, CSR in this context does not imply that firms should consider *every* possible impact on *any* stakeholders when making managerial decisions. Hart and Zingales (2017) argue that only the externalities that are inseparable from the firms’ production

decisions should be considered because, otherwise, the shareholders themselves can reverse the inefficiencies. Edmans (2020) proposes the “principle of materiality,” which suggests that a firm’s management should primarily address externalities to stakeholders that are most material to the firm’s business.¹² The Global Reporting Initiative (GRI), which stipulates the world’s most widely used guidelines for sustainability reporting, in their 2020 GRI 103 proposal, defines material topics for assessing firms’ social impacts as those “that reflect the organization’s *most significant* impacts on the economy, environment, and people, including impacts on human rights.” Similarly, Magill et al. (2015) suggest limiting the set of stakeholders to those closely affected and allowing states to resolve the externalities that affect widely dispersed agents in the economy. In this context, certain “CSR” actions, taking opportunity costs into account, might paradoxically result in a net decrease in social welfare and are not desirable. Nonetheless, in practice, firms are still “judged on their *overall aggregate performance across all indicators*, equally weighted, *rather than on the most salient issues* for their particular businesses,” even if some factors “are not material to the performance of a particular business, nor do they highlight areas where the business has the greatest impact on society” (Porter et al. 2019).

While the benefits of CSR, which is defined as a net increase in social welfare, are conceptually straightforward to formalize, the actual assessment of the social impacts that result from CSR is not evident. As discussed above, certain externalities are more material and are thus to be prioritized, which is particularly important when the opportunity costs matter with limited available resources. Therefore, to evaluate the social impact, we first need to identify which stakeholder groups are affected and by how much, but this is hard to quantify. Moreover, an action that intends to increase the welfare of specific stakeholders may yet reduce that of other stakeholders, so we would also need to assign the appropriate weights among the stakeholder groups to assess the net impact. Since these tasks are challenging in practice to execute, critics have raised concerns about the implementation of stakeholderism, i.e., emphasizing

¹² For instance, charitable donations and corporate philanthropy, which Friedman primarily criticized, would not qualify as CSR activity that addresses firms’ material externalities.

stakeholder benefits and social impacts could adversely exacerbate agency problems due to the lack of accountability (Tirole 2001, Magill et al. 2015, Bebchuk and Tallarita 2020, 2021).

The imprecise assessment also limits an appropriate reward for desirable behaviors and incentive provisions. Consider firms that adopt the stakeholder perspective. On the one hand, they risk becoming less attractive to investors because they do not intend to maximize financial returns, which could make them not viable in the long run.¹³ On the other hand, this will not be the case if some investors also value social impacts (Hart and Zingales 2017), since these “socially responsible” investors are willing to invest in those firms to complement more financially oriented investors, which could, in turn, improve social welfare (Oehmke and Opp 2020). Besides, other relevant stakeholders, such as employees, local communities, customers, or states, may similarly appreciate the firms’ social value creation, encouraging them to seek such objectives.

However, the above arguments implicitly assume that socially responsible firms *can* be readily distinguished from irresponsible ones. If we are unable to identify the former from the latter with no reliable assessment metric,¹⁴ then socially responsible firms might not survive because the social value they create would fail to be appreciated. Policymakers, corporate leaders, and market participants take this problem seriously, urging the development of reliable standards and frameworks to assess social values (e.g., European Union 2021). Still, even for the same firm, performance scores differ significantly across major rating providers (Dimson et al. 2020, Berg et al. 2022, Gibson Brandon et al. 2021), making it challenging to identify the “good” firms.

This limitation can become more problematic because it may further distort firms’ incentives (Edmans 2021). Prevailing metrics primarily analyze self-reported, hard

¹³ On the contrary, “doing well by doing good” view (Bénabou and Tirole 2010, Edmans 2020) suggests that firms can still increase their returns to investors even when incorporating their social impacts in managerial decisions. However, Bebchuk and Tallarita (2020) argue that this approach is essentially another manifestation of the traditional model that focuses on shareholder interests, rather than stakeholderism that aims at promoting the well-being of stakeholders.

¹⁴ For instance, Elmalt et al. (2021) find little evidence to suggest that higher ESG metrics are associated with reduced emission growth.

information on selected topics (Drempetic et al. 2020). These topics might indeed relate to a firm's material externalities on its relevant stakeholders, but they could instead reflect immaterial factors not directly associated with the firm's main business. If the former attribute is harder to observe and assess while the latter is more conspicuous, the firms may attempt to spend more resources to promote the latter at the expense of the former. Although this behavior would lead to socially undesirable outcomes, the rating agency could provide a positive assessment of such firms when they should be underappreciated. As we discuss below, this discrepancy could be more pronounced in commercial banks whose most material social externality – provision of funds to the right place *at the right time* – is not observable in good times, but only in bad times.

2.2. Banks' social responsibility and hypothesis development

Regarding corporate social impacts, banks are unique in various ways. As an intermediary, a bank's primary role is to receive funds, pool them, and lend them to those who need them. In this process, a bank creates social values through a transformation of maturity and liquidity (Diamond and Dybvig 1983) and generation of information (Diamond 1984) and retains part of the value-added as corporate profits. Its liquidity provision may not be easily substituted, particularly for borrowers facing financial frictions that hamper their direct access to funding markets. Hence, firms and households are significantly impacted when banks become reluctant to lend, and the disruptions of credit flows could even lead to the failure of otherwise solvent borrowers, exerting substantial negative externalities (Bernanke and Lown 1991). As the maturity transformation inevitably exposes banks to risks of bank runs (Diamond and Dybvig 1983), states in pursuit of social benefits provide public protection of deposits to maintain the stable provision of funds to the real economy.

Consequently, the corporate governance of banks is rather unique; from a social perspective, it is *clearly* suboptimal for a bank's management to solely focus on shareholders' interests (see, e.g., Macey and O'Hara 2003, 2016, Bebchuk and

Spamann 2009, Becht et al. 2011, and Laeven 2013).¹⁵ Banks are highly levered by the nature of their business model, yet own opaque assets (Morgan 2002), which makes them susceptible to asset substitution (Jensen and Meckling 1976). Creditors would typically monitor such agency conflicts, but the public protection of deposits weakens the market discipline for banks. Therefore, shareholder value maximization would naturally result in banks' excessive risk-taking (Fahlenbrach and Stulz 2011, Beltratti and Stulz 2012), while their distress would impose substantial social costs. Accordingly, states regulate banks' soundness and supervise their activities to enforce banks to be more "responsible," unlike with other industries. Traditionally, so-called "microprudential" regulations aim to address this misaligned incentive of bank shareholders (or management) and prevent bank failures, to enhance social welfare.

Following the Global Financial Crisis of 2007-2008, a consensus was reached among policymakers and researchers to re-orient the regulatory framework towards a "macroprudential" perspective. During the GFC and the subsequent recession, banks—with a substantial decrease in their risk appetite—significantly curtailed the provision of credit to the real economy (see, e.g., Ivashina and Scharstein 2010). While this step might have been a privately optimal decision from an individual bank's perspective, the consequent credit crunch transmitted the financial shock to the real economy and deepened the recession (i.e., amplifying "procyclicality"), which resulted in significant social costs (see, e.g., Hanson et al. 2011, Chodorow-Reich 2014, DeYoung et al. 2015).

To alleviate the negative externalities arising in bad times and to stay "socially responsible," banks were expected to set aside sufficient slack during good times to rest on in bad times, which many of them did not. The social costs of such bank negligence were so enormous that it triggered regulatory reforms to address the gap between the banks' privately optimal decisions and socially desirable ones. Various "macroprudential" tools, such as counter-cyclical capital buffers (CCyB), were

¹⁵ Macey and O'Hara (2016) thereby propose to broaden the fiduciary duties of bank directors to incorporate the social impacts. In addition, several countries (e.g., Korea, Japan) explicitly refer to banks' public nature in their banking acts.

introduced under the Basel III, to enforce banks to hoard larger slack in good times, to maintain the flow of credit in bad times (Hanson et al. 2011, Jiménez et al. 2017). During the Covid-19 pandemic, these new rules helped the banks stay sound and avoid a credit crunch. The states also intervened actively and provided direct assistance to liquidity-constrained borrowers (e.g., PPP in the U.S.) to alleviate the social costs, which left little room for the banks' voluntary "social responsibility" to make positive social impacts. However, such public interventions were largely missing during the Great Recession.

Thus, theoretically speaking, banks that were more socially responsible – i.e., better internalizing their material externalities on stakeholders – should have provided more funds to constrained borrowers during the Great Recession. Alternatively, from an ex-ante perspective, they should have put aside greater slack during the boom to sustain more credit provisions during the downturn. If the CSR scores measured immediately before the GFC accurately capture this (unobservable but material) attribute, the following hypothesis will hold true:

Hypothesis 1: A bank that had received a higher CSR score lent more to its local borrowers during the Great Recession.

Admittedly, there are other externalities that banks may exert on their stakeholders. However, considering their impacts on social welfare, these possible factors that are not yet addressed by the state interventions are rather immaterial to the bank's main business compared to the externality of provision of funds to the right place at the right time, which is so material that the post-crisis regulatory reforms mandate banks to internalize it better. Banks have fewer supply chain issues than firms in other industries. Environmental issues such as climate risks were not considered as urgent prior to the GFC. Banks were also criticized for paying rather lavish compensation to their staff during the boom without considering future risks.

Nonetheless, whether a bank would provide sufficient funds to its liquidity-constrained borrowers is hard to assess in good times. The GFC happened rather abruptly after a credit boom when borrowers in general had easy access to credit.

Prudential regulation and supervision were mainly aimed at assuring a minimum level of bank soundness or financial leverage to prevent bank failures, but they did not scrutinize whether banks had put aside sufficient resources to rest on in aggregate downturns. During the credit boom, therefore, this socially desirable attribute is not easily assessable. Only once the downturn comes, the banks' ex-post reactions reveal whether they acted responsibly. Hence, the CSR scores observed prior to the GFC may primarily reflect conspicuous issues that are only tangentially related to banks' material externalities or immaterial ones such as charitable giving and philanthropy (Masulis and Reza 2015). Alternatively, they may mechanically reflect the amount of CSR information voluntarily disclosed by firms (Drempetic et al. 2020), when such information collection and disclosure are costly. If banks spend more resources on these aspects, intentionally or not, it would help them earn a high CSR score in good times. However, they might be forced to squeeze their liquidity provisions to a greater degree later in bad times, due to the higher operating leverage that constrained their lending capacity further. The states did scrutinize their banks' financial leverage for social benefits, but their operating leverage was largely unchecked. In such a case, the opposite prediction could be derived:

***Hypothesis 1':** A bank that had received a higher CSR score paradoxically lent less to its local borrowers during the Great Recession. Such a bank had spent more resources in good times than those with a lower CSR score, which subsequently constrained its lending capacity further in bad times.*

3. Data

We combine several datasets. The firms' CSR information was obtained from the KLD Stats database.¹⁶ The KLD evaluates a firm's social responsibility performance in the following seven categories: environment, community, human rights, employee

¹⁶ The database is now known as MSCI KLD ESG Stats, following MSCI's acquisition in 2010.

relations, diversity, product, and governance. Each category includes a number of criteria comprising both strengths (i.e., positive impact) and concerns (i.e., negative impact) to calculate the binary evaluation (1 if yes, 0 if no) for each criterion. See the Appendix Table A1 for the list of the specific criteria.

Similar to prior studies, we exclude the governance category to focus on non-governance aspects of CSR and construct a firm's overall CSR score (i.e., "ES" scores) as follows (see, e.g., Deng et al. 2013, Servaes and Tamayo 2013 and Albuquerque et al. 2019). We first calculate a normalized strength score, ranging from 0 to 1, by dividing the sum of strength scores across all six categories by the number of available strength indicators. We similarly calculate a normalized concern score, ranging from 0 to 1. We then subtract the normalized concern score from the normalized strength score to construct the overall *CSR score* for that firm ranging from -1 (with more negative impacts) to 1 (with more positive impacts).¹⁷ The banks are then divided into two groups: *high-CSR* with positive overall scores and *low-CSR* with non-positive overall scores. For the 2006 year-end assessment, the KLD provides the CSR scores of 166 banks. Among them, 59 banks are included in the *high-CSR* group, and 107 banks are included in the *low-CSR* group.

The KLD database has two advantages for the present empirical study. First, there were not many ESG rating agencies in the early 2000s, as we do now. As such, the KLD provided the broadest coverage,¹⁸ and is used in the majority of academic studies examining the determinants and effects of CSR during this period (e.g., Godfrey et al. 2009, Hong and Kostovetsky 2012, Deng et al. 2013, Servaes and Tamayo 2013, Krüger 2015, Khan et al. 2016, Lins et al. 2017). Second, a core purpose of the KLD was to "influence corporate behavior toward a more just and sustainable world," that is, providing information that would bring positive impacts towards promoting social welfare, rather than helping investors better incorporate relevant non-financial information for higher returns (i.e., with "financial

¹⁷ Our empirical results do not change when we use the total number of *both* strengths and concerns indicators as the denominator, and the sum of strengths subtracted by the sum of concerns as the numerator to calculate the overall score (i.e., the robustness analysis in Albuquerque et al. 2019).

¹⁸ For instance, ASSET4, one of the largest databases for recent ESG information, assessed fewer than 30 U.S. banks in 2006.

materiality”).¹⁹ Hence, a higher KLD score aims to identify firms that better internalize their material externalities, regardless of whether it would ultimately lead to better financial returns.

We use the Federal Financial Institutions Examination Council’s (FFIEC) Community Reinvestment Act (CRA) disclosure data from 2003 to 2010 to analyze patterns in small business lending. The CRA is a federal law enacted in 1977 to “encourage” depository institutions to help meet the needs of borrowers in all community segments including low- and moderate-income neighborhoods, which suggests that the policymakers consider greater originations of the CRA loans to be socially desirable. The CRA data include small business lending whose loan amounts are less than \$1 million reported by banks with more than \$1 billion in assets. This loan-level data provides information about the year of origination, loan size, lender, and most importantly, borrower location to compare different banks within the same local area and thus, identify the supply effect.

We collect information on other bank (holding company) characteristics that we control for in our analysis from the Federal Reserve’s Y-9C reports between 2002 and 2010. Since the CSR scores and small business loan originations are assessed at the end of the year, we use the Q4 reports to construct the following variables: *Size* defined by a bank’s total assets in US dollars; *Liquid Assets* defined by the ratio of liquid assets (cash, securities, the federal funds sold and securities purchased) to total assets; *RE Loans* defined by the ratio of real estate loans to total loans; *CI Loans* defined by the ratio of C&I loans to total loans; *Non-performing Loans* defined by the ratio of non-performing loans to total loans; *Capital* defined by the ratio of a bank’s tier 1 capital to total risk-weighted assets; *Loan-to-Deposits* defined by the ratio of total loans to total deposits; and *ROA* defined by the ratio of net income to total assets.

We aggregate the CRA data to the bank-MSA level for each year and merge it with the bank characteristics and the CSR scores to construct the panel data. We exclude banks with loan to asset ratios lower than 0.25 and deposit to asset ratios

¹⁹ See <http://web.archive.org/web/20050403203540/http://www.kld.com:80/about/mission.html>.

lower than 0.25 to focus on commercial banks. All variables are winsorized at the top and bottom 1% of the distribution, and the final sample consists of 31,185 bank-MSA-year observations.

Table 1 reports the summary of the statistics. Panel A compares the balance sheet characteristics of the two groups, *high-* and *low-CSR* banks. As one can see, *high-CSR* banks are significantly larger in assets, have slightly fewer real estate loans but more commercial and industrial loans. One possibility is that the larger firms simply had more to disclose, and the rating firms relied on these voluntary inputs for their CSR assessment (Drempetic et al. 2020). Bank size can also correlate with other factors that affect lending. We explicitly address these issues in our empirical analyses.

Panel B presents the decomposition of the CSR scores for the two groups according to the CSR categories: *Environment*, *Community*, *Human Rights*, *Employee Relations*, *Diversity*, and *Products*.²⁰ *high-CSR* (*low-CSR*) banks have positive (negative) net scores in terms of *Community*, *Employee Relations*, and *Diversity*, and the difference between the two groups is statistically significant in all three categories. However, the two groups do not differ significantly with *Environment* and *Human Rights*; no bank received a positive net score in terms of *Products*. Comparing the aggregate overall scores used to define *high-* and *low-CSR* banks, *high-CSR* banks have a mean of 0.053 and a standard deviation of 0.038, and *low-CSR* banks have a mean of -0.028 and a standard deviation of 0.028.

[Table 1 here]

4. Empirical Findings

4.1. Difference-in-differences estimation

We begin by visually inspecting the trends in banks' small business lending.

²⁰ See the Appendix Table A1 for the list of specific topics assessed in each category.

Figure 1 presents the time series of yearly small business loan growth for the two groups of *high*- and *low*-CSR banks. Panel A is calculated based on the bank-level averages. While both groups of banks decreased their loans to small business borrowers after 2007, *high*-CSR banks reduced their lending more than *low*-CSR banks. The difference, however, is not too distinct, and we cannot infer whether it was driven by the banks' active decisions to pull back loans or simply a result of the differential loan demand they faced.

To account for the variation in local demand, we next examine loan growth at the MSA-bank level. For each MSA-bank level yearly growth, we subtract the average loan growth for the MSA in that year to absorb the MSA level variation. This leaves the deviation from the local average for each bank in each MSA, and we plot their averages for the two groups in Panel B.

With the demand controlled, the difference between the two groups becomes more distinct. Both trends were almost parallel prior to the crisis, but *high*-CSR bank lending decreased much more sharply as the crisis unfolded. The figure suggests that the supposedly "responsible" banks more actively cut back their lending to local borrowers who needed liquidity.

We now implement a difference-in-differences estimation to assess this effect using the following model:

$$LoanGrowth_{i,m,t} = \alpha_i + \alpha_{m,t} + \beta CSR_i * post_t + \gamma X_{i,t-1} + \varepsilon_{i,m,t} \quad (1)$$

where $post_t$ equals 1 for 2007 to 2010, and 0 for 2003 to 2006. CSR_i is a dummy variable for the *high*-CSR banks, which equals 1 if bank i 's overall *CSR score* in 2006 is positive, and 0 otherwise. α_i denotes bank fixed effects to control time-invariant bank characteristics, and $X_{i,t-1}$ denotes the matrix of bank characteristics lagged by one year. The bank controls include the natural logarithms of *Size*, *Liquid Assets*, *RE Loans*, *CI Loans*, *Non-performing Loans*, *Capital*, *Loan-to-Deposits*, and $1+ROA$. We control banks' holdings of liquid assets, loan quality, earning, capitalization, and loan-to-deposits ratio because these factors affect a bank's lending capacity. Banks' real estate loans to total loans and C&I loans to total loans ratios

account for changes in the business focus within the bank.

Our coefficient of interest is β , the coefficient on the interaction between CSR_i and $post_t$. We include MSA*year fixed effects, denoted as $\alpha_{m,t}$, to control for local economic conditions at the MSA level. This term absorbs variations in local demand to identify the credit supply effect (Khwaja and Mian 2008) so that β of our MSA-bank level regression can capture differential lending behaviors between the two groups within the same local market. All standard errors are clustered at the bank level.

[Table 2 here]

Table 2 reports the estimation results. The DID estimate in Column 1 indicates that small business loan growths of *high-CSR* banks decreased by approximately 31 percentage points more than *low-CSR* banks, relative to their pre-treatment behaviors. The estimate is statistically significant at the 1% level.

Recall, from Section 3, that *high-CSR* banks are, on average, larger in assets than *low-CSR* banks. This size difference can bias our results due to, for instance, the following confounders. First, larger banks faced stricter post-crisis regulations, which may limit their lending capacity further. Second, large banks' business models can differ from small banks, and thus their damages from or responses to the crisis also differ (Chen et al. 2017, Cortés et al. 2020)

We address this size effect in various ways, roughly classified as either (i) adding relevant controls or (ii) using subsamples. We first add the following controls to mitigate the confounding effects. To account for the regulation effects, we utilize two asset-size thresholds for regulatory requirements explicitly referred to in the Dodd-Frank Act, i.e., \$10 billion for “community banks” and \$50 billion for systemically important financial institutions (“SIFIs”). Regulatory burdens increase discretely as a bank's total assets exceed these thresholds (Hou and Warusawitharana 2018).²¹

²¹ Banks that exceed \$10 billion in assets are subject to, e.g., oversight by the Consumer Financial Protection Bureau and need to implement company-run stress tests. Those larger than \$50 billion are subject to, e.g., regulatory stress tests and liquidity regulations (e.g., liquidity coverage ratio (LCR)).

Hence, we create two dummy variables for banks with average asset sizes below \$10 billion and \$50 billion and interact them with $post_t$. We then include these additional terms in equation (1) to account for the different regulatory effects due to bank size. The DID estimate, reported in Column 2, turned out to be slightly larger in magnitude than that in Column 1, still significant at the 1% level.

We also control for the differential impact of the crisis on banks with different business models. We use banks' non-interest income to total income ratio in 2006, right before the treatment, to capture the business model (Stiroh 2004, 2006) and interact them with $post_t$. Again, we add this term in equation (1) and report the estimates in Column 3, where we obtain the same result as before. Lastly, we interact the bank's asset size in 2006 with $post_t$, and add this control to absorb *any* monotonic size effects. The DID estimate, reported in Column 4, is similar in economic magnitude, but statistically significant only at the 10% level with a t -statistic of -1.96. On the other hand, the size effect (i.e., the coefficient on the interaction of bank size and $post_t$) is neither economically nor statistically significant.

To verify the robustness of the results further, we first exclude all small "community" banks with asset sizes below \$10 billion. We then repeat the estimations in Table 2 based only on the subset of large banks and report the results in Panel A of Appendix Table B1.²² We have a total of 20 *high-CSR* banks and 26 *low-CSR* banks in this subsample, and the standard errors are generally larger as the sample size decreases. The estimates are similar to those of the full sample, albeit slightly less statistically significant. The estimate in Column 4, controlling the interaction of bank assets and the $post$ dummy, is statistically insignificant with a t -statistic of -1.68, although it is slightly larger in magnitude (-0.34) than that in Table 2 with the full sample (-0.31).

Alternatively, we analyze only the subset of small banks with assets below \$10 billion. Our sample has 120 such small banks, and these community banks operate primarily in their local markets. As such, our MSA-bank level analysis is not appropriate because we generally have very few banks within a given MSA.

²² As we exclusively use banks larger than \$10 billion in assets, we only include the interaction term with the \$50 billion threshold in column 2.

Therefore, we estimate state-bank level regression, where state-year fixed effects replace MSA-year fixed effects. Panel B of Appendix Table B1 reports the DID estimates for this small-bank subsample analysis, where we obtain a robust result.

Finally, using the asset size, we match each treated bank with the control bank in the nearest neighbor. The estimation result based on this matched sample is very close to that using the full sample in Table 2, both economically and statistically, which is available from the authors upon request.

While Panel B of Figure 1 suggests that the parallel trends assumption is not violated, we next confirm its validity by estimating the following equation:

$$\begin{aligned} LoanGrowth_{i,m,t} = & \alpha_i + \alpha_{m,t} + \sum_{t \neq 2006} \beta_t * CSR_i * year_t \\ & + \gamma X_{i,t-1} + \varepsilon_{i,m,t} \end{aligned} \quad (2)$$

where $year_t$ is a dummy variable for each calendar year excluding 2006, the base year. Figure 3 plots the estimates of β_t with the 90% confidence intervals. As seen, the estimates for the interaction term are not statistically different from 0 prior to the crisis. However, they are significantly negative after 2007, indicating that *high-CSR* banks reduced their loans to small business borrowers compared to banks that received lower CSR ratings.

[Figure 3 here]

4.2. Other confounders – financial soundness

It is important to note that banks' *CSR scores* prior to the treatment might have been related to factors that affected their post-treatment lending behaviors, other than the asset sizes. For instance, if *high-CSR* banks had somehow been more severely damaged during the financial crisis, it could have limited their lending capacity. Alternatively, they might have been financially riskier at the onset of the crisis, which would have affected their lending afterward.

To verify whether these were the cases, we next look closely into the two groups’ “soundness” characteristics, including *Capital*, *Liquid Assets*, *Non-performing Loans*, and *ROA*, which we used as controls in the main regression. Supervisory regulators paid close attention to these factors as part of their “CAMELS” assessment, while with more focus on the “lower bound” rather than the “slack.”²³ Table 3 reports the statistics of these ratios for the two groups based on all sample banks, distinguishing between pre- and post-treatment. We also test the significance of between-group differences, within-group differences, and difference-in-differences. The statistics based on the large bank subsample (greater than \$10 billion in assets) or the small bank subsample (below \$10 billion in assets) are reported in the Appendix Table B2.

[Table 3 here]

Table 3 indicates that *high-CSR* banks were not financial weaker prior to the crisis. Their liquid asset ratio was, on average, lower (by 1.6 percentage points and significant at the 10% level), and the non-performing loan ratio was higher (by 0.2 percentage points and significant at the 1% level), but this difference disappears when we compare only large banks in Panel A of Appendix Table B2. Moreover, the differences are not economically significant, particularly for the non-performing loan ratio. Looking at the within-group differences by comparing pre- versus post-treatment and the difference in these differences, it seems unlikely that the crisis more severely damaged *high-CSR*. If anything, *low-CSR* banks had a significantly larger reduction in their liquid asset ratio, both statistically and economically. One interpretation of this difference is that *low-CSR* banks were more willing to consume their cash buffers post-treatment, while *high-CSR* banks were more reluctant to do so. This argument coincides with the lending patterns identified in the previous section.

Overall, the results in Table 3 indicate that the soundness factors did not drive

²³ CAMELS indicates capital adequacy, asset quality, management, earnings, liquidity, and sensitivity to market risk.

the different lending behaviors we observed previously. For robustness, we explicitly control for the differential responses among banks with different fragilities by adding the interaction term of $post_t$ and each of the four soundness controls as of 2006 in equation (1). Table 4 reports the estimation results. For all four specifications, including that accounting for the effects of differential liquid assets holding in 2006, the DID estimates with the additional controls actually become larger in magnitude.

[Table 4 here]

4.3. Should socially responsible banks rather refrain from lending?

One may argue that some banks, with exhausted loss-absorbing buffers, were *forced* to reduce lending during the crisis to prevent failure or breach of regulatory requirements. Since bank failures can impose significant social costs, it could be socially beneficial if the weakened banks withdrew loans to reduce asset risks after the onset of the crisis rather than continuing them. However, “socially responsible” banks that better internalize their material externalities must, in good times, choose to set aside more loss-absorbing buffers to maintain liquidity provisions in times of necessity, which would dampen “procyclicality” and is shown to be socially beneficial (Hanson et al. 2011). Therefore, even if some banks aggressively pulled back their loans ex-post with their slack exhausted, it still indicates that they had *not* been socially responsible from the ex-ante perspective.

Nonetheless, it is possible that at the height of the banking crisis, *all* banks were on the verge of failures and needed to cut back loans to avoid further downfall. If so, there is nothing wrong with more responsible banks behaving more conservatively. To rule out this possibility, we re-estimate our main regression by excluding the years 2007 and 2008. As shown in Columns 1 of Table 5, the DID effect in fact became more pronounced in its economic magnitude. In Column 2, we alternatively exclude very weak banks whose average capital ratios belong to the 10th percentile. However, the estimation result barely differs from the benchmark case.

[Table 5 here]

Lastly, it is possible that *low-CSR* banks chose to maintain their loans to underwater borrowers during the crisis rather than illiquid borrowers to avoid recognizing the losses. This “zombie lending” is socially inefficient (e.g., Caballero et al. 2008, Acharya et al. 2021) and, if it were the case, *low-CSR* banks were indeed less responsible during the recession, as the metric rightly suggests. To assess this possibility, given the unavailability of performance information of the originated loans, we examine the non-performing loan ratio for C&I loans from the Y-9C form.²⁴ Using this as a dependent variable in equation (1), the DID estimate should be negative if *low-CSR* banks mainly maintain zombie loans post-treatment. However, the result indicates a positive estimate, albeit not statistically and economically significant. These results are available from the authors.

4.4. Effects on mortgage lending

We next examine mortgage lending by these banks, which mainly serves two purposes. First, we analyze whether *high-CSR* banks also reduced credit to other types of borrowers in local economies. However, note that mortgage lending decisions are only remotely related to the voluntary internalization of material social impacts. Unlike small business loans, reducing mortgage originations does not directly imply pulling back funds from local borrowers in need of liquidity. Policymakers also actively intervened in the housing market, which exerted differential effects on lenders. Second, Chakraborty et al. (2020) find that banks that benefited more from the Federal Reserves’ mortgage-backed securities (MBS) purchases increased mortgage lending, but at the same time, reduced C&I lending. With this crowding-out effect, it is possible that *high-CSR* banks reduced their small

²⁴ We use the ratio of non-performing C&I loans to total C&I loans, which includes both SME and larger corporations. Another limitation is that we do not observe the vintage years of the non-performing loans.

business lending because they needed to accommodate more mortgage originations in response to the central bank stimulus.

We re-estimate equation (1) using mortgage loan growths collected from the Home Mortgage Disclosure Act (HMDA) data as the dependent variable. The DID estimate in Table 6 is similar to that for small business loans in Column 1 of Table 2, slightly larger in economic magnitude (-0.371, statistically significant at the 1% level). In sum, banks with better CSR ratings also reduced their mortgage lending more than those with lower ratings, which implies that these banks had a limited lending capacity in general.

[Table 6 here]

5. Channels

The above discussion takes us to the pertinent question: how can we explain the puzzling behavior of *high-CSR* banks? In this section, we explore several channels to understand the underlying mechanisms. Our analysis suggests that these banks spent more resources on conspicuous but immaterial issues before the crisis and chose to leave out unobservable but more material externalities. The CSR metric erroneously ascribes them to be more socially responsible because it primarily reflects realized, observable attributes.

5.1. Uninformative or immaterial Ratings?

One argument is that the KLD data used in this study is simply too noisy and uninformative because of the apparent challenges in measuring the social impacts.²⁵ However, in such a case, we should have found a null result with an insignificant β in equation (1).

²⁵ Note that other datasets, such as ASSET4, assessed only a small number of banks during this period.

Relatedly, the “overall” *CSR score* we examined may mostly reflect “immaterial” aspects. As Hart and Zingales (2017) and Edmans (2020) suggest, socially responsible firms should address only “material” issues closely related to the firms’ business. In fact, social welfare could decrease if firms internalized “immaterial” externalities into managerial decisions, which is the basis of Friedman’s criticism. In recent years, various organizations (e.g., GRI and SASB) have provided distinctive ESG frameworks and reporting standards based on unique definitions of materiality.²⁶ For instance, the GRI focuses on the economic, environmental, and social impacts of a company’s activities and selects topics with the most significant impacts as material. This framework is similar to the stakeholderism approach we adopt, which considers the impact of corporate activities on social welfare as in, e.g., Tirole (2001), Magill et al. (2015), and Hart and Zingales (2017).

If *high-CSR* banks performed *worse* in the “material” aspects but had significantly higher scores for the “immaterial” factors, and thus higher overall CSR scores, our previous result was driven by misleading measures to identify the treatment group. However, to explore this possibility, we would need to have distinct scores for the material (i.e., with significantly positive impacts on the social welfare) and immaterial topics (i.e., with non-significant or possibly negative impacts), which we do not.

As an alternative, we use the SASB Materiality Map that identifies respective material issues at the industry level. We match the material topics for commercial banks with the KLD dataset following the classification suggested by Khan et al. (2016). A major limitation here is that the SASB adopts the investor viewpoint and focuses on issues that would have a “financially material” impact, rather than adopting the social welfare perspective with a more comprehensive range of stakeholders similar to GRI guidelines.

[Table 7 here]

²⁶ For the differences among the major organizations, see, e.g., their joint statement announced in September 2020 (<https://integratedreporting.org/resource/statement-of-intent-to-work-together-towards-comprehensive-corporate-reporting/>).

Panel A of Table 7 presents the basic statistics for *high*- and *low*-CSR groups, comparing their respective material and immaterial CSR scores. As we see from the matching table reported in the Appendix Table A1, for banks, most of the topics (50 out of 60) assessed by KLD are categorized as immaterial. In addition, many banks simply had a score of 0 for the material topics. Thus, a larger cross-sectional variation was observed for the immaterial scores, suggesting that the *overall* scores reflect the immaterial aspects more. However, *high*-CSR banks have significantly higher scores for both material and immaterial topics.

We next re-estimate our main regression of equation (1) with differently defined treatment groups. We first identify the treatment group of *high*-CSR banks using only the material topics. As discussed above, many banks have a score of 0 for these topics, and only 16 banks have a net positive score out of the total 166 banks. Hence, the DID estimate might have a low-power problem and should be interpreted with caution. We similarly define the treatment group using only the immaterial topics. A total of 58 banks have a net positive score to be included in the *high*-CSR group, and this classification almost perfectly overlaps with that of the benchmark case in the previous section, with the exception of only one bank.²⁷

Panel B of Table 7 presents the DID estimates that exclusively use either the material or immaterial scores to identify the treatment banks. The estimates for the immaterial scores are very close to those in Table 2. This is an expected result because the treatment groups for the two cases are almost identical. Compared to this result, the estimates for the material scores are smaller in magnitude and less statistically significant, but still with negative signs.

In sum, this analysis suggests that our previous results based on the overall scores are essentially the same when using only immaterial topics to define the “socially responsible” banks. However, putting the obvious limitation of identifying the material issues aside, the benchmark *high*-CSR banks do not show lower scores for the material factors and thus cannot be termed socially irresponsible.

²⁷ For the subsample of large banks more than \$10 billion in assets, 10 (out of the total 46) banks are classified as *high*-CSR for the material topics and 20 banks for the immaterial topics.

5.2. Resource constraint, operating leverage, and lending capacities

Our results in Section 4 suggest that differential impacts of the financial crisis or post-crisis policy interventions do not seem to explain why *high-CSR* banks had limited lending capacities post-treatment. In this section, we claim that these banks spent rather “too much” in good times, leaving too little financial or operational slack to maintain the flow of credit when necessary.

Suppose that a firm would need to spend more resources to acquire good CSR ratings, which requires, for example, more information disclosure (Lopez-de-Silanes et al. 2020, Drempetic et al. 2020), better employee benefits, or expenditures on specific activities that the rating agencies conventionally evaluate.²⁸ Also, note that a tradeoff between immediate expenditures and future slack should exist for any bank with a resource constraint. In this case, the overall CSR scores should be *positively* associated with immediate expenditures and *negatively* correlated with precautionary “dry powder” for future usages, all else being equal. Therefore, the banks’ social responsibility metric measured in good times can be misleading because it might primarily reflect non-material yet conspicuous aspects.

We first examine operating expenses, defined as banks’ non-interest expenses net of the write-offs of intangible assets, for the two groups in Table 8. Panel A presents the basic statistics for the ratio of operating expenses to total assets. Before the crisis, *high-CSR* banks spent more expenses than *low-CSR* banks by 0.3 percentage points. However, *high-CSR* banks significantly reduced this spending after 2007 (by 0.2 percentage points, which is sizable given that the average ROA is 0.6% in our sample), which suggests that they were constrained post-treatment to squeeze operating expenses. On the contrary, *low-CSR* banks did not significantly decrease their spending, indicating that they were not constrained. We observe the same patterns when using the large bank only or small bank only subsample (see Appendix Table B3).

²⁸ Here, we are agnostic about whether the firms spend more with an objective of better rating acquisition or in optimizing other goals, which results in a better rating as a byproduct.

[Table 8 here]

This result suggests that *high-CSR* banks had higher operating leverage at the treatment and were forced to cut down both their operating expenses and lending. Note that this could have been a privately optimal decision ex-ante because certain CSR-related expenditures – even if not related to the material externalities – can still increase the shareholder value by, for example, enhancing customer or employee loyalties and reducing compliance risks (e.g., fewer sanctions for *high-CSR* banks as shown in Figure 2, while the trend reversed post-treatment). However, banks in such cases promoted their ex-ante shareholder benefits at the expense of ex-post slack, when the latter was more valuable from the social perspective.

More concretely, we next examine a possible tension between serving different stakeholders with limited resources, specifically focusing on the conflict between bank employees and local borrowers. Banking is one of the highest-paying industries, sometimes criticized for “overpaying” their employees in good times, not reflecting the downside risks. On the other hand, employee satisfaction is one of the critical elements of CSR/ESG evaluation, with the implicit (yet misleading) assumption that more employee benefits are always desirable from the social perspective. As shown in Panel B of Table 1, our *high-CSR* banks had significantly higher scores in the *Employee Relations* category than *low-CSR* banks, suggesting that their employees felt that they were treated better.

It can be conjectured that *high-CSR* banks prioritized providing benefits to their employees in good times, which might have been socially excessive, to result in smaller slack for downturns. Panel B of Table 8 compares the salaries and benefits between the two groups, normalized by total assets. As in Panel A, *high-CSR* banks spent significantly more on their employees prior to the crisis than *low-CSR* banks. However, they cut down these expenses significantly after 2007, while *low-CSR* banks did not. This indicates that *high-CSR* banks paid rather “excessive” compensation pre-treatment and were forced to economize post-treatment. Again, more generous spending helped them acquire better ratings ex-ante, but this limited

their ex-post lending capacity and exerted larger negative externalities afterward.

To assess this possibility further, we re-estimate our main specification of equation (1) by sorting banks using a single CSR category. As discussed in Section 2, our *high*- and *low*-CSR banks differ significantly in the following three categories: *Community*, *Employee Relations*, and *Diversity*. Therefore, we define *high*- and *low*-CSR banks respectively for each of the three categories, where those with a positive net score in the specific category are defined as *high*-CSR banks. We then estimate the respective DID coefficients for the three cases, as reported in Table 9.

[Table 9 here]

Columns 1, 2, and 3 of Table 9 present the DID estimates when sorting banks based on their scores for the categories of *Community*, *Employee Relations*, and *Diversity*, respectively.²⁹ We obtain the same result as before when sorting banks using their *Employee Relations* scores – *high*-CSR banks reduced their lending more after 2007 than *low*-CSR banks. However, the DID estimates are insignificant for the other two categories. Note that the *Community* category in the present study also assesses banks' immaterial activities, such as charitable giving or volunteer programs (see Appendix Table A1). Consequently, these scores do not necessarily reflect whether banks indeed internalize their material externalities in local communities.

In sum, since the social responsibility metric primarily reflects *realized* stakeholder benefits, banks that spend more on their employees may receive better assessments in good times. However, given the resource constraint, these banks might have set aside smaller buffers to tap into in bad times, exerting greater social costs ex-post. Here, in their pursuit of immediate benefits, these banks choose to leave out unrealized and unquantifiable yet more material externalities. Even so, the metric does not accurately reflect the opportunity costs of promoting certain aspects over others and erroneously attributes them as more socially responsible.³⁰

²⁹ For each case, 49, 14, and 53 banks (out of 166) are with positive scores and identified as *high*-CSR when using the full sample. When limiting to banks larger than \$10 billion in assets, 19, 12, and 21 banks (out of 46) are identified as such.

³⁰ Appendix Figure A1 indicates that the average CSR score of *high*-CSR banks decreased after 2007

6. Conclusion

Stakeholder theory argues that firms should consider their material externalities on relevant stakeholders in making managerial decisions instead of merely focusing on profit maximization. Many corporate managers nowadays claim to adopt this perspective, taking their firms' social impacts into account. States, investors, customers, and employees may be willing to reward those who do so, yet identifying such "responsible" firms is challenging in practice because of the lack of a reliable performance metric.

This study examined whether firms with better CSR ratings indeed internalized their material externality better by analyzing banks' small business lending during the credit crunch episode when borrowers in need of liquidity had limited access. Banks are unique in that we can clearly identify their primary social impact: provision of funds to the right place at the right time. However, we cannot readily assess this attribute in good times when borrowers are generally not constrained. Therefore, those identified as socially responsible may actually not be, while receiving the "subsidies" rewarded to responsible firms. In bad times, on the contrary, we can distinctly observe banks' behaviors to assess the social impact, which allows ex-post validation of the ex-ante assessment.

The credit crunch during the Great Recession provides an interesting setup for analyzing our research question. First, it was preceded by the credit boom when borrowers had easy access to credit and banks had little room to create incremental social values by reducing financial frictions. In addition, during this boom, banks were known to have spent rather excessively and not sufficiently incorporating downside risks. This would make the ex-ante assessment of the banks' social responsibility particularly challenging since some might spend resources on rather immaterial but conspicuous factors instead of accumulating slack for downturns;

while that of *low*-CSR banks increased. However, this evidence is only suggestive since the set of banks assessed by KLD each year is unbalanced.

however, that could attract the rating agencies' attention to provide better scores.

Second, unlike the recent disruption due to the Covid-19 pandemic, the states did not intervene very actively to address the externality and maintain the flow of credit to the constrained borrowers, neither before (e.g., through macroprudential tools) nor after the shock (e.g., through the direct support such as the Paycheck Protection Program). Government inaction and the banks' social irresponsibility consequently resulted in substantial social costs, leading to various post-crisis regulatory reforms to address them explicitly. For our purpose, however, we could expect a greater room for banks' voluntary actions (i.e., cross-sectional variations) to take their material externality into account for the sake of social benefits. This helps us examine the hypothesis empirically.

The estimation result is paradoxical in that those banks that had received higher CSR scores, in fact, stayed further away from local borrowers in times of necessity. Socially responsible banks should set aside sufficient slack in good times to maintain the flow of credit in downturns, but this attribute is not observable ex-ante. Since the CSR metric primarily assesses observable and quantifiable features, firms that spend more to promote such features, even if they may not be socially desirable considering the opportunity costs, would receive a better evaluation. However, the consequent operating leverage limited their lending capacity during the downturn to become socially irresponsible in a time of need. Our findings suggest that the availability of an appropriate metric for the social impact assessment is a critical necessary condition for stakeholderism and ESG consideration to improve social welfare. Without it, we may ironically support socially "irresponsible" firms when we intend to reward the responsible ones.

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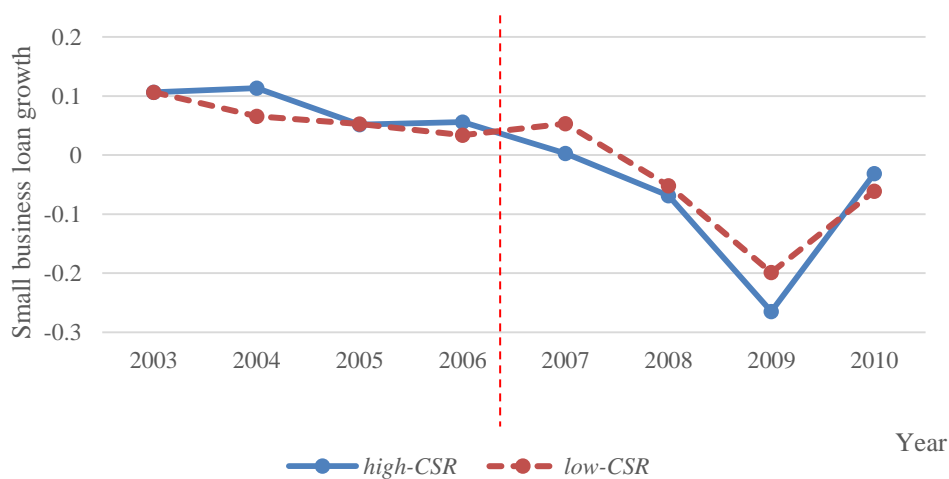
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Figure 1. Trends in banks' small business lending

This figure reports the time series of small business loan growth rates for the two bank groups (i.e., *high*- and *low*-CSR banks). In Panel A, we plot the cross-sectional averages across banks each year. In Panel B, we first subtract the average loan growth for the MSA in that year from the MSA-bank level yearly growth to absorb the MSA level variation. We then plot their averages for the two groups each year.

Panel A: average small business loan growth, bank level



Panel B: average small business loan growth, bank-MSA level net of the MSA level variation

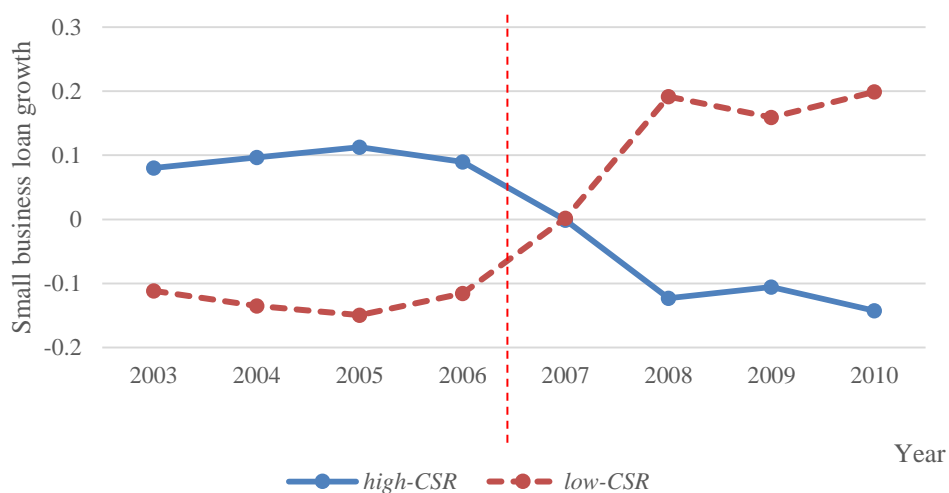


Figure 2. Trends in the number of regulatory sanctions received

This figure reports the time series of the average regulatory sanctions received by the two bank groups (i.e., *high-* and *low-*CSR banks). The raw data comes from the lists of enforcement actions reported by the Federal Reserve Board (FRB), the Federal Deposit Insurance Corporation (FDIC), and the Office of the Comptroller of the Currency (OCC). We include the following enforcement actions: *Cease and Desist* requiring a recipient to stop an illegal or alleged illegal activity; *Monetary Penalty* requiring a recipient to pay a fine; *Prompt Corrective Action* restricting or prohibiting certain activities for not adequately capitalized institutions; *Prohibition* forbidding an institution-affiliated party or an individual from participation in the conduct of the affairs of any insured depository institution; and *Written Agreement* summarizing the agreement between parties and is used when circumstances warrant a less severe form of formal supervisory action. The blue solid (red dashed) line presents the average number of sanctions received by a *high-*CSR (*low-*CSR) bank for each calendar year.

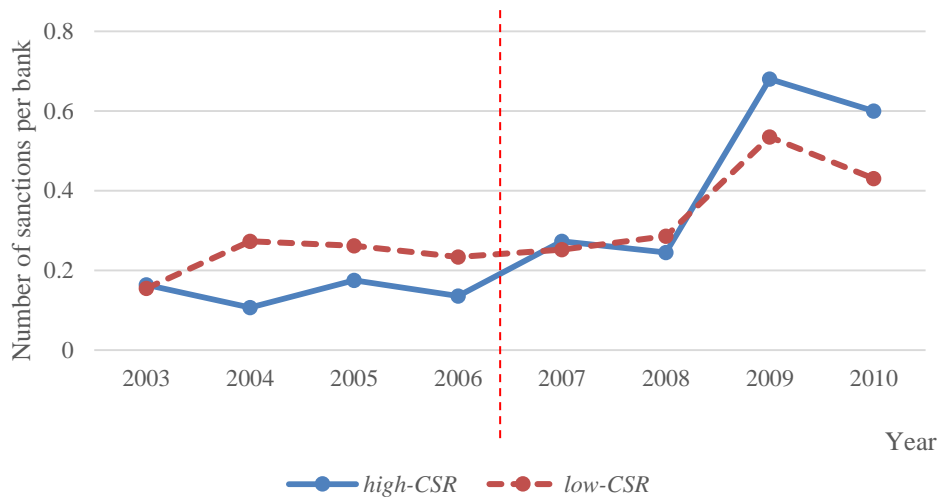


Figure 3. Yearly trends in the differential lending behaviors of *high-CSR* banks

This figure presents yearly trends in the differential lending behaviors of *high-CSR* banks compared to *low-CSR* banks. We first estimate the following equation:

$$LoanGrowth_{i,m,t} = \alpha_i + \alpha_{m,t} + \sum_{t \neq 2006} \beta_t * CSR_i * year_t + \gamma X_{i,t-1} + \varepsilon_{i,m,t}$$

where $year_t$ is a dummy variable for each calendar year excluding 2006. The bank controls and fixed effects are the same as those in Table 2. We then plot the estimates of β_t along with the 90% confidence intervals.

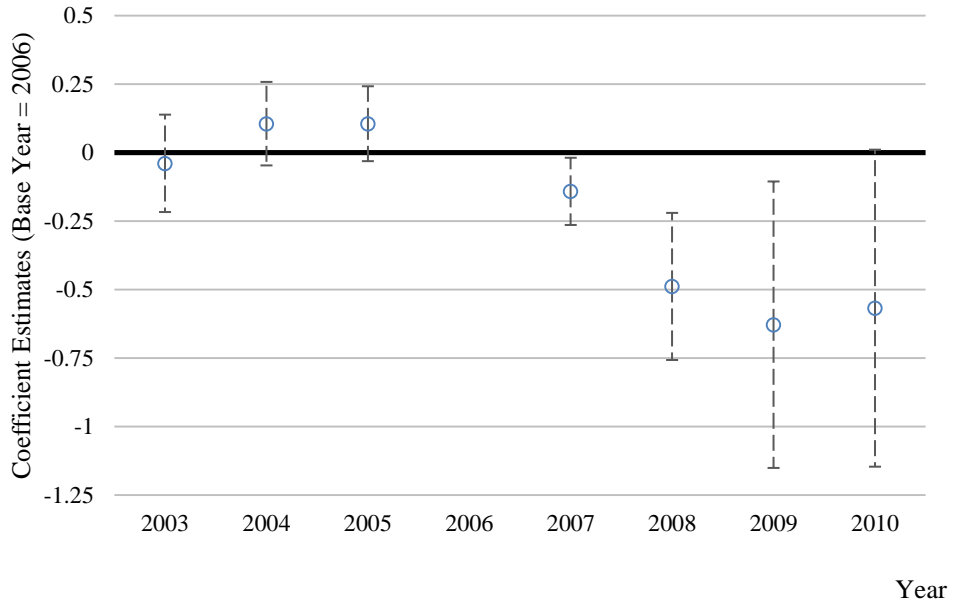


Table 1. Summary Statistics

This table reports the summary statistics for the variables used in the empirical analysis. Panel A compares the balance sheet characteristics of the two groups, *high-* and *low-CSR* banks. *Size* is defined by a bank's total assets in US dollars. *Liquid Assets* is defined by the ratio of liquid assets (the sum of cash, securities, and the federal funds sold and securities purchased) to total assets. *RE Loans* is defined by the ratio of real estate loans to total loans. *CI Loans* is defined by the ratio of C&I loans to total loans. *Non-performing Loans* is defined by the ratio of non-performing loans (payment delayed by more than 90 days) to total loans. *Capital* is defined by the ratio of a bank's tier 1 capital to total risk-weighted assets. *Loan-to-Deposits* is defined by the ratio of total loans to total deposits; *ROA* is defined by the ratio of net income to total assets. *LoanGrowth* is defined by the log difference of small business loan originations from the Community Reinvestment Act (CRA) disclosure data. Panel B presents the decomposition of *CSR score* for the two groups by respective CSR categories: *Environment*, *Community*, *Human Rights*, *Employee Relations*, *Diversity*, and *Products*. See Appendix Table A1 for more information about these categories. Strength (Concern) of each category is calculated by dividing the sum of strength (concern) scores for that category by the total number of strength (concern) topics assessed. Net of each category is calculated by subtracting the Concern score from the Strength score in that category. #indicator is the number of relevant topics assessed, which we present in Appendix Table A1. The table reports the means of Strength, Concern, and Net scores of the *high-* and *low-CSR* banks for each CSR category and their standard deviations. The last two columns report the mean difference between *high-* and *low-CSR* banks for each subject and corresponding t-statistics in parentheses. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Panel A: Summary statistics of the two groups, *high-* and *low-CSR* banks

Variables	<i>high-CSR</i>				<i>low-CSR</i>			
	Obs.	Mean	Median	Std.Dev.	Obs.	Mean	Median	Std.Dev.
Bank level								
<i>Size (billion)</i>	430	83.62	5.56	273.91	761	13.32	3.33	34.93
<i>Liquid Assets</i>	430	0.243	0.234	0.105	761	0.248	0.228	0.108
<i>RE Loans</i>	430	0.702	0.745	0.158	761	0.721	0.727	0.137
<i>CI Loans</i>	430	0.188	0.165	0.113	761	0.166	0.155	0.093
<i>Non-performing Loans</i>	430	0.021	0.010	0.026	761	0.018	0.008	0.026
<i>Capital</i>	430	0.114	0.111	0.027	761	0.114	0.111	0.027
<i>Loan-to-Deposit</i>	430	0.932	0.930	0.166	761	0.939	0.948	0.165
<i>ROA</i>	430	0.006	0.010	0.014	761	0.006	0.010	0.015
Bank-MSA level								
<i>LoanGrowth</i>	18,182	-0.005	0.033	0.851	13,003	0.002	-0.020	0.986

Table 1 Continued

Panel B: Decomposition of the *CSR scores* for the two groups by respective sub-categories

Category	Strength/ Concern	#indicator	<i>high-CSR</i>		<i>low-CSR</i>		<i>high-CSR vs low-CSR</i>	
			Mean	Std.Dev.	Mean	Std.Dev.	Mean difference	t-stat.
<i>Environment</i>	Strength	5	0.003	0.026	0.000	0.000	0.003	(1.000)
	Concern	7	0.000	0.000	0.000	0.000	0.000	(0.000)
	Net	12	0.003	0.026	0.000	0.000	0.003	(1.000)
<i>Community</i>	Strength	7	0.128***	0.142	0.017***	0.047	0.111***	(5.842)
	Concern	4	0.038***	0.091	0.065***	0.116	-0.027*	(-1.675)
	Net	11	0.094***	0.149	-0.042***	0.127	0.137***	(5.935)
<i>Human Rights</i>	Strength	3	0.006	0.043	0.000	0.000	0.006	(1.000)
	Concern	4	0.013*	0.055	0.000	0.000	0.013*	(1.761)
	Net	7	-0.007	0.071	0.000	0.000	-0.007	(-0.759)
<i>Employee Relations</i>	Strength	6	0.048***	0.107	0.006**	0.032	0.042***	(2.923)
	Concern	5	0.027***	0.069	0.052***	0.088	-0.025**	(-2.032)
	Net	11	0.021	0.125	-0.046***	0.094	0.067***	(3.602)
<i>Diversity</i>	Strength	8	0.172***	0.161	0.015***	0.044	0.156***	(7.308)
	Concern	3	0.034**	0.102	0.125***	0.162	-0.091***	(-4.424)
	Net	11	0.138***	0.153	-0.109***	0.177	0.247***	(9.395)
<i>Product</i>	Strength	4	0.004	0.033	0.002	0.024	0.002	(0.393)
	Concern	4	0.059***	0.163	0.021**	0.085	0.038*	(1.68)
	Net	8	-0.055***	0.154	-0.019**	0.074	-0.036*	(-1.701)
Aggregate	Strength	33	0.079***	0.073	0.009***	0.017	0.070***	(7.216)
	Concern	27	0.024***	0.043	0.036***	0.030	-0.011*	(-1.772)
	Net	60	0.053***	0.038	-0.028***	0.028	0.081***	(14.49)

Table 2. Main difference-in-differences estimation, CSR and small business lending

This table reports the difference-in-differences estimation results comparing small business lending of the two bank groups. The dependent variable *LoanGrowth* is the small business loan growth rate calculated at the MSA-bank-year level. *CSR* is a dummy variable for the *high-CSR* banks, which equals 1 if a bank's overall *CSR score* in 2006 is positive, and 0 otherwise. *post* is a dummy variable that equals 1 for 2007 to 2010, and 0 for 2003 to 2006. *10 billion* (*50 billion*) is a dummy variable that equals 1 if a bank's average asset size is below \$10 billion (\$50 billion), and 0 otherwise. *Non-interest income*₂₀₀₆ is a bank's non-interest income to total income ratio as of 2006. *Size*₂₀₀₆ is a natural logarithm of bank's total assets as of 2006. The bank-level controls include the natural logarithms of *Size*, *Liquid Assets*, *RE Loans*, *CI Loans*, *Non-performing Loans*, *Capital*, *Loan-to-Deposits*, and *1+ROA*. All regressions include bank fixed effects and MSA*year fixed effects. The table reports point estimates with t-statistics in parentheses. All standard errors are clustered at the bank level. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variables	<i>LoanGrowth</i>			
	(1)	(2)	(3)	(4)
<i>CSR * post</i>	-0.308*** (-3.819)	-0.320*** (-4.002)	-0.315*** (-3.210)	-0.308* (-1.961)
<i>10 billion * post</i>		-0.097 (-0.993)		
<i>50 billion * post</i>		0.112 (1.043)		
<i>Non-interest income</i> ₂₀₀₆ * <i>post</i>			-0.012 (-0.198)	
<i>Size</i> ₂₀₀₆ * <i>post</i>				0.001 (0.065)
Bank Level Controls	Yes	Yes	Yes	Yes
Observations	31,185	31,185	31,185	31,185
R-Squared	0.0358	0.0364	0.0358	0.0358
Bank Fixed Effects	Yes	Yes	Yes	Yes
MSA*Year Fixed Effects	Yes	Yes	Yes	Yes

Table 3. Statistics of “soundness” characteristics for the two groups, distinguishing pre- and post-treatment

This table reports the statistics of “soundness” characteristics, including *Liquid Assets*, *Non-performing Loans*, *Capital*, and *ROA* for the two bank groups (i.e., *high-* and *low-CSR*), distinguishing pre- and post-treatment. *Liquid Assets* is defined by the ratio of liquid assets to total assets. *Non-performing Loans* is defined by the ratio of non-performing loans to total loans. *Capital* is defined by the ratio of a bank's tier 1 capital to total risk-weighted assets. *ROA* is defined by the ratio of net income to total assets. For each of the four variables, the first and second rows present the respective means of the two groups and corresponding t-statistics (in parentheses), and the third row presents the mean differences between the two groups and corresponding t-statistics in parentheses. These statistics are based on pre-treatment (2003-06) only in the first column and post-treatment (2007-2010) only in the second column. The third column reports the differences between post- and pre-treatment means and corresponding t-statistics in parentheses, where the third row-third column entry presents the difference-in-differences for each soundness variable. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively

	<i>Liquid Assets</i>			<i>Non-performing Loans</i>			<i>Capital</i>			<i>ROA</i>		
	Pre-	Post-	Difference	Pre-	Post-	Difference	Pre-	Post-	Difference	Pre-	Post-	Difference
<i>low-CSR</i>	0.266*** (48.29)	0.227*** (42.47)	-0.039*** (-5.11)	0.006*** (27.19)	0.032*** (18.70)	0.026*** (15.92)	0.113*** (95.87)	0.115*** (73.44)	0.001 (0.60)	0.012*** (61.80)	-0.001 (-0.92)	-0.012*** (-13.07)
<i>high-CSR</i>	0.251*** (35.11)	0.235*** (32.63)	-0.016 (-1.59)	0.008*** (15.45)	0.035*** (16.33)	0.028*** (13.08)	0.112*** (79.88)	0.116*** (52.43)	0.004 (1.50)	0.012*** (48.28)	-0.002 (-1.22)	-0.013*** (-11.01)
Difference	-0.016* (-1.71)	0.008 (0.87)	0.023* (1.82)	0.002*** (3.16)	0.004 (1.29)	0.002 (0.78)	-0.001 (-0.77)	0.001 (0.47)	0.003 (0.84)	0.000 (1.22)	-0.001 (-0.39)	-0.001 (-0.64)

Table 4. Difference-in-differences estimation, controlling for differential impacts of “soundness” characteristics

This table reports the difference-in-differences estimation results comparing small business lending of the two bank groups. For each column, we explicitly control for differential responses among banks with different soundness by adding the interaction term of *post* and each of the four regression controls (i.e., *Liquid Assets*, *Non-performing Loans*, *Capital*, *ROA*) as of 2006, denoted as *Soundness*₂₀₀₆**post*. The dependent variable *LoanGrowth* is the small business loan growth rate calculated at the MSA-bank-year level. *CSR* is a dummy variable for the *high-CSR* banks, which equals 1 if a bank’s overall *CSR score* in 2006 is positive, and 0 otherwise. *post* is a dummy variable that equals 1 for 2007 to 2010, and 0 for 2003 to 2006. The bank-level controls include the natural logarithms of *Size*, *Liquid Assets*, *RE Loans*, *CI Loans*, *Non-performing Loans*, *Capital*, *Loan-to-Deposits*, and *1+ROA*. All regressions include bank fixed effects and MSA*year fixed effects. The table reports point estimates with t-statistics in parentheses. All standard errors are clustered at the bank level. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Soundness variable interacted	<i>LoanGrowth</i>			
	<i>Liquid Assets</i> (1)	<i>Non- performing Loans</i> (2)	<i>Capital</i> (3)	<i>ROA</i> (4)
Variables				
<i>CSR * post</i>	-0.343*** (-2.810)	-0.345*** (-3.065)	-0.328** (-2.384)	-0.402*** (-3.533)
<i>Soundness</i> ₂₀₀₆ * <i>post</i>	-0.034 (-0.434)	-0.012 (-0.463)	-0.015 (-0.216)	12.347 (1.443)
Bank Level Controls	Yes	Yes	Yes	Yes
Observations	31,185	31,185	31,185	31,185
R-Squared	0.0345	0.0347	0.0355	0.0375
Bank Fixed Effects	Yes	Yes	Yes	Yes
MSA*Year Fixed Effects	Yes	Yes	Yes	Yes

Table 5. Difference-in-differences estimation, excluding “banking crisis” years or thinly capitalized banks

This table reports the difference-in-differences estimation results comparing small business lending of the two bank groups. Column 1 re-estimates our main regression reported in the column 1 of Table 2 by excluding the years of 2007 and 2008. Column 2 excludes very weak banks with the average capital ratio belonging to the 10th percentile. The dependent variable *LoanGrowth* is the small business loan growth rate calculated at the MSA-bank-year level. *CSR* is a dummy variable for the *high-CSR* banks, which equals 1 if a bank’s overall *CSR score* in 2006 is positive, and 0 otherwise. *post* is a dummy variable that equals 1 for 2007 to 2010, and 0 for 2003 to 2006. The bank-level controls include the natural logarithms of *Size*, *Liquid Assets*, *RE Loans*, *CI Loans*, *Non-performing Loans*, *Capital*, *Loan-to-Deposits*, and $1+ROA$. All regressions include bank fixed effects and MSA*year fixed effects. The table reports point estimates with t-statistics in parentheses. All standard errors are clustered at the bank level. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variables	<i>LoanGrowth</i>	
	excluding 2007, 2008	excluding weak banks
	(1)	(2)
<i>CSR * post</i>	-0.434*** (-3.429)	-0.283*** (-2.612)
Bank Level Controls	Yes	Yes
Observations	22,888	22,458
R-Squared	0.0436	0.0355
Bank Fixed Effects	Yes	Yes
MSA*Year Fixed Effects	Yes	Yes

Table 6. Difference-in-differences estimation, CSR and mortgage lending

This table reports the difference-in-differences estimation results comparing mortgage lending of the two bank groups. The dependent variable *LoanGrowth(Mortgage)* is the mortgage loan growths collected from the Home Mortgage Disclosure Act (HMDA) data, calculated at the MSA-bank-year level. *CSR* is a dummy variable for the *high-CSR* banks, which equals 1 if a bank's overall *CSR score* in 2006 is positive, and 0 otherwise. *post* is a dummy variable that equals 1 for 2007 to 2010, and 0 for 2003 to 2006. The bank-level controls include the natural logarithms of *Size*, *Liquid Assets*, *RE Loans*, *CI Loans*, *Non-performing Loans*, *Capital*, *Loan-to-Deposits*, and $1+ROA$. All regressions include bank fixed effects and MSA*year fixed effects. The table reports point estimates with t-statistics in parentheses. All standard errors are clustered at the bank level. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variables	<i>LoanGrowth(Mortgage)</i>
<i>CSR * post</i>	-0.371*** (-2.887)
Bank Level Controls	Yes
Observations	31,185
R-Squared	0.0311
Bank Fixed Effects	Yes
MSA*Year Fixed Effects	Yes

Table 7. Results distinguishing material and immaterial topics

This table reports the empirical results distinguishing material and immaterial topics for commercial banks' CSR. We use SASB Materiality Map developed by the Sustainability Accounting Standards Board (SASB) and identify the material topics for commercial banks following the classification suggested by Khan et al. (2016). See Appendix Table A1 for the complete list of material and immaterial topics. Panel A presents the basic statistics for the *high-* and *low-CSR* banks comparing their respective material and immaterial CSR scores, where the two groups are sorted using all topics as in our main analysis. The first three rows report statistics only assessing the material topics, and the next three rows only use the immaterial topics. Strength (Concern) of each category is calculated by dividing the sum of strength (concern) scores in that category by the total number of strength (concern) indicators assessed. Net of each category is calculated by subtracting the Concern score from the Strength score in that category. #indicator is the number of relevant topics assessed, which we present in Appendix Table A1. The table reports the means of Strength, Concern, and Net scores of the *high-* and *low-CSR* banks for each CSR category and their standard deviations. The last two columns report the mean difference between *high-* and *low-CSR* banks for each subject and corresponding t-statistics in parentheses. Panel B presents the difference-in-differences estimation results when we sort the banks into *high-* or *low-CSR* groups using only material CSR topics or immaterial ones. For each case (material only or immaterial only), we redefine *high-CSR* banks as those with positive overall scores when examining only the material (column 1) or immaterial topics (column 2), and the rest as *low-CSR* banks. The regression specification is the same as that in the benchmark model of Table 2, column 1. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Table 7 Continued

Panel A: Statistics for the *high-* and *low-CSR* banks, comparing their respective material and immaterial CSR scores

Materiality	Strength/ Concern	#indicator	<i>high-CSR</i>		<i>low-CSR</i>		<i>high-CSR</i> vs <i>low-CSR</i>	
			Mean	Std.Dev.	Mean	Std.Dev.	Mean difference	t-stat.
Material	Strength	6	0.071***	0.143	0.002	0.016	0.069***	(-3.715)
	Concern	4	0.013	0.072	0.002	0.024	0.011	(1.134)
	Net	10	0.058***	0.142	-0.001	0.029	0.059***	(-3.139)
Immaterial	Strength	27	0.079***	0.060	0.010***	0.020	0.068***	(-8.495)
	Concern	23	0.026***	0.051	0.042***	0.036	-0.017***	(2.203)
	Net	50	0.053***	0.034	-0.032***	0.034	0.085***	(-15.335)

Table 7 Continued

Panel B: Difference-in-differences estimation, exclusively using either material topics or immaterial topics to identify *high-CSR* banks

Variables	<i>LoanGrowth</i>	
	Material only (1)	Immaterial only (2)
<i>CSR * post</i>	-0.185** (-2.098)	-0.302*** (-3.736)
Bank Level Controls	Yes	Yes
Observations	31,185	31,185
R-Squared	0.0297	0.0355
Bank Fixed Effects	Yes	Yes
MSA*Year Fixed Effects	Yes	Yes

Table 8. Statistics of operating expenses for the two groups, distinguishing pre- and post- treatment

This table reports the statistics of operating expenses for the two bank groups, distinguishing pre- and post-treatment. Panel A compares the ratio of operating expenses to total assets, where the operating expenses include salaries and employee benefits, expenses of premises and fixed assets, and other non-interest expense. Panel B compares the salaries and benefits between the two groups, normalized by total assets. The first and second rows present the respective means of the two groups and corresponding t-statistics (in parentheses), and the third row presents the mean differences between the two groups and corresponding t-statistics in parentheses. These statistics are based on pre-treatment (2003-06) only in the first column and post-treatment (2007-2010) only in the second column. The third column reports the differences between post- and pre-treatment means and corresponding t-statistics in parentheses, where the third row-third column entry presents the difference-in-differences for each soundness variable. ***, **, * represent significance at the 1%, 5%, 10% levels.

Panel A: Operating expenses to total assets

	Pre-	Post-	Difference
<i>low-CSR</i>	0.028*** (76.69)	0.027*** (73.36)	0.000 (-0.44)
<i>high-CSR</i>	0.030*** (40.77)	0.028*** (46.21)	-0.002** (-2.47)
Difference	0.003*** (3.48)	0.000 (0.58)	-0.002** (-2.16)

Panel B: Salaries and employee benefits to total assets

	Pre-	Post-	Difference
<i>low-CSR</i>	0.015*** (74.98)	0.015*** (73.15)	0.000 (-0.85)
<i>high-CSR</i>	0.016*** (42.18)	0.015*** (45.45)	-0.002*** (-3.40)
Difference	0.001*** (3.79)	0.000 (-0.02)	-0.001*** (-2.79)

Table 9. Difference-in-differences estimation, two groups sorted using a single category

This table reports the difference-in-differences estimation results where we sort the *high*- and *low*-CSR banks only using one of the following three categories: *Community*, *Employee Relations*, and *Diversity*. For each column, we define *high*-CSR banks as those with positive net scores for the *Community* topics (column 1), *Employee Relations* topics (column 2), or *Diversity* topics (column 3). The dependent variable *LoanGrowth* is the small business loan growth rate calculated at the MSA-bank-year level. *CSR* is a dummy variable for the *high*-CSR banks, which equals 1 if a bank's overall *CSR score* in 2006 is positive, and 0 otherwise. *post* is a dummy variable that equals 1 for 2007 to 2010, and 0 for 2003 to 2006. The bank-level controls include the natural logarithms of *Size*, *Liquid Assets*, *RE Loans*, *CI Loans*, *Non-performing Loans*, *Capital*, *Loan-to-Deposits*, and *1+ROA*. All regressions include bank fixed effects and MSA*year fixed effects. The table reports point estimates with t-statistics in parentheses. All standard errors are clustered at the bank level. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Category used Variables	<i>LoanGrowth</i>		
	<i>Community</i> (1)	<i>Employee Relations</i> (2)	<i>Diversity</i> (3)
<i>CSR * post</i>	-0.170 (-1.167)	-0.364*** (-3.812)	-0.173 (-1.146)
Bank Level Controls	Yes	Yes	Yes
Observations	31,185	31,185	31,185
R-Squared	0.0306	0.0373	0.0306
Bank Fixed Effects	Yes	Yes	Yes
MSA*Year Fixed Effects	Yes	Yes	Yes

Appendix

Appendix A: Additional Figures and Tables

Figure A1. Trends in banks' CSR scores

This figure reports the time series of the average *CSR scores* for the *high-* and *low-CSR* banks. We normalize each group's *CSR score* in 2006 as 0 and plot the deviations from the base year. The blue solid line presents the trend for the *high-CSR* banks, and the red dashed line presents that for the *low-CSR* banks. The shaded areas present the 95% confidence intervals for the yearly averages. Note that not all banks used in our main analysis (i.e., those with *CSR scores* in 2006) appear throughout 2003-2010. We report the number of banks assessed for each calendar year.

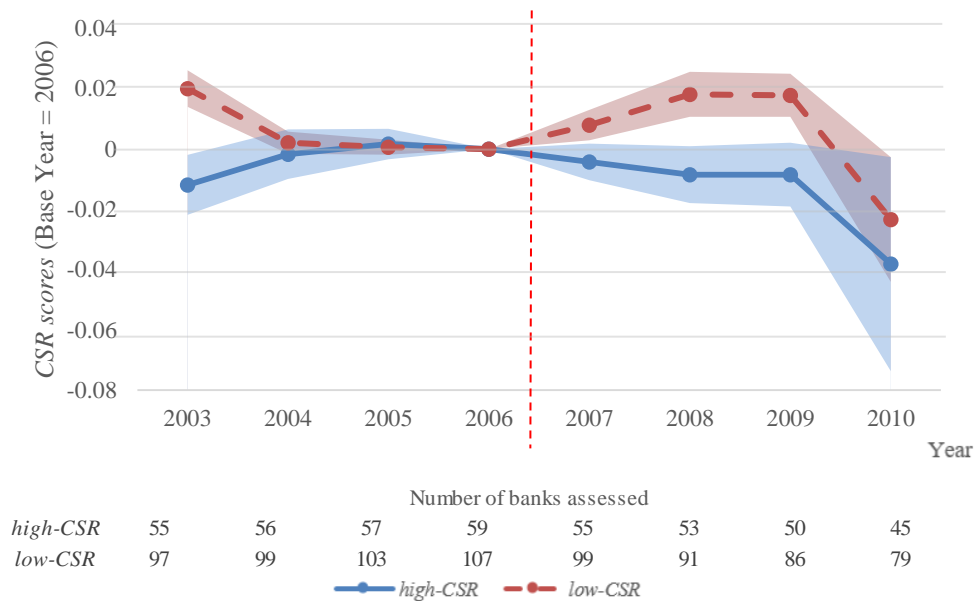


Table A1. CSR topics assessed by the KLD

This table reports the list of “Strength” and “Concern” topics by category assessed in the KLD Stats database. Each category includes selected topics comprising strengths (i.e., positive impact) and concerns (i.e., negative impact). We use SASB Materiality Map developed by the Sustainability Accounting Standards Board (SASB) and identify the material topics for commercial banks following the classification suggested by Khan et al. (2016). All non-material topics are defined as immaterial. Material topics are presented in bold font, and immaterial topics presented in normal font.

Category	<i>Strength</i> (material topics in bold)	<i>Concern</i> (material topics in bold)
<i>Environment</i>	Climate Change	Hazardous Waste
	Environmental Opportunities	Regulatory Compliance
	Waste Management	Ozone Depleting Chemicals
	Packaging Materials & Waste	Toxic Spills & Releases
	Other Strengths	Agriculture Chemicals
		Climate Change
<i>Community</i>		Other Concerns
	Support for Education	Community Impact
	Charitable Giving	Investment Controversies
	Innovative Giving	Tax Disputes
	Support for Housing	Other Concerns
	Non-US Charitable Giving	
	Volunteer Programs	
<i>Human Rights</i>	Other Strengths	
	Indigenous Peoples Relations Strength	Support for Controversial Regimes
	Labor Rights Strength	Labor Rights Concern
	Human Rights Policies & Initiatives	Indigenous Peoples Relations Concern
		Other Concerns

Table A1 Continued

Category	<i>Strength</i> (material topics in bold)	<i>Concern</i> (material topics in bold)
<i>Employee Relations</i>	Union Relations	Union Relations
	Cash Profit Sharing	Employee Health & Safety
	Employee Involvement	Workforce Reductions
	Retirement Benefits Strength	Retirement Benefits Concern
	Employee Health and Safety	Labor-Management Relations
	Emp. Relations Other Strength	
<i>Diversity</i>	Board of Directors - Gender	Workforce Diversity
	Women and Minority Contracting	Non-Representation
	CEO	Other Concerns
	Promotion	
	Work-Life Benefits	
	Employment of the Disabled	
	Gay and Lesbian Policies	
	Other Strengths	
<i>Product</i>	Quality	Product Quality & Safety
	Social Opportunities	Anticompetitive Practices
	R&D, Innovation	Marketing & Advertising
	Other Strengths	Other Concerns

Appendix B: Subsample Analyses

Table B1. Table 2 replication based on subsamples

This table re-estimates the regressions reported in Table 2 based only on the subset of large banks or small banks. Panel A reports the results for banks larger than \$10 billion in assets. Panel B reports the results for banks with assets below \$10 billion, where we estimate state-bank level regression replacing MSA*year fixed effects with state*year fixed effects.

Panel A: Banks larger than \$10 billion

<i>Control_interacted</i>	<i>LoanGrowth</i>			
		<i>50 billion</i>	<i>Non-interest income₂₀₀₆</i>	<i>Size₂₀₀₆</i>
Variables	(1)	(2)	(3)	(4)
<i>CSR * post</i>	-0.279*** (-3.421)	-0.289*** (-3.593)	-0.300** (-2.408)	-0.336 (-1.678)
<i>Control_interacted * post</i>		0.074 (0.650)	-0.038 (-0.330)	0.003 (0.246)
Bank Level Controls	Yes	Yes	Yes	Yes
Observations	24,511	24,511	24,511	24,511
R-Squared	0.0528	0.0531	0.0530	0.0528
Bank Fixed Effects	Yes	Yes	Yes	Yes
MSA*Year Fixed Effects	Yes	Yes	Yes	Yes

Table B1 Continued

Panel B: Banks below \$10 billion

<i>Control_interacted</i>	<i>LoanGrowth</i>		
		<i>Non-interest income₂₀₀₆</i>	<i>Size₂₀₀₆</i>
Variables	(1)	(2)	(3)
<i>CSR * post</i>	-0.168** (-2.162)	-0.179** (-2.240)	-0.168** (-2.072)
<i>Control_interacted * post</i>		0.169 (0.484)	0.000 (0.005)
Bank Level Controls	Yes	Yes	Yes
Observations	3,585	3,585	3,585
R-Squared	0.0150	0.0150	0.0150
Bank Fixed Effects	Yes	Yes	Yes
State*Year Fixed Effects	Yes	Yes	Yes

Table B2. Table 3 replication based on subsamples

This table re-estimates the statistics reported in Table 3 based only on the subset of large banks or small banks. Panel A reports the results for banks larger than \$10 billion in assets. Panel B reports the results for banks with assets below \$10 billion.

Panel A: Banks larger than \$10 billion

	<i>Liquid Assets</i>			<i>Non-performing Loans</i>			<i>Capital</i>			<i>ROA</i>		
	Pre-	Post-	Difference	Pre-	Post-	Difference	Pre-	Post-	Difference	Pre-	Post-	Difference
<i>low-CSR</i>	0.284*** (24.27)	0.229*** (21.92)	-0.055*** (-3.40)	0.008*** (14.16)	0.035*** (8.71)	0.027*** (7.51)	0.104*** (45.98)	0.107*** (46.26)	0.003 (0.92)	0.013*** (30.51)	0.000 (-0.11)	-0.013*** (-7.83)
<i>high-CSR</i>	0.268*** (19.11)	0.261*** (20.04)	-0.007 (0.31)	0.008*** (10.90)	0.043*** (9.42)	0.034*** (7.79)	0.101*** (48.69)	0.113*** (35.70)	0.012*** (3.18)	0.013*** (31.50)	0.001 (0.56)	-0.012*** (-7.24)
Difference ^e	-0.016 (-0.88)	0.032* (1.92)	0.048* (1.93)	0.000 (0.48)	0.008 (1.25)	0.007 (1.25)	-0.003 (-0.90)	0.006 (1.55)	0.009* (1.79)	0.000 (-0.81)	0.001 (0.45)	0.002 (0.67)

Panel B: Banks below \$10 billion

	<i>Liquid Assets</i>			<i>Non-performing Loans</i>			<i>Capital</i>			<i>ROA</i>		
	Pre-	Post-	Difference	Pre-	Post-	Difference	Pre-	Post-	Difference	Pre-	Post-	Difference
<i>low-CSR</i>	0.261*** (41.85)	0.227*** (37.11)	-0.034*** (-3.86)	0.006*** (23.75)	0.030*** (16.79)	0.025*** (14.13)	0.116*** (85.75)	0.117*** (63.30)	0.000 (0.21)	0.011*** (55.57)	-0.001 (-0.71)	-0.012*** (-10.60)
<i>high-CSR</i>	0.242*** (30.15)	0.220*** (26.44)	-0.022* (-1.89)	0.008*** (11.52)	0.032*** (13.02)	0.025*** (10.19)	0.117*** (69.55)	0.117*** (39.32)	0.000 (-0.15)	0.012*** (37.33)	-0.003 (-1.65)	-0.014*** (-8.69)
Difference ^e	-0.019* (-1.81)	-0.007 (-0.68)	0.012 (0.79)	0.002*** (3.13)	0.002 (0.51)	0.000 (-0.06)	0.001 (0.52)	0.000 (0.07)	-0.001 (-0.24)	0.001 (1.42)	-0.002 (-0.99)	-0.003 (-1.28)

Table B3. Table 8 replication based on subsamples

This table re-estimates the statistics reported in the Table 8 based only on the subset of large banks or small banks. Panel A reports the results for banks larger than \$10 billion in assets. Panel B reports the results for banks with assets below \$10 billion.

Panel A: Banks larger than \$10 billion

	Operating expenses to total assets			Salaries and employee benefits to total assets		
	Pre-	Post-	Difference	Pre-	Post-	Difference
<i>low-CSR</i>	0.027*** (28.36)	0.028*** (32.85)	0.001 (0.39)	0.014*** (27.53)	0.015*** (28.82)	0.000 (0.31)
<i>low-CSR</i>	0.033*** (19.76)	0.030*** (23.01)	-0.003 (-1.44)	0.017*** (20.95)	0.015*** (22.80)	-0.002* (-1.67)
Difference	0.005*** (2.96)	0.002 (1.21)	-0.004 (-1.47)	0.002** (2.44)	0.000 (0.34)	-0.002 (-1.57)

Panel B: Banks below \$10 billion

	Operating expenses to total assets			Salaries and employee benefits to total assets		
	Pre-	Post-	Difference	Pre-	Post-	Difference
<i>low-CSR</i>	0.028*** (74.55)	0.027*** (68.65)	0.000 (-0.91)	0.015*** (73.79)	0.015*** (69.40)	0.000 (-1.38)
<i>low-CSR</i>	0.029*** (42.23)	0.027*** (44.14)	-0.002** (-2.03)	0.016*** (38.56)	0.014*** (43.18)	-0.002*** (-3.05)
Difference	0.001 (1.35)	0.000 (-0.57)	-0.001 (-1.36)	0.001*** (2.71)	0.000 (-0.37)	-0.001** (-2.22)

Chapter 2.

Lending Behaviors of Prudent Banks around the 2008 Financial Crisis

1. Introduction

Before the 2008 financial crisis, the US banking sector sharply increased its bank loans and aggregate credit supply (Schularick and Taylor, 2012), especially via newly-originated loans to risky households with subprime credit ratings (Dell'Ariccia, et al., 2008; Demyanyk and Hemert, 2011). An increase in aggregate loans raises asset prices, so a sharp fall in asset prices can trigger a financial crisis (Bernanke et al., 1991; Herring and Wachter, 1999; Peek and Rosengren, 2000; Ivashina and Scharfstein, 2010). As non-performing loans accumulate (Saba et al., 2012; Lu and Whidbee, 2013), banks fail.

While risky banks sharply increase credit supply and drive system-wide instability, researchers have not fully studied the behaviors and performances of relatively safe banks before a crisis. Sound banks are well-capitalized, have advanced risk management, and have high performing loans. As sound banks have an incentive to preserve their charter values, they might avoid lending to risky borrowers (Keeley, 1990; Demsetz et al., 1996; Repullo, 2004). However, past studies show that sound banks provided more credit during a crisis (Ivashina and Scharfstein, 2010; Cornett et al., 2011; Gambacorta and Marques-Ibane, 2011; Kapan and Minoiu, 2018). Do sound banks also increase their credit supplies before the crisis, and thereby contribute to bubbles and financial crises?

Using small data sets¹, past studies show piecemeal evidence that well-capitalized banks or banks with stable funding structure take more risks.² However, we still need to determine whether these results are robust, for example, after accounting for real-estate market conditions.

In addition, past studies do not consider whether sound banks' unused lending capacity or greater risk taking caused their increased lending. If relatively sound

¹ Past studies use a small number of bank holding companies (BHC) (Demsetz and Strahan, 1997), European banks (Camara et al. 2013), or data based short time period covering the 2008 crisis (Ivashina and Scharfstein, 2010; Cornett, et al. 2011).

² Past studies showed that well-capitalized banks (Demsetz and Strahan, 1997; Camara et al., 2013) and banks with stable funding structure (Ivashina and Scharfstein, 2010; Cornett, et al., 2011) took more risks before the 2008 crisis.

banks are taking excessive risks, then they are lending to riskier borrowers. This issue also raises the question of whether relatively sound banks increased real-estate related loans faster than risky banks before the 2008 crisis. When a bank aggressively takes excessive risks to increase its lending to riskier borrowers, its increased loans would reduce bank performance and raise bank riskiness even *before* a financial bubble bursts. However, past studies have not fully answered these questions.

Hence, we show that relatively sound banks take more risks using large, detailed data between 2001 and 2014. By using all US commercial banks over a longer period around the 2008 crisis, our results are robust, controlling for other bank characteristics, and geographical macro-economic and real-estate market conditions. In addition, we show that an excess loan growth of prudent banks lowers bank performance over time in an asset bubble period before a crisis, implying that their excess loan growth is related to their risk taking rather than exploiting their unused lending capacities.

Based on the quarterly information of all commercial banks in the US from 2001 to 2014, our study examines the lending and risk-taking behaviors of relatively sound banks with high capital adequacy ratios (e.g., high BIS capital ratio), high-performing loan ratios, or high stability in funding (e.g., high core deposit ratio). We call them *prudent* banks. Specifically, we examine whether prudent banks aggressively increase their lending (especially to riskier borrowers) compared to other banks.

To test the robustness of our results, we control for real-estate conditions in geographical markets in which banks operate. We also analyze the effects of excessive loan growth on bank risks and profitability. Using aggregate borrower and loan information at the bank level, we further analyze whether bank lending behaviors differ across types of borrowers and loans (i.e., households vs. commercial borrowers; loan secured by real-estate vs. unsecured loans) and whether sound banks approve household mortgage loan applications at higher rates.

Our study shows that prudent banks have lower levels of risk (lower loan ratios). However, prudent banks show higher excess loan growth rates, even after controlling for bank characteristics and banks' geographical information, such as Metropolitan

Statistical Area-level (MSA) information. The higher loan growth rates of prudent banks are robust, even after controlling for their bank loan ratio (representing unused lending capacity of banks). After the 2008 crisis, prudent banks sharply decrease their loan growths, which conflicts with the claim that unutilized lending capacity drove increased bank loans.

Instead, the high growth in loans is driven by (a) lending to households rather than commercial or industrial borrowers and (b) secured real estate loans rather than unsecured loans. Banks with excessive lending also have showed rising bank riskiness (measured via non-performing loan [NPL] ratios and volatility in accounting rate of return) and falling profitability over time. In sum, these results suggest that prudent banks make more excessive loans than other banks, which yields poor performance before the 2008 crisis—thereby showing prudent banks' risk taking behaviors.

Compared to risky banks, prudent banks (with high capital ratios, high core deposit ratios, and high performing loans) show higher approval rates for household mortgage loan applications. As banks can securitize and sell their loans to other financial institutions (Krainer and Laderman, 2014; Jiang et al., 2014), balance sheet information may not reflect the actual loan making decisions of banks. By contrast, analyzing loan approval rates mitigates such problems and reflects banks' actual lending decisions.

We also construct a prudence index based on capital ratio, core deposit funding ratio and performing loan ratios. Analyses using prudence indices confirm the above results. Banks with higher prudence indices show higher growth of excessive loans, higher loan application approval rates, rising non-performing loan (NPL) ratios, higher volatility in profitability, and decreasing profitability over time.

Our results suggest that prudent banks show high risk-taking behaviors before a financial crisis. They increase their loan growth faster to riskier borrowers. These results conflict with the conventional belief that as prudent banks take fewer risks and choose their borrowers more prudently than other banks, their borrowers are less likely to face failures/insolvencies. Our results suggest that prudent banks also increase their exposure to risks during the asset-bubble period before a crisis.

Furthermore, this study indicates that prudent banks do not necessarily exhibit better information or better lending-decision technology. Our analyses suggest that prudent banks make lending decisions without a proper credit analysis of borrowers. Prudent banks seem to capitalize on rising real-estate prices in the pre-crisis period.

As our study is based on all commercial banks rather than a small number of banks, the results have more substantial implications for banking regulation. To ensure financial stability in the banking sector, current micro-prudential policy focuses on monitoring individual banks' risk taking; banks are labeled "risky" when they show weak financials (e.g., lower capital adequacy ratios, higher NPL ratios, and so on). Hence, regulators carefully monitor risky banks to prevent them from taking too much risk. In addition to conventional risky banks, this study shows that prudent banks with sound financials increased their risky lending before a financial crisis. Prudent banks appear to contribute to a rapid credit expansion before the 2008 crisis. Our finding suggests that regulators must also consider macro-prudential supervisions to ensure the stability of financial system.

The rest of the paper proceeds as follows. Section 2 reviews related literature. Section 3 presents our hypotheses. Section 4 describes the data and methodology used in our analysis, and Section 5 presents the empirical results and discusses them. Finally, Section 6 concludes.

2. Related Literature on Bank Lending Behavior and its Consequences

Increased lending, especially to riskier borrowers, rendered the banking sector vulnerable to a shock that triggered the 2008 financial crisis (Brunnermeier, 2009; Acharya and Naqvi, 2012). As past studies showed, large aggregate bank loans can portend an upcoming banking crisis (Acharya and Naqvi, 2012), and bank credit and new loans rose dramatically before the 2008 crisis (Chari et al., 2008; Ivashina and Scharfstein, 2010). Furthermore, banks made loans to riskier borrowers before the

crisis. Using mortgage loan-level data, Demyanyk and Hemert (2011) showed that not only the total number and amount of originated loans increased, but also the quality of loans deteriorated from 2001 to 2006. Banks with higher debt growth showed poorer performance through lower interest income and lower capital ratios (Foos et al., 2010), so they were vulnerable to failure and exit (Arena, 2008).

Piecemeal findings from past studies suggest that sound banks (well-capitalized, advanced risk management and/or profitable) also took excessive risks and increased their lending risk during an asset bubble period before a crisis. First, well-capitalized banks, such as merged banks and bank holding companies, tend to take more risks and lend more relative to their capital (Demsetz and Strahan, 1997; Camara et al., 2013). Exploiting their stable funding structure (Ivashina and Scharfstein, 2010; Cornett et al., 2011), banks that depend on core deposits more than other banks (c.f. banks with larger wholesale funding) provide more loans during a crisis. Indeed, banks with more capital took more risks before the 2008 crisis (Camara et al. 2013) but did not improve their performance during the 2008 crisis (Ratnovski and Huang, 2009). Also, banks that required an intervention during the crisis had higher capital ratios than other banks did.

Second, banks with advanced risk management can take more risks and supply more credit. For example, active risk management or better ability to manage credit risks can allow banks to hold less capital and invest more aggressively in risky and illiquid loans (Froot et al. 1993; Froot and Stein, 1998; Cebenoyan and Strahan, 2004).

Third, contrary to the *charter value* argument (Keeley, 1990; Demsetz et al., 1996; Repullo, 2004), profitable banks can lend more and take more risks, which damages their charter values. Profitable banks with high performing loans require smaller loss-provisions and have more resources for lending (Hasan and Wall, 2004; Messai and Jouini, 2013). These banks can accumulate their capital, thereby increasing their leverage (Martynova et al., 2015) or reducing the binding constraints of their capital requirements (Calem and Rob, 1999). Indeed, capitalizing on their larger lending capacities, these profitable banks with few non-performing loans are less risk averse and make more loans and riskier loans (Calem and Rob, 1999; Martynova et al.,

2015).

Excessive aggregate lending to new, higher-risk borrowers often yields poor bank performance and greater likelihood of bank failure. Cross-country analysis shows that high loan growth rates before the global crisis led to more loan loss provisions, lower relative interest income, and lower capital ratios (Foos et al., 2010), suggesting that banks extended their lending to new, higher-risk borrowers. This excessive lending-driven poor performance can increase bank failures (Arena, 2008).

Studies suggest that different types of banks change their lending practices in different ways during a financial crisis. After the onset of the 2008 financial crisis, banks both reduced their lending to corporate borrowers (Ivashina and Scharfstein, 2010; Chari et al., 2008) and raised their loan prices (Santos, 2011), causing corporations to lower their corporate investment in the US (Duchin et al., 2010). During the crisis, banks with higher exposure to liquidity risks showed lower loan growth rates, whereas banks with stable sources of financing (such as deposits rather than wholesale financing) continued to lend more relative to other banks (Cornett et al., 2011). Hence, the lending and risk taking behaviors of different banks changed in different ways during a crisis.

3. Hypothesis Development

Banks with high capital adequacy ratios, high stable-funding ratios (i.e., high reliance on core-deposit ratios rather than on wholesale funding), or low non-performing loans (NPLs) have large lending capacities and greater resilience to external unfavorable shocks. Regulators, depositors and investors often consider these prudent banks to be sound (Martinez-Peria and Schmukler, 2001; Berger and Udell, 1997), so depositors and investors demand lower interest rates for their deposits and investments, respectively (Martinez-Peria and Schmukler, 2001). While prudent banks are more likely to survive large external shocks, piecemeal evidence from past studies suggest that these banks took more risks.

First, we hypothesize that prudent banks with higher capital adequacy, lower risks of failure/insolvency and higher lending capacities can increase their lending at higher rates, thereby increasing their exposure to risks. A bank with a high capital ratio has more capacity than other banks to borrow more at lower cost from wholesale financiers (King, 2008). Similarly, banks with more core-deposit funding have more capacity than other banks to borrow more at a lower cost from depositors (Park and Peristiani, 1998; Martinez-Peria and Schmukler, 2001). When a bank has more capacity to borrow more at a lower cost, it can lend more to borrowers to increase its profits (Froot et al. 1993; Froot and Stein, 1998; Martynova et al., 2015; Camara et al., 2013). Specifically, we argue that a prudent bank can increase its lending faster than its increase in assets, suggesting that it makes excessive loans.

H1: Before a financial crisis, prudent banks show higher growth rates of excessive lending than other banks.

Second, we argue that banks with excessively high loan growth suffer from poor performance. When banks make more loans from their assets than before (high loan growth exceeding asset growth), their loans do not fully price in the risks, or they provide more loans to new, lower-quality borrowers than before. Allocating larger portions of assets to riskier borrowers implies that banks take more risks than before. Therefore, banks with excessive loan growth are bearing greater risk. As riskier borrowers are less likely than others to make their loan payments, banks with higher loan growth rates can have higher non-performing loan ratios and lower profitability over time.

H2: Before a financial crisis, excessive lending precedes lower bank performance.

Third, by combining H1 and H2, we argue that the performances of prudent banks decrease over time more than those of other banks. From H1, prudent banks take excessive risks and lend excessively. From H2, when banks lend more to borrowers with higher credit risks who are more likely to default, they underperform other banks. Therefore, we hypothesize that prudent banks experience higher NPL ratios and lower profitability.

H3: Before a financial crisis, the performance of prudent banks falls over time more than that of other banks.

Finally, we argue that the excessive lending of prudent banks is more closely related to their incentives to exploit their lending capacity rather than their superior credit evaluation ability. Facing fewer constraints in raising capital, a prudent bank has an incentive to exploit its unused lending capacity and expand its loans to borrowers. In a booming real-estate market before a crisis, a bank without careful credit evaluation might not appreciate the long-term effects of aggregate excessive lending and might view mortgage loans as safe (Bester, 1985; Niinimäki, 2009). Specifically, such a bank without strong credit evaluation skills might view lending to household borrowers with collateral in real estate markets (such as mortgage loan borrowers) as safer than lending to commercial and industrial borrowers. Therefore, such a prudent bank with more lending capacity than other banks might approve more household mortgage loan applications than other loan applications. This hypothesis implies that prudent banks neither have better information about the macro-economic conditions nor superior credit evaluation skills than other banks.

H4: Before a financial crisis, prudent banks approve households' mortgage loan applications more often than risky banks do.

4. Data and Methodology

4.1. Data sources

We use data from several sources. We construct bank-specific information using quarterly financial statements on US commercial banks from the first quarter of 2001 through the fourth quarter of 2014 from the Consolidated Reports of Condition and Income (Call Reports) of the Federal Financial Institutions Examination Council (FFIEC). Also, we collect branch-level deposits from the Summary of Deposits (SOD) database of the Federal Deposit Insurance Corporation (FDIC). For economic

activities and real estate market conditions, we use MSA (Metropolitan Statistical Area)-level information such as Total Real GDP (Total RGDP) from the Bureau of Economic Analysis (BEA) and Housing Price Index (HPI) from the Federal Housing Finance Agency (FHFA). The Herfindahl-Hirschman Index (HHI) measures market concentration in each MSA or state based on bank deposits from SOD. Economic conditions in each MSA (such as average income, real-estate prices, or banking sector competition) can affect the loan demand for its banks. As a bank can operate multiple branches in different MSAs, we use MSA-level information weighted by the relative deposit of each branch within a bank. So, HPI, Total RGDP, and HHI are value-weighted by the deposit in each branch across MSAs. When a bank has a branch with no MSA location information, we use the state-level information of that branch.

We exclude banks with zero total assets and branches with zero total deposits. We winsorize the deposit, bank-level, and MSA-level variables at the top and bottom 1% of the distribution of each variable. The final sample consists of 416,191 bank-quarter observations. For definitions and constructions of all the variables used in this study along with their sources, see Table 1.

[Table 1 here]

For summary statistics of variables used in this study, including their means for different time periods, see Table 2. Assets and loans steadily increased across all time periods. In our data, secured real-estate loans constitute the largest portion of Total loans. The mean of secured real-estate loan over total loans ratio is 0.76.

While the mean value of *BIS capital ratio* slightly changes over time, its large standard deviation compared to its mean suggests large variations across banks. Some banks were financially troubled around the crisis and received capital injection. These banks showed very low *BIS capital ratio*. *Core deposit ratio* is lowest during the crisis and highest after the crisis. *Core deposit ratio* also varies substantially across banks. *NPL ratio* increased sharply during the crisis and is three times higher after the crisis than before the crisis. *ROA* was highest before the crisis, lowest

during the crisis, and somewhat higher afterwards. *HPI* has the highest value during the crisis and its post-crisis value remains below its pre-crisis value.

[Table 2 here]

4.2. Methodology and Variables

We examine how bank attributes are related to bank lending. As a bank's loan ratio reflects its risk exposure, changes in its loan ratio can reflect changes in its risk exposure. Following past studies (Ivashina and Scharfstein, 2010; Foos et al., 2010; Cornett et al., 2011), we measure risk taking through loan growth rates. As aggressive banks can increase their lending faster than their assets (suggesting that banks make more loans beyond their increase in capital), we focus on loan growth rate in excess of the asset growth rate, which we call excessive loan growth rates, rather than their lending level. Our definition of excess loan growth is measured at the bank level. Specifically, we examine whether excessive lending growth rates are higher in prudent banks than in risky banks.

To reduce omitted variable bias, we control for bank-specific attributes, MSA-level business and MSA-level real-estate market conditions. As the economy might show structural differences across the pre-crisis, crisis, and post-crisis periods, we test the above hypotheses for each time period. The pre-crisis period is from the first quarter of 2001 to the second quarter of 2007.³ The crisis period is from the third quarter of 2007 to the second quarter of 2009, and the post-crisis period is from the third quarter of 2009 to the fourth quarter of 2014.

$$Y_{it} = \beta_0 + \beta_1 \cdot \mathbf{B}_{it-1} + \beta_2 \cdot \mathbf{B}_{it-1} \cdot \text{Crisis}_t + \beta_3 \cdot \mathbf{B}_{it-1} \cdot \text{Post}_t + \beta_4 \cdot \mathbf{X}_{it} + \omega_i + \mu_t + \varepsilon_{it} \quad (1)$$

³ In early 2000s, an effect of the collapse of the speculative dot-com bubble might be remained, distorting our results for the risky lending behavior of prudent firms in pre-crisis period. Therefore, we re-estimate our main regression in Table 3 and Table 5 with different sample periods whose pre-crisis period starts from 2002, 2003 or 2004. The results are robust regardless of the length of pre-crisis. These results are available from the authors.

The dependent variable, bank lending behavior, is measured in two ways: *Total loan ratio* and *Excess total loan growth*. *Total loan ratio_{it}* is the ratio of total loans (to households, firms and others) over total assets for bank *i* at time *t*, ($Total\ Loan_t / Total\ Assets_t$). *Excess loan growth_{it}* denotes a change in loan ratios over time, equivalent to the log value of loan growth in excess of the log value of asset growth, $\log(Loan_t / Assets_t) - \log(Loan_{t-1} / Assets_{t-1}) = \log(Loan_t / Loan_{t-1}) - \log(Assets_t / Assets_{t-1})$. While loan ratio reflects the existing level of a bank's risk exposure, excess loan growth rate represents the additional risk that a bank takes. Excess loan growth variables measure an abnormal growth of loans above the growth rate of assets. A positive value indicates that a bank's loans increase faster than its assets do, while a negative value indicates that its loans grow slower than its assets do.

We also examine bank lending behaviors to different types of loans and borrowers: households versus business borrowers, and secured loans versus unsecured loans. The largest component of loans in commercial banks is secured real estate loans (*Secured R.E. loans*) including residential home loans, and construction and land development loans. *Secured R.E. loan ratio_{it}* is the ratio of the all secured real estate loans over bank assets for bank *i* at time *t*. *Residential home loan ratio_{it}* is the ratio of the credit supply to households through residential home loans over bank assets for bank *i* at time *t*. As banks also make car loans, and credit card loans to households and individuals, in our analysis, household loans include residential home loans (89% of all household loans in our data), car loans, and credit card loans. *Household loan ratio_{it}* is the ratio of the credit supply to households and individuals over bank assets for bank *i* at time *t*. On the other hand, while banks lend loans to business taking real estate as collateral, they also lend to corporations and industrial borrowers without collateral. *C&I loan ratio_{it}* is the ratio of commercial and industrial loans over bank assets for bank *i* at time *t*.

Excess real estate loan growth_{it} is the log value of secured real estate loan in excess of the log value of asset growth, $\log(Secured\ R.E.\ loan_t / Secured\ R.E.\ loan_{t-1}) - \log(Assets_t / Assets_{t-1})$. Similarly, *Excess residential home loan growth_{it}* is the log value of residential home loan growth in excess of the

log value of asset growth, $\log (Residential\ home\ loan_t / Residential\ home\ loan_{t-1}) - \log (Assets_t / Assets_{t-1})$. *Excess C&I loan growth_{it}* is the log value of commercial and industrial loan growth in excess of the log value of asset growth, $\log (C\&I\ loan_t / C\&I\ loan_{t-1}) - \log (Assets_t / Assets_{t-1})$.

B_{it-1} denotes prudent bank attributes: *BIS capital ratio*, *Core deposit ratio*, and *NPL ratio*. To reduce endogeneity issues, we use their lagged values. We also control for other bank characteristics such as *Total assets*, and *ROA* for each bank (See variable definitions in Table 1). To examine whether the regression coefficients of these variables differ across time periods, we include their interaction terms with *Crisis* or *Post* dummies.

X_{it} denotes MSA-level variables such as *HPI*, *Total RGDP*, *HHI*. MSA-economic conditions can affect loan demand. MSAs with better economic conditions or higher housing prices may have higher loan demand. As borrowing demand varies across MSAs, bank loans to meet loan demand likely vary as well, yielding cross-sectional differences in loan growth across MSAs. To mitigate the impact of potential changes in loan demand, we control for MSA-economic conditions, such as average income and real-estate prices along with banking sector competition. For a bank that operates multiple branches in different MSAs, we use weighted MSA level information. ω_i is a bank-fixed effect to control unobserved bank specific characteristics and μ_t is a time-fixed effect to control nation-wide macro-economic conditions. ε_{it} is assumed to be a serially and cross-sectionally uncorrelated error term.

We also examine the loan approval rates of prudent banks. We compute the approval rates in two ways: (a) by dividing the total amount of approved loans by the total requested amount in loan applications, and (b) by dividing the number of approved loans by the number of loan applications. In addition to the above bank attributes, we also include the average income level of loan applicants.

$$\begin{aligned} Loan\ approval\ rates_{it} = & \beta_0 + \beta_1 \cdot B_{it-1} + \beta_2 \cdot B_{it-1} \cdot Crisis_t + \beta_3 \cdot B_{it-1} \cdot Post_t \\ & + \beta_4 \cdot X_{it} + \omega_i + \mu_t + \varepsilon_{it} \end{aligned} \quad (2)$$

We test whether prudent banks and excessive lending behavior are related to changes in bank performance, which reflects the financial health and outcome of risk taking. Bank performance depends on several factors including bank-specific information such as total loan growth rates, funding costs (Berger and DeYoung, 1997; Podpiera and Weill, 2008; Dietrich and Wanzenried, 2011; Foos et al., 2010), market-specific conditions such as market concentration (Keeley, 1990; Demsetz et al., 1996; Jiménez et al., 2007; Boyd and De Nicolo, 2005), and macroeconomic environments (Louzis et al., 2012).

We measure bank performance through the change in NPL ratio over time and the change in profitability over time, respectively. Similar to Louzis et al. (2012), the *Change in NPL ratio* is measured through the log differences of NPL ratios, denoting the growth rate of non-performing loans in excess of the growth of total loans. Following Knapp et al. (2006), bank performance is also measured through log differences in ROA.

$$\begin{aligned}
Bank\ Performance_{it} = & \beta_0 + \beta_1 \cdot \sum_{k=1}^4 Excess\ Loan\ Growth_{it-k} \\
& + \beta_2 \cdot \sum_{k=1}^4 Excess\ Loan\ Growth_{it-k} \cdot Crisis_t \\
& + \beta_3 \cdot \sum_{k=1}^4 Excess\ Loan\ Growth_{it-k} \cdot Post_t + \beta_4 \cdot B_{it-1} \\
& + \beta_5 \cdot B_{it-1} \cdot Crisis_t + \beta_6 \cdot B_{it-1} \cdot Post_t + \beta_7 \cdot X_{it} \\
& + \omega_i + \mu_t + \varepsilon_{it}
\end{aligned} \tag{3}$$

5. Empirical Results

5.1. Univariate Tests of Lending Behaviors

To compare the lending behaviors of prudent banks and risky banks, we graph them across time. First, we sorted banks into quintiles according to *BIS capital ratio*, *Core deposit ratio*, and *NPL ratio*. Then, we compare the mean of the highest quintile group with that of the lowest quintile group in each time period (i.e., pre-

crisis, during-crisis, and post-crisis).

In all three periods, banks with higher values of *BIS capital ratio*, and *Core deposit ratio*, and lower *NPL ratio* lend proportionately less than risky banks do in all periods (see Figures 1A, 1B, and 1C in Panel A). However, prudent banks with higher *BIS capital ratios*, higher *Core deposit ratios*, or higher *PL ratios* (*performing loan ratio* measured through *1-NPL ratio*) than other banks have higher excess total loan growth rates in the pre-crisis period but reduce their excess total loans more sharply than other banks in the post-crisis period (see Figures 2A, 2B, and 2C in Panel B).

In short, univariate test results show that in the pre-crisis period, banks with better capital adequacy, more core deposits, or higher PL ratios (i.e., lower NPL ratio) than other banks have lower lending levels but exhibit higher excess loan growth rates. These results suggest that relatively sound banks aggressively increase their lending and their exposure to risks more than risky banks do. In the post-crisis period however, these banks have reduced their excess loan growth rates more sharply compared to risky banks.

[Figure 1 here]

5.2. Multivariate Regression

Table 3 shows the effects of bank-specific characteristics on bank lending behaviors, notably through loan ratios and excess loan growth rates in Panel A and Panel B, respectively. The results for all types of loans, *Total loan ratios*, *Secured R.E. loan ratios*, *Residential home loan ratios*, *Non-residential R.E. loans*, *household loans*, and *C&I loans* are similar. In all columns, the coefficients of *BIS capital ratio* and *Core deposit ratio* are negative, suggesting that banks with higher capital adequacy ratios or more stable funding sources have lower lending levels compared to other banks. The coefficient of *NPL ratio* is negative, showing that banks with higher non-performing loan ratios lend less than other banks do. The coefficients of

ROA are positive and significant, suggesting that banks with higher profitability have higher lending ratios.

When analyzing C&I loans, we address a selection problem that large banks engage in lending to commercial borrowers while small banks often have few commercial borrowers. So, we apply Heckman's (1979) two-stage model using *Deposit Rank* (which ranges from 1 to 30) based on the quarterly ranking of banks' deposit sizes within their MSA as an instrumental variable. Banks with the highest deposit rank have more commercial and industrial loans than those with the lowest deposit rank. The results of the selection model are reported in column 7. The results for *C&I loan ratio* are almost the same as the results for other types of loans and loans to household borrowers, except for *Core deposit ratio* (see column 8). The positive coefficient of *Core deposit ratio* suggests that banks with higher relative stability than other banks lend more to commercial borrowers.

In Panel B, the results for Excess growth of loans are very similar regardless of the type of loan except for *Excess C&I loan growth*. The coefficients of *BIS capital ratio* and *Core deposit ratio* are positive, and the coefficient of *NPL ratio* is negative (all are statistically significant at the 1% level). In column 1, the coefficient of *BIS capital ratio* is 0.4096, indicating that when *BIS capital ratio* increases by one percentage point, a bank increases total loans by about 0.41% faster than total assets do from the last quarter. As explained earlier, due to troubled banks around the crisis, the standard deviation of the *BIS capital ratio* in our sample is large, reaching 0.0955. So, when *BIS capital ratio* increases by one standard deviation, *Excess total loan growth* increases by about 3.9%. The large impact of *BIS capital ratio* is partially due to its large standard deviation. The coefficient of *Core deposit ratio* is 0.0181, indicating that when *Core deposit ratio* increases by 1%, a bank increases total loans by about 0.02% faster than total assets do from last quarter. The standard deviation of *Core deposit ratio* is 0.1702, so when *Core deposit ratio* increases by one standard deviation, *Excess total loan growth* increases by about 0.3%. Likewise, the coefficient of *NPL ratio* is -0.3504, and its standard deviation is 0.0214, indicating that when *NPL ratio* decreases by one standard deviation, *Excess total loan growth* increases by about 0.8%. Banks with higher capital adequacy ratios, more stable

funding sources (higher core deposit ratio), and lower NPL ratios than other banks exhibit higher excess loan growth rates, showing that their lending grows faster than their assets. Sound bank characteristics are positively related to higher excess total loan growth rates, excess secured R.E. loan growth, excess residential home loan growth, and excess household loan growth rates, and individual loan growth rates, suggesting that prudent banks increased their lending more aggressively compared to other banks.

As some might argue higher loan growth are due to bank unused lending capacity (as shown in lower loan ratios) rather than bank risk taking, we further examine whether higher loan growth rates of prudent banks are robust even when accounting for their bank loan ratio (representing unused lending capacity of banks). The results are robust and reported in Table A3 of Appendix. In short, Table 3 shows that banks with risky characteristics have higher loan ratios, but banks with sound bank characteristics show higher excess loan growth rates, suggesting that they are more aggressive than risky banks in increasing their lending before the financial crisis. After the crisis however, sound banks reduce their excess lending growth rates more sharply than risky banks do.

[Table 3 here]

For the effects of bank lending on performance over time, we respectively report the *Change in NPL ratio* in column 1, the *Change in ROA* in column 2, and the *Volatility of ROA* in column 3 in Table 4. The *Volatility of ROA* is measured via the standard deviation of *ROA* from t-3 to t, representing the riskiness of bank profitability. Panel A shows direct effects of *Excess total loan growth* on these performance variables while Panel B shows interaction effects of *Excess total loan growth* and sound financial characteristics. In Panel A, the positive coefficients of *Excess total loan growth* from t-2 to t-3 for changes in NPL ratio suggest that aggressive lending is followed by a larger *NPL ratio* 2 quarters later or 3 quarters later. The negative coefficients of the *Excess total loan growth* from t-1 to t-2 for *Changes in ROA* imply that aggressive loan growth lowers bank profitability. The

positive coefficients of the *Excess total loan growth* from t-1 to t-4 for the *Volatility in ROA* imply that aggressive loan growth increases volatility in bank profitability.

In short, these results suggest that aggressive lending weakens a bank's short-term soundness and profitability, and eventually increases non-performing loan ratios and leads to higher volatility of profitability before the 2008 crisis. However, sound financial characteristics show positive future performance. As these variables generate opposite effects, we further examine the effects by including interaction terms between excess loan growth rates and sound financial characteristic variables in Panel B.

In Panel B, the sum of coefficients on the interaction terms of *Excess total loan growth* with *BIS capital ratio* is positive for the *Change in NPL ratio*. Similarly, positive coefficients on the interaction terms between *Excess total loan growth* and *Core deposit ratio* show that *Excess total loan growth* raises *NPL ratio* over time. Column 2 shows that negative interaction terms with *BIS capital ratio*, and those with *Core deposit ratio* lower *ROA* over time. In column 3, the positive coefficients of the interactions terms show positive effects for *Volatility of ROA* over time. These results show that excess total loan growth at prudent banks increase NPL ratios, increase volatility of ROAs, and decreasing profitability.

[Table 4 here]

5.3. Robustness Test Results

We test the robustness of our results with bank prudence indices (section 5.3.1) and banks' actual lending decisions rather than loans on balance sheets (section 5.3.2). As banks can securitize and sell their loans to other financial institutions (Krainer and Laderman, 2014; Jiang et al., 2014), balance sheet information may not reflect banks' actual loan decisions. To avoid such problems, we also examine banks' approval rates for home mortgage loan applications. Furthermore, we control for loan demands to address endogeneity issues of bank loans (section 5.3.3). We also

investigate whether our results hold across banks of different sizes (section 5.3.4).

5.3.1. Banks with Higher Prudence Index

Our main results are robust when we use a *Prudence index* based on bank characteristics. To characterize the soundness of a bank, we construct an quarterly prudence index via Exploratory Factor Analysis (EFA) (Cattell, 1958) based on three of the financial variables examined in the CAMELS rating (Hays et al., 2009; Rose and Hudgins 2012; Cole and White, 2012): capital adequacy, funding stability, and performing loans. See details in the Appendix. Prudence levels are generally stable over time.

Banks with higher prudence levels show lower loan ratios (see Panel A, Table 5) but higher *Excess total loan growth rates*, *Excess secured R.E. loan growth*, *Excess non-residential R.E. loan growth*, *Excess residential home loan growth*, *Excess household loan growth*, and *Excess individual loan growth*, (see Panel B, Table 5), suggesting that prudent banks increased their lending more aggressively compared to other banks. However, the effect of prudence level is not significant in *C&I loan ratio* or *Excess C&I loan growth*.

[Table 5 here]

Banks with a higher prudence level had higher NPL ratios and lower ROA over time (see Table 6). These results suggest that the performance of prudent banks deteriorates more than that of other banks over time. Furthermore, the excess loan growth rates from t-4 to t-1 in the pre-crisis period aggravate the increase in NPL ratios.

[Table 6 here]

We also construct a quarterly prudence index based on additional bank characteristics (bank size and/or profitability in addition to aforementioned capital

adequacy, funding stability, and performing loans), which yields similar results. Due to the space limitations, we report the results using an index based on capital adequacy, funding stability, and performing loans. Results using other factors are available upon request.

5.3.2. Banks' Approval Rates for Home Mortgage Loan Applications

We analyze the relations between prudent bank characteristics and household mortgage loan applications. We construct annual approval rates for household loan applications for each bank using Loan Application Register (LAR) data under the Home Mortgage Disclosure Act (HMDA) during 2001-2013⁴. We first aggregate LAR data for each bank for each year. By summing up information for each bank, we calculate the total amount of loans requested, total approved loan amount, total applications, and total approved applications. Then, we construct the approval rate for each bank (a) by dividing the total amount of approved loans by the total requested amount in loan applications, and (b) by dividing the number of approved loans by the number of loan applications. In addition to the above bank attributes, we also include the average income, gender, and race of loan applicants.⁵ We then merge aggregated LAR data with our bank data. LAR data is reported annually but bank data is reported quarterly, so we only use fourth quarter observations of each bank every year. The final sample for approval rates of household loan applications comprise about 45,000 bank-year observations.

Table 7 shows that banks with greater *BIS capital ratio*, *Core deposit ratio*, or lower *NPL ratio* have higher approval rates (columns 1 and 2). In addition, banks with higher prudence indices show higher approval rates (columns 3 and 4). These

⁴ LAR serves loan level information and the number of observation is about 25 million per year. The data includes loans of not only commercial banks but other financial institutions like investment banks, insurance companies, brokerage firms etc. Non-commercial institution data is excluded.

⁵ For each application, the variable *Gender* is 1 for a male applicant, and zero for a female. The variable *Race* is 1 when an applicant is white, and zero otherwise. As our data are aggregated at a bank level, *Gender* represents the percentage of male applicants and *Race* represents the percentage of white applicants.

results remain robust after controlling for *Applicants' income*, *Gender*, and *Race* at the bank level. These findings suggest that prudent banks approve more loan applications and increase their lending rapidly.

[Table 7 here]

5.3.3. Bank Loan Demands

As discussed earlier, macro-economic conditions and MSA-economic conditions can affect loan demand. When borrowing demand varies across MSAs, bank loans to meet loan demand likely vary as well, yielding cross-sectional differences in loan growth across MSAs. To mitigate the impact of potential changes in loan demand, we test banks operating in a local market including MSA*time dummies to control any local factors that could vary over time such as demand sensitivity (Khwaja and Mian, 2008). Our results are robust despite the potential endogeneity problems of banks' loan supply meeting loan demand.

[Table 8 here]

5.3.4. Variation across Bank Sizes

We examine whether the effects of bank characteristics on bank lending are robust across banks of different sizes. We divide the sample into three types of banks: large, medium, small. Each *large* bank has more than \$1 billion in assets. We further divide the remaining banks with assets less than \$1 billion into two equal-sized groups: *medium* (whose assets exceed the quarterly-median values) and *small* (whose assets are equal to or less than the quarterly-median values). The average of these quarterly-median values is \$117 million.

Table 9 reports the links between bank characteristics and bank lending, and Table 10 reports the relations between excessive loan growth and bank performance

across banks of different sizes. Across bank size, banks with higher *BIS capital ratio* or *Core deposit ratio* have lower loan ratios, and those with higher *NPL ratio* have lower loan ratios. Among banks with less than \$1 billion, *BIS capital ratio* and *Core deposit ratio* are positively related to *Excess total loan growth* while *NPL ratio* is negatively related to it. However, large banks with assets greater than \$1 billion do not show such relations (see Table 9, columns 5-8). These results suggest that small or medium-sized prudent banks increased their lending more aggressively than large prudent banks. Furthermore, excessive loan growth lowers ROA over time for banks of all sizes and increases NPL ratio over time with some time lags, suggesting that they lend to less profitable, riskier borrowers (see Table 10).

[Table 9 here]

[Table 10 here]

We also run the regressions with a bank *Prudence index*. Banks with greater prudence levels had lower loan ratios across banks of different sizes. Banks with greater prudence levels show higher lending growth rates (see Table 11). Among banks with more than \$1 billion however, the prudence level was not related to lending growth rates (column 8). These results suggest that small or medium-sized prudent banks increased their lending more aggressively. In addition, banks with higher prudence values have higher NPL ratios and lower ROA across all banks sizes, suggesting that they lend to less profitable, riskier borrowers.

[Table 11 here]

[Table 12 here]

In addition, the results are robust even when we control for exit and entry issues by using balanced panel data. Our main results are robust when loan growth rates are used instead of excess loan growth rates. These results are available upon request.

5.4. Summary and Discussion

We examine bank lending behaviors around the 2008 financial crisis using information on all commercial banks in the US from 2001 to 2014. While prudent banks have lower loan ratios than risky banks, prudent banks increase their lending more aggressively than risky banks do before the financial crisis. Prudent banks also show higher approval rates for home mortgage loan applications. Aggressive lending and high growth of loans yield lower bank performance. Increased lending is eventually followed by more non-performing loans, higher volatility of profitability and lower profitability, but not immediately. While the risk exposure level of risky banks exceeds that of prudent banks, these results suggest that prudent banks also rapidly increase their risk exposure during the asset-bubble period before a crisis. In particular, small or medium sized prudent banks engage in more aggressive lending than risky banks and increase their lending faster than their assets.

To be clear, our analysis is not based on borrower-level information, so we have not established direct evidence that prudent banks aggressively increase their lending to riskier borrowers. Future studies can extend our study using borrower information or more detailed loan application information.

Findings of this study contradict the conventional belief that sound banks take fewer risks and are less likely to face failure/insolvency. Prudent banks increase their risk exposure by lending to new, riskier borrowers, while exploiting lower financing constraints and higher capacities for more lending. Hence, the lending behaviors of prudent banks warrant macro-prudential regulations for financial stability.

6. Conclusion

Using information on commercial banks from 2001 to 2014, we examine banks' lending around the 2008 financial crisis using a bank prudence index and

several bank-specific characteristics, controlling for macro-economic conditions and MSA factors that affect loan demands. While risky banks show higher lending ratios than prudent banks before the 2008 financial crisis, prudent banks showed a higher lending growth rate, and their performance worsens over time. In the pre-crisis period, banks with high BIS capital ratios, high core deposit ratios, or low NPL ratios increased their lending, mostly to secured real estate loan borrowers or households rather than to commercial borrowers. Prudent banks increased their lending aggressively and had higher NPL ratio, higher volatility, and lower profitability in subsequent years. Our study suggests that prudent banks made excessive loans to riskier borrowers before the crisis.

These results suggest that the importance of macro-prudential regulations during an asset bubble period. In addition, these results suggest that future studies examine whether prudent banks show similar excessive lending or excessive risk taking behaviors in other countries and other time periods before a looming financial crisis.

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Figure 1. Total loan ratios and Excess loan growth in bank groups over Pre, During and Post-Crisis periods

Figures show the group means of total loan ratios (in Panel A) and total loan growth rates (in Panel B) in each bank group across sub-time periods. In each quarter, all banks are sorted into quintiles based on bank characteristics such as BIS capital ratio, Core deposit ratio, Performing Loan ratio. The low group consists of banks that belong to the lowest quintile group and the high group consists of banks that belong to the highest quintile group. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q.

Panel A: Total loan ratio

Figure A. BIS capital ratio Group

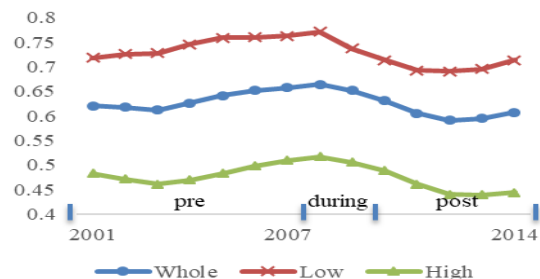


Figure B. Core deposit ratio Group

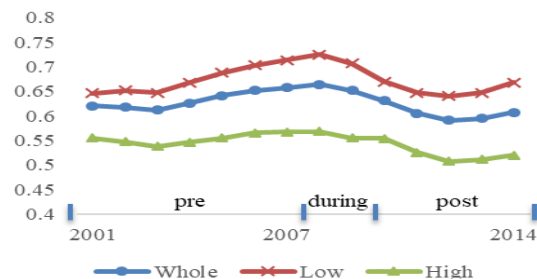
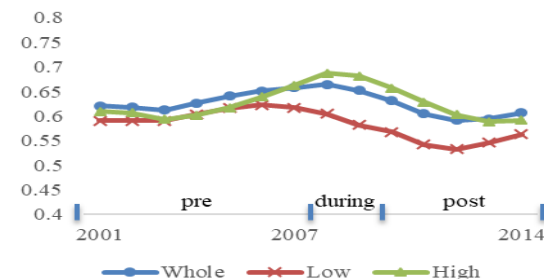


Figure C. NPL ratio Group



Panel B: Excess total loan growth rate

Figure A. BIS capital ratio Group

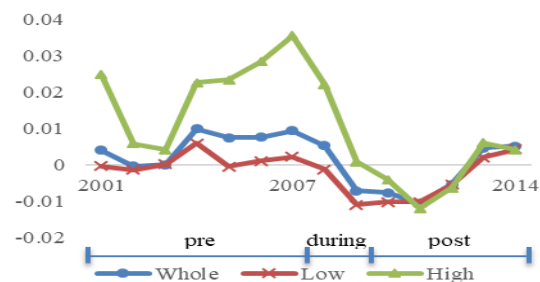


Figure B. Core deposit ratio Group

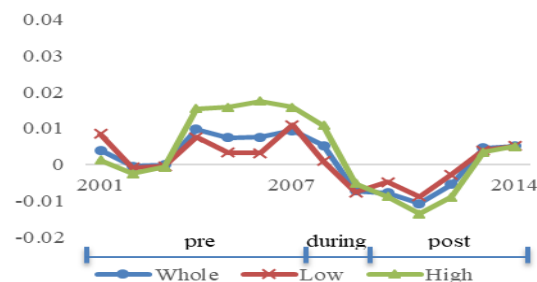


Figure C. NPL ratio Group

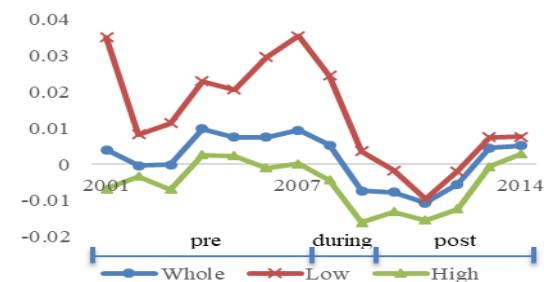


Table 1. Definitions of the variables and data sources

Variable	Definition	Source
<i>BIS capital ratio</i>	Equity capital to its total risk-weighted assets.	FFIEC
<i>Core deposit ratio</i>	Core deposit to sum of core deposit & wholesale funding.	FFIEC
<i>NPL ratio</i>	Total non-performing loans to TA.	FFIEC
<i>Total assets (TA)</i>	Amounts of the assets of the bank in \$1000.	FFIEC
<i>ROA</i>	Return on assets.	FFIEC
<i>Total loan ratio</i>	Ratio of total loans to total assets (total loan/TA).	FFIEC
<i>Secured R.E. loan ratio</i>	Ratio of secured real-estate loans to TA.	FFIEC
<i>Residential home loan ratio</i>	Ratio of residential property loans to TA.	FFIEC
<i>Non-residential R.E. loan ratio</i>	Ratio of secured real-estate loans minus residential property loans to TA	FFIEC
<i>Household loan ratio</i>	Ratio of sum of residential property loans, car loans and credit card loans to TA.	FFIEC
<i>Individual loans</i>	Ratio of household loans minus residential property loans to TA.	FFIEC
<i>C&I loan ratio</i>	Ratio of a bank's commercial and industrial loans to TA.	FFIEC
<i>Excess total loan growth</i>	$\text{Log}(\text{Total Loans}_t / \text{Total Loans}_{t-1}) - \text{log}(\text{TA}_t / \text{TA}_{t-1})$.	FFIEC
<i>Excess secured R.E. loan growth</i>	$\text{Log}(\text{Secured R.E. loans}_t / \text{Secured R.E. loans}_{t-1}) - \text{Log}(\text{TA}_t / \text{TA}_{t-1})$.	FFIEC
<i>Excess residential home loan growth</i>	$\text{Log}(\text{Residential home loans}_t / \text{Residential home loans}_{t-1}) - \text{log}(\text{TA}_t / \text{TA}_{t-1})$.	FFIEC
<i>Excess non-residential R.E. loan growth</i>	$\text{Log}(\text{Non residential R.E. loans}_t / \text{Non residential R.E. loans}_{t-1}) - \text{log}(\text{TA}_t / \text{TA}_{t-1})$.	FFIEC
<i>Excess household loan growth</i>	$\text{Log}(\text{Household loans}_t / \text{Household loans}_{t-1}) - \text{log}(\text{TA}_t / \text{TA}_{t-1})$.	FFIEC
<i>Excess Individual loan growth</i>	$\text{Log}(\text{Individual loans}_t / \text{Individual loans}_{t-1}) - \text{log}(\text{TA}_t / \text{TA}_{t-1})$.	FFIEC
<i>Excess C&I loan Growth</i>	$\text{Log}(\text{C\&I loans}_t / \text{C\&I loans}_{t-1}) - \text{log}(\text{TA}_t / \text{TA}_{t-1})$.	FFIEC
<i>Change in NPL ratio</i>	$\text{Log}(\text{NPL ratio}_t) - \text{log}(\text{NPL ratio}_{t-1})$.	FFIEC
<i>Change in ROA</i>	$\text{Log}(\text{ROA}_t) - \text{log}(\text{ROA}_{t-1})$.	FFIEC
<i>Application Approval rates</i>	Sum of approved loans divided by total applied loans. ¹	HMDA
<i>Applicants' income</i>	Average of the applicants' incomes in a bank.	HMDA
<i>Gender</i>	Percentage of male applicants.	HMDA
<i>Race</i>	Percentage of white applicants	HMDA
<i>HPI</i>	Average of the housing price index of the MSAs or states.	FHFA
<i>Total RGDP</i>	Average of the total real GDP of the MSAs or states.	BEA
<i>HHI</i>	Herfindahl-Hirschman Index measuring banking sector market concentration in each MSA or state.	FDIC SOD

Note: Consolidated Reports of Condition and Income (Call Reports); Federal Financial Institutions Examination Council (FFIEC); Summary of Deposits (SOD); Bureau of Economic Analysis (BEA); Federal Housing Finance Agency (FHFA); The Home Mortgage Disclosure Act (HMDA)

⁶ Loan/Application Register (LAR) of HMDA Approved loans include loans originated, approved but not accepted and purchased by the bank. Total applied loans include approved loan applications, applications denied, applications withdrawn and files closed for incompleteness.

Table 2. Summary statistics

This table provides the descriptive statistics for the variables used in the analysis. The definition and construction of each variable is explained in Table 1. Variables are winsorized at the 1st and 99th percentiles. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q.

	Whole period				Pre-Crisis	During-Crisis	Post-Crisis
	MEAN	STD	MIN	MAX	MEAN	MEAN	MEAN
<i>Total loans (\$1000)</i>	295,441	935,589	1,251	13,268,055	242,184	317,923	363,498
<i>Secured R.E. loans (\$1000)</i>	188,342	520,996	0	6,502,157	150,927	211,649	233,048
<i>Residential home loans (\$1000)</i>	77,510	217,701	0	2,801,474	65,586	76,054	94,722
<i>Non-Residential home loans (\$1000)</i>	107,689	298,008	0	3,257,286	82,712	131,857	133,973
<i>Household loans (\$1000)</i>	93,438	251,280	0	3,163,876	82,637	90,697	109,618
<i>Individual loans (\$1000)</i>	18,625	73,998	0	828,068	20,447	16,730	16,762
<i>C&I loans (\$1000)</i>	38,528	177,643	0	2,681,911	29,978	41,518	49,711
<i>Total loan ratio</i>	0.6275	0.1626	0.0435	0.9353	0.6296	0.6615	0.6105
<i>Secured R.E. loan ratio</i>	0.4316	0.1795	0.0000	0.8395	0.4161	0.4673	0.4395
<i>Residential home loan ratio</i>	0.1879	0.1256	0.0000	0.6538	0.1877	0.1867	0.1885
<i>Non-Residential R.E. loan ratio</i>	0.2415	0.1403	0.0000	0.7008	0.2259	0.2785	0.2487
<i>Household loan ratio</i>	0.2357	0.1363	0.0000	0.7044	0.2466	0.2302	0.2227
<i>Individual loan ratio</i>	0.0467	0.0471	0.0000	0.3510	0.0577	0.0418	0.0326
<i>C&I loan ratio</i>	0.0222	0.0510	0.0000	0.3023	0.0184	0.0245	0.0266
<i>Excess total loan growth</i>	0.0015	0.0623	-0.3229	0.6258	0.0048	0.0029	-0.0036
<i>Excess secured R.E. loan growth</i>	0.0043	0.0681	-0.3240	0.4840	0.0090	0.0063	-0.0032
<i>Excess residential home loan growth</i>	0.0001	0.0934	-0.4081	0.6793	-0.0012	0.0124	-0.0032
<i>Excess non- residential R.E. loan growth</i>	0.0078	0.0959	-0.4116	0.6105	0.0170	0.0044	-0.0036
<i>Excess household loan growth</i>	0.0029	0.0715	-0.4995	1.1412	0.0068	0.0065	-0.0038
<i>Excess individual loan growth</i>	-0.0224	0.1339	-0.6842	0.8765	-0.0230	-0.0205	-0.0223
<i>Excess C&I loan growth</i>	-0.0164	0.0687	-0.3874	0.2763	-0.0204	-0.0206	-0.0090
<i>BIS capital ratio</i>	0.1760	0.0955	0.0012	1.3720	0.1768	0.1716	0.1766
<i>Core deposit ratio</i>	0.7767	0.1702	0.0000	1.0000	0.7555	0.6928	0.8422
<i>NPL ratio</i>	0.0137	0.0214	0.0000	0.1911	0.0078	0.0154	0.0216
<i>Total assets(\$1000)</i>	467,670	1,511,187	7,986	20,938,997	389,105	470,947	580,427
<i>ROA</i>	0.0050	0.0075	-0.0821	0.0331	0.0062	0.0035	0.0038
<i>HPI</i>	171.6	32.9	108.8	336.9	162.1	189.9	177.8
<i>Total RGDP (\$Billion)</i>	97,355	104,842	1,539	459,699	93,020	101,311	102,016
<i>HHI</i>	0.0717	0.0520	0.0063	0.5071	0.0724	0.0709	0.0709
Observations	416,191	416,191	416,191	416,191	210,924	60,050	145,217

Table 3. Effects of bank-specific characteristics to the lending level and growth

Dependent variables are lending level (Panel A) and excess growth (Panel B) of different types of loans as a proxy for banks' lending behaviors. Variables are defined in Table 1. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies. T-statistics in parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	Panel A : Loan ratio							
	Total loan ratio	Secured R.E. loan ratio	Residential home loan ratio	Non-Residential R.E. loan ratio	Household loan ratio	Individual loan ratio	C&I loan	
	(1)	(2)	(3)	(4)	(5)	(6)	Selection Model (7)	C&I loan ratio (8)
<i>BIS capital ratio</i>	-0.4719*** (-67.15)	-0.2873*** (-49.00)	-0.1032*** (-30.10)	-0.1813*** (-39.66)	-0.1626*** (-38.08)	-0.0511*** (-30.59)	-2.5266*** (-32.53)	-0.1144*** (-12.13)
<i>BIS capital ratio · Crisis</i>	0.0547*** (6.71)	-0.0128** (-2.05)	0.0054 (1.52)	-0.0247*** (-4.84)	0.0284*** (6.31)	0.0225*** (13.64)	-0.1433 (-0.94)	0.0343*** (3.24)
<i>BIS capital ratio · Post</i>	-0.0650*** (-7.25)	-0.1230*** (-17.54)	-0.0426*** (-9.75)	-0.0806*** (-16.13)	-0.0278*** (-5.09)	0.0230*** (10.62)	-1.4692*** (-12.03)	0.0713*** (7.30)
<i>Core deposit ratio</i>	-0.0630*** (-14.20)	-0.0579*** (-14.73)	-0.0038 (-1.57)	-0.0552*** (-18.12)	-0.0095*** (-3.02)	0.0009 (0.69)	-0.6494*** (-23.41)	0.0121*** (3.54)
<i>Core deposit ratio · Crisis</i>	0.0148*** (3.05)	0.0186*** (4.72)	0.0185*** (8.08)	-0.0002 (-0.06)	0.0234*** (7.52)	0.0032** (2.56)	-0.2510*** (-4.42)	-0.0034 (-0.97)
<i>Core deposit ratio · Post</i>	-0.0090 (-1.51)	0.0138*** (3.00)	-0.0116*** (-4.27)	0.0238*** (6.50)	-0.0107*** (-2.83)	-0.0054*** (-3.33)	0.5281*** (10.82)	-0.0159*** (-4.02)
<i>NPL ratio</i>	-0.2492*** (-6.84)	-0.2007*** (-6.36)	-0.1073*** (-5.57)	-0.0834*** (-3.30)	-0.0182 (-0.71)	0.0520*** (4.55)	0.9193* (1.67)	-0.2596*** (-4.99)
<i>NPL ratio · Crisis</i>	0.0038 (0.09)	0.1767*** (4.33)	0.0886*** (3.62)	0.1011*** (2.93)	0.0021 (0.07)	-0.0452*** (-3.58)	0.3828 (0.53)	0.1282** (2.34)
<i>NPL ratio · Post</i>	-0.1827*** (-4.52)	0.0445 (1.27)	0.1031*** (4.64)	-0.0681** (-2.44)	0.0146 (0.50)	-0.0531*** (-4.31)	0.5684 (0.97)	0.1009* (1.95)
<i>Log(Total assets)</i>	0.0018 (1.20)	0.0174*** (11.96)	-0.0006 (-0.69)	0.0150*** (13.98)	-0.0062*** (-6.00)	-0.0047*** (-10.69)	1.1886*** (155.45)	-0.0018 (-1.36)
<i>Log(Total assets) · Crisis</i>	0.0060*** (10.85)	0.0033*** (6.79)	-0.0006** (-2.22)	0.0041*** (10.22)	-0.0006* (-1.85)	0.0003*** (2.22)	0.0879*** (6.28)	0.0024*** (4.17)
<i>Log(Total assets) · Post</i>	0.0060*** (10.80)	-0.0012** (-2.42)	-0.0008*** (-2.68)	0.0003 (0.85)	-0.0003 (-0.72)	0.0008*** (5.10)	0.3694*** (33.20)	0.0042*** (6.88)
<i>ROA</i>	0.1449** (2.29)	0.1609*** (2.90)	0.0421*** (2.88)	0.1313*** (2.86)	0.0938*** (3.05)	0.0260** (2.53)	-0.6307 (-0.76)	0.1348** (2.29)
<i>ROA · Crisis</i>	-0.1088 (-1.53)	-0.0988* (-1.86)	0.0292 (1.04)	-0.1296** (-2.31)	-0.0060 (-0.16)	-0.0069 (-0.62)	-0.0562 (-0.04)	-0.2295*** (-3.16)
<i>ROA · Post</i>	0.1443* (1.88)	0.0142 (0.25)	-0.0098 (-0.45)	0.0210 (0.44)	-0.0471 (-1.03)	-0.0108 (-0.59)	0.0511 (0.05)	-0.1529** (-2.33)
<i>Log(HPI)</i>	0.0319*** (9.03)	0.0547*** (16.69)	0.0136*** (6.32)	0.0432*** (15.82)	0.0098*** (3.92)	-0.0045*** (-4.23)	-2.0169*** (-78.78)	-0.0225*** (-8.05)
<i>Log(Total RGDP)</i>	0.0125*** (5.50)	0.0103*** (4.92)	0.0012 (0.86)	0.0093*** (5.49)	-0.0024 (-1.54)	-0.0035*** (-5.12)	-0.0470*** (-13.28)	0.0034** (2.07)
<i>HHI</i>	0.1804*** (6.99)	0.1331*** (5.26)	0.0201 (1.22)	0.1108*** (5.75)	-0.0150 (-0.84)	-0.0365*** (-4.80)	3.3453*** (39.16)	0.0624*** (3.34)
<i>Deposit rank</i>							-0.0542*** (-62.33)	
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	407,530	407,530	407,530	407,530	407,530	407,530	407,530	407,530
R-squared	0.8346	0.8844	0.9015	0.8749	0.8910	0.8379		0.8566

Table 3 Continued

Panel B : Excess loan growth							
Variable	<i>Excess total loan growth</i>	<i>Excess secured R.E. loan growth</i>	<i>Excess residential home loan Growth</i>	<i>Excess non- residential R.E. loan Growth</i>	<i>Excess household loan Growth</i>	<i>Excess individual loan growth</i>	<i>Excess C&I loan growth</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>BIS capital ratio</i>	0.4096*** (34.13)	0.3824*** (20.05)	0.2796*** (14.49)	0.3295*** (17.95)	0.4436*** (18.53)	0.2208*** (10.46)	0.0355 (0.41)
<i>BIS capital ratio · Crisis</i>	0.0208 (1.42)	0.0104 (0.51)	-0.0167 (-0.79)	0.0371* (1.78)	0.0717** (2.57)	-0.0208 (-0.85)	0.1511 (1.51)
<i>BIS capital ratio · Post</i>	-0.0415*** (-4.27)	-0.0196 (-1.47)	-0.0378*** (-3.05)	0.0146 (1.09)	-0.0581*** (-3.30)	-0.0163 (-1.05)	0.1111 (1.57)
<i>Core deposit ratio</i>	0.0181*** (3.05)	0.0331*** (4.86)	0.0229*** (3.13)	0.0316*** (4.79)	0.0320*** (3.14)	0.0125 (1.48)	0.0343** (2.17)
<i>Core deposit ratio · Crisis</i>	0.0071 (1.18)	0.0075 (1.06)	-0.0208** (-2.44)	0.0098 (1.44)	-0.0769*** (-6.35)	0.0009 (0.10)	0.0062 (0.37)
<i>Core deposit ratio · Post</i>	-0.0213*** (-3.42)	-0.0310*** (-3.99)	-0.0292*** (-3.86)	-0.0257*** (-3.49)	-0.0607*** (-6.14)	-0.0339*** (-3.78)	0.0142 (0.85)
<i>NPL ratio</i>	-0.3504*** (-8.23)	-0.4639*** (-14.69)	-0.2355*** (-5.73)	-0.6393*** (-15.65)	-0.2126*** (-4.22)	-0.2897*** (-5.73)	-0.7144*** (-2.71)
<i>NPL ratio · Crisis</i>	0.0716 (1.46)	-0.0246 (-0.53)	0.2342*** (3.73)	0.0125 (0.25)	0.2969*** (4.22)	0.2356*** (3.23)	0.5760** (2.10)
<i>NPL ratio · Post</i>	0.1852*** (4.22)	0.2390*** (6.71)	0.1613*** (3.63)	0.3399*** (7.70)	0.1539*** (2.86)	0.2337*** (4.18)	0.8597*** (3.22)
<i>Log(Total assets)</i>	0.0192*** (9.35)	0.0153*** (5.73)	0.0087*** (3.10)	0.0199*** (7.58)	0.0079** (2.37)	0.0146*** (5.03)	0.0720*** (7.97)
<i>Log(Total assets) · Crisis</i>	0.0032*** (5.31)	0.0032*** (4.34)	0.0035*** (4.46)	0.0024*** (3.47)	0.0036*** (3.82)	0.0030*** (3.39)	0.0043 (1.62)
<i>Log(Total assets) · Post</i>	-0.0020*** (-4.94)	-0.0001 (-0.25)	0.0032*** (6.56)	-0.0017*** (-3.04)	0.0001 (0.10)	0.0028*** (4.31)	-0.0047** (-1.97)
<i>ROA</i>	-0.6806*** (-7.61)	-0.5194*** (-5.65)	-0.4860*** (-5.67)	-0.5244*** (-5.57)	-0.9479*** (-3.51)	-0.3481*** (-4.86)	0.5146 (1.25)
<i>ROA · Crisis</i>	0.4117*** (3.43)	0.0950 (0.66)	0.0907 (0.64)	0.1297 (0.98)	1.0066*** (3.85)	0.1010 (0.91)	-0.4881 (-0.69)
<i>ROA · Post</i>	0.3281*** (3.30)	0.1706 (1.58)	0.0721 (0.68)	0.2688** (2.56)	0.4255 (1.62)	0.0728 (0.66)	-0.0799 (-0.20)
<i>Log(HPI)</i>	0.0041* (1.68)	0.0057* (1.70)	0.0062 (1.50)	-0.0004 (-0.10)	0.0230*** (4.75)	-0.0066 (-1.23)	-0.0291*** (-2.99)
<i>Log(Total RGDP)</i>	-0.0046*** (-2.72)	-0.0008 (-0.44)	-0.0003 (-0.14)	-0.0014 (-0.68)	-0.0051* (-1.74)	-0.0056** (-2.26)	-0.0039 (-0.79)
<i>HHI</i>	0.0826*** (5.24)	0.0981*** (4.02)	0.0413 (1.49)	0.1041*** (3.58)	0.0334 (1.05)	0.0625* (1.79)	0.1166* (1.75)
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	407,530	407,530	407,530	407,530	407,530	407,530	407,530
R-squared	0.1126	0.0874	0.0517	0.0567	0.0666	0.0356	0.0588

Table 4. Effects of banks' lending behavior on non-performing loans and profitability

This table shows the effects of banks' lending behavior on non-performing loans, controlling for bank-specific characteristics and macro-economic conditions. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies to control for time and bank fixed effects. T-statistics in parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Panel A : Effects of Excess loan growths			
variable	Change in NPL ratio (1)	Change in ROA (2)	Volatility of ROA (3)
<i>Excess total loan growth t-1</i>	0.0647 (0.75)	-0.0938*** (-4.05)	0.0002** (1.98)
<i>Excess total loan growth t-1 · Crisis</i>	-0.0332 (-0.29)	-0.0112 (-0.19)	0.0007** (2.46)
<i>Excess total loan growth t-1 · Post</i>	-0.0075 (-0.06)	-0.0035 (-0.06)	-0.0004* (-1.76)
<i>Excess total loan growth t-2</i>	0.1034** (2.24)	-0.0490*** (-2.69)	0.0005*** (4.75)
<i>Excess total loan growth t-2 · Crisis</i>	0.0790 (0.91)	0.0422 (0.66)	0.0010*** (4.30)
<i>Excess total loan growth t-2 · Post</i>	-0.0329 (-0.53)	0.0411 (0.93)	-0.0003 (-1.17)
<i>Excess total loan growth t-3</i>	0.3367*** (6.37)	-0.0048 (-0.28)	0.0009*** (7.65)
<i>Excess total loan growth t-3 · Crisis</i>	0.0258 (0.28)	-0.0886** (-2.05)	0.0012*** (4.47)
<i>Excess total loan growth t-3 · Post</i>	-0.1720** (-2.50)	-0.2173*** (-5.67)	-0.0002 (-0.63)
<i>Excess total loan growth t-4</i>	-0.0568 (-0.54)	0.0503** (2.07)	0.0012*** (8.75)
<i>Excess total loan growth t-4 · Crisis</i>	0.2388* (1.84)	0.0402 (0.74)	0.0011*** (4.14)
<i>Excess total loan growth t-4 · Post</i>	0.0754 (0.67)	0.1059** (2.44)	-0.0008*** (-3.09)
<i>BIS capital ratio</i>	-0.3034*** (-6.51)	-0.3992*** (-15.02)	0.0013*** (4.51)
<i>BIS capital ratio · Crisis</i>	-0.1911*** (-3.25)	0.0206 (0.76)	0.0008*** (2.70)
<i>BIS capital ratio · Post</i>	0.0978** (2.53)	-0.1328*** (-6.30)	-0.0040*** (-13.30)
<i>Core deposit Ratio</i>	-0.1591*** (-7.87)	0.0605*** (4.98)	0.0010*** (7.63)
<i>Core deposit Ratio · Crisis</i>	-0.0202 (-0.77)	0.1475*** (8.78)	-0.0006*** (-3.57)
<i>Core deposit Ratio · Post</i>	0.0542*** (2.62)	0.0077 (0.56)	-0.0027*** (-15.39)
Other bank controls	Yes	Yes	Yes
MSA variables	Yes	Yes	Yes
Bank and Time Fixed Effects	Yes	Yes	Yes
Observations	316,663	323,710	368,604
R-squared	0.0204	0.7637	0.4430

Table 4 Continued

Panel B : Effects of Excess loan growths conditioning on soundness variables			
variable	<i>Change in NPL ratio (1)</i>	<i>Change in ROA (2)</i>	<i>Volatility of ROA (3)</i>
<i>Excess total loan growth t-1· BIS capital ratio</i>	0.2530 (0.89)	-0.1774** (-2.20)	0.0002** (1.98)
<i>Excess total loan growth t-2· BIS capital ratio</i>	0.2432 (0.91)	-0.1389** (-2.27)	0.0007** (2.46)
<i>Excess total loan growth t-3· BIS capital ratio</i>	0.5177* (1.70)	-0.0259 (-0.42)	-0.0004* (-1.76)
<i>Excess total loan growth t-4· BIS capital ratio</i>	-0.4049* (-1.65)	-0.2336*** (-3.17)	0.0005*** (4.75)
<i>Excess total loan growth t-1· Core deposit ratio</i>	-0.2840* (-1.74)	-0.0809 (-1.20)	0.0010*** (4.30)
<i>Excess total loan growth t-2· Core deposit ratio</i>	0.0210 (0.13)	-0.1356** (-2.25)	-0.0003 (-1.17)
<i>Excess total loan growth t-3· Core deposit ratio</i>	0.4136** (2.56)	0.0107 (0.22)	0.0009*** (7.65)
<i>Excess total loan growth t-4· Core deposit ratio</i>	0.4248*** (2.97)	0.0509 (1.01)	0.0012*** (4.47)
Triple interaction term controls	Yes	Yes	Yes
Excess total loan growth controls	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes
MSA variables	Yes	Yes	Yes
Bank and Time Fixed Effects	Yes	Yes	Yes
Observations	316,663	323,710	368,604
R-squared	0.0208	0.7640	0.6596

Table 5. Effects of prudence index to the lending level and growth

Dependent variables are lending level (Panel A) and excess growth (Panel B) of different types of loans as a proxy for banks' lending behaviors. Variables are defined in Table 1. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies from regression (1) to (7). Regression (8) and (9) includes interaction terms between quarterly dummies and MSA dummies. T-statistics in parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Panel A : Loan ratio								
Variable	Total loan ratio	Secured R.E. loan ratio	Residential home loan ratio	Non-Residential R.E. loan ratio	Household loan ratio	Individual loan ratio	C&I loan	
	(1)	(2)	(3)	(4)	(5)	(6)	Selection Model (7)	C&I loan ratio (8)
<i>Prudence index</i>	-0.1192*** (-56.30)	-0.0754*** (-40.40)	-0.0235*** (-21.26)	-0.0516*** (-35.10)	-0.0417*** (-29.46)	-0.0143*** (-24.37)	-0.5236*** (-26.04)	-0.0008 (-0.33)
<i>Prudence index · Crisis</i>	0.0338*** (14.08)	0.0077*** (3.68)	0.0080*** (6.44)	-0.0026 (-1.49)	0.0179*** (12.07)	0.0085*** (15.32)	0.3181*** (8.67)	0.0039* (1.67)
<i>Prudence index · Post</i>	0.0562*** (24.13)	0.0183*** (8.93)	-0.0017 (-1.33)	0.0195*** (12.03)	0.0084*** (5.58)	0.0084*** (13.88)	0.1219*** (4.28)	0.0062*** (2.67)
<i>Log(Total assets)</i>	0.0216*** (13.76)	0.0294*** (20.39)	0.0036*** (4.46)	0.0228*** (21.37)	-0.0007 (-0.63)	-0.0035*** (-8.03)	1.1210*** (153.48)	-0.0012 (-0.88)
<i>Log(Total assets) · Crisis</i>	0.0051*** (9.26)	0.0023*** (4.72)	-0.0012*** (-4.36)	0.0037*** (9.23)	-0.0012*** (-3.46)	0.0003** (2.33)	0.0765*** (5.74)	0.0029*** (5.04)
<i>Log(Total assets) · Post</i>	0.0057*** (10.07)	-0.0018*** (-3.76)	-0.0010*** (-3.38)	-0.0001 (-0.30)	-0.0003 (-0.95)	0.0009*** (5.89)	0.5368*** (48.38)	0.0049*** (8.24)
<i>ROA</i>	0.3312*** (3.62)	0.2798*** (3.59)	0.0854*** (3.85)	0.2055*** (3.34)	0.1507*** (3.76)	0.0376*** (3.22)	-0.8678 (-1.10)	0.1457** (2.35)
<i>ROA · Crisis</i>	-0.0528 (-0.49)	-0.0677 (-0.79)	0.0409 (0.78)	-0.1104** (-2.01)	0.0101 (0.16)	-0.0035 (-0.23)	-0.2516 (-0.20)	-0.2130*** (-2.80)
<i>ROA · Post</i>	0.2825*** (2.85)	0.0598 (0.79)	0.0041 (0.16)	0.0573 (0.94)	-0.0256 (-0.50)	0.0002 (0.01)	-0.2609 (-0.26)	-0.0702 (-1.01)
<i>Log(HPI)</i>	0.0453*** (12.27)	0.0645*** (19.37)	0.0156*** (7.29)	0.0509*** (18.55)	0.0121*** (4.85)	-0.0047*** (-4.44)	-2.0972*** (-82.26)	-0.0195*** (-6.75)
<i>Log(Total RGDP)</i>	0.0106*** (4.41)	0.0091*** (4.24)	0.0010 (0.67)	0.0083*** (4.86)	-0.0028* (-1.73)	-0.0035*** (-5.07)	-0.0250*** (-7.09)	0.0024 (1.39)
<i>HHI</i>	0.2144*** (7.90)	0.1570*** (6.04)	0.0295* (1.77)	0.1250*** (6.36)	-0.0040 (-0.22)	-0.0350*** (-4.55)	4.2630*** (50.41)	0.0721*** (3.74)
<i>Deposit rank</i>							-0.0601*** (-71.75)	
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	407,536	407,536	407,536	407,536	407,536	407,536	407,536	407,536
R-squared	0.8211	0.8797	0.9003	0.8717	0.8891	0.8368		0.8528

Table 5 Continued

Panel B : Excess loan growth							
Variable	<i>Excess total loan growth</i>	<i>Excess secured R.E. loan growth</i>	<i>Excess residential home loan Growth</i>	<i>Excess non- residential R.E. loan growth</i>	<i>Excess household loan growth</i>	<i>Excess individual loan growth</i>	<i>Excess C&I loan growth</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Prudence index</i>	0.1171*** (33.55)	0.1161*** (22.71)	0.0822*** (15.88)	0.1049*** (21.27)	0.1267*** (18.82)	0.0646*** (11.20)	0.0206 (1.54)
<i>Prudence index · Crisis</i>	-0.0013 (-0.31)	0.0005 (0.08)	-0.0206*** (-3.41)	0.0110* (1.94)	-0.0187** (-2.25)	-0.0134* (-1.94)	0.0148 (1.00)
<i>Prudence index · Post</i>	-0.0475*** (-16.68)	-0.0427*** (-10.65)	-0.0403*** (-9.98)	-0.0280*** (-7.12)	-0.0670*** (-12.57)	-0.0331*** (-6.77)	-0.0083 (-0.67)
<i>Log(Total assets)</i>	0.0100*** (4.83)	0.0076*** (2.87)	0.0025 (0.87)	0.0141*** (5.32)	-0.0028 (-0.82)	0.0099*** (3.39)	0.0672*** (7.88)
<i>Log(Total assets) · Crisis</i>	0.0033*** (5.56)	0.0034*** (4.69)	0.0036*** (4.63)	0.0025*** (3.60)	0.0046*** (4.65)	0.0026*** (3.15)	0.0033 (1.32)
<i>Log(Total assets) · Post</i>	-0.0018*** (-4.49)	-0.0001 (-0.09)	0.0035*** (7.03)	-0.0020*** (-3.55)	0.0010 (1.49)	0.0028*** (4.53)	-0.0065*** (-2.79)
<i>ROA</i>	-0.7919*** (-7.61)	-0.6124*** (-5.80)	-0.5626*** (-5.85)	-0.5957*** (-5.79)	-1.0840*** (-4.08)	-0.4082*** (-5.33)	0.3380 (0.82)
<i>ROA · Crisis</i>	0.3661** (2.01)	0.0709 (0.38)	0.0521 (0.27)	0.1148 (0.70)	0.9127*** (2.97)	0.0792 (0.57)	-0.3507 (-0.50)
<i>ROA · Post</i>	0.3809*** (3.54)	0.2227* (1.93)	0.1142 (1.04)	0.3216*** (2.96)	0.5196** (2.00)	0.1271 (1.17)	-0.0333 (-0.08)
<i>Log(HPI)</i>	0.0029 (1.18)	0.0042 (1.24)	0.0049 (1.19)	-0.0007 (-0.20)	0.0224*** (4.48)	-0.0079 (-1.45)	-0.0293*** (-3.04)
<i>Log(Total RGDP)</i>	-0.0043** (-2.48)	-0.0006 (-0.32)	-0.0001 (-0.03)	-0.0013 (-0.63)	-0.0049 (-1.59)	-0.0054** (-2.15)	-0.0035 (-0.71)
<i>HHI</i>	0.0616*** (3.89)	0.0831*** (3.38)	0.0252 (0.90)	0.0953*** (3.27)	-0.0035 (-0.11)	0.0533 (1.51)	0.1071 (1.60)
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	407,536	407,536	407,536	407,536	407,536	407,536	407,536
R-squared	0.0975	0.0796	0.0485	0.0535	0.0591	0.0347	0.0577

Table 6. Effects of prudence index and lending behavior on bank performance

Dependent variables are NPL Ratio and ROA and their growths. Variables are defined in Table 1. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies. T-statistics in parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	Change in NPL ratio (1)		Change in ROA (2)	
<i>Prudence index</i>	0.6852***	(44.20)	-0.0188***	(-2.68)
<i>Prudence index · Crisis</i>	-0.0028	(-0.16)	0.0957***	(9.59)
<i>Prudence index · Post</i>	-0.0797***	(-5.90)	-0.0168**	(-2.24)
<i>Excess total loan growth t-1</i>	0.0603	(0.71)	-0.0763***	(-3.30)
<i>Excess total loan growth t-1 · Crisis</i>	-0.0868	(-0.77)	-0.0225	(-0.37)
<i>Excess total loan growth t-1 · Post</i>	-0.0012	(-0.01)	0.0051	(0.09)
<i>Excess total loan growth t-2</i>	0.0991**	(2.13)	-0.0321*	(-1.80)
<i>Excess total loan growth t-2 · Crisis</i>	0.0514	(0.57)	0.0682	(1.08)
<i>Excess total loan growth t-2 · Post</i>	-0.0072	(-0.11)	0.0484	(1.13)
<i>Excess total loan growth t-3</i>	0.3273***	(5.17)	0.0022	(0.13)
<i>Excess total loan growth t-3 · Crisis</i>	-0.0182	(-0.18)	-0.0962**	(-2.25)
<i>Excess total loan growth t-3 · Post</i>	-0.1486*	(-1.90)	-0.2007***	(-5.20)
<i>Excess total loan growth t-4</i>	-0.0617	(-0.58)	0.0549**	(2.39)
<i>Excess total loan growth t-4 · Crisis</i>	0.1833	(1.37)	0.0055	(0.10)
<i>Excess total loan growth t-4 · Post</i>	0.0772	(0.67)	0.1206***	(2.95)
Other bank controls	Yes		Yes	
MSA variables	Yes		Yes	
Bank and Time Fixed Effects	Yes		Yes	
Observations	316,666		323,716	
R-squared	0.0296		0.7632	

Table 7. Effects of bank-specific characteristics and prudence index on loan application approval rates

Dependent variables are the loan application approval rates. Approval rates are measured through the loan amounts in column 1 and through the number of applications in column 2. Variables are defined in Table 1. Pre-crisis is from 2001 to 2007, during crisis is from 2008 to 2009 and post-crisis is from 2010 to 2013. Each regression includes annual dummies and bank dummies. T-statistics in parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	Loan application approval rates (1)	Number of loan App. approval rates (2)	Loan application approval rates (3)	Number of loan app. approval rates (4)
<i>BIS capital ratio</i>	0.0426 (1.63)	0.0622*** (2.64)		
<i>BIS capital ratio · Crisis</i>	-0.0702*** (-2.63)	-0.0667*** (-2.96)		
<i>BIS capital ratio · Post</i>	-0.0999*** (-4.22)	-0.0864*** (-3.99)		
<i>Core deposit ratio</i>	0.0328*** (3.10)	0.0264*** (2.69)		
<i>Core deposit ratio · Crisis</i>	0.0179 (1.58)	0.0111 (1.09)		
<i>Core deposit ratio · Post</i>	-0.0225* (-1.65)	-0.0054 (-0.42)		
<i>NPL ratio</i>	-0.3167*** (-3.48)	-0.2849*** (-3.43)		
<i>NPL ratio · Crisis</i>	-0.0785 (-0.51)	0.0195 (0.14)		
<i>NPL ratio · Post</i>	0.2107** (2.11)	0.1042 (1.12)		
<i>Prudence index</i>			0.0148*** (4.12)	0.0152*** (4.56)
<i>Prudence index · Crisis</i>			-0.0016 (-0.44)	-0.0035 (-1.12)
<i>Prudence index · Post</i>			-0.0161*** (-4.28)	-0.0100*** (-2.83)
<i>Log(Applicants' income)</i>	0.0327*** (11.83)	0.0379*** (14.32)	0.0330*** (11.94)	0.0383*** (14.51)
<i>Gender</i>	0.0890*** (7.61)	0.1068*** (10.15)	0.0892*** (7.65)	0.1070*** (10.28)
<i>Race</i>	0.0574*** (4.71)	0.0727*** (6.06)	0.0569*** (4.65)	0.0721*** (6.04)
Other bank controls	Yes	Yes	Yes	Yes
MSA variables	Yes	Yes	Yes	Yes
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes
Observations	44,945	44,945	44,945	44,945
R-squared	0.5269	0.5861	0.5264	0.5857

Table 8. Effects of bank-specific characteristics and prudence on loan ratio and excess loan growth controlling MSA*time and bank fixed effects

Dependent variables are lending level and growth of total loan as a proxy for banks' lending behaviors. Variables are defined in Table 1. Pre-crisis is from 2001:1Q to 2007:2Q, during crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes the interaction between MSA dummies and quarter dummies as well as bank dummies. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	Total loan ratio (1)	Excess total loan growth (2)	Total loan ratio (3)	Excess total loan growth (4)
<i>BIS capital ratio</i>	-0.4479*** (-174.89)	0.4479*** (113.79)		
<i>BIS capital ratio · Crisis</i>	0.0290*** (8.45)	0.0135** (2.55)		
<i>BIS capital ratio · Post</i>	-0.1011*** (-27.62)	-0.0347*** (-6.17)		
<i>Core deposit ratio</i>	-0.0472*** (-24.32)	0.0211*** (7.06)		
<i>Core deposit ratio · Crisis</i>	0.0129*** (4.98)	0.0109*** (2.76)		
<i>Core deposit ratio · Post</i>	-0.0092*** (-3.84)	-0.0246*** (-6.72)		
<i>NPL ratio</i>	-0.2898*** (-15.52)	-0.3346*** (-11.65)		
<i>NPL ratio · Crisis</i>	0.0433* (1.67)	0.1139*** (2.86)		
<i>NPL ratio · Post</i>	-0.1130*** (-5.44)	0.2049*** (6.42)		
<i>Prudence index</i>			-0.1122*** (-121.88)	0.1305*** (95.05)
<i>Prudence index · Crisis</i>			0.0236*** (18.72)	-0.0038** (-2.01)
<i>Prudence index · Post</i>			0.0396*** (34.46)	-0.0537*** (-31.35)
Other bank controls	Yes	Yes	Yes	Yes
MSA*Time fixed effects	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes
Observations	294,373	294,373	294,373	294,373
R-squared	0.8663	0.2144	0.8554	0.2006

Table 9. Effects of bank-specific characteristics on loan ratio and excess loan growth across bank sizes

We divide the banks into three groups: large, medium, small. *Large* banks have more than \$1 billion in assets. A median split of the smaller, remaining banks defines *medium* banks as the upper half (>\$117 million) and *small* banks as the lower half. Dependent variables are total loan ratio and its growth. Variables are defined in Table 1. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies. T-statistics in parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	Total loans ratio				Excess total loan growth			
	Bank size				Bank size			
	<i>Small</i> (1)	<i>Medium</i> (2)	<i>Small or Medium</i> (3)	<i>Large</i> (4)	<i>Small</i> (5)	<i>Medium</i> (6)	<i>Small or Medium</i> (7)	<i>Large</i> (8)
<i>BIS capital ratio</i>	-0.4432*** (-55.50)	-0.6392*** (-30.72)	-0.4733*** (-66.81)	-0.4841*** (-9.15)	0.4954*** (38.25)	0.1408*** (4.29)	0.4316*** (37.24)	0.1302 (0.79)
<i>BIS capital ratio · Crisis</i>	0.0403*** (4.60)	0.0606*** (3.09)	0.0546*** (6.65)	0.1323*** (2.85)	-0.0072 (-0.47)	0.0899** (2.11)	0.0028 (0.19)	0.1947 (1.22)
<i>BIS capital ratio · Post</i>	-0.1036*** (-9.66)	0.0097 (0.65)	-0.0840*** (-9.26)	0.2079*** (4.30)	-0.0128 (-1.22)	0.0348* (1.74)	-0.0218** (-2.16)	-0.0777 (-0.58)
<i>Core deposit ratio</i>	-0.0744*** (-11.12)	-0.0574*** (-9.97)	-0.0688*** (-15.71)	-0.0246 (-1.51)	0.0333*** (4.03)	0.0225*** (2.74)	0.0251*** (4.32)	-0.0063 (-0.22)
<i>Core deposit ratio · Crisis</i>	-0.0090 (-1.14)	0.0271*** (4.44)	0.0119** (2.39)	0.0606*** (3.88)	0.0040 (0.34)	0.0019 (0.22)	0.0058 (0.87)	0.0254 (1.17)
<i>Core deposit ratio · Post</i>	-0.0136 (-1.34)	-0.0113 (-1.47)	-0.0111* (-1.81)	0.0392** (2.25)	-0.0313*** (-3.90)	-0.0078 (-1.13)	-0.0225*** (-3.80)	-0.0106 (-0.40)
<i>NPL ratio</i>	-0.2258*** (-5.86)	-0.1890*** (-2.99)	-0.2376*** (-6.53)	-0.8835*** (-3.09)	-0.2580*** (-9.86)	-0.4896*** (-7.33)	-0.3602*** (-12.83)	1.0962 (0.98)
<i>NPL ratio · Crisis</i>	0.0770 (1.49)	-0.0466 (-0.63)	0.0080 (0.18)	0.6629** (2.22)	0.0200 (0.54)	0.2312*** (2.71)	0.0840** (2.09)	-1.2989 (-1.24)
<i>NPL ratio · Post</i>	-0.1932*** (-4.26)	-0.2344*** (-3.44)	-0.1884*** (-4.64)	0.4920* (1.71)	0.1286*** (3.95)	0.3144*** (4.83)	0.2123*** (7.41)	-1.2670 (-1.17)
Other bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	188,858	188,893	378,279	28,807	188,858	188,893	378,279	28,807
R-squared	0.8442	0.8537	0.8402	0.8326	0.2180	0.1189	0.1462	0.0818

Table 10. Effects of bank-specific characteristics and bank lending on bank performance across bank sizes

We divide the banks into three groups: large, medium, small. *Large* banks have more than \$1 billion in assets. A median split of the smaller, remaining banks defines *medium* banks as the upper half (>\$117 million) and *small* banks as the lower half. Dependent variables are changes in NPL ratio and changes in ROA. Variables are defined in Table 1. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies. T-statistics in the parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	Changes in NPL Ratio				Changes in ROA			
	Bank size				Bank size			
Variable	<i>Small</i> (1)	<i>Medium</i> (2)	<i>Small or Medium</i> (3)	<i>Large</i> (4)	<i>Small</i> (5)	<i>Medium</i> (6)	<i>Small or Medium</i> (7)	<i>Large</i> (8)
<i>Excess total loan growth t-1</i>	-0.0469 (-0.57)	-0.0400 (-0.49)	-0.0712 (-1.23)	0.3576** (2.48)	-0.0316 (-1.03)	-0.1482*** (-3.09)	-0.1076*** (-3.93)	-0.0712*** (-2.67)
<i>Excess total loan growth t-1- Crisis</i>	-0.0726 (-0.48)	0.1232 (0.90)	0.0461 (0.45)	-0.0234 (-0.13)	-0.0553 (-0.76)	0.0124 (0.11)	-0.0070 (-0.11)	0.0193 (0.15)
<i>Excess total loan growth t-1- Post</i>	0.0160 (0.15)	0.0220 (0.22)	0.0326 (0.44)	0.1484 (0.54)	0.1420*** (2.70)	0.1239* (1.70)	0.0739 (1.29)	-0.0537 (-0.85)
<i>Excess total loan growth t-2</i>	0.0329 (0.45)	0.2140*** (2.64)	0.1001* (1.80)	0.2490*** (2.73)	-0.0199 (-0.68)	-0.0735*** (-3.08)	-0.0585*** (-3.20)	-0.0114 (-0.22)
<i>Excess total loan growth t-2- Crisis</i>	0.0715 (0.52)	0.1031 (0.74)	0.1184 (1.19)	-0.2342 (-1.60)	-0.1260** (-2.10)	0.1565 (1.29)	0.0258 (0.36)	0.1096 (1.00)
<i>Excess total loan growth t-2- Post</i>	-0.0002 (0.00)	-0.0551 (-0.56)	-0.0245 (-0.35)	-0.1571 (-1.37)	-0.1067** (-2.35)	0.0541 (1.23)	0.0038 (0.10)	-0.0146 (-0.18)
<i>Excess total loan growth t-3</i>	0.3935*** (5.40)	0.1409* (1.67)	0.2911*** (5.18)	0.3825*** (2.66)	0.0285 (1.04)	0.0191 (0.59)	0.0189 (0.88)	-0.0714*** (-2.61)
<i>Excess total loan growth t-3- Crisis</i>	-0.0361 (-0.27)	0.1617 (1.04)	0.0379 (0.37)	0.2293 (0.87)	-0.1485** (-2.41)	-0.1233* (-1.75)	-0.1165** (-2.49)	-0.0153 (-0.08)
<i>Excess total loan growth t-3- Post</i>	-0.1340 (-1.33)	-0.0894 (-0.87)	-0.1102 (-1.50)	-0.3630** (-2.29)	-0.1983*** (-3.72)	-0.1769*** (-3.60)	-0.2263*** (-5.85)	-0.0259 (-0.47)
<i>Excess total loan growth t-4</i>	0.1789** (2.45)	0.0420 (0.62)	0.1091** (2.18)	-0.2841** (-2.03)	0.1365*** (4.41)	0.0150 (0.49)	0.0747*** (2.94)	-0.0375* (-1.89)
<i>Excess total loan growth t-4- Crisis</i>	-0.0716 (-0.52)	0.2250 (1.46)	0.0597 (0.59)	0.5738*** (3.29)	-0.0156 (-0.18)	-0.0143 (-0.22)	-0.0050 (-0.09)	0.2326** (2.22)
<i>Excess total loan growth t-4- Post</i>	-0.1974** (-2.05)	0.0380 (0.40)	-0.0905 (-1.33)	0.2710* (1.80)	-0.0243 (-0.46)	0.0737 (1.51)	0.0543 (1.32)	0.0987* (1.76)
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	144,871	144,972	290,368	25,890	149,503	149,569	299,613	23,758
R-squared	0.0340	0.0330	0.0288	0.0881	0.7359	0.7930	0.7604	0.8126

Table 11. Effects of prudence index on loan ratio and excess loan growth across bank sizes

We divide the banks into three groups: large, medium, small. *Large* banks have more than \$1 billion in assets. A median split of the smaller, remaining banks defines *medium* banks as the upper half (>\$117 million) and *small* banks as the lower half. Dependent variables are total loan ratio and its growth. Variables are defined in Table 1. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies. T-statistics in parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	Total loans ratio				Excess total loan growth			
	Bank size				Bank size			
	<i>Small</i> (1)	<i>Medium</i> (2)	<i>Small or Medium</i> (3)	<i>Large</i> (4)	<i>Small</i> (5)	<i>Medium</i> (6)	<i>Small or Medium</i> (7)	<i>Large</i> (8)
<i>Prudence index</i>	-0.1195*** (-45.32)	-0.1033*** (-27.93)	-0.1198*** (-56.93)	-0.0806*** (-6.50)	0.1488*** (35.89)	0.0404*** (6.84)	0.1240*** (36.00)	0.0158 (0.56)
<i>Prudence index · Crisis</i>	0.0189*** (6.39)	0.0519*** (13.44)	0.0330*** (13.59)	0.0577*** (5.13)	-0.0092* (-1.82)	0.0122** (2.31)	-0.0073* (-1.73)	0.0501* (1.70)
<i>Prudence index · Post</i>	0.0373*** (12.29)	0.0636*** (17.20)	0.0539*** (23.16)	0.0607*** (5.23)	-0.0543*** (-15.52)	-0.0037 (-0.86)	-0.0492*** (-17.88)	0.0069 (0.29)
Other bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	188,864	188,899	378,285	28,813	188,864	188,899	378,285	28,813
R-squared	0.8323	0.8409	0.8270	0.8241	0.1948	0.1170	0.1270	0.0799

Table 12. Effects of prudence index and bank lending on bank performance across bank sizes

We divide the banks into three groups: large, medium, small. *Large* banks have more than \$1 billion in assets. A median split of the smaller, remaining banks defines *medium* banks as the upper half (>\$117 million) and *small* banks as the lower half. Dependent variables are changes in NPL ratio and changes in ROA. Variables are defined in Table 1. Pre-crisis is from 2001:1Q to 2007:2Q, during-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies. T-statistics in the parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	Changes in NPL ratio				Changes in ROA			
Variable	Bank size				Bank size			
	<i>Small</i> (1)	<i>Medium</i> (2)	<i>Small or Medium</i> (3)	<i>Large</i> (4)	<i>Small</i> (5)	<i>Medium</i> (6)	<i>Small or Medium</i> (7)	<i>Large</i> (8)
<i>Prudence index</i>	1.0096*** (38.58)	0.5621*** (26.26)	0.7518*** (44.80)	0.1625*** (4.71)	-0.0194* (-1.77)	-0.0162 (-1.48)	-0.0175** (-2.32)	-0.0566*** (-2.63)
<i>Prudence index · Crisis</i>	-0.0570* (-1.94)	0.0563** (2.27)	-0.0061 (-0.32)	0.1195*** (2.93)	0.0235* (1.73)	0.1973*** (12.05)	0.0929*** (8.63)	0.0946*** (3.21)
<i>Prudence index · Post</i>	-0.1039*** (-4.42)	-0.0458** (-2.55)	-0.0855*** (-5.84)	0.0766** (2.29)	-0.0466*** (-4.26)	0.0208* (1.73)	-0.0178** (-2.24)	0.0067 (0.26)
Excess total loan growth controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other bank controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank and Time Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	144,871	144,972	290,368	25,890	149,503	149,569	299,613	23,758
R-squared	0.0340	0.0330	0.0288	0.0881	0.7359	0.7930	0.7604	0.8126

Appendix A

We assume that several bank attributes constitute a latent factor indicating bank prudence. Therefore, we use an Exploratory Factor Analysis (EFA) to create a prudence index (Cattell, 1958) from three bank attributes (Capital adequacy ratio, core deposit funding, and non-performing loans). Because a high NPL ratio indicates a low prudence level, we define Performing loan ratio (PL) as one minus NPL ratio.

Table A1 shows the eigenvalues of all factors. The eigenvalue of the first factor (Factor1) is 0.1213 and the eigenvalue of the second factor (Factor2) is 0.0045. The eigenvalue of Factor1 occupies almost all of the total eigenvalue and the eigenvalue of Factor1 is about 27 times bigger than the eigenvalue of Factor2. The variance explained by Factor1 is also much larger than the variance explained by Factor2 (0.0213 vs. 0.0116).

Hence, we choose Factor1 as a prudence index of a bank based on the eigenvalues and the variances from EFA.¹ Table A2 shows the standardized scoring coefficients of Factor1. The coefficients are all positive.

Table A1. Eigenvalues of the reduced correlation matrix

Variable	Eigenvalue	Difference	Proportion	Cumulative
<i>Factor1</i>	0.1213	0.1168	4.9023	4.9023
<i>Factor2</i>	0.0045	0.1056	0.1822	5.0844
<i>Factor3</i>	-0.1011		-4.0844	1.0000
<i>Total</i>	0.0248			
<i>Average</i>	0.0082			

⁷ We also ran all regressions with both Factor1 and Factor2, which showed similar, robust results.

Table A2. Standardized scoring coefficients of Factor1

Variable	Standardized Scoring Coefficients
<i>BIS capital ratio</i>	0.2245
<i>Core deposit Ratio</i>	0.1686
<i>PL Ratio (=1- NPL ratio)</i>	0.1391

Table A3. Testing the first column of Panel B of both Table 3 and Table 5

Dependent variables are *Excess total loan growth*. Variables are defined in Table 1. The period of Pre-crisis are from 2002:1Q to 2007:2Q or from 2003:1Q to 2007:2Q. During-crisis is from 2007:3Q to 2009:2Q and post-crisis is from 2009:3Q to 2014:4Q. Each regression includes quarterly dummies and bank dummies. T-statistics in parentheses are based on standard errors clustered by bank and robust to heteroskedasticity. ***, **, * represent significance at the 1%, 5%, 10% levels, respectively.

Variable	<i>Excess total loan growth</i> (1)	<i>Excess total loan growth</i> (2)
<i>Total loan ratio t-1</i>	-0.2631*** (-38.09)	-0.2854*** (-43.13)
<i>BIS capital ratio</i>	0.2520*** (20.29)	
<i>BIS capital ratio · Crisis</i>	0.0334** (2.37)	
<i>BIS capital ratio · Post</i>	-0.0582*** (-6.15)	
<i>Core deposit ratio</i>	-0.0021 (-0.36)	
<i>Core deposit ratio · Crisis</i>	0.0101 (1.64)	
<i>Core deposit ratio · Post</i>	-0.0228*** (-3.62)	
<i>NPL ratio</i>	-0.3688*** (-9.02)	
<i>NPL ratio · Crisis</i>	0.0750 (1.59)	
<i>NPL ratio · Post</i>	0.1149*** (2.65)	
<i>Prudence index</i>		0.0718*** (21.00)
<i>Prudence index · Crisis</i>		0.0079** (2.07)
<i>Prudence index · Post</i>		-0.0283*** (-10.47)
<i>Log(Total assets)</i>	0.0186*** (9.00)	0.0157*** (7.72)
<i>Log(Total assets) · Crisis</i>	0.0045*** (7.53)	0.0044*** (7.62)
<i>Log(Total assets) · Post</i>	-0.0004 (-1.00)	-0.0002 (-0.43)
<i>ROA</i>	-0.6063*** (-7.51)	-0.6499*** (-7.68)
<i>ROA · Crisis</i>	0.3753*** (3.27)	0.3447** (2.37)
<i>ROA · Post</i>	0.3544*** (3.86)	0.4472*** (4.93)
<i>Log(HPI)</i>	0.0114*** (4.41)	0.0148*** (5.71)
<i>Log(Total RGDP)</i>	-0.0011 (-0.63)	-0.0011 (-0.62)
<i>HHI</i>	0.1191*** (7.01)	0.1122*** (6.55)
Bank and Time Fixed Effects	Yes	Yes
Observations	407,530	407,536
R-squared	0.1439	0.1384

국문초록

은행의 대출행태에 관한 연구

이 논문은 기업의 사회적 책임(CSR)과 대출행태, “신중한”(“Prudent”) 은행들의 대출행태에 관한 2개의 소논문으로 구성되어 있다. 첫 번째 논문은 기업의 사회적 책임 평가지표가 그 기업의 주요한 사회적 영향력을 정확하게 평가하는지 여부를 확인한다. 2008년 대침체기 때의 미국 은행들의 소상공인 대출을 분석한 결과, 사회적 책임을 다하는 것으로 평가 받은 은행들이 실제로는 유동성이 필요한 주체들로부터 적극적으로 대출을 회수함으로써 더 높은 사회적 비용을 부과했다는 것을 발견하였다. 이 은행들은 주요하진 않지만 눈에 띄는 부분에서 더 많은 비용을 썼었고, 이러한 행동은 더 우호적인 평가를 받을 수 있게 하였다. 경기침체가 도래하자, 이 은행들은 높은 영업 레버리지와 함께, 대출을 지속하기 위한 여유 자금이 부족해졌고, 따라서 대출을 긴축하였다. 이러한 결과는 기업의 사회적 영향에 대한 신뢰할 수 있는 측정 지표 없이 기업의 사회적 책임에 대중의 관심이 커지면, 오히려 사회 복지가 역설적으로 감소할 수 있음을 시사한다.

두 번째 논문은 미국 은행들의 2008년 금융위기 전후의 대출 행태에 대해 분석한다. 2008년 위기 이전에는 위험성이 큰 은행들은 자산대비 대출 비율이 높았다. 반면, 높은 자본비율, 시장성 수신 비중이 적은 예금 구조, 적은 부실대출 등으로 대변되는 상대적으로 건전한(“신중한”) 은행들은 자산 증가율 대비 높은 대출 증가율을 보였으며, 특히 부동산 담보대출, 가게 대출 항목에서 이러한 현상이 두드러졌다. 또한, 신중한

은행들은 위험한 은행들보다 주택담보대출 신청에 대한 승인 비율이 더 높게 나타났다. 신중한 은행들의 공격적인 대출은 부실대출비율을 높이고, 시간이 지날수록 수익성을 떨어뜨리는 결과로 이어졌다. 이러한 결과는 신중한 은행들이 2008년 금융위기 이전에 과도한 대출 증가와 위험 감수를 보였다는 것을 시사한다.

주요어: 은행 대출, 대침체, 기업의 사회적 책임, 이해관계자 이론, 사회적 영향력 평가, 위험 감수, 은행 성과

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