Lending Behaviors of Prudent Banks around the 2008 Financial Crisis*

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Before the 2008 crisis, risky banks had higher lending ratios, whereas prudent banks, characterized by high capital ratios, robust core deposit ratios, and low non-performing loan (NPL) ratios, exhibited higher excess loan growth rates. This trend was particularly notable in the context of secured real estate and household loans. Prudent banks also approved more mortgage applications than their risky counterparts. However, this proactive lending approach by prudent banks resulted in higher NPL ratios and lower profitability over time. Analyses using a prudence index confirmed these findings, indicating that prudent banks demonstrated excessive loan growth and risk-taking before the 2008 financial crisis.

I. Introduction

Before the 2008 financial crisis, the US banking sector significantly increased bank loans and aggregate credit supply (Schularick and Taylor, 2012), notably through newly-originated loans to households with subprime credit ratings, especially those deemed risky (Dell'Ariccia et al., 2008; Demyanyk and Hemert, 2011). An escalation in aggregate loans can boost asset prices, making a substantial decline in asset values a potential trigger for 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 face failures.

Although risky banks significantly increase credit supply, precipitating system-wide instability, there has been limited examination of the behaviors and performances of relatively safe banks before a crisis. Sound banks, characterized by robust capitalization, advanced risk management, and high-performing loans, are incentivized to safeguard their charter values, potentially leading them to refrain from lending to risky borrowers (Keeley, 1990; Demsetz et al., 1996; Repullo, 2004). However, past studies show that sound banks extended more credit during crises (Ivashina and Scharfstein, 2010; Cornett et al., 2011; Gambacorta and Marques-Ibane, 2011; Kapan and Minoiu, 2018). Do sound banks also increase credit supplies before a crisis, thereby contributing to bubbles and financial crises?

Using small data sets,[1] existing studies show piecemeal evidence suggesting that well-capitalized banks or those with a stable funding structure tend to take more risks.[2] However, we still need to determine the robustness of these findings, especially after accounting for real-estate market conditions.

In addition, past studies do not consider whether the heightened lending by sound banks is attributable to their unused lending capacity or increased risk taking. If relatively sound banks engage in excessive risk taking, it implies lending to riskier borrowers. This aspect prompts the question of whether sound banks escalated real-estate related loans more rapidly than risky banks before the 2008 crisis. When a bank aggressively takes on excessive risks to amplify lending to riskier borrowers, the subsequent expansion in loans may diminish bank performance and elevate bank riskiness even *before* a financial bubble bursts. However, these questions have not received comprehensive attention in past studies.

Hence, we show that relatively sound banks exhibit a propensity for greater risk taking, utilizing extensive and detailed data spanning the period from 2001 to 2014. Our analysis encompasses all US commercial banks over an extended period surrounding the 2008 crisis, ensuring the robustness of our results. We control for various bank characteristics, as well as macro-economic and real-estate market conditions at the geographical level. In addition, we illustrate that the excess loan growth observed in prudent banks detrimentally impacts bank performance over time during an asset bubble period preceding a crisis. This implies that their heightened loan growth is linked to risk taking rather than the exploitation of

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[1] Past studies typically rely on a limited number of bank holding companies (BHC) (Demsetz and Strahan, 1997), European banks (Camara et al., 2013), or data covering a short time period centered around the 2008 crisis (Ivashina and Scharfstein, 2010; Cornett et al., 2011).

[2] Previous research indicates that well-capitalized banks (Demsetz and Strahan, 1997; Camara et al., 2013) and banks with a stable funding structure (Ivashina and Scharfstein, 2010; Cornett et al., 2011) demonstrated a propensity for increased risk taking before the 2008 crisis.

unused lending capacities.

Drawing from quarterly data spanning all US commercial banks between 2001 and 2014, our study examines the lending and risk-taking behaviors of relatively sound banks characterized by high capital adequacy ratios (e.g., high BIS capital ratio), high-performing loan ratios, or stability in funding (e.g., high core deposit ratio). Termed as *prudent* banks, we specifically investigate whether these banks exhibit an aggressive surge in lending, particularly to riskier borrowers, in comparison to their counterparts.

To test the robustness of our findings, we incorporate controls for real-estate conditions in the geographical markets where banks operate. Additionally, we scrutinize the repercussions of excessive loan growth on bank risks and profitability. Employing aggregate borrower and loan information at the bank level, we further dissect whether lending behaviors differ across borrower and loan types (i.e., households vs. commercial borrowers; loans 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 maintain lower levels of risk, as evidenced by lower loan ratios. However, these banks exhibit higher excess loan growth rates, a trend that persists even after adjusting for bank characteristics and geographical information, such as Metropolitan Statistical Area (MSA)-level data. The heightened loan growth rates of prudent banks remain robust, even after accounting for their bank loan ratio, representing the unused lending capacity of banks. Post the 2008 crisis, prudent banks experience a marked reduction in loan growth, contradicting the notion that unutilized lending capacity propelled increased bank loans.

Instead, the surge in loans is attributed to (a) lending primarily to households rather than commercial or industrial borrowers and (b) focusing on secured real estate loans over unsecured loans. Banks engaged in excessive lending also demonstrate an escalation in bank riskiness, measured through non-performing loan (NPL) ratios and volatility in the accounting rate of return, along with a decline in profitability over time. In summary, our results suggest that prudent banks engage in more excessive lending compared with their counterparts, resulting in suboptimal performance before the 2008 crisis—a manifestation of the risk-taking behaviors of prudent banks.

Compared with risky banks, prudent banks, characterized by high capital ratios, high core deposit ratios, and robust performing loans, exhibit higher approval rates for household mortgage loan applications. Recognizing that banks can securitize and sell their loans to other financial institutions (Krainer and Laderman, 2014; Jiang et al., 2014), relying solely on balance sheet information may not accurately portray the actual loan-making decisions of banks. Therefore, our analysis of loan approval rates addresses these concerns, offering insights into the tangible lending

decisions of banks.

We also construct a prudence index based on capital ratio, core deposit funding ratio, and performing loan ratios. Analyses utilizing these prudence indices validate the aforementioned results. Banks with higher prudence indices show higher growth in excessive loans, increased approval rates for loan applications, a rise in NPL ratios, heightened volatility in profitability, and a decline in profitability over time.

Our results suggest that prudent banks show high risk-taking behaviors preceding a financial crisis, accelerating their loan growth to riskier borrowers. These results challenge the traditional belief that prudent banks, by taking fewer risks and selecting borrowers more judiciously than their counterparts, are less prone to failures/insolvencies. Instead, our results indicate that prudent banks heighten their exposure to risks during the asset-bubble period before a crisis. Furthermore, this study implies that prudent banks do not necessarily possess superior information or better lending-decision technology. Our analyses suggest that some prudent banks make lending decisions without conducting proper credit analyses of borrowers, seemingly capitalizing on rising real-estate prices in the pre-crisis period.

As our study encompasses all commercial banks, as opposed to a limited subset, the implications of our results carry significant weight for banking regulation. In the current landscape of micro-prudential policy aimed at ensuring financial stability in the banking sector, the focus is primarily on monitoring the risk-taking activities of individual banks. Banks are typically labeled "risky" when they exhibit weakened financials, indicated by lower capital adequacy ratios, higher NPL ratios, among other metrics. Consequently, regulators diligently oversee risky banks to mitigate the potential of excessive risk taking. However, our study introduces a nuanced perspective. Beyond the conventional understanding of risky banks, we demonstrate that prudent banks, despite maintaining sound financials, engaged in risky lending before a financial crisis. Prudent banks, with their robust financial foundations, appear to have contributed to a rapid credit expansion preceding the 2008 crisis. This finding suggests that regulators should broaden their focus to include macro-prudential supervisions in order to ensure the overall stability of the financial system.

The rest of the paper proceeds as follows. Section 2 reviews related literature, and 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.

II. Related Literature on Bank Lending Behavior and Its Consequences

Increased lending, especially to riskier borrowers, left the banking sector susceptible to a shock that triggered the 2008 financial crisis (Brunnermeier, 2009; Acharya and Naqvi, 2012). Past studies have indicated that a substantial rise in aggregate bank loans can serve as a harbinger of an impending banking crisis (Acharya and Naqvi, 2012). Notably, both bank credit and new loans experienced a dramatic surge before the 2008 crisis (Chari et al., 2008; Ivashina and Scharfstein, 2010). Additionally, loans extended to riskier borrowers intensified in the period leading up to the crisis. Demyanyk and Hemert (2011), using mortgage loan-level data, demonstrated an increase not only in the total number and amount of originated loans but also a deterioration in the quality of loans from 2001 to 2006. Banks with higher debt growth exhibited poorer performance, characterized by lower interest income and lower capital ratios (Foos et al., 2010), rendering them vulnerable to failure and exit (Arena, 2008).

Piecemeal findings from past studies hint at the possibility that sound banks—defined as well-capitalized, equipped with advanced risk management, and/or profitable—also engaged in excessive risk taking and increased their lending risk during an asset bubble period preceding a crisis. First, well-capitalized banks, including merged banks and bank holding companies, have a propensity 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 relying on core deposits more than others (compared with those with larger wholesale funding) tend to provide more loans during a crisis. Interestingly, banks with more capital exhibited greater risk taking before the 2008 crisis (Camara et al., 2013) but did not enhance their performance during the crisis itself (Ratnovski and Huang, 2009). Moreover, banks requiring intervention during the crisis had higher capital ratios than their counterparts.

Second, banks with advanced risk management capabilities have the capacity to take more risks and supply more credit. For example, active risk management or superior ability to handle credit risks enables 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 extend more loans and assume more risks, potentially compromising their charter values. Profitable banks with high-performing loans require smaller loss provisions and possess more resources for lending (Hasan and Wall, 2004; Messai and Jouini, 2013). These banks can accumulate capital, thereby increasing their leverage (Martynova et al., 2015) or

alleviating the binding constraints of their capital requirements (Calem and Rob, 1999). Indeed, leveraging their larger lending capacities, these profitable banks, with few non-performing loans, demonstrate less risk aversion and engage in more loans, including riskier ones (Calem and Rob, 1999; Martynova et al., 2015).

Excessive aggregate lending to new, higher-risk borrowers often results in poor bank performance and an increased likelihood of bank failure. Cross-country analysis, as demonstrated by Foos et al. (2010), indicates that high loan growth rates before the global crisis were associated with more loan loss provisions, lower relative interest income, and lower capital ratios. This suggests that banks extended their lending to new, higher-risk borrowers, and the resulting poor performance can contribute to an elevated number of bank failures (Arena, 2008).

Studies further propose that various types of banks alter their lending practices in distinct ways during a financial crisis. In the aftermath of the 2008 financial crisis, banks not only curtailed their lending to corporate borrowers (Ivashina and Scharfstein, 2010; Chari et al., 2008) but also increased their loan prices (Santos, 2011), prompting corporations to reduce their corporate investment in the US (Duchin et al., 2010). Notably, banks with higher exposure to liquidity risks exhibited lower loan growth rates during the crisis, whereas those 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 underwent diverse changes during the crisis.

III. Hypothesis Development

Banks with high capital adequacy ratios, high stable-funding ratios (i.e., a high reliance on core-deposit ratios rather than on wholesale funding), or low NPLs possess large lending capacities and greater resilience to external unfavorable shocks. Prudent banks are commonly perceived as sound by regulators, depositors, and investors (Martinez-Peria and Schmukler, 2001; Berger and Deyoung, 1997). Consequently, depositors and investors demand lower interest rates for their deposits and investments (Martinez-Peria and Schmukler, 2001). Despite being more likely to survive large external shocks, fragmented evidence from past studies suggests that these banks may have taken more risks.

First, we hypothesize that prudent banks, characterized by higher capital adequacy, lower risks of failure/insolvency, and greater lending capacities, can increase their lending at higher rates, thereby augmenting their exposure to risks. A bank with a high capital ratio possesses more capacity than other banks to borrow more at a 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). With increased borrowing capacity at a lower cost, a bank can extend more loans to borrowers to enhance 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 experiencing excessively high loan growth are prone to poor performance. When banks increase their loans from their assets at a rate surpassing historical norms (high loan growth exceeding asset growth), these loans may not adequately account for associated risks, potentially extending credit to new, lower-quality borrowers. Allocating larger portions of assets to riskier borrowers implies an increased overall risk for banks. Consequently, banks with excessive loan growth are exposed to higher risk, as riskier borrowers are less likely to meet their loan obligations, leading to 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 posit that the performances of prudent banks decline over time more than those of other banks. According to H1, prudent banks undertake excessive risks and engage in excessive lending. As per H2, when banks extend more loans to higher credit risk borrowers who are more likely to default, they underperform compared with 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 by prudent banks is more closely linked to their incentives to exploit their lending capacity rather than their superior credit evaluation ability. With fewer constraints in raising capital, a prudent bank has the motivation to utilize its unused lending capacity and increase loans to borrowers. In a booming real-estate market before a crisis, a bank lacking careful credit evaluation might underestimate the long-term effects of aggregate excessive lending and perceive mortgage loans as safe (Bester, 1985; Niinimaki, 2009). Specifically, such a bank without robust credit evaluation skills might consider lending to household borrowers with collateral in real estate markets (such as mortgage loan borrowers) as safer than lending to commercial and industrial borrowers. Consequently, a prudent bank with more lending capacity than other banks might approve more household mortgage loan applications than other types of loan applications. This hypothesis implies that prudent banks neither possess

better information about 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.

IV. Data and Methodology

4.1. Data Sources

We use data from multiple sources to construct comprehensive bank-specific information for our study. Quarterly financial statements on US commercial banks spanning from the first quarter of 2001 through the fourth quarter of 2014 are sourced from the Consolidated Reports of Condition and Income (Call Reports) of the Federal Financial Institutions Examination Council (FFIEC). Additionally, branch-level deposit data is collected from the Summary of Deposits (SOD) database of the Federal Deposit Insurance Corporation (FDIC). To incorporate economic activities and real estate market conditions, MSA-level information is employed. This includes Total Real GDP (Total RGDP) from the Bureau of Economic Analysis (BEA) and the Housing Price Index (HPI) from the Federal Housing Finance Agency (FHFA). The Herfindahl-Hirschman Index (HHI), measuring market concentration in each MSA or state based on bank deposits from SOD, is also utilized. Economic conditions in each MSA, such as average income, real estate prices, or banking sector competition, can impact the loan demand for banks operating within that area. Recognizing that a bank can operate multiple branches across different MSAs, we use MSA-level information weighted by the relative deposit of each branch within a bank. Consequently, HPI, Total RGDP, and HHI are value-weighted by the deposit in each branch across MSAs. In cases where a bank has a branch with no MSA location information, we resort to the state-level information of that branch.

We exclude banks with zero total assets and branches with zero total deposits. We apply winsorization to deposit, bank-level, and MSA-level variables, addressing extreme values by truncating the top and bottom 1% of the distribution for each variable. The final data set comprises 416,191 bank-quarter observations. For detailed definitions and constructions of all variables used in this study, along with their sources, see Table 1.

[Table 1] Definitions of the variables and data sources

Variable	Definition	Source
BIS capital ratio	Equity capital to its total risk-weighted assets.	FFIEC
Core deposit ratio	Core deposit to sum of core deposit & wholesale funding.	FFIEC

NPL ratio	Total non-performing loans to TA.	FFIEC
Total assets (TA)	Amounts of the assets of the bank in $1000.	FFIEC
ROA	Return on assets.	FFIEC
Total loan ratio	Ratio of total loans to total assets (total loan/TA).	FFIEC
Secured R.E. loan ratio	Ratio of secured real-estate loans to TA.	FFIEC
Residential home loan ratio	Ratio of residential property loans to TA.	FFIEC
Non-residential R.E. loan ratio	Ratio of secured real-estate loans minus residential property loans to TA	FFIEC
Household loan ratio	Ratio of sum of residential property loans, car loans and credit card loans to TA.	FFIEC
Individual loans	Ratio of household loans minus residential property loans to TA.	FFIEC
C&I loan ratio	Ratio of a bank's commercial and industrial loans to TA.	FFIEC
Excess total loan growth	$\text{Log}(\text{Total Loans}_t / \text{Total Loans}_{t-1}) - \log(TA_t / TA_{t-1})$.	FFIEC
Excess secured R.E. loan growth	$\text{Log}(\text{Secured R.E. loans}_t / \text{Secured R.E. loans}_{t-1}) - \text{Log}(TA_t / TA_{t-1})$.	FFIEC
Excess residential home loan growth	$\text{Log}(\text{Residential home loans}_t / \text{Residential home loans}_{t-1}) - \log(TA_t / TA_{t-1})$.	FFIEC
Excess non-residential R.E. loan growth	$\text{Log}(\text{Non residential R.E. loans}_t / \text{Non residential R.E. loans}_{t-1}) - \log(TA_t / TA_{t-1})$.	FFIEC
Excess household loan growth	$\text{Log}(\text{Household loans}_t / \text{Household loans}_{t-1}) - \log(TA_t / TA_{t-1})$.	FFIEC
Excess Individual loan growth	$\text{Log}(\text{Individual loans}_t / \text{Individual loans}_{t-1}) - \log(TA_t / TA_{t-1})$.	FFIEC
Excess C&I loan Growth	$\text{Log}(C\&I \text{ loans}_t / C\&I \text{ loans}_{t-1}) - \log(TA_t / TA_{t-1})$.	FFIEC
Change in NPL ratio	$\text{Log}(\text{NPL ratio}_t) - \log(\text{NPL ratio}_{t-1})$.	FFIEC
Change in ROA	$\text{Log}(ROA_t) - \log(ROA_{t-1})$.	FFIEC
Application Approval rates	Sum of approved loans divided by total applied loans.[3]	HMDA
Applicants' income	Average of the applicants' incomes in a bank.	HMDA
Gender	Percentage of male applicants.	HMDA
Race	Percentage of white applicants	HMDA
HPI	Average of the housing price index of the MSAs or states.	FHFA
Total RGDP	Average of the total real GDP of the MSAs or states.	BEA
HHI	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), and The Home Mortgage Disclosure Act (HMDA)

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[3] The Loan Application Register (LAR) of HMDA Approved loans encompasses loans that are 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.

For a detailed overview of the variables used in this study, including their means across different periods, see Table 2. Notably, assets and loans exhibit a consistent upward trend across all periods. In our data set, secured real-estate loans represent the predominant component of total loans, with a mean ratio of 0.76.

Although the mean value of *BIS capital ratio* slightly changes over time, its large standard deviation compared with its mean suggests considerable variations across banks. Some banks faced financial challenges around the crisis and received capital injections, resulting in very low *BIS capital ratio*. *Core deposit ratio* reached its lowest during the crisis and peaks after the crisis. This ratio also varies substantially across banks. The *NPL ratio* increased sharply during the crisis, reaching three times its pre-crisis level after the crisis. *ROA* attains its highest value before the crisis, dips to its lowest during the crisis, and exhibits a partial recovery thereafter. *HPI* has the highest value during the crisis, with its post-crisis value remaining below the pre-crisis level.

[Table 2] Summary statistics

	Whole period				Pre-Crisis	During-Crisis	Post-Crisis
	MEAN	STD	MIN	MAX	MEAN	MEAN	MEAN
Total loans ($1000)	295,441	935,589	1,251	13,268,055	242,184	317,923	363,498
Secured R.E. loans ($1000)	188,342	520,996	0	6,502,157	150,927	211,649	233,048
Residential home loans ($1000)	77,510	217,701	0	2,801,474	65,586	76,054	94,722
Non-Residential home loans ($1000)	107,689	298,008	0	3,257,286	82,712	131,857	133,973
Household loans ($1000)	93,438	251,280	0	3,163,876	82,637	90,697	109,618
Individual loans ($1000)	18,625	73,998	0	828,068	20,447	16,730	16,762
C&I loans ($1000)	38,528	177,643	0	2,681,911	29,978	41,518	49,711
Total loan ratio	0.6275	0.1626	0.0435	0.9353	0.6296	0.6615	0.6105
Secured R.E. loan ratio	0.4316	0.1795	0.0000	0.8395	0.4161	0.4673	0.4395
Residential home loan ratio	0.1879	0.1256	0.0000	0.6538	0.1877	0.1867	0.1885
Non-Residential R.E. loan ratio	0.2415	0.1403	0.0000	0.7008	0.2259	0.2785	0.2487
Household loan ratio	0.2357	0.1363	0.0000	0.7044	0.2466	0.2302	0.2227
Individual loan ratio	0.0467	0.0471	0.0000	0.3510	0.0577	0.0418	0.0326
C&I loan ratio	0.0222	0.0510	0.0000	0.3023	0.0184	0.0245	0.0266
Excess total loan growth	0.0015	0.0623	-0.3229	0.6258	0.0048	0.0029	-0.0036
Excess secured R.E. loan growth	0.0043	0.0681	-0.3240	0.4840	0.0090	0.0063	-0.0032
Excess residential home loan growth	0.0001	0.0934	-0.4081	0.6793	-0.0012	0.0124	-0.0032
Excess non- residential R.E. loan growth	0.0078	0.0959	-0.4116	0.6105	0.0170	0.0044	-0.0036

Excess household loan growth	0.0029	0.0715	-0.4995	1.1412	0.0068	0.0065	-0.0038
Excess individual loan growth	-0.0224	0.1339	-0.6842	0.8765	-0.0230	-0.0205	-0.0223
Excess C&I loan growth	-0.0164	0.0687	-0.3874	0.2763	-0.0204	-0.0206	-0.0090
BIS capital ratio	0.1760	0.0955	0.0012	1.3720	0.1768	0.1716	0.1766
Core deposit ratio	0.7767	0.1702	0.0000	1.0000	0.7555	0.6928	0.8422
NPL ratio	0.0137	0.0214	0.0000	0.1911	0.0078	0.0154	0.0216
Total assets ($1000)	467,670	1,511,187	7,986	20,938,997	389,105	470,947	580,427
ROA	0.0050	0.0075	-0.0821	0.0331	0.0062	0.0035	0.0038
HPI	171.6	32.9	108.8	336.9	162.1	189.9	177.8
Total RGDP ($Billion)	97,355	104,842	1,539	459,699	93,020	101,311	102,016
HHI	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

Note: This table presents descriptive statistics for the variables utilized in the analysis. The definition and construction of each variable are detailed in Table 1. Variables have been winsorized at the 1st and 99th percentiles. The pre-crisis period spans from 2001:1Q to 2007:2Q, the during-crisis period from 2007:3Q to 2009:2Q, and the post-crisis period from 2009:3Q to 2014:4Q.

4.2. Methodology and Variables

We examine how bank attributes are related to bank lending. As a bank's loan ratio serves as an indicator of its risk exposure, variations in this ratio can signify changes in risk exposure. Drawing inspiration from prior studies (Ivashina and Scharfstein, 2010; Foos et al., 2010; Cornett et al., 2011), we quantify risk-taking behavior through loan growth rates. Recognizing that aggressive banks may augment their lending at a pace exceeding asset growth (indicating loans beyond the increase in capital), our focus lies on the excess loan growth rate—measured as the loan growth rate surpassing the asset growth rate. We specifically refer to this as excessive loan growth rates. Importantly, we emphasize the growth rate rather than the absolute lending level. Our definition of excess loan growth is evaluated at the bank level, enabling us to assess whether prudent banks exhibit higher excessive loan growth rates than risky banks.

To reduce omitted variable bias, we control for bank-specific attributes, MSA-level business conditions, and MSA-level real-estate market conditions. Recognizing potential structural differences in the economy across the pre-crisis, crisis, and post-crisis periods, we conduct separate analyses for each time segment. The pre-crisis period spans from the first quarter of 2001 to the second quarter of 2007.[4] The crisis

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[4] In the early 2000s, the effects of the collapse of the speculative dot-com bubble might persist, distorting our results for the risky lending behavior of prudent firms in the pre-crisis period. Therefore, we re-estimate our main regression in Tables 3 and 5 with different sample periods whose pre-crisis periods start from 2002, 2003, or 2004. The results are robust regardless of the length of pre-crisis.

period encompasses the third quarter of 2007 to the second quarter of 2009, whereas the post-crisis period extends from the third quarter of 2009 to the fourth quarter of 2014.

$$Y_{it} = \beta_0 + \beta_1 \cdot \boldsymbol{B}_{it-1} + \beta_2 \cdot \boldsymbol{B}_{it-1} \cdot Crisis_t + \beta_3 \cdot \boldsymbol{B}_{it-1} \cdot Post_t + \beta_4 \cdot \boldsymbol{X}_{it} + \omega_i + \mu_t + \varepsilon_{it} \quad (1)$$

The dependent variable, bank lending behavior, is assessed through two measures: *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, $\log(Loan_t / Assets_t) - \log(Loan_{t-1} / Assets_{t-1}) = \log(Loan_t / Loan_{t-1}) - \log(Assets_t / Assets_{t-1})$. Loan ratio reflects the existing level of a bank's risk exposure, whereas excess loan growth rate represents the additional risk that a bank takes. Excess loan growth variables measure abnormal loan growth above the asset growth rate. A positive value indicates that a bank's loans increase faster than its assets, whereas a negative value suggests that its loans grow slower than its assets.

We also examine bank lending behaviors concerning different types of loans and borrowers, distinguishing between households and business borrowers as well as secured and 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. Given that banks extend loans to households, including residential home loans, car loans, and credit card loans, we define Household loans to encompass this category (89% of all household loans in our data). *Household loan ratio$_{it}$* is the ratio of the credit supply to households and individuals over bank assets for bank i at time t. Apart from lending loans to businesses by taking real estate as collateral, banks 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, $\log(C\&I\ loan_t / C\&I\ loan_{t-1}) - \log(Assets_t /$

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These results are available from the authors.

$Assets_{t-1}$).

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 and 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 periods, we include their interaction terms with *Crisis* or *Post* dummies.

X_{it} denotes MSA-level variables such as *HPI*, *Total RGDP*, and *HHI*. MSA-economic conditions may influence loan demand, with MSAs having better economic conditions or higher housing prices potentially exhibiting higher loan demand. To account for variations in borrowing demand across MSAs, we control for MSA-economic conditions, including average income and real estate prices, along with indicators of banking sector competition. For banks operating 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 a serially and cross-sectionally uncorrelated error term.

We also examine the loan approval rates of prudent banks, employing two distinct methods: (a) calculating the approval rates by dividing the total approved loan amount by the aggregate requested amount in loan applications and (b) determining the rates by dividing the number of approved loans by the total number of loan applications. Additionally, we factor in the average income level of loan applicants.

$$Loan\ approval\ rates_{it} = \beta_0 + \beta_1 \cdot B_{it-1} + \beta_2 \cdot B_{it-1} \cdot Crisis_t + \beta_3 \cdot B_{it-1} \cdot Post_t$$
$$+ \beta_4 \cdot X_{it} + \omega_i + \mu_t + \varepsilon_{it} \tag{2}$$

We investigate the correlation between prudent banking practices and excessive lending behavior with changes in bank performance, indicative of financial health and risk outcomes. Bank performance hinges on various factors, encompassing bank-specific details like 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 temporal evolution of the NPL ratio and profitability. Consistent with Louzis et al. (2012), the *Change in NPL ratio* is computed using the logarithmic differences in NPL ratios, denoting the growth rate of non-performing loans relative to total loan growth. Following Knapp et al. (2006), we also assess bank performance through logarithmic differences in ROA.

$$Bank\ Performance_{it} = \beta_0 + \beta_1 \cdot \sum_{k=1}^{4} Excess\ Loan\ Growth_{it-k}$$
$$+\beta_2 \cdot \sum_{k=1}^{4} Excess\ Loan\ Growth_{it-k} \cdot Crisis_t$$
$$+\beta_3 \cdot \sum_{k=1}^{4} Excess\ Loan\ Growth_{it-k} \cdot Post_t + \beta_4 \cdot \boldsymbol{B}_{it-1}$$
$$+\beta_5 \cdot \boldsymbol{B}_{it-1} \cdot Crisis_t + \beta_6 \cdot \boldsymbol{B}_{it-1} \cdot Post_t + \beta_7 \cdot \boldsymbol{X}_{it} + \omega_i + \mu_t + \varepsilon_{it} \qquad (3)$$

V. Empirical Results

5.1. Univariate Tests of Lending Behaviors

To compare the lending behaviors of prudent banks and risky banks, we plot them across time. First, we sort banks into quintiles according to *BIS capital ratio, Core deposit ratio,* and *NPL ratio.* We then compare the mean of the highest quintile group with that of the lowest quintile group in each period (i.e., pre-crisis, during-crisis, and post-crisis).

In all three periods, banks with higher *BIS capital ratio* and *Core deposit ratio* and lower *NPL ratio* consistently exhibit proportionally lower lending than risky banks (see Figures 1A, 1B, and 1C in Panel A). Prudent banks with higher *BIS capital ratios*, *Core deposit ratios*, or higher *PL ratios (performing loan ratio* measured through *1-NPL ratio)* than their counterparts demonstrate higher excess total loan growth rates in the pre-crisis period. However, they markedly decrease their excess total loans in the post-crisis period compared with other banks (see Figures 2A, 2B, and 2C in Panel B).

In short, univariate test results indicate that in the pre-crisis period, banks with superior capital adequacy, increased core deposits, or higher PL ratios (i.e., lower NPL ratio) exhibit lower lending levels but display higher excess loan growth rates. These findings suggest that relatively sound banks aggressively expand lending and expose themselves to risks more than risky banks. Conversely, in the post-crisis period, these banks significantly reduce their excess loan growth rates compared with risky banks.

5.2. Multivariate Regression

Table 3 shows the effects of bank-specific characteristics on lending behaviors, specifically reflected in loan ratios and excess loan growth rates in Panels A and B, respectively. The observed effects hold true for various types of loans, including *Total loan ratios, Secured R.E. loan ratios, Residential home loan ratios, Non-residential R.E. loans, household loans,* and *C&I loans*. Across 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 exhibit

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

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
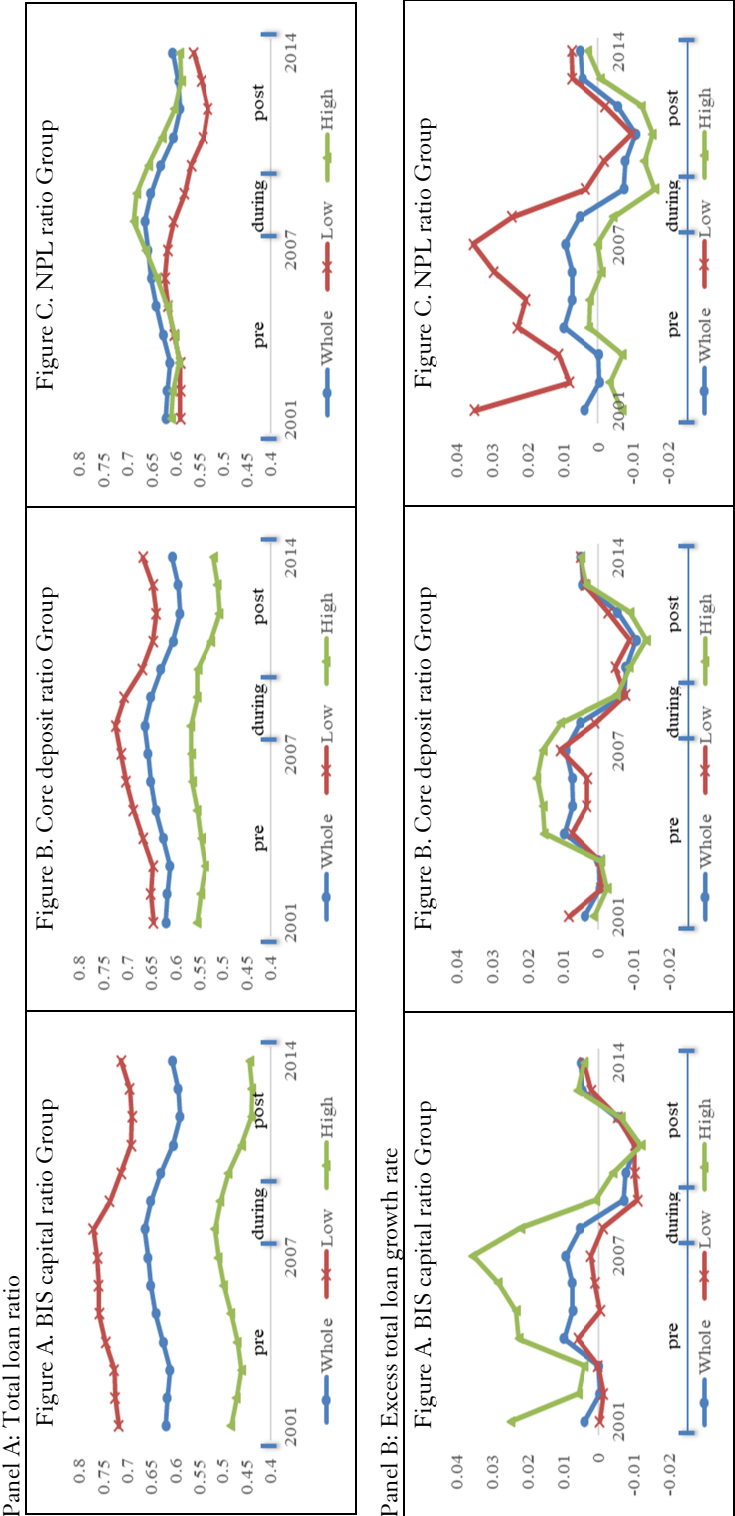
Note: The figures illustrate the group means of total loan ratios (in Panel A) and total loan growth rates (in Panel B) within each bank group across sub-periods. Quarterly, all banks are categorized into quintiles based on characteristics such as BIS capital ratio, Core deposit ratio, and Performing Loan ratio. The low group comprises banks falling within the lowest quintile, whereas the high group consists of banks belonging to the highest quintile. The pre-crisis period extends from 2001:1Q to 2007:2Q, the during-crisis phase spans from 2007:3Q to 2009:2Q, and the post-crisis period encompasses 2009:3Q to 2014:4Q.

lower lending levels than their counterparts. The negative coefficient of *NPL ratio* suggests that banks with higher NPL ratios engage in lower lending compared with other banks. Conversely, positive and significant coefficients of *ROA* imply that banks with higher profitability have higher lending ratios.

When analyzing C&I loans, we address a selection issue where large banks participate in lending to commercial borrowers, whereas small banks often have fewer commercial borrowers. To mitigate this, we employ Heckman's (1979) two-stage model, using *Deposit Rank* (ranging 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 exhibit more commercial and industrial loans than those with the lowest deposit rank. The results of the selection model are reported in column 7, and the findings for the *C&I loan ratio* align closely with those for other loan types and loans to household borrowers, with the exception of *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 consistently similar across various types 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 a one-percentage-point increase in *BIS capital ratio* results in a bank increasing total loans by approximately 0.41% more rapidly than total assets from the last quarter. Notably, given the large standard deviation of the *BIS capital ratio* in our sample (0.0955), a one-standard-deviation increase corresponds to a 3.9% increase in *Excess total loan growth*. The significant impact of *BIS capital ratio* is partially due to its large standard deviation. The coefficient of *Core deposit ratio* is 0.0181, indicating that that a 1% increase in *Core deposit ratio* leads to a 0.02% faster increase in total loans compared with total assets from the last quarter. With a standard deviation of 0.1702, a one-standard-deviation rise in *Core deposit ratio* corresponds to an increase of approximately 0.3% in *Excess Total Loan Growth*. Likewise, the coefficient of NPL ratio is -0.3504, and with a standard deviation of 0.0214, a one-standard-deviation decrease in NPL ratio results in an approximately 0.8% increase in *Excess Total Loan Growth*. Banks exhibiting higher capital adequacy ratios, more stable funding sources (reflected in a higher *Core deposit ratio*), and lower NPL ratios than their counterparts demonstrate higher excess loan growth rates, indicating that their lending expands more rapidly than their assets. Overall, sound bank characteristics exhibit a positive association with higher excess total loan growth rates across various loan types, suggesting that prudent banks aggressively increased lending compared with other banks.

Some may content that increased loan growth is attributable to a bank's untapped lending capacity, as indicated by lower loan ratios, rather than indicative of

increased risk-taking by the bank. In light of this, we conduct a thorough examination to determine if the heightened loan growth rates observed in prudent banks remain robust when considering their bank loan ratio, which represents the unused lending capacity of the banks. The findings, presented in Table A.3 of the Appendix, affirm the robustness of the results. In summary, Table 3 illustrates that banks possessing risky characteristics tend to have higher loan ratios. Conversely, banks characterized by sound banking practices exhibit higher excess loan growth rates, suggesting a greater proclivity for aggressive lending compared with their riskier counterparts, particularly leading up to the financial crisis. Notably, in the aftermath of the crisis, sound banks demonstrate a more pronounced reduction in their excess lending growth rates compared with risky banks.

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

Panel A : Loan ratio

Variable	Total loan ratio (1)	Secured R.E. loan ratio (2)	Residential home loan ratio (3)	Non-Residential R.E. loan ratio (4)	Household loan ratio (5)	Individual loan ratio (6)	C&I loan	
							Selection Model (7)	C&I loan ratio (8)
BIS capital ratio	-0.4719***	-0.2873***	-0.1032***	-0.1813***	-0.1626***	-0.0511***	-2.5266***	-0.1144***
	(-67.15)	(-49.00)	(-30.10)	(-39.66)	(-38.08)	(-30.59)	(-32.53)	(-12.13)
BIS capital ratio · Crisis	0.0547***	-0.0128**	0.0054	-0.0247***	0.0284***	0.0225***	-0.1433	0.0343***
	(6.71)	(-2.05)	(1.52)	(-4.84)	(6.31)	(13.64)	(-0.94)	(3.24)
BIS capital ratio · Post	-0.0650***	-0.1230***	-0.0426***	-0.0806***	-0.0278***	0.0230***	-1.4692***	0.0713***
	(-7.25)	(-17.54)	(-9.75)	(-16.13)	(-5.09)	(10.62)	(-12.03)	(7.30)
Core deposit ratio	-0.0630***	-0.0579***	-0.0038	-0.0552***	-0.0095***	0.0009	-0.6494***	0.0121***
	(-14.20)	(-14.73)	(-1.57)	(-18.12)	(-3.02)	(0.69)	(-23.41)	(3.54)
Core deposit ratio · Crisis	0.0148***	0.0186***	0.0185***	-0.0002	0.0234***	0.0032**	-0.2510***	-0.0034
	(3.05)	(4.72)	(8.08)	(-0.06)	(7.52)	(2.56)	(-4.42)	(-0.97)
Core deposit ratio · Post	-0.0090	0.0138***	-0.0116***	0.0238***	-0.0107***	-0.0054***	0.5281***	-0.0159***
	(-1.51)	(3.00)	(-4.27)	(6.50)	(-2.83)	(-3.33)	(10.82)	(-4.02)
NPL ratio	-0.2492***	-0.2007***	-0.1073***	-0.0834***	-0.0182	0.0520***	0.9193*	-0.2596***
	(-6.84)	(-6.36)	(-5.57)	(-3.30)	(-0.71)	(4.55)	(1.67)	(-4.99)
NPL ratio · Crisis	0.0038	0.1767***	0.0886***	0.1011***	0.0021	-0.0452***	0.3828	0.1282**
	(0.09)	(4.33)	(3.62)	(2.93)	(0.07)	(-3.58)	(0.53)	(2.34)
NPL ratio · Post	-0.1827***	0.0445	0.1031***	-0.0681**	0.0146	-0.0531***	0.5684	0.1009*
	(-4.52)	(1.27)	(4.64)	(-2.44)	(0.50)	(-4.31)	(0.97)	(1.95)
Log(Total assets)	0.0018	0.0174***	-0.0006	0.0150***	-0.0062***	-0.0047***	1.1886***	-0.0018
	(1.20)	(11.96)	(-0.69)	(13.98)	(-6.00)	(-10.69)	(155.45)	(-1.36)
Log(Total assets) · Crisis	0.0060***	0.0033***	-0.0006**	0.0041***	-0.0006*	0.0003**	0.0879***	0.0024***
	(10.85)	(6.79)	(-2.22)	(10.22)	(-1.85)	(2.22)	(6.28)	(4.17)
Log(Total assets) · Post	0.0060***	-0.0012**	-0.0008***	0.0003	-0.0003	0.0008***	0.3694***	0.0042***
	(10.80)	(-2.42)	(-2.68)	(0.85)	(-0.72)	(5.10)	(33.20)	(6.88)
ROA	0.1449**	0.1609***	0.0421***	0.1313***	0.0938***	0.0260**	-0.6307	0.1348**
	(2.29)	(2.90)	(2.88)	(2.86)	(3.05)	(2.53)	(-0.76)	(2.29)
ROA · Crisis	-0.1088	-0.0988*	0.0292	-0.1296**	-0.0060	-0.0069	-0.0562	-0.2295***
	(-1.53)	(-1.86)	(1.04)	(-2.31)	(-0.16)	(-0.62)	(-0.04)	(-3.16)
ROA · Post	0.1443*	0.0142	-0.0098	0.0210	-0.0471	-0.0108	0.0511	-0.1529**

	(1.88)	(0.25)	(-0.45)	(0.44)	(-1.03)	(-0.59)	(0.05)	(-2.33)
Log(HPI)	0.0319***	0.0547***	0.0136***	0.0432***	0.0098***	-0.0045***	-2.0169***	-0.0225***
	(9.03)	(16.69)	(6.32)	(15.82)	(3.92)	(-4.23)	(-78.78)	(-8.05)
Log(Total RGDP)	0.0125***	0.0103***	0.0012	0.0093***	-0.0024	-0.0035***	-0.0470***	0.0034**
	(5.50)	(4.92)	(0.86)	(5.49)	(-1.54)	(-5.12)	(-13.28)	(2.07)
HHI	0.1804***	0.1331***	0.0201	0.1108***	-0.0150	-0.0365***	3.3453***	0.0624***
	(6.99)	(5.26)	(1.22)	(5.75)	(-0.84)	(-4.80)	(39.16)	(3.34)
Deposit rank							-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] Effects of bank-specific characteristics to the lending level and growth (Continued)

Panel B : Excess loan growth

Variable	Excess total loan growth	Excess secured R.E. loan growth	Excess residential home loan Growth	Excess non-residential R.E. loan growth	Excess household loan Growth	Excess individual loan growth	Excess C&I loan growth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
BIS capital ratio	0.4096***	0.3824***	0.2796***	0.3295***	0.4436***	0.2208***	0.0355
	(34.13)	(20.05)	(14.49)	(17.95)	(18.53)	(10.46)	(0.41)
BIS capital ratio · Crisis	0.0208	0.0104	-0.0167	0.0371*	0.0717**	-0.0208	0.1511
	(1.42)	(0.51)	(-0.79)	(1.78)	(2.57)	(-0.85)	(1.51)
BIS capital ratio · Post	-0.0415***	-0.0196	-0.0378***	0.0146	-0.0581***	-0.0163	0.1111
	(-4.27)	(-1.47)	(-3.05)	(1.09)	(-3.30)	(-1.05)	(1.57)
Core deposit ratio	0.0181***	0.0331***	0.0229***	0.0316***	0.0320***	0.0125	0.0343**
	(3.05)	(4.86)	(3.13)	(4.79)	(3.14)	(1.48)	(2.17)
Core deposit ratio · Crisis	0.0071	0.0075	-0.0208**	0.0098	-0.0769***	0.0009	0.0062
	(1.18)	(1.06)	(-2.44)	(1.44)	(-6.35)	(0.10)	(0.37)
Core deposit ratio · Post	-0.0213***	-0.0310***	-0.0292***	-0.0257***	-0.0607***	-0.0339***	0.0142
	(-3.42)	(-3.99)	(-3.86)	(-3.49)	(-6.14)	(-3.78)	(0.85)
NPL ratio	-0.3504***	-0.4639***	-0.2355***	-0.6393***	-0.2126***	-0.2897***	-0.7144***
	(-8.23)	(-14.69)	(-5.73)	(-15.65)	(-4.22)	(-5.73)	(-2.71)
NPL ratio · Crisis	0.0716	-0.0246	0.2342***	0.0125	0.2969***	0.2356***	0.5760**
	(1.46)	(-0.53)	(3.73)	(0.25)	(4.22)	(3.23)	(2.10)
NPL ratio · Post	0.1852***	0.2390***	0.1613***	0.3399***	0.1539***	0.2337***	0.8597***
	(4.22)	(6.71)	(3.63)	(7.70)	(2.86)	(4.18)	(3.22)
Log(Total assets)	0.0192***	0.0153***	0.0087***	0.0199***	0.0079**	0.0146***	0.0720***
	(9.35)	(5.73)	(3.10)	(7.58)	(2.37)	(5.03)	(7.97)
Log(Total assets) · Crisis	0.0032***	0.0032***	0.0035***	0.0024***	0.0036***	0.0030***	0.0043
	(5.31)	(4.34)	(4.46)	(3.47)	(3.82)	(3.39)	(1.62)
Log(Total assets) · Post	-0.0020***	-0.0001	0.0032***	-0.0017***	0.0001	0.0028***	-0.0047**
	(-4.94)	(-0.25)	(6.56)	(-3.04)	(0.10)	(4.31)	(-1.97)

ROA	-0.6806***	-0.5194***	-0.4860***	-0.5244***	-0.9479***	-0.3481***	0.5146
	(-7.61)	(-5.65)	(-5.67)	(-5.57)	(-3.51)	(-4.86)	(1.25)
ROA · Crisis	0.4117***	0.0950	0.0907	0.1297	1.0066***	0.1010	-0.4881
	(3.43)	(0.66)	(0.64)	(0.98)	(3.85)	(0.91)	(-0.69)
ROA · Post	0.3281***	0.1706	0.0721	0.2688**	0.4255	0.0728	-0.0799
	(3.30)	(1.58)	(0.68)	(2.56)	(1.62)	(0.66)	(-0.20)
Log(HPI)	0.0041*	0.0057*	0.0062	-0.0004	0.0230***	-0.0066	-0.0291***
	(1.68)	(1.70)	(1.50)	(-0.10)	(4.75)	(-1.23)	(-2.99)
Log(Total RGDP)	-0.0046***	-0.0008	-0.0003	-0.0014	-0.0051*	-0.0056**	-0.0039
	(-2.72)	(-0.44)	(-0.14)	(-0.68)	(-1.74)	(-2.26)	(-0.79)
HHI	0.0826***	0.0981***	0.0413	0.1041***	0.0334	0.0625*	0.1166*
	(5.24)	(4.02)	(1.49)	(3.58)	(1.05)	(1.79)	(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

Note: The dependent variables in this analysis encompass the lending level (Panel A) and excess growth (Panel B) of various loan types, serving as a proxy for discerning banks' lending behaviors. Definitions for the variables can be found in Table 1. The periods considered are categorized as follows: pre-crisis spans from 2001:1Q to 2007:2Q, during-crisis encompasses 2007:3Q to 2009:2Q, and post-crisis extends from 2009:3Q to 2014:4Q. Each regression model incorporates quarterly dummies and bank dummies. T-statistics, presented in parentheses, derive from standard errors clustered by bank, ensuring robustness to heteroskedasticity. The significance levels are denoted by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

For the assessment of the impact of bank lending on performance over time, we present 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 calculated as the standard deviation of *ROA* from t-3 to t, indicating the riskiness of bank profitability. In Panel A, we illustrate the direct effects of *Excess total loan growth* on these performance variables, whereas Panel B explores the interaction effects of *Excess total loan growth* and sound financial characteristics. Notably, positive coefficients of *Excess total loan growth* from t-2 to t-3 for *Changes in NPL ratio* imply that aggressive lending precedes a larger NPL ratio two or three quarters later. Conversely, negative coefficients of *Excess total loan growth* from t-1 to t-2 for *Changes in ROA* suggest that aggressive loan growth negatively impacts bank profitability. The positive coefficients of *Excess total loan growth* from t-1 to t-4 for the *Volatility in ROA* indicate that aggressive loan growth contributes to increased volatility in bank profitability.

In short, these findings suggest that aggressive lending compromises a bank's short-term soundness and profitability, ultimately leading to higher non-performing loan ratios and increased volatility in profitability before the 2008 crisis. However,

sound financial characteristics exhibit positive future performance. Given the opposing effects of these variables, we delve deeper by examining the impacts through the inclusion of interaction terms between excess loan growth rates and sound financial characteristic variables in Panel B.

In Panel B, the cumulative coefficients on the interaction terms of *Excess total loan growth* with the *BIS capital ratio* are positive for the *Change in NPL ratio*. Similarly, positive coefficients on the interaction terms between *Excess total loan growth* and *Core deposit ratio* indicate that *Excess total loan growth* elevates the NPL ratio over time. Moving to column 2, negative interaction terms with *BIS capital ratio* and *Core deposit ratio* reveal a diminishing effect on ROA over time. In column 3, positive coefficients of the interaction terms signify favorable effects on the *Volatility of ROA* over time. These results collectively indicate that *Excess total loan growth* at prudent banks contributes to an increase in NPL ratios, heightened volatility of ROAs, and a decline in profitability over time.

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

Panel A : Effects of Excess loan growths

Variable	Change in NPL ratio (1)	Change in ROA (2)	Volatility of ROA (3)
Excess total loan growth t-1	0.0647	-0.0938***	0.0002**
	(0.75)	(-4.05)	(1.98)
Excess total loan growth t-1 · Crisis	-0.0332	-0.0112	0.0007**
	(-0.29)	(-0.19)	(2.46)
Excess total loan growth t-1 · Post	-0.0075	-0.0035	-0.0004*
	(-0.06)	(-0.06)	(-1.76)
Excess total loan growth t-2	0.1034**	-0.0490***	0.0005***
	(2.24)	(-2.69)	(4.75)
Excess total loan growth t-2 · Crisis	0.0790	0.0422	0.0010***
	(0.91)	(0.66)	(4.30)
Excess total loan growth t-2 · Post	-0.0329	0.0411	-0.0003
	(-0.53)	(0.93)	(-1.17)
Excess total loan growth t-3	0.3367***	-0.0048	0.0009***
	(6.37)	(-0.28)	(7.65)
Excess total loan growth t-3 · Crisis	0.0258	-0.0886**	0.0012***
	(0.28)	(-2.05)	(4.47)
Excess total loan growth t-3 · Post	-0.1720**	-0.2173***	-0.0002
	(-2.50)	(-5.67)	(-0.63)
Excess total loan growth t-4	-0.0568	0.0503**	0.0012***
	(-0.54)	(2.07)	(8.75)
Excess total loan growth t-4 · Crisis	0.2388*	0.0402	0.0011***
	(1.84)	(0.74)	(4.14)
Excess total loan growth t-4 · Post	0.0754	0.1059**	-0.0008***
	(0.67)	(2.44)	(-3.09)
BIS capital ratio	-0.3034***	-0.3992***	0.0013***
	(-6.51)	(-15.02)	(4.51)

BIS capital ratio · Crisis	-0.1911***	0.0206	0.0008***
	(-3.25)	(0.76)	(2.70)
BIS capital ratio · Post	0.0978**	-0.1328***	-0.0040***
	(2.53)	(-6.30)	(-13.30)
Core deposit Ratio	-0.1591***	0.0605***	0.0010***
	(-7.87)	(4.98)	(7.63)
Core deposit Ratio · Crisis	-0.0202	0.1475***	-0.0006***
	(-0.77)	(8.78)	(-3.57)
Core deposit Ratio · Post	0.0542***	0.0077	-0.0027***
	(2.62)	(0.56)	(-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] Effects of banks' lending behavior on non-performing loans and profitability (Continued)

Panel B : Effects of Excess loan growths conditioning on soundness variables

variable	Change in NPL ratio (1)	Change in ROA (2)	Volatility of ROA (3)
Excess total loan growth t-1 · BIS capital ratio	0.2530	-0.1774**	0.0002**
	(0.89)	(-2.20)	(1.98)
Excess total loan growth t-2 · BIS capital ratio	0.2432	-0.1389**	0.0007**
	(0.91)	(-2.27)	(2.46)
Excess total loan growth t-3 · BIS capital ratio	0.5177*	-0.0259	-0.0004*
	(1.70)	(-0.42)	(-1.76)
Excess total loan growth t-4 · BIS capital ratio	-0.4049*	-0.2336***	0.0005***
	(-1.65)	(-3.17)	(4.75)
Excess total loan growth t-1 · Core deposit ratio	-0.2840*	-0.0809	0.0010***
	(-1.74)	(-1.20)	(4.30)
Excess total loan growth t-2 · Core deposit ratio	0.0210	-0.1356**	-0.0003
	(0.13)	(-2.25)	(-1.17)
Excess total loan growth t-3 · Core deposit ratio	0.4136**	0.0107	0.0009***
	(2.56)	(0.22)	(7.65)
Excess total loan growth t-4 · Core deposit ratio	0.4248***	0.0509	0.0012***
	(2.97)	(1.01)	(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

Note: This table presents the impact of banks' lending behavior on non-performing loans, while accounting for both bank-specific characteristics and macro-economic conditions. The

periods considered are categorized as pre-crisis (2001:1Q to 2007:2Q), during-crisis (2007:3Q to 2009:2Q), and post-crisis (2009:3Q to 2014:4Q). Each regression model incorporates quarterly dummies and bank dummies to effectively control for time and bank fixed effects. T-statistics, provided in parentheses, are computed based on standard errors clustered by bank, ensuring robustness to heteroskedasticity. The significance levels are denoted by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

5.3. Robustness Test Results

To assess the robustness of our findings, we conduct tests using alternative measures, specifically focusing on bank prudence indices (Section 5.3.1) and banks' actual lending decisions rather than loans on balance sheets (Section 5.3.2). Recognizing that balance sheet information may not fully capture banks' actual loan decisions due to securitization and loan sales (Krainer and Laderman, 2014; Jiang et al., 2014), we extend our analysis to include banks' approval rates for home mortgage loan applications. Additionally, we address potential endogeneity concerns related to bank loans by controlling for loan demands (Section 5.3.3). Furthermore, we explore the consistency of our results across banks of different sizes (Section 5.3.4).

5.3.1. Banks with Higher Prudence Index

Our main results maintain robustness when employing a *Prudence index* based on key bank characteristics. To gauge the soundness of a bank, we construct a quarterly prudence index through exploratory factor analysis (Cattell, 1958). This index is derived from three 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. Detailed information is available in the Appendix. Prudence levels exhibit general stability over time.

Banks characterized by higher prudence levels exhibit lower loan ratios (see Panel A, Table 5) but display 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). This suggests that prudent banks engage in more aggressive lending compared with their counterparts. However, the effect of prudence level is not statistically significant in *C&I loan ratio* or *Excess C&I loan growth*.

Banks exhibiting a higher prudence level had higher NPL ratios and diminished ROA over time, as evidenced in Table 6. These findings imply that the performance of prudent banks experiences a more pronounced deterioration compared with other banks over the specified period. Notably, the excess loan growth rates from t-4 to t-1 during the pre-crisis period exacerbate the escalation of NPL ratios.

We also construct a quarterly prudence index based on additional bank characteristics, such as bank size and/or profitability, in addition to the aforementioned factors (capital adequacy, funding stability, and performing loans). The results obtained using this index are consistent with those reported. Due to space constraints, we present the results using an index based on capital adequacy, funding stability, and performing loans, but results using other factors are available upon request.

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

Panel A : Loan ratio

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

Panel B : Excess loan growth

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

Note: The dependent variables in this analysis encompass the lending level (Panel A) and excess growth (Panel B) of various loan types, serving as a proxy for discerning banks' lending behaviors. Definitions for the variables can be found in Table 1. The periods considered are categorized as pre-crisis (2001:1Q to 2007:2Q), during-crisis (2007:3Q to 2009:2Q), and post-crisis (2009:3Q to 2014:4Q). Each regression from (1) to (7) incorporates quarterly dummies and bank dummies. In regressions (8) and (9), interaction terms between quarterly dummies and MSA dummies are introduced. T-statistics, presented in parentheses, are calculated based on standard errors clustered by bank, ensuring robustness to heteroskedasticity. The significance levels are denoted by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

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

Variable	Change in NPL ratio (1)		Change in ROA (2)	
Prudence index	0.6852***	(44.20)	-0.0188***	(-2.68)
Prudence index · Crisis	-0.0028	(-0.16)	0.0957***	(9.59)
Prudence index · Post	-0.0797***	(-5.90)	-0.0168**	(-2.24)
Excess total loan growth t-1	0.0603	(0.71)	-0.0763***	(-3.30)
Excess total loan growth t-1 · Crisis	-0.0868	(-0.77)	-0.0225	(-0.37)
Excess total loan growth t-1 · Post	-0.0012	(-0.01)	0.0051	(0.09)
Excess total loan growth t-2	0.0991**	(2.13)	-0.0321*	(-1.80)
Excess total loan growth t-2 · Crisis	0.0514	(0.57)	0.0682	(1.08)
Excess total loan growth t-2 · Post	-0.0072	(-0.11)	0.0484	(1.13)
Excess total loan growth t-3	0.3273***	(5.17)	0.0022	(0.13)
Excess total loan growth t-3 · Crisis	-0.0182	(-0.18)	-0.0962**	(-2.25)
Excess total loan growth t-3 · Post	-0.1486*	(-1.90)	-0.2007***	(-5.20)
Excess total loan growth t-4	-0.0617	(-0.58)	0.0549**	(2.39)
Excess total loan growth t-4 · Crisis	0.1833	(1.37)	0.0055	(0.10)
Excess total loan growth t-4 · Post	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	

Note: The dependent variables in this analysis encompass the NPL Ratio and ROA, along with their respective growth rates. Definitions for the variables are provided in Table 1. The periods considered are categorized as pre-crisis (2001:1Q to 2007:2Q), during-crisis (2007:3Q to 2009:2Q), and post-crisis (2009:3Q to 2014:4Q). Each regression model incorporates quarterly dummies and bank dummies. T-statistics, presented in parentheses, are calculated based on standard errors clustered by bank, ensuring robustness to heteroskedasticity. The significance levels are denoted by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

5.3.2. Banks' Approval Rates for Home Mortgage Loan Applications

In our examination of the relationship between prudent bank characteristics and household mortgage loan applications, we utilize Loan Application Register (LAR) data under the Home Mortgage Disclosure Act (HMDA) spanning the years 2001–2013.[5] The data are aggregated for each bank annually, and we derive the total

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[5] The LAR provides loan-level information, with an extensive number of observations, approximately 25 million per year. This data set encompasses loans from various financial institutions, including commercial banks, investment banks, insurance companies, brokerage firms, among others. For the purpose of our analysis, we have excluded data from non-commercial institutions to focus specifically on commercial banks.

amount of loans requested, total approved loan amount, total applications, and total approved applications for each bank. Subsequently, we calculate the approval rate for each bank by (a) dividing the total amount of approved loans by the total requested amount in loan applications, and (b) dividing the number of approved loans by the number of loan applications. In addition to the aforementioned bank attributes, we incorporate information on the average income, gender, and race of loan applicants.[6] The aggregated LAR data are then merged with our bank data. Given the reporting frequency differences (LAR data is reported annually, whereas bank data is reported quarterly), we use fourth-quarter observations of each bank every year. The final sample for approval rates of household loan applications comprises approximately 45,000 bank-year observations.

Table 7 shows that banks with greater *BIS capital ratio* and *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 results remain robust after controlling for *Applicants' income*, *Gender*, and *Race* at the bank level. These findings suggest that prudent banks not only approve a greater number of loan applications but also accelerate their lending activities.

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

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)
BIS capital ratio	0.0426	0.0622***		
	(1.63)	(2.64)		
BIS capital ratio · Crisis	-0.0702***	-0.0667***		
	(-2.63)	(-2.96)		
BIS capital ratio · Post	-0.0999***	-0.0864***		
	(-4.22)	(-3.99)		
Core deposit ratio	0.0328***	0.0264***		
	(3.10)	(2.69)		
Core deposit ratio · Crisis	0.0179	0.0111		
	(1.58)	(1.09)		
Core deposit ratio · Post	-0.0225*	-0.0054		
	(-1.65)	(-0.42)		
NPL ratio	-0.3167***	-0.2849***		
	(-3.48)	(-3.43)		
NPL ratio · Crisis	-0.0785	0.0195		
	(-0.51)	(0.14)		

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[6] For each loan application, the variable *Gender* is coded as 1 for a male applicant; 0, female applicant. Similarly, the variable *Race* is coded as 1 when an applicant is identified as white; 0, otherwise. Given the aggregation of our data at the bank level, *Gender* signifies the percentage of male applicants, whereas *Race* indicates the percentage of white applicants.

NPL ratio · Post	0.2107**	0.1042		
	(2.11)	(1.12)		
Prudence index			0.0148***	0.0152***
			(4.12)	(4.56)
Prudence index · Crisis			-0.0016	-0.0035
			(-0.44)	(-1.12)
Prudence index · Post			-0.0161***	-0.0100***
			(-4.28)	(-2.83)
Log(Applicants' income)	0.0327***	0.0379***	0.0330***	0.0383***
	(11.83)	(14.32)	(11.94)	(14.51)
Gender	0.0890***	0.1068***	0.0892***	0.1070***
	(7.61)	(10.15)	(7.65)	(10.28)
Race	0.0574***	0.0727***	0.0569***	0.0721***
	(4.71)	(6.06)	(4.65)	(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

Note: The dependent variables in this analysis are the loan application approval rates, measured for loan amounts in columns 1 and 3, and for the number of applications in columns 2 and 4. Definitions for the variables can be found in Table 1. The periods considered are categorized as pre-crisis (2001 to 2007), during the crisis (2008 to 2009), and post-crisis (2010 to 2013). Each regression model includes annual dummies and bank dummies. T-statistics, presented in parentheses, are calculated based on standard errors clustered by bank, ensuring robustness to heteroskedasticity. The significance levels are denoted by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

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

Variable	Total loan ratio (1)	Excess total loan growth (2)	Total loan ratio (3)	Excess total loan growth (4)
BIS capital ratio	-0.4479***	0.4479***		
	(-174.89)	(113.79)		
BIS capital ratio · Crisis	0.0290***	0.0135**		
	(8.45)	(2.55)		
BIS capital ratio · Post	-0.1011***	-0.0347***		
	(-27.62)	(-6.17)		
Core deposit ratio	-0.0472***	0.0211***		
	(-24.32)	(7.06)		
Core deposit ratio · Crisis	0.0129***	0.0109***		
	(4.98)	(2.76)		
Core deposit ratio · Post	-0.0092***	-0.0246***		
	(-3.84)	(-6.72)		

NPL ratio	-0.2898***	-0.3346***		
	(-15.52)	(-11.65)		
NPL ratio · Crisis	0.0433*	0.1139***		
	(1.67)	(2.86)		
NPL ratio · Post	-0.1130***	0.2049***		
	(-5.44)	(6.42)		
Prudence index			-0.1122***	0.1305***
			(-121.88)	(95.05)
Prudence index · Crisis			0.0236***	-0.0038**
			(18.72)	(-2.01)
Prudence index · Post			0.0396***	-0.0537***
			(34.46)	(-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

Note: The dependent variables in this analysis encompass the lending level and growth of total loans, serving as proxies for banks' lending behaviors. Definitions for the variables are provided in Table 1. The periods considered are categorized as pre-crisis (2001:1Q to 2007:2Q), during the crisis (2007:3Q to 2009:2Q), and post-crisis (2009:3Q to 2014:4Q). Each regression includes the interaction between MSA dummies and quarter dummies, along with bank dummies. Significance levels are denoted by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

5.3.3. Bank Loan Demands

As previously discussed, loan demand can be influenced by macro-economic conditions and metropolitan statistical area (MSA)-specific economic conditions. Recognizing that varying borrowing demand across MSAs may lead to differences in bank loans to meet this demand, resulting in divergent loan growth patterns, we incorporate MSA*time dummies into our analysis. This inclusion aims to control for local factors that might fluctuate over time, such as demand sensitivity, as suggested by Khwaja and Mian (2008). Despite potential endogeneity concerns related to banks' loan supply meeting loan demand, our results remain robust.

5.3.4. Variation across Bank Sizes

We examine the robustness of the effects of bank characteristics on bank lending across banks of different sizes. The sample is stratified into three categories based on bank size: large, medium, and small. *Large* banks are defined as those with assets exceeding $1 billion. For the remaining banks with assets less than $1 billion, we

further categorize them into two equal-sized groups: *medium* (with assets surpassing the quarterly-median values) and *small* (with assets equal to or less than the quarterly-median values). The average of these quarterly-median values is $117 million.

Table 9 presents the associations between bank characteristics and bank lending, whereas Table 10 explores the relationships between excessive loan growth and bank performance across banks of different sizes. Across varying bank sizes, those with higher *BIS capital ratio* or *Core deposit ratio* tend to exhibit lower loan ratios, whereas those with higher NPL ratios tend to have lower loan ratios as well. Notably, among banks with assets less than $1 billion, *BIS capital ratio* and *Core deposit ratio* positively correlate with *Excess total loan growth*, whereas *NPL ratio* is negatively associated with it. However, this pattern is not observed among larger banks with assets exceeding $1 billion (see Table 9, columns 5–8). These findings suggest that small or medium-sized prudent banks displayed more aggressive lending growth compared with their larger counterparts. Moreover, excessive loan growth is linked to lower ROA over time for banks of all sizes and an increase in NPL ratio over time with certain time lags, indicating lending to less profitable and riskier borrowers (see Table 10).

We also run the regressions with a bank *Prudence index*. with higher prudence levels exhibited lower loan ratios across different bank sizes. Additionally, banks with greater prudence levels demonstrated higher lending growth rates (see Table 11). Among banks with assets exceeding $1 billion, however, the prudence level did not show a significant relationship with lending growth rates (column 8). These outcomes suggest that small or medium-sized prudent banks pursued more aggressive lending growth. Furthermore, banks with higher prudence values experienced higher NPL ratios and lower ROA across all bank sizes, indicating a tendency to lend to less profitable and riskier borrowers.

In addition, our findings remain robust even when we account for exit and entry issues by utilizing balanced panel data. The robustness of our main results persists when we employ loan growth rates instead of excess loan growth rates. Further details on these results are available upon request.

5.6. Summary and Discussion

In our investigation of bank lending behaviors surrounding the 2008 financial crisis, we leverage data encompassing all commercial banks in the US from 2001 to 2014. Although prudent banks exhibit lower loan ratios compared with risky banks, they paradoxically engage in more aggressive lending than their risky counterparts leading up to the financial crisis. Prudent banks also demonstrate higher approval rates for home mortgage loan applications. This aggressive lending behavior and heightened loan growth result in lower bank performance. The increased lending is

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

Variable	Total loans ratio				Excess total loan growth			
	Bank size				Bank size			
	Small	Medium	Small or Medium	Large	Small	Medium	Small or Medium	Large
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
BIS capital ratio	-0.4432***	-0.6392***	-0.4733***	-0.4841***	0.4954***	0.1408***	0.4316***	0.1302
	(-55.50)	(-30.72)	(-66.81)	(-9.15)	(38.25)	(4.29)	(37.24)	(0.79)
BIS capital ratio · Crisis	0.0403***	0.0606***	0.0546***	0.1323***	-0.0072	0.0899**	0.0028	0.1947
	(4.60)	(3.09)	(6.65)	(2.85)	(-0.47)	(2.11)	(0.19)	(1.22)
BIS capital ratio · Post	-0.1036***	0.0097	-0.0840***	0.2079***	-0.0128	0.0348*	-0.0218**	-0.0777
	(-9.66)	(0.65)	(-9.26)	(4.30)	(-1.22)	(1.74)	(-2.16)	(-0.58)
Core deposit ratio	-0.0744***	-0.0574***	-0.0688***	-0.0246	0.0333***	0.0225***	0.0251***	-0.0063
	(-11.12)	(-9.97)	(-15.71)	(-1.51)	(4.03)	(2.74)	(4.32)	(-0.22)
Core deposit ratio· Crisis	-0.0090	0.0271***	0.0119**	0.0606***	0.0040	0.0019	0.0058	0.0254
	(-1.14)	(4.44)	(2.39)	(3.88)	(0.34)	(0.22)	(0.87)	(1.17)
Core deposit ratio · Post	-0.0136	-0.0113	-0.0111*	0.0392**	-0.0313***	-0.0078	-0.0225***	-0.0106
	(-1.34)	(-1.47)	(-1.81)	(2.25)	(-3.90)	(-1.13)	(-3.80)	(-0.40)
NPL ratio	-0.2258***	-0.1890***	-0.2376***	-0.8835***	-0.2580***	-0.4896***	-0.3602***	1.0962
	(-5.86)	(-2.99)	(-6.53)	(-3.09)	(-9.86)	(-7.33)	(-12.83)	(0.98)

[Table 9] Effects of bank-specific characteristics on loan ratio and excess loan growth across bank sizes (Continued)

Variable	Total loans ratio				Excess total loan growth			
	Bank size				Bank size			
	Small	Medium	Small or Medium	Large	Small	Medium	Small or Medium	Large
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
NPL ratio · Crisis	0.0770	-0.0466	0.0080	0.6629**	0.0200	0.2312***	0.0840**	-1.2989
	(1.49)	(-0.63)	(0.18)	(2.22)	(0.54)	(2.71)	(2.09)	(-1.24)
NPL ratio · Post	-0.1932***	-0.2344***	-0.1884***	0.4920*	0.1286***	0.3144***	0.2123***	-1.2670
	(-4.26)	(-3.44)	(-4.64)	(1.71)	(3.95)	(4.83)	(7.41)	(-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

Note: We categorize banks into three groups: large, medium, and small. *Large* banks are defined as those with assets exceeding $1 billion. For the smaller remaining banks, we establish *medium* banks as the upper half (> $117 million) and *small* banks as the lower half based on a median split. The dependent variables in the regressions are the total loan ratio and its growth, with variable definitions available in Table 1. The pre-crisis period spans from 2001:1Q to 2007:2Q, the during-crisis phase encompasses 2007:3Q to 2009:2Q, and the post-crisis duration extends from 2009:3Q to 2014:4Q. Each regression model integrates quarterly dummies and bank dummies. T-statistics presented in parentheses are computed based on standard errors clustered by bank and are robust to heteroskedasticity. Significance levels are indicated by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

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

| Variable | Changes in NPL Ratio | | | | Changes in ROA | | | |
| | Bank size | | | | Bank size | | | |
	Small (1)	Medium (2)	Small or Medium (3)	Large (4)	Small (5)	Medium (6)	Small or Medium (7)	Large (8)
Excess total loan growth t-1	-0.0469	-0.0400	-0.0712	0.3576**	-0.0316	-0.1482***	-0.1076***	-0.0712***
	(-0.57)	(-0.49)	(-1.23)	(2.48)	(-1.03)	(-3.09)	(-3.93)	(-2.67)
Excess total loan growth t-1 · Crisis	-0.0726	0.1232	0.0461	-0.0234	-0.0553	0.0124	-0.0070	0.0193
	(-0.48)	(0.90)	(0.45)	(-0.13)	(-0.76)	(0.11)	(-0.11)	(0.15)
Excess total loan growth t-1 · Post	0.0160	0.0220	0.0326	0.1484	0.1420***	0.1239*	0.0739	-0.0537
	(0.15)	(0.22)	(0.44)	(0.54)	(2.70)	(1.70)	(1.29)	(-0.85)
Excess total loan growth t-2	0.0329	0.2140***	0.1001*	0.2490***	-0.0199	-0.0735***	-0.0585***	-0.0114
	(0.45)	(2.64)	(1.80)	(2.73)	(-0.68)	(-3.08)	(-3.20)	(-0.22)
Excess total loan growth t-2 · Crisis	0.0715	0.1031	0.1184	-0.2342	-0.1260**	0.1565	0.0258	0.1096
	(0.52)	(0.74)	(1.19)	(-1.60)	(-2.10)	(1.29)	(0.36)	(1.00)
Excess total loan growth t-2 · Post	-0.0002	-0.0551	-0.0245	-0.1571	-0.1067***	0.0541	0.0038	-0.0146
	(0.00)	(-0.56)	(-0.35)	(-1.37)	(-2.35)	(1.23)	(0.10)	(-0.18)
Excess total loan growth t-3	0.3935***	0.1409*	0.2911***	0.3825***	0.0285	0.0191	0.0189	-0.0714***
	(5.40)	(1.67)	(5.18)	(2.66)	(1.04)	(0.59)	(0.88)	(-2.61)
Excess total loan growth t-3 · Crisis	-0.0361	0.1617	0.0379	0.2293	-0.1485**	-0.1233*	-0.1165**	-0.0153
	(-0.27)	(1.04)	(0.37)	(0.87)	(-2.41)	(-1.75)	(-2.49)	(-0.08)
Excess total loan growth t-3 · Post	-0.1340	-0.0894	-0.1102	-0.3630**	-0.1983***	-0.1769***	-0.2263***	-0.0259
	(-1.33)	(-0.87)	(-1.50)	(-2.29)	(-3.72)	(-3.60)	(-5.85)	(-0.47)

[Table 10] Effects of bank-specific characteristics and bank lending on bank performance across bank sizes (Continued)

Variable	Changes in NPL Ratio				Changes in ROA			
	Bank size				Bank size			
	Small (1)	Medium (2)	Small or Medium (3)	Large (4)	Small (5)	Medium (6)	Small or Medium (7)	Large (8)
Excess total loan growth t-4	0.1789**	0.0420	0.1091**	-0.2841**	0.1365***	0.0150	0.0747***	-0.0375*
	(2.45)	(0.62)	(2.18)	(-2.03)	(4.41)	(0.49)	(2.94)	(-1.89)
Excess total loan growth t-4 · Crisis	-0.0716	0.2250	0.0597	0.5738***	-0.0156	-0.0143	-0.0050	0.2326**
	(-0.52)	(1.46)	(0.59)	(3.29)	(-0.18)	(-0.22)	(-0.09)	(2.22)
Excess total loan growth t-4 · Post	-0.1974**	0.0380	-0.0905	0.2710*	-0.0243	0.0737	0.0543	0.0987*
	(-2.05)	(0.40)	(-1.33)	(1.80)	(-0.46)	(1.51)	(1.32)	(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

Note: We categorize banks into three groups: large, medium, and small. *Large* banks are those with assets exceeding $1 billion. For the smaller remaining banks, we define *medium* banks as the upper half (> $117 million) and *small* banks as the lower half using a median split. The dependent variables in the regressions are changes in NPL ratio and changes in ROA, with variable definitions provided in Table 1. The pre-crisis period spans from 2001:1Q to 2007:2Q, the during-crisis phase encompasses 2007:3Q to 2009:2Q, and the post-crisis duration extends from 2009:3Q to 2014:4Q. Each regression model incorporates quarterly dummies and bank dummies. T-statistics in parentheses are based on standard errors clustered by bank and are robust to heteroskedasticity. Significance levels are indicated by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

[**Table 11**] Effects of prudence index on loan ratio and excess loan growth across bank sizes

Variable	Total loans ratio				Excess total loan growth			
	Bank size				Bank size			
	Small (1)	*Medium* (2)	*Small or Medium* (3)	*Large* (4)	*Small* (5)	*Medium* (6)	*Small or Medium* (7)	*Large* (8)
Prudence index	-0.1195***	-0.1033***	-0.1198***	-0.0806***	0.1488***	0.0404***	0.1240***	0.0158
	(-45.32)	(-27.93)	(-56.93)	(-6.50)	(35.89)	(6.84)	(36.00)	(0.56)
Prudence index · Crisis	0.0189***	0.0519***	0.0330***	0.0577***	-0.0092*	0.0122**	-0.0073*	0.0501*
	(6.39)	(13.44)	(13.59)	(5.13)	(-1.82)	(2.31)	(-1.73)	(1.70)
Prudence index · Post	0.0373***	0.0636***	0.0539***	0.0607***	-0.0543***	-0.0037	-0.0492***	0.0069
	(12.29)	(17.20)	(23.16)	(5.23)	(-15.52)	(-0.86)	(-17.88)	(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

Note: We categorize banks into three groups: large, medium, and small. *Large* banks are those with assets exceeding $1 billion. For the smaller remaining banks, we define *medium* banks as the upper half (> $117 million) and *small* banks as the lower half using a median split. The dependent variables in the regressions are the total loan ratio and its growth, with variable definitions available in Table 1. The pre-crisis period spans from 2001:1Q to 2007:2Q, the during-crisis phase encompasses 2007:3Q to 2009:2Q, and the post-crisis duration extends from 2009:3Q to 2014:4Q. Each regression model includes quarterly dummies and bank dummies. T-statistics presented in parentheses are based on standard errors clustered by bank and are robust to heteroskedasticity. Significance levels are indicated by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

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

Variable	Changes in NPL ratio				Changes in ROA			
	Bank size				Bank size			
	Small (1)	Medium (2)	Small or Medium (3)	Large (4)	Small (5)	Medium (6)	Small or Medium (7)	Large (8)
Prudence index	1.0096***	0.5621***	0.7518***	0.1625***	-0.0194*	-0.0162	-0.0175**	-0.0566***
	(38.58)	(26.26)	(44.80)	(4.71)	(-1.77)	(-1.48)	(-2.32)	(-2.63)
Prudence index · Crisis	-0.0570*	0.0563**	-0.0061	0.1195***	0.0235*	0.1973***	0.0929***	0.0946***
	(-1.94)	(2.27)	(-0.32)	(2.93)	(1.73)	(12.05)	(8.63)	(3.21)
Prudence index · Post	-0.1039***	-0.0458**	-0.0855***	0.0766**	-0.0466***	0.0208*	-0.0178**	0.0067
	(-4.42)	(-2.55)	(-5.84)	(2.29)	(-4.26)	(1.73)	(-2.24)	(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

Note: We categorize banks into three groups: large, medium, and small. *Large* banks are those with assets exceeding $1 billion. For the smaller remaining banks, we define *medium* banks as the upper half (> $117 million) and *small* banks as the lower half using a median split. The dependent variables in the regressions are changes in NPL ratio and changes in ROA, with variable definitions provided in Table 1. The pre-crisis period spans from 2001:1Q to 2007:2Q, the during-crisis phase encompasses 2007:3Q to 2009:2Q, and the post-crisis duration extends from 2009:3Q to 2014:4Q. Each regression model incorporates quarterly dummies and bank dummies. T-statistics in parentheses are based on standard errors clustered by bank and are robust to heteroskedasticity. Significance levels are indicated by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

subsequently followed by a rise in non-performing loans, heightened volatility of profitability, and lower overall profitability, albeit not immediately. Despite the inherently higher risk exposure of risky banks, our results indicate that even prudent banks rapidly increase their risk exposure during the asset-bubble period before a crisis. Notably, small or medium-sized prudent banks demonstrate particularly aggressive lending behaviors, outpacing risky banks in the rate of lending growth relative to their assets.

Our analysis does not rely on borrower-level information, and we have not established direct evidence that prudent banks aggressively increase lending to riskier borrowers. Future studies could extend our investigation by incorporating borrower information or more detailed loan application data.

The findings of this study challenge the conventional belief that sound banks take fewer risks and are less prone to failure or insolvency. Prudent banks, in contrast, increase their risk exposure by lending to new and riskier borrowers, leveraging lower financing constraints and greater capacities for lending. Consequently, the lending behaviors of prudent banks underscore the need for macro-prudential regulations aimed at ensuring financial stability.

VI. Conclusion

Our study spans the years 2001 to 2014, scrutinizing the lending behaviors of commercial banks around the 2008 financial crisis. Employing a bank prudence index and various bank-specific characteristics while accounting for macro-economic conditions and MSA factors influencing loan demands, we make several noteworthy observations. Contrary to expectations, risky banks exhibit higher lending ratios than prudent banks leading up to the 2008 financial crisis. However, prudent banks display a higher lending growth rate, and their performance deteriorates over time. During the pre-crisis period, banks with high BIS capital ratios, robust core deposit ratios, or low NPL ratios intensify their lending, particularly directed toward secured real estate loans or households rather than commercial borrowers. Prudent banks, in particular, engage in aggressive lending practices, resulting in higher NPL ratios, increased volatility, and diminished profitability in subsequent years. Our findings imply that prudent banks extended excessive loans to riskier borrowers in the lead-up to the crisis.

These results underscore the significance of macro-prudential regulations, particularly during asset bubble periods. Additionally, our study suggests the relevance of exploring whether prudent banks exhibit similar patterns of excessive lending or heightened risk-taking behaviors in other countries and periods preceding potential financial crises.

Appendix A

We assume a latent factor representing bank prudence can be inferred from several bank attributes. To operationalize this, we employ an exploratory factor analysis (EFA) following the approach outlined by Cattell (1958). The three chosen bank attributes for the EFA are the Capital Adequacy Ratio, Core Deposit Funding, and Non-Performing Loan (NPL). To ensure consistency with our conceptualization where a higher NPL ratio implies a lower prudence level, we define the performing loan (PL) ratio as one minus the NPL ratio.

Table A.1 presents the eigenvalues for all factors derived from the EFA. Notably, the eigenvalue of the first factor (Factor1) is 0.1213, significantly surpassing the eigenvalue of the second factor (Factor2), which is 0.0045. Factor1's eigenvalue dominates the total eigenvalue, being approximately 27 times larger than that of Factor2. Moreover, the variance explained by Factor1 substantially exceeds that of Factor2 (0.0213 vs. 0.0116).

We designate Factor1 as the prudence index for a bank based on the eigenvalues and the variances from EFA.[7] Table A.2 shows the standardized scoring coefficients of Factor1, all of which are positive.

[Table A.1] Eigenvalues of the reduced correlation matrix

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

[Table A.2] Standardized scoring coefficients of Factor1

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

[Table A.3] Testing the first column of Panel B of Tables 3 and 5

Variable	*Excess total loan growth* (1)	*Excess total loan growth* (2)
Total loan ratio t-1	-0.2631***	-0.2854***
	(-38.09)	(-43.13)
BIS capital ratio	0.2520***	
	(20.29)	
BIS capital ratio · Crisis	0.0334**	

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[7] We also ran all regressions incorporating both Factor1 and Factor2, yielding consistent and robust results across the analyses.

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

Note: The dependent variables in the regressions pertain to *Excess total loan growth*, with variable definitions available in Table 1. The pre-crisis periods are defined as spanning from 2002:1Q to 2007:2Q or from 2003:1Q to 2007:2Q. The during-crisis phase encompasses 2007:3Q to 2009:2Q, and the post-crisis duration spans from 2009:3Q to 2014:4Q. Each regression model incorporates quarterly dummies and bank dummies. T-statistics, presented in parentheses, are computed based on standard errors clustered by bank and are robust to heteroskedasticity. Significance levels are indicated by ***, **, and * representing significance at the 1%, 5%, and 10% levels, respectively.

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2008 금융위기 전후 미국 은행의 대출 행태에 관한 연구*

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초 록

2008년 글로벌 금융위기 이전, 위험성이 높은 은행들은 자산대비 대출 비율이 높았으나, 상대적으로 견실한(prudent), 즉 높은 자본 비율, 높은 핵심 예금 비율, 낮은 부실 대출 비율을 가진 은행들은 높은 초과 대출 증가율을 보였으며, 특히 부동산 담보대출, 가계 대출 쪽에서 이러한 모습이 확연히 나타났다. 또한, 견실한 은행들은 위험성이 높은 은행들보다 높은 모기지론 승인율을 보였다. 견실한 은행의 공격적인 대출은 시간이 지남에 따라 부실 대출 비율의 증가와 수익성 감소로 이어졌다. 본 연구에서 개발한 견실성 지표 사용에 대한 결과로 강건성을 확인하였으며, 이러한 결과는 금융위기 전 견실한 은행이 과도한 대출 증가 및 위험감수를 하였음을 시사한다.

핵심 주제어: 대출행태, 위험감수, 은행 실적, 금융위기
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