Canary in the Coal Mine: Government Guaranteed Loans and Banks' Loan Loss Provisions in Japan*

Joseph J. French[a], Kiyonori Iwata[b] , James A. Wilcox[c], Yukihiro Yasuda[d]

[a] School of Management, Asian Institute of Technology, Khlong Luang District, Pathum Thani 12120, Thailand. Email: joseph@ait.asia

[b] Corresponding author. Faculty of Business Administration, Tokyo Keizai University, 1-7-34, Minamicho, Kokubunji-shi, Tokyo 185-0021, Japan. Email: k-iwata@tku.ac.jp

[c] Haas School of Business, 545 Student Services, #1900, University of California Berkeley, Berkeley, CA 94720-1900, USA. Email: jamesawilcox@berkeley.edu

[d] Graduate School of Business Administration, Hitotsubashi University, 2-1 Naka, Kunitachi, Tokyo 186-8601, Japan. Email: y.yasuda@r.hit-u.ac.jp

Abstract:

We investigate the signaling effects of government guaranteed loans on banks' accruals for loan losses. Our findings indicate that banks make fewer loan loss provisions when they utilize more guaranteed loans, demonstrating the risk-reducing effects of such loans on non-guaranteed loan portfolios. This negative relationship is predominantly driven by the expansion of the government guaranteed loan program introduced during the COVID-19 pandemic. Additionally, we show that banks increase their loan loss provisions in response to higher payouts from defaulted guaranteed loans. While these payouts represent a de facto recovery of bank loans and do not directly impact non-guaranteed loans, they signal increased future default risk among borrowers with both types of loans. This phenomenon can be likened to the "canary in the coal mine" analogy, where higher payouts act as an early warning signal of heightened credit risk, prompting banks to bolster their reserves in anticipation of future losses.

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EFM classification: 510, 710

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1. Introduction

In this study, we propose government guaranteed loans and payouts as new determinants of banks' loan loss provisioning behavior. Prior literature has extensively examined banks' use of loan loss provisions, with a particular focus on the discretionary component, as a means of managing expected credit losses and enhancing operational efficiency (e.g., Beatty and Liao, 2011; Jin et al., 2018). Some scholars argue that banks may signal their financial strength by increasing provisions, which negatively impacts current earnings and regulatory capital (Wahlen, 1994). Alternatively, banks might opportunistically reduce loan loss provisions to meet or beat certain earnings targets (Beatty et al., 2002; Kanagaretnam et al., 2010). These contrasting arguments underscore the complex and controversial nature of bank loan loss provisioning motivations.

We extend the literature by examining how a bank's usage of government guaranteed loans influences its reporting behavior regarding loan loss provisions. Following the COVID-19 pandemic, many countries worldwide expanded guaranteed loan programs to support small and medium-sized enterprises (SMEs) and other businesses in financing their operations (e.g., Falagiarada et al., 2020). Consequently, numerous banks now hold guaranteed loans in their portfolios. Concerns have been raised that guaranteed loans may have unintended consequences on bank behavior, such as increased risk-taking, evergreen lending, and the perpetuation of zombie firms (Peek and Rosengren, 2005; Caballero et al., 2008). However, the impact of such behavior on bank accounting policies, particularly the accrual estimates for loan loss provisions, remains unexplored.

While guaranteed loans do not directly affect the risk of non-guaranteed loans, they could reduce client firms' liquidity and credit risk by providing additional funding sources. This risk reduction effect might lead to decreased recording of loan loss provisions for non-guaranteed loans. Conversely, guaranteed loans might incentivize banks to take on more nonguaranteed loans and risks (e.g., Wilcox and Yasuda, 2019; Bachhuber et al., 2021; Backs et al., 2021), potentially raising the credit risk of their loan portfolios and necessitating higher loan loss provisions. Therefore, the association between

guaranteed loans and loan loss provisions is an empirical question that warrants investigation.

When guaranteed loans default, the government agency makes a payout to banks instead of the borrowing firms. This payout is akin to receiving loan repayments from borrowers. However, it is important to note that some borrowers may have both guaranteed and non-guaranteed loans, implying a risk association between them[1]. If payouts due to distressed firms increase in the current period, and these firms have received non-guaranteed loans in addition to guaranteed loans, the higher payouts may signal an increased future default risk.

This scenario can be likened to the "canary in the coal mine" analogy. Historically, coal miners would carry a canary into the mines as an early warning system for dangerous gases. The canary, being more sensitive to toxic gases, would show signs of distress or die before the gases reached levels harmful to humans, thus signaling the miners to evacuate. Similarly, rising payouts on defaulted guaranteed loans act as an early warning signal for banks. These payouts indicate financial distress among borrowers, akin to the canary showing distress, signaling potential danger ahead.

Just as miners would take preventive action upon seeing the canary in distress, banks recognize the early warning sign of increased payouts and proactively adjust their loan loss provisions. The higher payouts signal that borrowers with both guaranteed and non-guaranteed loans are experiencing financial difficulties, suggesting an elevated risk of future defaults on non-guaranteed loans. Based on this depressive effect, banks may have an incentive to increase reserves for non-guaranteed loans by recording higher loan loss provisions.

Consequently, our primary hypothesis posits that if banks use loan loss provisions to signal expected losses from future depressive effects due to client firms' financial distress, there may be a

[1] Table A3 shows the extent to which SMEs had loan guarantees, classified by borrowers' credit scores in Japan. As explained later, we use Japanese bank data and presume that SMEs generally had both loans, especially after the inception of Covid-19. Saito and Tsuruta (2018) investigate the association between borrowers' default rates and their ratio of guaranteed loans to total loans and find affirmative evidence. Wilcox and Yasuda (2008) and Ono, Uesugi, and Yasuda (2013) focus on the relationship between guaranteed and nonguaranteed lending to examine their substitutability or complementarity for each borrower.

positive relationship between realized government payouts to banks in the current period and loan loss provisions.

We conduct our empirical examination by focusing on Japanese banks. Prior to COVID-19, Japan had already implemented a substantial program of government guaranteed loans during normal times (e.g., Uesugi et al., 2010; Ono et al., 2013). Additionally, the existence of risky borrower firms, such as zombie firms, has been widely documented (Peek and Rosengren, 2005; Caballero et al., 2008 Banerjee and Hofmann 2018; Acharya et al. 2024). This unique environment provides an ideal testing ground for examining banks' behavior regarding loan loss provisioning.

Our findings indicate that banks make fewer loan loss provisions when they hold more guaranteed loans. This result suggests the risk-reducing effects of guaranteed loans on non-guaranteed loans: the additional funding provided by guaranteed loans reduces the need for loan loss provisions for non-guaranteed loans. Furthermore, we find that this negative relationship is primarily driven by the expansion of the government guaranteed program introduced during the COVID-19 pandemic, known as "Zero-Zero loans" (i.e., 100% government-guaranteed loans with no interest and no collateral requirements). Rather, our results show that banks make higher loan loss provisions when payouts increase. This finding indicates the side effects of guaranteed loan payouts on bank loan loss accruals: banks use loan loss provisions to signal expected losses from future depressive effects due to the financial distress of their client firms.

Our study contributes to accounting literature by providing new determinants of banks' loan loss provisioning behavior. Existing studies suggest that banks use the discretionary portion of loan loss provisions to recognize expected future credit losses for risk management purposes (e.g., Beatty and Liao, 2011; Bushman and Williams, 2012; Jin et al., 2018), even though bank accounting is based on an incurred loss model rather than an expected loss model. Curcio and Hasan (2015) also document that European banks strategically use loan loss provisions for capital management and signaling purposes. Our results indicate that the existence of government guaranteed loans creates incentives for

banks to utilize discretionary provisions for efficient risk management. Specifically, we find that a greater presence of guaranteed loans is associated with lower provisions for non-guaranteed loans, suggesting the risk-reducing effect of guaranteed loans through the provision of additional liquidity.

On the other hand, we report that a greater amount of guaranteed loan payouts leads to higher discretionary provisions. While the payout of guaranteed loans itself does not directly impair banks' financial soundness, it appears to have a negative spillover effect on the perceived collectability of non-guaranteed loans. This finding aligns with the depressive effect hypothesis, where banks anticipate future losses and build reserves for non-guaranteed loans in response to increased payouts on defaulted guaranteed loans. Relatedly, Dantas et al. (2023) report that guaranteed loans reduce bank tail risk and decrease the need for income smoothing using discretionary provisions. However, our study shows the effect of government guarantees on banks' perception of expected credit losses from non-guaranteed loans, and consequently, their loan loss provisioning behavior. Specifically, we highlight the opposing impacts of guaranteed loans and their payouts, with the former reducing provisions and the latter increasing them.

The construction of the paper is as follows. Section 2 develops the hypotheses. Section 3 describes the research design, and Sections 4 and 5 present the empirical results. Section 6 summarizes our findings and the limitations of the study.

2. Hypotheses Development

Even within the incurred loss model framework for loan loss provisioning, prior research indicates that banks utilize the discretionary component of provisions to recognize expected future credit losses and manage loan portfolio risks. Beatty and Liao (2011) find that timely recognition of expected losses through higher loan loss provisions leads to smaller reductions in lending during recessionary periods, suggesting that provisions serve as a buffer against future losses. Bushman and Williams (2012) document that forward-looking provisioning practices that facilitate timely loss recognition tend to

enhance banks' risk-taking behavior, potentially due to the increased loss absorption capacity. Jin et al. (2018) provide evidence that banks with higher abnormal loan loss allowances in the pre-crisis period leading up to the 2007–2009 financial crisis exhibited lower risk-taking and a reduced likelihood of failure during the crisis, indicating that provisions can promote prudent risk management. Collectively, these studies suggest that banks have incentives to exercise accounting discretion over loan loss provisions as a mechanism to cushion against future credit losses and manage risk exposures more efficiently.

Our study focuses on examining the effect of government-guaranteed loans on banks' loan loss provisioning behavior. We note that while increased payouts to banks by government agencies due to defaulted guaranteed loans represent a transfer of funds rather than an impairment of bank health, the liquidity provided through these guaranteed loans can potentially reduce the credit risk faced by banks' client firms. This risk reduction could, in turn, lower the need for banks to accrue loan loss provisions against their non-guaranteed loan portfolios.

Importantly, we acknowledge that guaranteed loans do not directly create additional risk for banks, and thus, do not inherently impact the losses associated with non-guaranteed loans. However, by providing additional funding sources and alleviating liquidity constraints for client firms, guaranteed loans can indirectly influence the risk profiles of borrowers with non-guaranteed loans. This indirect effect may incentivize banks to reduce their loan loss provisions for non-guaranteed loans, a phenomenon we term the "risk-reducing effect" of guaranteed loans. Specifically, the additional liquidity supplied through guaranteed loans can diminish the need for banks to hold higher loan loss reserves against their non-guaranteed loan portfolios.

On the contrary, several recent studies (e.g., Wilcox and Yasuda, 2019; Bachhuber et al., 2021; Backs et al., 2021) suggest that guaranteed loans may incentivize banks to engage in greater risk-taking by increasing their risk-bearing capacity. This increased risk appetite could translate into higher credit risk exposures, subsequently necessitating larger loan loss provisions. Thus, the relationship between

guaranteed loans and banks' loan loss provisioning behavior remains an empirical question to be investigated. Based on these considerations, we propose the following hypotheses:

H1-1: Increased use of guaranteed loans reduces the need for loan loss provisions due to the risk-reducing effect on non-guaranteed loans (risk-reducing effect).

H1-2: Increased use of guaranteed loans leads to higher loan loss provisions due to incentives for risk-taking behavior (risk-taking incentive).

Next, we examine the payout amounts. When guaranteed loans default, the government agency makes payouts to banks, effectively acting as repayments from borrowers. However, some bank borrowers may use both guaranteed and non-guaranteed loans, suggesting a risk association between them. In such cases, higher payouts might indicate an increased future default risk for the client firms. This potential risk may incentivize banks to build reserves for non-guaranteed loans by recording more loan loss provisions. Therefore, if banks use loan loss provisions to anticipate expected losses from future financial distress of their client firms, there could be a positive relationship between realized government payments to banks in the current period and loan loss provisions. Furthermore, when guaranteed loans default and result in payouts to banks, it may signal financial distress for the borrowers, potentially impacting the risk profile of their non-guaranteed loans.

On the other hand, banks experiencing guaranteed loan payouts may have incentives to signal a less pessimistic future outlook by recording higher loan loss provisions, as they face less financial burden. This scenario is an alternative to our "canary" scenario. In fact, accounting research has found a positive correlation between LLP and stock returns, and it has been suggested that discretionary LLP may actually function as a positive signal. Beaver et al. (1989) argue that "increasing the allowance for loan losses is actually "good news," because it indicates that management perceives the earning power of the bank to be sufficiently strong that it can withstand a "hit to earnings" in the form of additional

loan-loss provisions." Beaver and Engel (1996) argue that signaling occurs when a "stronger" bank wishes to distinguish itself from "weaker" banks by showing that it is strong enough to take an additional charge against capital.

From the accounting standards framework, when banks experience higher payouts and expect a less pessimistic future, they signal this by recording lower loan loss provisions. Although which scenario is appropriate is an empirical question, we hypothesize:

H2: Higher payouts from defaulted government-guaranteed loans are positively associated with banks' loan loss provisions, as banks account for the expected future losses due to the depressive effects of borrower distress.

3. Research Design

3.1. Methodology for main analysis

To investigate the effect of government guaranteed loans on bank's loan loss provisioning practices, we estimate the following model with bank- and year-fixed effects:

$$LLP_{it} = \beta_0 + \beta_1 w\_cgloan\_avtotalloan_{it} + \beta_2 w\_payout\_avtotalloan_{it} + \sum_{k=1}^{n} Determinants_{kit} + Bank\ FE + Year\ FE + \varepsilon_{it} \quad (1)$$

where *i*, *t*, *k* denotes bank *i*, fiscal year *t*, and *k*th control variable, respectively. *LLP* is the loan loss provision divided by the lagged total loans. *cgloan_avtotalloan* is the amount of government guaranteed loans divided by the total loans. *payout_avtotalloan* is the amount of subrogation payments divided by total loans. If guaranteed loans are associated with less (more) bank risks, the coefficient of *cgloan_avtotalloan* is expected to be negative (positive). If payout of guaranteed loans is associated with more bank risks, the coefficient of *Payout* would be positive.

In Japanese banks, loan loss provision is classified into two categories: general loan loss provisions (*GLLP*) and specific loan loss provisions (*SLLP*). General loan loss provisions are those set aside for normal loans and banks generally allocate these provisions based on the actual default rate. Specific loan loss provisions are those for doubtful loans, so banks allocate these provisions based on the circumstances of each loan. We use aggregate amount of loan loss provisions (*LLP*), general loan loss provisions (*GLLP*), specific loan loss provisions (*SLLP*) as the variables of *LLP*.

Various studies examine determinants of loan loss provisions, utilizing different variables to explain provisioning variations. We employ the three models below proposed by Liu and Ryan (LR, 2006), Beatty et al. (BPV, 1995), and Beck and Narayanamoorthy (BN, 2013). The variable commonly included in the estimation is the change in non-performing assets[2] (*ΔNPA*). The non-discretionary loan loss provisions would be directly explained by the change in the default rate on the loan portfolio (Beatty et al., 1995), proxied by *ΔNPA*. If the variables added to these models are correlated with LLP, it suggests that these variables contribute to discretionary LLP that cannot be explained by fundamentals.

$$LLP_{it} = \beta_0 + \beta_1 \Delta NPA_{i,t} + Bank\ FE + Year\ FE + \varepsilon_{it} \quad \text{(LR)}$$

$$LLP_{it} = \beta_0 + \beta_1 \Delta NPA_{i,t} + \beta_2 ALW_{i,t-1} + Bank\ FE + Year\ FE + \varepsilon_{it} \quad \text{(BCM)}$$

$$LLP_{it} = \beta_0 + \beta_1 CO_{it} + \beta_2 \Delta NPA_{i,t} + \beta_3 ALW_{i,t-1} + Bank\ FE + Year\ FE + \varepsilon_{it} \quad \text{(BN)}$$

where *i*, *t* denotes bank *i*, fiscal year *t*, respectively. To align the model with Japanese institutional setting, we break down the NPA variable (*ΔNPL*) into four subcategories: change in normal loans (*ΔNPL*0), substandard loans (*ΔNPL*1), doubtful assets (*ΔNPL*2), and quasi-bankrupt assets (*ΔNPL*3). In the Japanese context, general loan loss provisions are recorded for normal and substandard loans, while

[2] Some studies additionally control lagged non-performing loans (Collins et al., 2006; Kanagaretnam et al., 2010). We do not include this variable because including this variable results in a VIF exceeding 10, raising concerns about multicollinearity.

specific loan loss provisions are recorded for doubtful and quasi-bankrupt assets, each with a different allowance ratio. While certain models incorporate macroeconomic variables such as unemployment rates or gross domestic product, our analysis deliberately excludes these variables as we control for year-fixed effects, effectively accounting for macroeconomic factors that vary across different time periods.

Variations across these models stem from their inclusion of specific regressors: lagged loan loss allowance levels, and charge-offs. According to Beatty and Liao (2014), these differences come from divergent assumptions regarding the exogeneity of variables relative to loan loss provisioning. For instance, models incorporating loan loss allowances (i.e. ALW) assume past loan loss allowance decisions are exogenous to current period decisions. Thus, overestimation of the future loan losses in the past period leads to lower provisions in the current period (Beatty et al., 1995).

In the Covid-19 crisis, the utilization of government guaranteed loans increased substantially. The effects of origination or subrogation of guaranteed loans in the crisis may be different from those in the ordinary times. Thus, we estimate model (2) which adds the cross terms of cgloan_avtotalloan or *Payout* and *Post*, a dummy variable that takes one for observations from March 2021 onwards.

$$\begin{aligned} LLP_{it} = \beta_0 + \beta_1 \text{cgloan\_avtotalloan}_{it} \; or \; \text{payout\_avtotalloan}_{it} \\ + \beta_2 \text{cgloan\_avtotalloan}_{it} \; or \; \text{payout\_avtotalloan}_{it} * Post_t \\ + \sum_{k=1}^{n} Determinants_{kit} + Bank\ FE + Year\ FE + \varepsilon_{it} \end{aligned} \tag{2}$$

3.2. Data and Sample Selection

We gather data on financial statements of Japanese bank whose fiscal year ends between March 2012 and March 2023 as an initial sample. We collect the financial information from Nikkei NEEDS financial data, which provides financial statement data for Japanese city banks and regional banks. Next, we obtain data on the balance of government guaranteed loans and the amount of payout

due to subrogation from The Small and Medium Enterprise Agency. We combine these data with data on regulatory capital from Nikkei NEEDS Financial Quest 2.0 database.

After merging the bank's financial data with the guaranteed-loans data, we removed any observations with missing values for our variables of interest. Since some variables required lagged values, the analysis period covers 2013 to 2023. We also excluded singleton observations, as fixed effects cannot be calculated for those. Following these steps, we arrived at a final sample of 902 bank-year observations for the main analysis[3]. Table 1 provides descriptive statistics summarizing this data.

Figure 1 illustrates the trend of government-guaranteed loans in Japan over our sample period. As shown in Panel A, the total balance of guaranteed loans decreased from around 23 trillion yen in 2012 to roughly 13 trillion yen in 2020, prior to the COVID-19 crisis. However, this trend underwent a substantial shift after the COVID-19 pandemic. In an effort to provide relief to small and medium-sized enterprises (SMEs) during the pandemic, the government introduced unsecured and interest-free lending programs, causing the balance of guaranteed loans to increase to 20 trillion yen. The payout amount for these guaranteed loans exhibited a similar pattern.

Panel B of Figure 1 shows that payout amounts were declining from approximately 500 billion yen in 2012 to around 200 billion yen per year by 2020. Notably, this amount remained substantially lower during the COVID-19 crisis, at about 150 billion yen per year in 2021 and 2022 respectively. Given the anticipated significant impact of the pandemic on the financial stability of SMEs, these relief programs in Japan are expected to have considerably reduced bankruptcies. We note that while the payout-to-balance ratio for guaranteed loans typically hovers around 2.0% in ordinary times, it remained below 1% during the COVID-19 crisis.

[3] In the database we used, there is an unnatural omission of samples where loan loss provision reversals occur. Therefore, following Umezawa (2024), we replace general loan loss provisions (GLLP) with the difference between the general loan loss allowance and its lagged value (GLLA – lagged GLLA) when GLLP has missing values in our database.

4. Empirical Results

4.1. Effects of government guaranteed loans on bank's loan loss provisions

Table 2 summarizes the baseline regression models based on equation (2). Row 1 of Panel A in Table 2 shows that the coefficients for *cgloan_avtotalloan* are negative and statistically significant across all specifications. These results indicate that banks make fewer loan loss provisions when they utilize more guaranteed loans, demonstrating the risk-reducing effects of guaranteed loans on non-guaranteed loans: the additional supply of guaranteed loans reduces the need for loan loss provisions for non-guaranteed loans.

Panel B presents the results divided into two categories of loan loss provisions, as discussed in Section 3. The positive effects of *cgloan_avtotalloan* variable are driven by specific loan loss provisions (SLLP), rather than general loan loss provisions (GLLP), consistent with the characteristics of each variable. This pattern holds across all subsequent analyses. Consequently, we report only the total amounts of loan loss provisions.

Our sample includes the period of the Covid-19 pandemic, during which the guaranteed loan program was extensively expanded. This program expansion acts as an exogenous shock for banks, making the difference-in-differences (DID) approach a robust check of our results and of our additional interest in the effects of Covid-19 on reporting loan loss provisions. We include an interaction term of *cgloan_avtotalloan* with a dummy variable that equals one for fiscal years after 2020 to examine the impact of the pandemic period. Panel C shows the results. The coefficient of the interaction term is positive and statistically significant, indicating that the observed relationship is primarily driven by the expansion of the government guaranteed program introduced during the Covid-19 pandemic, known in Japan as "Zero-Zero" loans (i.e., 100% government guaranteed loans with no interest and no collateral).

4.2. Effects of payouts on bank's loan loss provisions

Table 3 presents the results when we employ *payout_avtotalloan* as a measure of subrogation payment.

Row 1 indicates that the coefficients on *payout_avtotalloan* are positive and statistically significant. These results suggest a depressing effect, implying that higher payouts can predict increased future default risk for client firms of banks. This depressing effect provides incentives for banks to hold higher reserves against these non-guaranteed loans, thereby recognizing greater loan loss provisions in the current period.

In Table 4, we include both *cgloan_avtotalloan* and payout_avtotalloan simultaneously in the model. The findings reveal that both measures of government guaranteed loan usage remain statistically significant. Table 5 incorporates non-performing loans in the subsequent period as an additional regressor. Although prior literature has documented a positive relation, we find that future non-performing loans enter negatively and with statistical significance. Nonetheless, our primary variables of interest, *cgloan_avtotalloan* and *payout_avtotalloan*, retain their respective signs and statistical significance.

Additionally, we examine the lagged impact of these variables. The results in Panel B in Table 5 indicate that the effect of *payout_avtotalloan* is short-lived, persisting for only one year.

5. Extensions and Robustness Checks

5.1. Channels of decreasing loan loss provisions

We now turn to the mechanism underlying the reporting of loan loss provisions. As discussed in Section 4, we expect loan loss provisions to decrease when guaranteed loans increase. However, at least two possible explanations exist: either this effect is driven by a reduction in non-guaranteed loans, or it arises from a decline in credit risk due to increased liquidity provision, as posited in our hypothesis. To disentangle these explanations, we test whether changes in loan loss provisions are related to total loans and non-guaranteed loans as separate dependent variables.

Table 6 presents the results. Column 1 shows that the coefficient on *cgloan_avtotalloan* is positive and statistically significant. However, Column 2 reveals an insignificant coefficient, indicating

that the decrease in loan loss provisions is not associated with a reduction in non-guaranteed loans. Thus, the findings are consistent with the argument that guaranteed loans exert risk-reducing effects on non-guaranteed loans: the additional liquidity supplied by guaranteed loans reduces the need for loan loss provisioning against non-guaranteed loans.

5.2. Alternative measures of payout ratio and the subsample period

We assess the robustness of our findings by employing an alternative payout ratio measure: the ratio of payout to guaranteed loans (*payout_avtotalcgloan* or Payout/CG). Additionally, our sample period includes the COVID-19 pandemic, during which the guaranteed loan program was substantially expanded. Thus, we restrict our sample to the pre-pandemic period to examine whether our results persist or are unique to the policy environment prevailing during the pandemic era. Panel A of Table 7 presents the results using *payout_avtotalcgloan* as the payout measure. The coefficients are generally positive, consistent with our baseline findings regarding the depressing effect of payouts.

Panel B reports the subsample results for the pre-pandemic period with our main analyses. Interestingly, the coefficients on *payout_avtotalloan* remain positive across all specifications. Thus, in contrast to the risk-reducing effects of guaranteed loans, the depressive effects of payouts appear unrelated to the pandemic period, which is in contrast to the risk reducting effects of guaranteed loans.

5.3. Endogeneity

To further test the robustness of our results, we address potential endogeneity concerns. Our analysis focuses on the effect of guaranteed loan conditions on loan loss provisioning, with the implicit assumption in model (1) that changes in guaranteed loans or payout amounts are exogenous to each bank. However, banks may have incentives to avoid recognizing non-performing loans, in which case the balance or payout amount of guaranteed loans could potentially reflect these reporting incentives. To mitigate this endogeneity issue, we construct a new variable based on the premise that macro-level payout variables represent the exogenous portion of guaranteed loan payouts.

Specifically, we include a cross-term between each bank's guaranteed loan exposure in 2012 (*cgloan_avtotalloan*) and the macro-level payout amount in Japan for each year (*exposure12#lnsum_payout_mod*). Table 8 shows that the coefficients on this cross term tend to be positive, suggesting that banks with higher ex-ante exposure to guaranteed loans are more likely to increase their loan loss provisions when macro-level payouts increase.

6. Conclusion

We investigate the spillover effects of government guaranteed loans on banks' loan loss provisioning behavior. We find that banks accrue lower loan loss provisions when their reliance on guaranteed loans increases, consistent with a risk reduction effect. However, this negative relationship is predominantly driven by the expansion of the guaranteed loan program introduced during the COVID-19 pandemic period. In contrast, we document that banks increase their loan loss provisions when guaranteed loan payouts rise. This result indicates that while subrogation represents a de facto recovery of bank loans and does not directly impact non-guaranteed loans, it highlights the depressive effects of guaranteed loan payouts on banks' loan loss accruals for non-guaranteed loans.

Our findings suggest that bank’s view higher guaranteed loan payouts as a potential leading indicator of elevated default risk among their non-guaranteed loan portfolios. Consequently, they have an incentive to increase their loan loss reserves proactively to mitigate future losses on these non-guaranteed exposures. This depressive effect of payouts on loan loss provisioning appears robust and persists even during the pre-pandemic sample period.

Furthermore, we uncover heterogeneous effects based on banks' reliance on guaranteed loans and their capital positions. Banks with higher ex-ante exposure to guaranteed loans exhibit a stronger likelihood to increase loan loss provisions when macro-level guaranteed loan payouts rise. Additionally, less well-capitalized banks tend to decrease their loan loss provisions more aggressively as their guaranteed loan exposure increases. This may indicate that banks are potentially utilizing

discretionary provisioning to manage regulatory capital ratios.

Our results have important policy implications. While guaranteed loan programs aim to support businesses, particularly during crises periods, they can have unintended consequences on bank behavior. Policymakers and regulators should carefully monitor the potential risk-reducing effects of these programs, which could lead to lower loan provisioning. Additionally, the positive relationship between guaranteed loan payouts and provisions suggests that these programs may incentivize banks to hold higher reserves, affecting their lending capacity and profitability. Governance mechanisms may be necessary during periods of increased government guarantees are necessary to ensure that banks do not opportunistically manage provisions, deviating from their intended purpose of efficient risk management.

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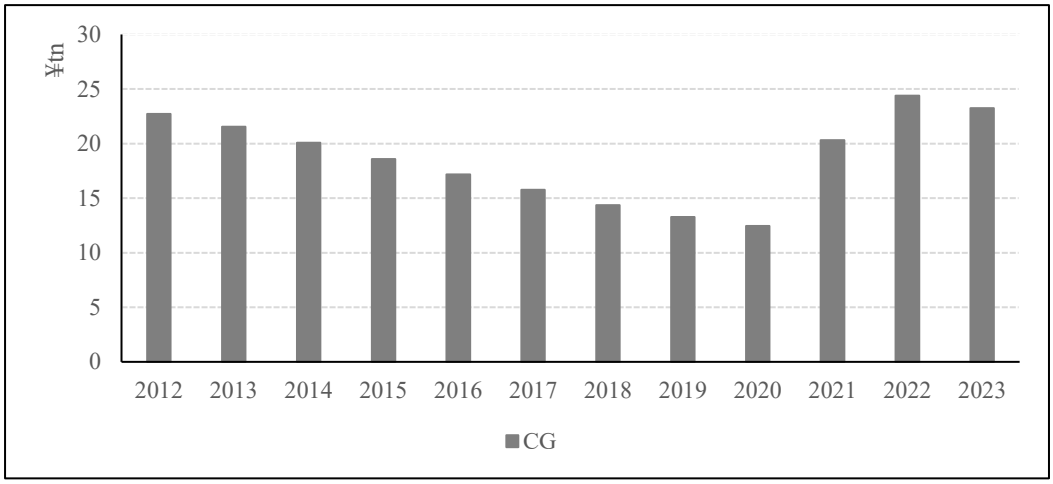
Figure 1: The trend of government guaranteed loans in Japan

Panel A: The balanced amounts



Panel B: The amount of payouts

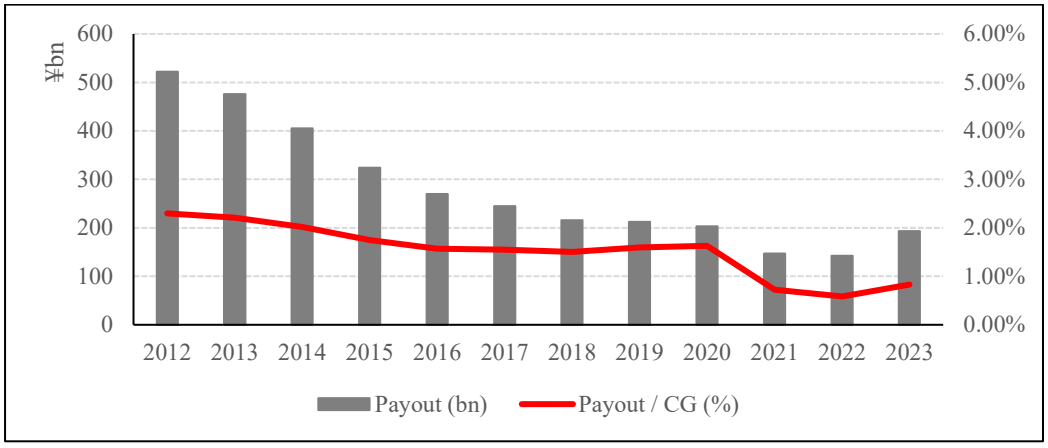


Table 1: Descriptive statistics

Definition of variables

Variables	Description
LLP_lagtotalloan	loan loss provision (t) / total loans (t-1)
SLLP_lagtotalloan	specific loan loss provision (t) / total loans (t-1)
GLLP_lagtotalloan	general loan loss provision (t) / total loans (t-1)
cgloan_avtotalloan	average guaranteed loans (t-1 ~ t) / average total loans (t-1 ~ t)
payout_avtotalloan	payout (t-1 ~ t) / average total loans (t-1 ~ t)
payout_avtotalcgloan	payout (t-1 ~ t) / average total guaranteed loans (t-1 ~ t)
d_NPL_lagtotalloan	Δ non-performing loans (t) / total loans (t-1) Non-performing loans is the sum of NPL1, NPL2, and NPL3.
d_NPL0_lagtotalloan	Δ normal loans (t) / total loans (t-1)
d_NPL1_lagtotalloan	Δ substandard loans (t) / total loans (t-1)
d_NPL2_lagtotalloan	Δ doubtful assets (t) / total loans (t-1)
d_NPL3_lagtotalloan	Δ (quasi-) bankrupt assets (t) / total loans (t-1)
NetIncomebfLLP_avtotalassets	net income before LLP (t) / average total assets (t-1 ~ t)
Chargeoff_lagtotalloan	loan chargeoffs (t) / total loans (t-1)
LLA_totalloan_l	loan loss allowances (t-1) / total loans (t-1)
SLLA_totalloan_l	specific loan loss allowances (t-1) / total loans (t-1)
GLLA_totalloan_l	general loan loss allowances (t-1) / total loans (t-1)
totalloan_lagtotalloan	total loans (t) / total loans (t-1)
d_loan_lagtotalassets	Δtotal loans / total assets (t-1)
lnassets	natural logarithm of total assets (t)
ExcRegCapbfLLP_riskassets	regulatory capital buffer before LLP (t) / risk assets (t)
exposure12	cgloan_avtotalloan in 2012 (bank-level, time-invariant)
lnsum_payout_mod	natural logarithm of total amount of payout (macro-economic)

Summary statistics

stats	N	mean	sd	min	p25	p50	p75	max
LLP_lagtotalloan	902	0.0009	0.0010	-0.0014	0.0002	0.0006	0.0013	0.0049
SLLP_lagtotalloan	840	0.0009	0.0009	-0.0009	0.0003	0.0007	0.0013	0.0045
GLLP_lagtotalloan	902	0.0000	0.0007	-0.0020	-0.0003	0.0000	0.0003	0.0030
cgloan_totalloan	902	0.0685	0.0397	0.0078	0.0409	0.0607	0.0863	0.2074
payout_avtotalloan	902	0.0010	0.0008	0.0001	0.0004	0.0007	0.0012	0.0044
payout_avtotalcgloan	902	0.0141	0.0075	0.0024	0.0080	0.0136	0.0187	0.0355
d_NPL_lagtotalloan	902	-0.0004	0.0030	-0.0101	-0.0018	-0.0004	0.0011	0.0105
NetIncomebfLLP_avtotalassets	902	0.0012	0.0006	-0.0006	0.0009	0.0012	0.0016	0.0031
Chargeoff_lagtotalloan	902	0.0002	0.0004	0.0000	0.0000	0.0000	0.0002	0.0025
LLA_totalloan_l	902	0.0083	0.0047	0.0026	0.0051	0.0072	0.0104	0.0258
SLLA_totalloan_l	902	0.0053	0.0035	0.0010	0.0029	0.0045	0.0064	0.0205
GLLA_totalloan_l	902	0.0031	0.0020	0.0004	0.0017	0.0025	0.0038	0.0104
totalloan_lagtotalloan	902	1.0346	0.0307	0.9680	1.0151	1.0310	1.0501	1.1423
d_loan_lagtotalassets	902	0.0217	0.0193	-0.0188	0.0094	0.0194	0.0313	0.0922
lnassets	902	15.0703	1.2132	12.8355	14.2235	15.0027	15.7272	19.1733
ExcRegCapbfLLP_riskassets	902	0.0617	0.0181	0.0287	0.0479	0.0596	0.0726	0.1196
exposure12	893	0.0937	0.0432	0.0207	0.0666	0.0881	0.1098	0.2609
lnsum_payout_mod	902	12.8893	0.3619	12.3986	12.7322	12.7705	13.1741	13.5643
Disaggregated non-performing loan								
d_NPL0_lagtotalloan	902	0.0360	0.0310	-0.0336	0.0165	0.0323	0.0512	0.1424
d_NPL1_lagtotalloan	902	0.0000	0.0014	-0.0045	-0.0005	0.0000	0.0004	0.0063
d_NPL2_lagtotalloan	902	-0.0001	0.0024	-0.0078	-0.0012	-0.0001	0.0011	0.0086
d_NPL3_lagtotalloan	902	-0.0002	0.0012	-0.0048	-0.0007	-0.0001	0.0003	0.0030

Table 2: Determinants of Loan Loss Provisions: Effects of Guaranteed Loans

Panel A. Baseline Results

Note: This table presents the results of the effects of government guaranteed loans on bank's loan loss provisioning practices.

	(1)	(2)	(3)
VARIABLES	LLP_lagtotalloan	LLP_lagtotalloan	LLP_lagtotalloan
cgloan_avtotalloan	**-0.014*** **	**-0.014*** **	**-0.014*** **
	(0.003)	**(0.003)**	**(0.003)**
d_NPL1_lagtotalloan	0.098***	0.094***	0.102***
	(0.023)	(0.024)	(0.025)
d_NPL2_lagtotalloan	0.114***	0.102***	0.109***
	(0.019)	(0.023)	(0.021)
d_NPL3_lagtotalloan	0.151***	0.135***	0.134***
	(0.026)	(0.030)	(0.031)
NetIncomebfLLP_avtotalassets	0.510***	0.510***	0.534***
	(0.147)	(0.144)	(0.138)
Chargeoff_lagtotalloan			0.463**
			(0.192)
LLA_totalloan_l		-0.051**	-0.050**
		(0.025)	(0.024)
lnassets	-0.000	-0.000	-0.000
	(0.001)	(0.000)	(0.000)
ExcRegCapbfLLP_riskassets	0.007**	0.007*	0.006*
	(0.004)	(0.004)	(0.004)
Constant	0.008	0.009	0.007
	(0.008)	(0.008)	(0.007)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	902	902	902
AdRs	0.465	0.471	0.483

Panel B. Splitting into General Loan Loss Provisions (GLLP) and Specific Loan Loss Provisions (SLLP)

VARIABLES	(1) SLLP_lagtotalloan	(2) SLLP_lagtotalloan	(3) SLLP_lagtotalloan
cgloan_avtotalloan	**-0.011*** **	**-0.011*** **	**-0.010*** **
	(0.003)	**(0.003)**	**(0.003)**
d_NPL2_lagtotalloan	0.132***	0.141***	0.143***
	(0.015)	(0.016)	(0.016)
d_NPL3_lagtotalloan	0.114***	0.125***	0.124***
	(0.027)	(0.029)	(0.029)
NetIncomebfLLP_avtotalassets	0.416***	0.417***	0.428***
	(0.088)	(0.087)	(0.087)
Chargeoff_lagtotalloan			0.179*
			(0.096)
SLLA_totalloan_l		0.033*	0.032*
		(0.019)	(0.018)
lnassets	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
ExcRegCapbfLLP_riskassets	0.007**	0.007**	0.007**
	(0.003)	(0.003)	(0.003)
Constant	0.003	0.002	0.002
	(0.004)	(0.004)	(0.004)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	838	838	838
AdRs	0.557	0.559	0.561

(Continued)

VARIABLES	(4) GLLP_lagtotalloan	(5) GLLP_lagtotalloan	(6) GLLP_lagtotalloan
cgloan_avtotalloan	**-0.002**	**-0.003**	**-0.003**
	(0.003)	**(0.003)**	**(0.003)**
d_NPL0_lagtotalloan	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)
d_NPL1_lagtotalloan	0.192***	0.173***	0.176***
	(0.029)	(0.028)	(0.028)
NetIncomebfLLP_avtotalassets	0.205*	0.197**	0.208**
	(0.110)	(0.091)	(0.089)
Chargeoff_lagtotalloan			0.205
			(0.142)
GLLA_totalloan_l		-0.323***	-0.324***
		(0.033)	(0.031)
lnassets	-0.000	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)
ExcRegCapbfLLP_riskassets	0.001	0.002	0.002
	(0.003)	(0.004)	(0.004)
Constant	0.006	0.016**	0.015**
	(0.008)	(0.007)	(0.007)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	902	902	902
AdRs	0.231	0.394	0.398

Panel C. Effects of the expansion of Covid 19 pandemic

Note: This table presents the results adding the cross term of cgloan_avtotalloan with *COVID*.

	(1)	(2)	(3)
VARIABLES	LLP_lagtotalloan	LLP_lagtotalloan	LLP_lagtotalloan
cgloan_avtotalloan	-0.004	-0.003	-0.003
	(0.003)	(0.003)	(0.003)
post	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)
post#cgloan_avtotalloan	**-0.006*** **	**-0.007*** **	**-0.007*** **
	(0.002)	**(0.002)**	**(0.002)**
d_NPL1_lagtotalloan	0.127***	0.126***	0.133***
	(0.025)	(0.024)	(0.026)
d_NPL2_lagtotalloan	0.139***	0.135***	0.140***
	(0.018)	(0.020)	(0.018)
d_NPL3_lagtotalloan	0.154***	0.147***	0.144***
	(0.026)	(0.028)	(0.029)
NetIncomebfLLP_avtotalassets	0.492***	0.498***	0.533***
	(0.131)	(0.129)	(0.120)
Chargeoff_lagtotalloan			0.643***
			(0.192)
LLA_totalloan_l		-0.017	-0.023
		(0.024)	(0.023)
lnassets	-0.001	-0.001*	-0.001
	(0.001)	(0.001)	(0.000)
ExcRegCapbfLLP_riskassets	0.011***	0.011***	0.010***
	(0.004)	(0.004)	(0.004)
Constant	0.012	0.013	0.010
	(0.008)	(0.008)	(0.007)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	902	902	902
AdRs	0.425	0.425	0.449

Table 3: Effects of Payouts on Loan Loss Provisions

Note: This table presents the results of the effects of payouts of guaranteed loans on bank's loan loss provisioning practices.

	(1)	(2)	(3)
VARIABLES	LLP_lagtotalloan	LLP_lagtotalloan	LLP_lagtotalloan
payout_avtotalloan	**0.229****	**0.241*****	**0.231****
	(0.089)	**(0.090)**	**(0.091)**
d_NPL1_lagtotalloan	0.093***	0.089***	0.098***
	(0.023)	(0.023)	(0.025)
d_NPL2_lagtotalloan	0.114***	0.103***	0.109***
	(0.021)	(0.024)	(0.023)
d_NPL3_lagtotalloan	0.152***	0.137***	0.137***
	(0.028)	(0.032)	(0.033)
NetIncomebfLLP_avtotalassets	0.501***	0.501***	0.526***
	(0.155)	(0.152)	(0.147)
Chargeoff_lagtotalloan			0.487**
			(0.208)
LLA_totalloan_l		-0.048*	-0.046*
		(0.026)	(0.025)
lnassets	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.000)
ExcRegCapbfLLP_riskassets	0.005	0.005	0.004
	(0.004)	(0.004)	(0.004)
Constant	-0.000	0.000	-0.001
	(0.008)	(0.008)	(0.007)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	902	902	902
AdRs	0.452	0.458	0.471

Table 4: Effects of both Payouts and Guaranteed Loans on Loan Loss Provisions

Note: This table presents the results of the effects of both guaranteed loans and payouts of guaranteed loans on bank's loan loss provisioning practices.

	(1)	(2)	(3)
VARIABLES	LLP_lagtotalloan	LLP_lagtotalloan	LLP_lagtotalloan
payout_avtotalloan	**0.280*** **	**0.296*** **	**0.284*** **
	(0.085)	**(0.087)**	**(0.088)**
cgloan_avtotalloan	**-0.015*** **	**-0.016*** **	**-0.015*** **
	(0.003)	**(0.003)**	**(0.003)**
d_NPL1_lagtotalloan	0.095***	0.090***	0.098***
	(0.023)	(0.023)	(0.024)
d_NPL2_lagtotalloan	0.116***	0.103***	0.109***
	(0.019)	(0.022)	(0.021)
d_NPL3_lagtotalloan	0.164***	0.148***	0.147***
	(0.027)	(0.030)	(0.031)
NetIncomebfLLP_avtotalassets	0.516***	0.517***	0.539***
	(0.147)	(0.143)	(0.138)
Chargeoff_lagtotalloan			0.447**
			(0.196)
LLA_totalloan_l		-0.055**	-0.054**
		(0.024)	(0.023)
lnassets	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.000)
ExcRegCapbfLLP_riskassets	0.008**	0.007**	0.006*
	(0.003)	(0.003)	(0.004)
Constant	0.008	0.008	0.007
	(0.008)	(0.008)	(0.007)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	902	902	902
AdRs	0.473	0.481	0.492

Table 5: Effects of both Payouts and Guaranteed Loans on Loan Loss Provisions:

Panel A: Adding future Non-performing Loans

VARIABLES	(1) LLP_lagtotalloan	(2) LLP_lagtotalloan	(3) LLP_lagtotalloan
payout_avtotalloan	**0.277*** **	**0.294*** **	**0.284*** **
	(0.084)	**(0.086)**	**(0.086)**
cgloan_avtotalloan	**-0.014*** **	**-0.015*** **	**-0.014*** **
	(0.004)	**(0.004)**	**(0.003)**
d_NPL_lagtotalloan (t+1)	-0.021	-0.042***	-0.038**
	(0.015)	(0.015)	(0.015)
d_NPL_lagtotalloan	0.108***	0.092***	0.098***
	(0.015)	(0.017)	(0.017)
NetIncomebfLLP_avtotalassets	0.507***	0.514***	0.536***
	(0.159)	(0.150)	(0.144)
Chargeoff_lagtotalloan			0.462**
			(0.206)
LLA_totalloan_l		-0.077***	-0.071***
		(0.025)	(0.023)
lnassets	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.000)
ExcRegCapbfLLP_riskassets	0.009**	0.008**	0.007*
	(0.004)	(0.004)	(0.004)
Constant	0.006	0.008	0.006
	(0.009)	(0.008)	(0.008)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	814	814	814
AdRs	0.491	0.504	0.515

Panel B. Lagged Effects

(1-year lag)

VARIABLES	(1) LLP_lagtotalloan	(2) LLP_lagtotalloan	(3) LLP_lagtotalloan
payout_avtotalloan (t-1)	0.310***	0.330***	0.342***
	(0.111)	(0.110)	(0.107)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	727	727	727
AdRs	0.507	0.518	0.525

(2-year lag)

VARIABLES	(4) LLP_lagtotalloan	(5) LLP_lagtotalloan	(6) LLP_lagtotalloan
payout_avtotalloan (t-2)	-0.013	-0.006	0.003
	(0.100)	(0.100)	(0.095)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	616	616	616
AdRs	0.464	0.466	0.472

Table 6: Channel of increasing Loan Loss Provisions

Note: This table presents the results of the effects of guaranteed loans on bank's total loans (*loan_ta*) and Nonguaranteed Loans (proper_loan_ta).

	(1)	(2)
VARIABLES	loan_ta	proper_loan_ta
cgloan_avtotalloan	**0.419****	**0.185**
	(0.177)	**(0.171)**
d_NPL1_lagtotalloan	2.019**	1.192
	(0.997)	(0.913)
d_NPL2_lagtotalloan	1.785**	1.292**
	(0.730)	(0.596)
d_NPL3_lagtotalloan	1.107	1.016
	(1.071)	(0.859)
NetIncomebfLLP_avtotalassets	11.871***	12.672***
	(3.558)	(3.309)
lnassets	-0.104**	-0.073*
	(0.046)	(0.041)
ExcRegCapbfLLP_riskassets	-0.562**	-0.638***
	(0.233)	(0.225)
Constant	2.194***	1.722***
	(0.694)	(0.615)
Bank FE	Yes	Yes
Year FE	Yes	Yes
Observations	902	902
AdRs	0.879	0.887

Table 7: Alternative Measures of Payout Ratio and Sample Period

Panel A. Total sample period

Note: This table presents the results of the effects of government guaranteed loans on bank's loan loss provisioning practices, using alternative measurement.

	(1)	(2)	(3)
VARIABLES	LLP_lagtotalloan	LLP_lagtotalloan	LLP_lagtotalloan
payout_avtotalcgloan	**0.017****	**0.017****	**0.015****
	(0.007)	**(0.007)**	**(0.007)**
d_NPL1_lagtotalloan	0.095***	0.091***	0.100***
	(0.024)	(0.024)	(0.025)
d_NPL2_lagtotalloan	0.114***	0.103***	0.109***
	(0.020)	(0.024)	(0.023)
d_NPL3_lagtotalloan	0.148***	0.134***	0.133***
	(0.028)	(0.032)	(0.033)
NetIncomebfLLP_avtotalassets	0.498***	0.498***	0.523***
	(0.154)	(0.151)	(0.147)
Chargeoff_lagtotalloan			0.478**
			(0.202)
LLA_totalloan_l		-0.046*	-0.045*
		(0.027)	(0.026)
lnassets	0.000	0.000	0.000
	(0.001)	(0.001)	(0.000)
ExcRegCapbfLLP_riskassets	0.005	0.005	0.004
	(0.004)	(0.004)	(0.004)
Constant	-0.001	-0.000	-0.002
	(0.008)	(0.008)	(0.007)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	902	902	902
AdRs	0.450	0.455	0.468

Panel B. Subsample before Covid 19

VARIABLES	(1) LLP_lagtotalloan	(2) LLP_lagtotalloan	(3) LLP_lagtotalloan
payout_avtotalloan	**0.298****	**0.313****	**0.286****
	(0.117)	**(0.122)**	**(0.118)**
cgloan_avtotalloan	**-0.008**	**-0.008**	**-0.006**
	(0.007)	**(0.006)**	**(0.006)**
d_NPL1_lagtotalloan	0.084***	0.085***	0.084***
	(0.030)	(0.031)	(0.031)
d_NPL2_lagtotalloan	0.091***	0.078***	0.083***
	(0.024)	(0.026)	(0.024)
d_NPL3_lagtotalloan	0.146***	0.125***	0.125***
	(0.029)	(0.032)	(0.032)
NetIncomebfLLP_avtotalassets	0.588***	0.589***	0.616***
	(0.176)	(0.167)	(0.161)
Chargeoff_lagtotalloan			0.433*
			(0.251)
LLA_totalloan_l		-0.072***	-0.063**
		(0.027)	(0.025)
lnassets	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)
ExcRegCapbfLLP_riskassets	0.010**	0.010*	0.008
	(0.005)	(0.005)	(0.005)
Constant	0.001	0.000	0.002
	(0.015)	(0.015)	(0.015)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	639	639	639
AdRs	0.510	0.522	0.531

Table 8: Addressing the Endogeneity Issues: Bartik-like approach

Note: This table presents the results of the effects of government guaranteed loans on bank's loan loss provisioning practices, using cross term of guaranteed loan exposure in 2012 and macro-level payout variables.

	(1)	(2)	(3)
VARIABLES	LLP_lagtotalloan	LLP_lagtotalloan	LLP_lagtotalloan
exposure12#lnsum_payout_mod	**0.007*** **	**0.007*** **	**0.008*** **
	(0.002)	**(0.003)**	**(0.003)**
cgloan_avtotalloan	-0.015***	-0.016***	-0.015***
	(0.003)	(0.003)	(0.003)
d_NPL1_lagtotalloan	0.097***	0.092***	0.101***
	(0.023)	(0.023)	(0.025)
d_NPL2_lagtotalloan	0.117***	0.105***	0.112***
	(0.020)	(0.023)	(0.021)
d_NPL3_lagtotalloan	0.147***	0.131***	0.129***
	(0.026)	(0.029)	(0.029)
NetIncomebfLLP_avtotalassets	0.532***	0.534***	0.562***
	(0.148)	(0.144)	(0.137)
Chargeoff_lagtotalloan			0.513**
			(0.199)
LLA_totalloan_l		-0.054**	-0.052**
		(0.025)	(0.024)
lnassets	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.000)
ExcRegCapbfLLP_riskassets	0.009***	0.009**	0.008**
	(0.003)	(0.003)	(0.003)
Constant	0.004	0.005	0.002
	(0.009)	(0.009)	(0.008)
Bank FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	893	893	893
AdRs	0.475	0.483	0.497

Appendix

A1. The loan classification in Japanese banks

On the balance sheets of the Japanese banks, there are three kinds of loan classifications disclosed: (1) risk management assets disclosed under Banking Act, (2) assets disclosed under Financial Reconstruction Law (FRL), and (3) assets under self-inspection to calculate accounting numbers.

Among these categories, (1) risk management assets and (2) assets under FRL are mandatory disclosed loans. The main difference between the two is the range of the disclosure. (1) risk management assets are the classification of loans, while (2) assets under FRL are the classification of loans, accrued interest, guarantee of obligations, advance payment, foreign exchange, loanable securities. To simplify the disclosure of bank loan quality, Banking Act was revised in 2020 unifying the risk management assets with assets under FRL. The implementation of the act is from 2022/3/31. After the revision, risk management loans have changed to be essentially classified according to FRL loan categories.

Apart from the regulatory disclosure of loan quality, banks conduct self-assessment of loan classification following their internal manual of assessment. The internal manual has tended to comply with the "Financial Inspection Manual" published by Financial Services Agency (FSA), which is made for the inspection by FSA. However, the Financial Inspection Manual has been criticized that it leads to inflexible credit loss estimation and mechanical treatment of loan loss provisioning. Given these arguments, FSA decided to abolish the manual in 2019.

Table A1-1 shows the relationship between asset classification under Financial Reconstruction Law and loan loss provisioning for each assets. The sum of the light and dark gray cells (bankrupt assets, potentially bankrupt assets, substandard loans) are so-called "non-performing loans" in Japan. Each loan classification is further divided into four classes based on its collectability. The loan classifications based on the self-assessment are mostly corresponding to those based on the FRL. The institutional uniqueness of Japanese bank accounting is the correspondence of the loan quality classification and accounting choices. Banks establish the specific loan loss provisions (SLLP) for quasi-bankrupt or

bankrupt assets and potentially bankrupt assets. They establish the general loan loss provisions (GLLP) for substandard loans and all normal loans.

Table A1-1: The relationship between asset classification and accounting treatment for loan loss allowances

<table>
<tr><th>Asset classification
under Financial Reconstruction Law</th><th>Accounting treatment</th></tr>
<tr><td>(quasi-) bankrupt assets</td><td rowspan="2">Specific loan loss allowance
(SLLA)</td></tr>
<tr><td>Doubtful assets</td></tr>
<tr><td>Substandard loans</td><td rowspan="2">General loan loss allowance
(GLLA)</td></tr>
<tr><td>Normal loans</td></tr>
</table>

A2. The consideration of CECL and discretion in Japanese accounting practices

Before CECL, banks under IAS 39 or US-GAAP are not allowed to consider expected credit losses when calculating loan loss allowance, which is called "incurred loss model". The main characteristics of the incurred loss model are to require evidence of loan impairment and prohibit inclusion of future expected losses that have not yet been incurred when measuring the current value of impairment (e.g., IASB 2009, par.22).

As the incurred loss model has been criticized that it makes provisioning "too little, too late", new standards (IFRS 9 and ASC 326 in US-GAAP) take more forward-looking approaches for loan loss accounting. Under the new framework, banks are required to estimate the current expected loan losses even without evidence of credit losses.

In Japan, the current stipulations of J-GAAP or related practical guidelines fall between incurred loss model and CECL model. J-GAAP generally assumes that the LLPs for normal loans are based on the past events or actual rate of credit losses to recognize loan impairment (characteristics of the incurred loss model) but does not rule out the inclusion of the information about expected losses when measuring the value of loan impairment. For example, the practical guideline for accounting for financial instruments allows to adjust the past rate of losses considering changes in the environment. For doubtful assets, banks can consider forward-looking information when estimating the discounted cash flows.

Given these arguments, in the 368th Accounting Standards Board of Japan (ASBJ) committee, they pointed out that there are no significant differences in stipulations between J-GAAP and IFRS 9 in considering expected losses in the future, while there are some technical issues when calculating LLAs for normal loans.

In terms of the estimation periods of the loan impairment, J-GAAP systematically determines the estimation periods based on loan classification. Table A2-1 shows the correspondence of estimation periods and guidelines / accounting standards. In Japan, the two guidelines stipulate that they should

consider expected losses in the whole periods of loan contract for doubtful loans or (quasi-) bankruptcy loans. For doubtful loans, however, the financial inspection manual points out that it is recognized as valid if banks consider the expected loan losses in the next three years to measure the LLAs.

Table A2-1: The differences in estimation periods to measure expected credit losses under practical guidelines in Japan, IFRS 9, and ASC 326

	One year	Average Payback period	Three years	Entire period
Guideline for financial instruments	Normal loans	Normal loans		Doubtful, Bankruptcy
Guideline on bank audit	Normal loans		Substandard	Doubtful, Bankruptcy
IFRS 9	Others			Loans with significant change in credit risks
FASB ASC 326				All loans

(Note) Excerpt from JICPA (2018).

A3. The interpretational differences in GLLP/SLLP between Japan and the U.S.

US-GAAP (before CECL) has similar categories of LLP (FAS 5 provision or FAS 114 provision), but different from J-GAAP in terms of the correspondence to self-assessment of loan quality. In Japan, the borrower classification based on bank's self-assessment is directly linked to LLP calculation. Banks are required to set GLLP for normal loans and substandard loans, and SLLP for doubtful assets and (quasi-)bankrupt assets. GLLP is based on the actual rate of each borrower classification. SLLP is based on each loan's circumstances.

In the US, self-assessed classification exists (Pass, Watch, Special mention, Substandard, Doubtful, Loss), but it is not accounting concept. In the accounting procedure, banks use FAS 5 reserves or FAS 114 reserves based on whether the loans are impaired. FAS 5 require banks to calculate LLP based on actual loss rate for each group of non-impaired loans, like GLLP calculation process in Japan. FAS 114 require banks to calculate LLP based on each loan's circumstances, like SLLP calculation process in Japan. A member of FSA working group mentioned that in the US, FAS 5 reserve (for non-impaired loans) account for most of LLA in US banks. Most of impaired loans tend to be quickly charged off[4].

[4] Our explanations about the differences between loan loss accounting in Japan and that in the U.S. are based on the minutes of the 4th working group on the inspection and monitoring practices for loans. (see https://www.fsa.go.jp/singi/yuusiken/gijiroku/20181029.html)

A4. The impact of additional LLP on regulatory capital

Calculation of regulatory capital for banks adopting a standardized approach[5]:

$$Reglatory\ Capital = \frac{Tier1 + Tier2}{risk\ assets}$$

$$= \frac{\widetilde{Tier1} - LLA * (1 - \tau) + \widetilde{Tier2} + GLLA}{\widetilde{risk\ assets} - SLLA}$$

where $\widetilde{Tier1}$ denotes Tier1 capital before adjusting LLA, $\widetilde{Tier2}$ denotes Tier2 capital before adjusting LLA, $\widetilde{risk\ assets}$ denotes risk assets before adjusting LLA. τ denotes marginal tax rate.

When banks increase GLLA,

- Net income (hence Tier 1 capital) decreases by GLLP * (1 – τ)
- Tier 2 capital increases by GLLP

⋯ decrease net income, but increase regulatory capital (above Tier 2)

When banks increase SLLA,

- Net income (hence Tier 1 capital) decreases by SLLP * (1 – τ)
- SLLA cannot be added back to Tier 2 capital
- But deducted from risk assets

⋯ decrease both of net income and regulatory capital

To think about the marginal effect of increasing SLLP:

[5] Banks can adopt internal rating-based approach (IRB) to calculate risk assets. Under the IRB approach, SLLP and GLLP are collectively accounted for in the calculation, ensuring no differences in incentives for regulatory capital between them (Umezawa, 2024, pp.104-106). The explanations here are following Umezawa (2016), which argues the calculation in detail and analyzes the discretionary loan loss provisioning practices in Japan.

$$\frac{\widetilde{Tier1} - SLLP * (1 - \tau) + Tier2}{\widetilde{risk\ assets} - SLLP}$$

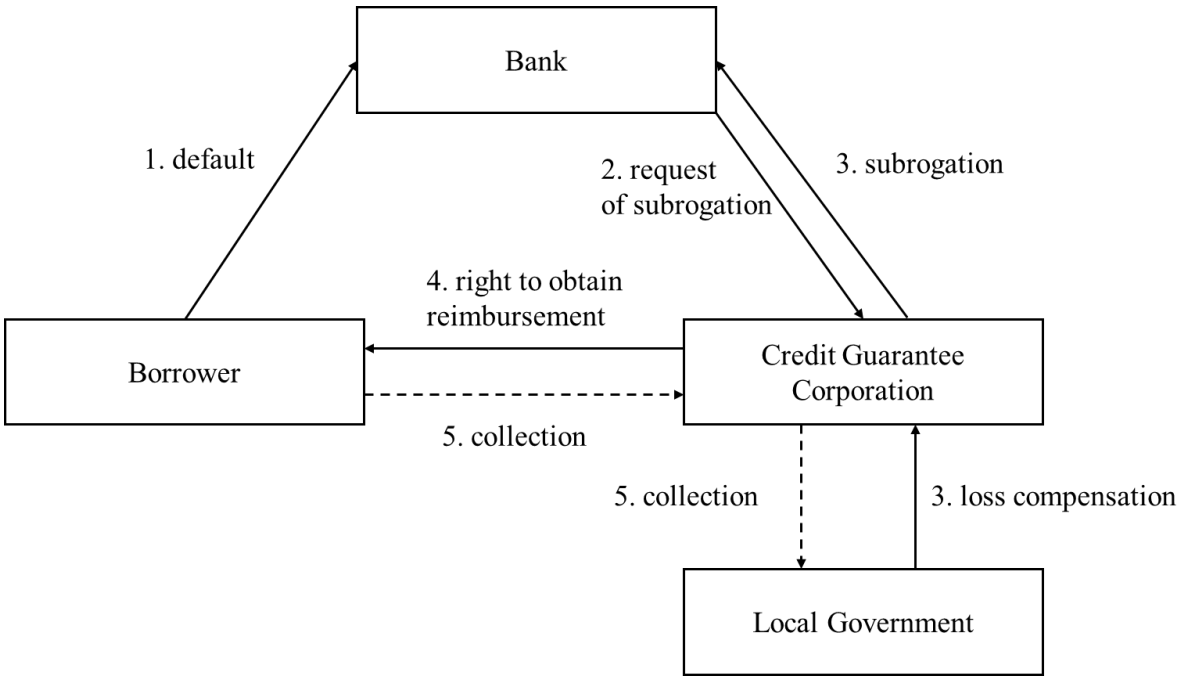
Generally, risk assets are much larger than Tier 1 / Tier 2 capital, so the effect of increasing SLLP is larger on numerator than denominator. Regulatory capital is decreasing in additional SLLP.

A5. The procedures of subrogation payment

Figure A5-1 illustrates the flow when a borrower becomes insolvent, and the credit guarantee corporation carries out subrogation payment. When the borrower becomes unable to repay the debt, the bank submits a subrogation claim to the local credit guarantee corporation. Upon receiving the claim, the credit guarantee corporation performs the subrogation payment to the bank, thereby becoming the new creditor in place of the bank. The funds for the subrogation payment are covered by the insurance from the Japan Finance Corporation or subsidies by the government. At this time, the credit guarantee corporation acquires the right to obtain reimbursement against the debtor. Subsequently, the credit guarantee corporation undertakes the debt collection from the debtor, and the local government has the right to receive the collected funds.

The credit guarantee corporation has the right to obtain reimbursement after subrogation payment, which sometimes makes debt waivers difficult. Waiving the right to obtain reimbursement implies waiving the rights of the public, which is not easily achieved and often requires resolutions by local councils. Therefore, claims with subrogation face higher hurdles for debt waiver and business rehabilitation, potentially increasing the likelihood of bankruptcy.

Figure A5-1: The flow of subrogation payment.



(Note) This figure is based on The Small and Medium Enterprise Agency (2016).

Table A3. Numbers of SMEs, Percent with Guaranteed Loans, Percent of Loans Guaranteed, by Credit Score in Ono (2006)

		Credit Scores (better→)					
	Total	<50	50-54	55-59	60-64	65-69	>69
Number of SMEs (percent of SMEs)	7491 (100)	1130 (15.1)	1956 (26.1)	1814 (24.2)	1238 (16.5)	1055 (14.1)	298 (4.0)
Percent of SMEs with guaranteed loans	48.2	77.7	66.3	49.2	29.5	15.7	4.0
Percent of SMEs, by share of loans guaranteed							
0-40%	61.2	51.9	56.6	66.3	76.2	83.7	91.7
40-60%	13.7	13.8	14.9	13.9	11.2	8.4	0
60-100%	14.4	17.4	17.5	12.7	6.6	2.4	0
100%	9.1	15.1	9.5	5.4	4.4	4.2	0

Source: Ono (2006).