Credit Smoothing and Determinants of Loan Loss Reserves. Evidence from Europe, US, Asia and Africa

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Abstract

This study provides a link between accounting, managerial discretion and monetary policy. Monetary authorities encourage banking institutions to supply credit to the economy. Increased bank supply of credit is a good thing but too much of a good can be a bad thing. This paper investigates under what circumstances excessive loan supply ceases to be a good thing and how bank managers react to this. After examining 82 bank samples, I find that (i) bank underestimate the level of reserves to boost credit supply in line with expectations of monetary authorities, particularly, in Asia and UK (ii) consistent with the credit smoothing hypothesis, US and Chinese banks smooth credit supply to minimize unintended stock market signaling; (iii) managerial priority during a recession is to smooth credit over time rather than to boost credit supply; (iv) non-performing loans, bank portfolio risk and loan portfolio size are significant determinants of the level of loan loss reserves; and (v) credit risk, proxy by loan growth, do not have a significant impact on loan loss reserves but tend to have some significant effect during a recession, particularly, when change in loans is negative. The implications of these findings are two-fold: (i) bank managers use their discretion over reserves to influence bank credit supply; (ii) bank supply of credit is not solely driven by loan demand but by a combination of several factors, particularly, capital market concerns, the need to avoid scrutiny from monetary authorities, and country-specific factors.

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1 Introduction

This paper seeks to provide a link between managerial discretion, an accounting number (loan loss reserves) and monetary transmission mechanism. The paper begins with the well-known premise that monetary authorities supply money or credit to the economy through banking institutions. If banking institutions decline to supply credit or issue loan, then, these institutions may lose their legitimacy. Therefore, banks will supply credit or loan. Motivations to increase bank credit supply may derive from the need to generate higher profit or due to policy requirements by central bankers. Managers are, particularly, concerned about excessive supply of bank credit because of its potential to communicate unintended signal to the stock market, particularly, investors. Therefore, managers can expect to take on certain actions to address this concern. Motivated by this concern, this study investigates one possible action that managers might take - credit smoothing. Particularly, I examine whether banks smooth credit over time and under what conditions they do this.

A second motivation for this study is to investigate bank-specific determinants of loan loss reserves, not provisions. Extant research has already investigated the determinants of provisions. However, there is a scant literature on determinants of loan loss reserves[1]. Therefore, this paper aims to fill this gap by examining bank-specific determinants of level of loan loss reserves. I note that banks in several countries have different accounting rules, different supervisory rules, different loan loss policies, and possibly different incentives that might affect provisioning and reserve behavior. To control for these differences, I examine country-specific reserve behaviour.

The findings in the study make some contribution to the existing literature. First, this study contributes to the banking literature by investigating bank-specific determinants of loan loss reserves by extending the provisioning literature to loan loss reserves. An approach unique to this paper is the inclusion of an important determinant, the size of bank loan portfolio rather than the total asset, a common proxy for bank size across mainstream studies[2]. The rational for this is because, intuitively,

[1] Hasan and Wall (2004) and Bikker and Metzemakers (2005)

[2] (For example, Bhat, 1996; Ahmed et al., 1999; Lobo and Yang, 2001; Hassan and Wall, 2004; Kanagaretna et al., 2004; El Sood, 2012; Leventis et al, 2011)

loan loss reserves should have a direct impact on bank loan portfolio not necessarily on total asset.[3] Third, this study contributes to the monetary economics literature by providing another explanation as to why actual monetary supply outcomes falls below expected outcomes.

The remainder of the paper is organized as follows. Section 2 distinguishes between provisions and reserves. Second 3 review the existing literature. Section 4 discusses the data, sample selection and methodology. Section 5 discusses the main results. Section 6 concludes.

2 Literature Review

2.1 Provisions and reserves

An important distinction between loan loss provision (LLP) and loan loss reserve (LLR) is needed. Provisions and reserves behave differently. Provisions are a deduction from gross interest income in the income statement while reserves are yearly accumulation of provisions in the balance sheet. Also, reserves behave like capital and are used to shield banks against unusual expected losses. According to Bikker and Metzemaker (2005), LLP reflect managerial decision at a point in time (annual) while loan loss reserves is the accumulation of annual net provisions over time that reflects actual expected loan losses. Also, loan loss reserve is perceived to be linked directly to the quality of bank loan portfolio and is susceptible to short-term fluctuations arising from macroeconomic developments and the solvency of individual counterparties (Bikker and Metzemaker, 2005). Bikker and Metmaker (2005) went on to investigate whether the same variables that explain provisioning behaviour also explains the behaviour of reserves. They found that the same explanatory variables that explain loan loss provision also explain the level of loan loss reserve but less significantly. However, they concluded that the level of reserve is likely to be influenced more significantly by outside shocks and insignificantly by managerial incentives such as capital management motives and income smoothing motives.

[3] Another justification for using loan portfolio size, rather than total asset, is due to my observation that most studies do not find strong significant size effect on provisions and when they do, it is significant mostly at the 10% s.f level. (for example, Laeven and Majononi, 2003). Therefore, provision/reserves tend to have a weak relation to bank size proxy by total asset.

2.2 Theory

The theoretical literature argue that credit risk represents an important driver of the riskiness of banks and that current period loan growth is likely to have an impact on current period provisions (e.g. Liu and Ryan, 2006). In theory, a positive relation between credit risk and provisions is expected (e.g., Liu and Ryan, 2006; Foos et al. 2010). Following this reasoning, incremental increase in loan should lead to incremental increase in reserves (e.g. Kanagaretnam et al, 2003). Also, Laeven and Majnoni (2002) note that continuous increase in bank lending is generally associated with lower monitoring efforts and deterioration in loan quality, thus, necessitating increased provisions. Thus, a prudent bank is expected to report a positive relationship between the level of loan loss reserves and credit risk. A common measure for bank credit risk exposure in the literature is loan growth or change in outstanding loans (e.g. Cavallo and Majnoni, 2001; Laeven and Majnoni, 2002; Lobo and Yang, 2001). Nonetheless, Lobo and Yang (2001) argue that, in reality, the relationship between loan growth and LLP is largely unpredictable due to uncertainty in the quality of incremental loans.

2.3 Determinants of LLR

Provisioning research identify three (3) bank-specific determinants of loan loss reserves: bank asset portfolio composition, credit risk and the state of the business cycle. Many provisioning studies employed these variables as control variables when examining income smoothing practices while few studies employed these variables as bank-specific factors. In this study, I employ these variables as bank-specific factors.

Asset-portfolio risk is an indication of banks' overall risk from the financial analyst perspective. It is a measure of how much loans banks have in relation to total asset. The use of loan to asset ratio as a proxy for overall risk exposure on bank portfolio is common across the literature (e.g. Sinkey and Greenawalt, 1991; Laeven and Majnoni, 200; Hasan and Wall, 2004; Floro, 2010). Intuitively, portfolio risk should influence the level of reserves if bank asset portfolio contains more loans than securitized assets. This is because loan loss reserve tends to behave like capital used as a buffer against losses arising from excessive risk-taking. Thus, when portfolio risk is high, banks tend to

increase LLR as a buffer to absorb losses in the portfolio. The higher the risk, the greater the need for more reserves. Sinkey and Greenawalt (1991) found a significant positive relationship between loan-asset ratio and level of loan loss reserve. Hasan and Wall (2004) investigated the determinants of loan loss reserve and found that loan-asset ratio is significant and positively related to loan loss reserve for US banks and Japanese bank samples but negative and insignificant for Canadian banks. Bikker and Metzemakers (2005) found a significant positive relationship between loan loss reserve and bank portfolio risk. Consistent with prior studies, I expect a positive relationship between reserves and bank portfolio. However, a significant negative relationship, if any, is likely to indicate a largely diversified bank portfolio.

Credit risk, proxy by loan growth, is also a determinant of the level of loan loss reserve. Lobo and Yang (2001) found a significant positive relationship between loan growth and provisions not reserves. Laeven and Majnoni (2002) found a weakly significant negative relationship between loan growth and provisions for Europe, Asia, US and Latin America. Kanagaretnam et al (2003) found a significant positive relationship between provisions and loan growth. Bikker and Metzemakers (2005) found a significant positive relationship between loan loss reserves and loan growth for US banks but insignificant evidence for European banks. Bushman and Williams (2012) found a significant positive relationship between provisions and loan growth. Overall, I hypothesize a positive relationship between bank credit risk exposure (loan growth) and LLR.

Another determinant of the level of loan loss reserves is the state of the business cycle. Bikker and Metzemakers (2005) found strong evidence of procyclical pattern in loan loss reserve during recessionary period for the full bank sample. However, this procyclical behaviour is significant for European banks but insignificant for US banks. Floro (2010) found a significant negative relationship between loan loss reserves and the business cycle for Philippine banks while Ozili (2015) found a negative relationship for Nigerian banks. A positive sign on GDP growth rate would suggest that LLR behaves like capital. That is, banks build up reserves during good times and use up reserves during bad times, thus, a positive relationship.

3 Hypothesis Development

3.1 LLR and Credit Supply Hypothesis

Monetary authorities tend to facilitate money supply to the economy through banking institutions. As bank loan portfolio increases, the supply of credit to the economy also increases, at least, in principle. Therefore, the size of bank loan portfolio is an indicator of bank credit supply. If monetary authorities want expansionary credit supply and act as a guarantor against significant expected loan losses, banks may have some incentive to underestimate loan loss reserve to boost credit supply (gross loan) to the economy in line with monetary policy expectations. This describes the credit supply hypothesis. Following this reasoning, I hypothesize that, if banks are concerned about meeting monetary policy expectations, a negative relationship between reserves and bank loan portfolio is expected.

H1: A negative relationship between LLR and loan portfolio size is expected.

3.2 LLR and Credit Smoothing Hypothesis.

Monetary authorities expect banks to increase their supply of bank credit to boost consumption and investment in the economy. This expectation is usually intense to speed up recovery from recession. Also, banks that significantly decrease the size of loan portfolio in bad times tend to attract regulatory attention. Therefore, in order to avoid such regulatory scrutiny, banks tend to smooth the level of credit supply over time. There are two explanations for this.

First, bank managers are concerned that excessive supply of credit can have unintended signaling effect to the stock market (that is, investors might interpret excessive credit supply as a signal for excessive risk-taking which is generally associated low loan quality). Therefore, banks tend to strike a balance between supplying excessive credit to satisfy monetary authorities and the need to prevent unintended signaling effect to the stock market.

Second, increased supply of credit is a good thing to the economy but too much of a good thing can be a bad thing due to adverse selection. Therefore, banks attempt to avoid excessive loan supply by using accounting techniques to influence the size of gross loans.

Following both reasoning, there is a reason to believe that banks tend to smooth credit supply by overstating (understating) loan loss reserves when loan portfolio is expected to be unusually high (low) to minimize unintended signaling to investors and to avoid regulatory attention. This behaviour is described here as 'credit smoothing', hence, the credit smoothing hypothesis.

This hypothesis suggest that, if banks are strongly concerned about the signaling consequences of excessive credit supply, then, banks will use loan-decreasing smoothing strategies to reduce the unusually large size of gross loan during good times and use loan-increasing strategies, in bad times, to boost loan portfolio size when loan size is unusually low to avoid regulatory discipline. Therefore, I hypothesize that the need to avoid unintended signaling tends to motivate managers to smooth bank credit supply. Thus, a positive relationship between reserves and bank loan size would indicate evidence for credit smoothing. Therefore, the second hypothesis is:

H2: A significant positive relationship between LLR and loan portfolio size is expected.

3.3 Reserves Behaviour during a Crisis

The behaviour of loan loss reserve during a crisis might provide new information about bank managers' priority during the crisis - whether to smooth credit supply or to boost credit supply in line with the expectations of monetary expectations. During recessionary periods, I propose that banks may not necessarily increase the size of its loan portfolio due to credit risk concerns rather banks might understate reserves to boost net loans upwards to satisfy regulators and monetary authorities. Therefore, I expect evidence for credit smoothing during a recession. This expectation is intuitive, particularly, when monetary authorities act as a guarantor against severe credit losses arising from complying with monetary authorities. A negative sign would suggest support the credit supply hypothesis.

H3: A positive relationship between LLR and bank loan portfolio size is expected.

On the other hand, it may be difficult to predict the behaviour of LLR because managerial actions during a recession or crisis are influenced by a combination of factors such as credit risk concerns,

expectations of monetary authorities, stock market signaling, state of the business cycle and other country-specific considerations, etc.

4 Methodology

4.1 Data and Sample Selection

The data include banks' balance sheet information and country-specific macroeconomic indicators obtained from Bankscope database and World Bank databank, respectively, over the period 2004 to 2013. Bankscope is believed to provide the widest coverage of banking data for several countries. I include countries that have bank data from 2004-2013. This period covers a full business cycle for all the countries included. Unfortunately, some crucial variables are not reported for many banking organizations on Bank Scope and even where reported are only available for some years and unavailable for other periods. I have then eliminated banks that over the sample period had no reporting data for crucial variables for four consecutive years of balance sheet observations, in order to control for the consistency and quality of bank reporting. The resulting sample included 82 banks from 11 countries, with a total of 820 bank-year observations. The sample is divided into regions: Europe, US, Asia and Africa.

4.2 Estimation Procedure

Panel data cross-section and time series regression with fixed effect is employed. This is consistent with Cavallo and Majnoni (2001) and Bikker and Metzemakers (2005). I modify the equation to introduce the credit smoothing variable into the model containing other determinants of the level of reserves. I adopt three model specifications.

The first model specifies theoretical determinants of reserves and tests the two main hypotheses. The second model tests the crisis-reserve hypothesis. The third model tests for robustness by employing a more precise measure of credit risk rather than loan growth. Another robustness check examines country-specific regression to control for country-specific differences. The only weakness of bank-country analysis is that it reduces the degree of freedom of bank-country observations. However, this

approach is preferred in order to avoid the 'dummy variable trap' arising from using multiple dummy variables to control for multiple cross-country and institutional differences.

Therefore, the econometric specification is given as:

Model 1:

$$LLR_{i,t} = NPL_{i,t} + LOTA_{i,t} + LOAN_{i,t} + InGL_{i,t} + GDPR_{j} + \varepsilon_{i,t}$$

Model 2:

$$CRISIS*LLR_{i,t} = CRISIS*NPL_{i,t} + CRISIS*LOTA_{i,t} + CRISIS*LOAN_{i,t} + CRISIS*InGL_{i,t} + CRISIS*GDPR_{j} + \varepsilon_{i,t}$$

Model 3:

$$LLR_{i,t} = NPL_{i,t} + LOTA_{i,t} + negLOAN_{i,t} + INGL_{i,t} + GDPR_{j} + \varepsilon_{i,t}$$

Where,

LLR = ratio of loan loss reserve to gross loan for bank i at time t

NPL = ratio of impaired loans ratio gross loans for bank i at time t

LOTA = ratio of net loans over total asset for bank i at time t

INGL = natural logarithm of gross loan for bank i at time t

LOAN = change in gross loan for bank i at time t.

negLOAN = negative change in gross loan for bank i at time t.

GDPR = growth in gross domestic product.

CRISIS = I introduce a financial crisis dummy variable. The dummy variables take a value of one during the financial crisis period (2007-2009) and otherwise, zero.

Bank-specific determinants of interest in this analysis are LOAN, LOTA and INGL. To test the credit smoothing hypothesis, the key variable of interest is the InGL variable. The dependent variable is the ratio of loan loss reserves over gross loans. This is consistent with Bhat (2010). Explanatory variables include bank-specific determinants (LOAN, NPL and LOTA) and country-specific determinants (GDPR). At bank level, I employ NPL to control for non-discretionary influences on reserves. This is consistent with prior studies, for example, Beaver and Engel (1996). NPL, the ratio of nonperforming loans to gross loan is an ex post measure of loan portfolio quality and may contain information on bank risk not captured by traditional measures of risk. I exclude income smoothing and capital management variables from the model because Bikker and Metzemaker (2005) found that the level of reserve had less statistical significance with loan loss reserves

5 Discussion of Results

5.1 Descriptive Statistics and Correlations

Table 1 present the descriptive statistics for the full sample. On average, LLR is 2.58. Notably, LLR is relatively large for Indonesian and African banks and is relatively lower for South African banks. On average, NPL is 4.03 (median=2.88), LOAN is 14.28(median = 11.74; InGL is 17.45 (median=18), LOTA is 51.89 (median =52.50) and GDPR is 4.02 (median=4.00). The correlation statistics in Table 6 report a negative and significant relationship between LLR and InGL while LLR reports a positive and significant relationship with GDPR and NPL is reported. The negative correlation between GDPR and NPL indicates procyclical behavior associated with problem loan.

Table 1: Descriptive Statistics

			Region				Some Countries				
Var.	Statistic	Full Sample	Europe	US	Asia	Africa	UK	China	India	Indonesia	South Africa
LLR	Mean	2.58	2.34	2.18	2.55	3.09	2.13	2.54	1.75	3.86	1.72
	Median	2.04	2.20	1.91	1.98	2.09	1.59	2.30	1.51	2.80	1.75
	S.D	2.34	1.42	1.32	2.09	3.46	1.56	1.67	1.27	2.76	0.69
NPL	Mean	4.03	4.34	3.09	2.95	5.95	4.59	1.83	3.05	4.09	3.67
	Median	2.88	3.74	2.40	2.32	3.97	3.41	1.12	2.99	3.16	3.58
	S.D	4.42	2.76	3.27	3.13	6.63	3.32	2.49	1.44	3.51	1.98

LOAN	Mean	14.28	6.25	9.16	19.27	17.57	6.46	20.84	21.49	27.62	11.92
	Median	11.74	2.24	20.18	16.86	15.99	2.35	16.41	20.53	24.31	12.01
	S.D	20.06	21.10	20.17	19.69	16.30	25.93	18.57	12.36	22.42	11.07
INGL	Mean	17.45	19.05	19.83	17.51	14.53	19.47	19.52	16.56	14.82	17.61
	Median	18.00	20.03	20.17	17.56	14.17	20.34	19.55	16.51	14.96	17.82
	S.D	3.16	2.31	0.94	2.54	3.24	1.86	0.99	0.72	1.99	0.58
LOTA	Mean	51.89	44.76	43.11	55.20	57.21	41.87	54.20	55.35	61.53	61.67
	Median	52.50	41.55	43.86	54.61	56.26	38.78	52.32	58.55	63.15	66.29
	S.D	15.91	15.48	19.17	13.81	12.75	12.45	14.15	8.21	11.42	13.61
GDPR	Mean	4.02	1.09	1.70	6.28	4.66	1.29	10.04	7.54	5.82	3.31
	Median	4.00	2.00	2.00	6.00	5.50	2.00	10.00	8.00	6.00	4.00
	S.D	3.69	2.29	1.89	3.73	2.68	2.11	1.89	2.07	0.39	2.38
Obs		749	170	105	283	190	80	77	59	87	89

5.2 Discussion of result

Main Result

Regression 1 shows that most variables are consistent with prior expectations. After pooling the full bank sample, NPL, LOTA and InGL report significant coefficient signs. InGL variable reports a significant negative sign in support of the credit supply hypothesis indicating that banks reduce the level of reserves to boost the size of its loan portfolio either to earn high profit or to meet the credit supply expectations of monetary authorities. Unlike Bikker and Metzemakers (2005) and Hasan and Wall (2004)'s findings, the LOTA variable report a significant negative sign for the pooled sample. The significant and negative sign indicates that bank loan portfolio appears to be largely diversified. LOAN variable did not report any significant sign. This suggests that the level of reserve is not influenced by current credit risk exposure.

Regression 2 in Table 2 reports regional results. NPL is significant across all regional bank samples. Also, InGL coefficient reports a significant positive sign for US banks (t=2.97). This supports the credit smoothing hypothesis. InGL reports a significant negative sign for Asian banks (t=-5.36). This supports the credit supply hypothesis. InGL is not significant across European and African bank samples. Also, LOTA reports a significant negative sign for Asian banks (t=-5.58), European banks (t=-1.89) and African banks (t=-3.28) but not for US banks. LOAN does not report any significant

sign for regional bank samples. GDP reports a significant negative sign for US banks only. This indicates procyclical loan loss reserve behaviour.

Table 2: Main Result									
		Reg 1	Regression 2				Regression 3		
		Overall	Regional result				Some country-specific results		
		All banks	US	Europe	Africa	Asia	UK	China	India
Variables	Exp./ Sign	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)
C	?	3.776*** 4.25	-13.64*** -3.07	2.438*** 2.86	2.026 1.10	14.32*** 8.68	25.75*** 4.42	-10.71*** -3.12	-1.309 -0.29
NPL	+	0.356*** 23.97	0.309*** 6.74	0.401*** 17.97	0.403*** 15.05	0.28*** 10.87	0.42*** 13.91	0.719*** 23.61	0.706*** 9.55
LOAN	+/-	-0.002 -0.71	-0.0005 -0.12	-0.003 -1.001	0.014 1.55	-0.046 -0.14	0.003 0.745	0.009* 1.87	0.017* 1.76
GDPR	-	0.006 0.28	-0.166*** -4.13	0.029 1.38	0.071 1.38	-0.046 -1.29	0.014 0.375	-0.032 -0.69	0.068 1.59
LOTA	+/-	-0.018*** -2.67	0.015 1.09	-0.017* -1.89	-0.049*** -3.28	-0.074*** -5.58	-0.02 -1.55	-0.015 -0.95	-0.056*** 2.72
INGL	+	-0.098** -2.01	0.732*** 2.97	-0.056 -1.37	0.059 0.54	-0.462*** -5.36	-1.271*** -4.11	0.660*** 4.45	0.188 0.69
Adj R		75.28	70.61	82.93	81.66	72.99	83.46	90.8	81.57
F-stat		27.48***	17.65***	35.19***	34.65***	23.42***	31.66***	58.71	21.24
Obsv.		749	105	170	190	283	80	77	59

Robustness Test

i. Country specific result

To test the argument that country-specific factors may have an impact on the level of bank loan loss reserve, I examine country-specific bank samples. The results are reported in Table 2 and 3. The results indicate that InGL is significant for UK, US, Chinese banks. I find strong evidence for credit smoothing incentives among banks in US, China and Uganda and find strong evidence for credit supply incentives among banks in the UK and Indonesia. This is indicated by the positive and negative sign on the InGL variable, respectively. These conflicting results suggest that managerial

discretion on the level of loan loss reserves depend on country-specific factors. Similarly, LOTA report a significant negative sign for banks in India and Indonesia but reports a positive and significant sign banks in France and Germany. LOAN appears to be significant only for African banks, particularly, Kenya and South Africa.

Table 3: Cross-country Regression

	France	Germany	Indonesia	Japan	Kenya	South Africa	Uganda
Var.	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)
C	2.86 0.76	-0.518 -0.48	18.62*** 7.85	7.003 1.003	15.17*** 4.67	6.97* 1.69	-14.12** -2.64
NPL	0.509*** 9.48	0.374*** 8.55	0.313*** 5.94	0.024* 1.65	0.445*** 11.65	0.17*** 6.04	0.272*** 4.46
LOTA	0.027** 2.34	0.034* 1.93	-0.109*** -4.81	0.003 0.18	-0.287*** -6.21	-0.003 -0.94	-0.014 -0.52
INGL	-0.161 -0.84	-0.027 -0.74	-0.459*** -4.44	-0.29 0.34	0.065 0.44	-0.313 -1.32	1.293** 2.73
LOAN	0.003 0.46	0.002 0.37	-0.0004 -0.07	-0.008 -1.61	0.029* 1.76	-0.011** -2.44	-0.009 -0.77
GDPR	0.032 1.15	0.003 0.11	-0.428 -1.26	-0.003 -0.17	0.009 0.08	-0.005 -0.32	0.156 1.42
Adj R^2	89.27	87.11	82.76	27.39	84.53	87.23	83.38
F-stat	34.29***	35.45***	32.76***	3.23	30.81***	43.95***	24.83***

ii. During financial Crisis

I expand the baseline model to introduce a crisis dummy as shown in Model 2. The results are reported in Table 4 During the crisis, I find strong evidence for credit smoothing across all banks indicated by the InGL coefficient. This indicates that credit smoothing is a top priority for bank managers during recessionary periods. Also, GDPR coefficient report find strong evidence for procyclical loan loss reserve behaviour among US banks but counter-cyclical reserve behaviour among Asian banks.

Table 4: Financial Crisis Regression Result					
	Combined Sample	Europe	US	Asia	Africa
Variable	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)
C	0.0114 0.29	-0.002 -0.064	-0.009 -0.15	0.008 0.14	0.025 0.27
CRISIS*NPL	0.247*** 17.53	0.289*** 7.31	-0.029 -1.00	0.114*** 4.17	0.364*** 14.21
CRISIS*LOTA	0.006* 1.68	0.001 0.311	0.001 0.17	0.006 0.92	-0.034** -2.44
CRISIS*INGL	0.052*** 4.93	0.042*** 3.76	0.119*** 6.50	0.067*** 3.47	0.131*** 2.71
CRISIS*LOAN	0.003 1.06	0.00001 0.98	-0.009** -2.05	0.005 1.06	0.036*** 3.67
CRISIS*GDPR	0.043*** 2.81	-0.032 -1.34	-0.436*** -8.90	0.061*** 2.75	0.054 1.31
Adj R^2	69.22***	86.05***	85.37***	65.09***	77.63***
F-Stat	20.56	44.42	41.46	16.47	27.25

iii. Negative Loan Growth

Next, I predict that banks that significantly decrease (increase) loan size (that is, banks with negative loan growth) should have low (high) reserves and vice versa. This implies a positive relationship. This is intuitive because reserves should increase (decrease) as credit risk exposure increases (decreases). However, if a negative sign is observed, this might imply that bank loan loss reserve decisions might be motivated for reasons other than credit risk motivations. This would have serious implication for financial reporting and might be construed as misleading investors. To investigate this, I substitute the LOAN variable with negLOAN variable. I create a dummy variable 'negLOAN' that takes the value of '1' if change in loan is negative, otherwise zero. The negLOAN represent a negative change in loan growth. The model specification is given by Model 3. Table 5 report a significant positive sign on the negLOAN variable for the full bank sample and for US banks. Interestingly, I find a significant negative sign for Chinese banks. Also, Indian banks and African

banks report a negative but this sign is insignificant. These findings suggest that some banks appear to have non-credit risk-related motivations for determining the level of reserves as well bank-country and institutional factors.

Table 5: Negative Loan Growth Model								
	World	US	Europe	Africa	Asia	UK	China	india
	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)	Coeff (t-stat)
C	3.74*** 4.22	-12.1*** -4.31	2.385*** 2.79	2.769 1.45	13.83*** 8.54	23.44*** 4.36	-6.488** -2.31	3.13 0.92
NPL	0.354*** 24.01	0.278*** 6.25	0.397*** 17.01	0.397*** 15.17	0.285*** 11.14	0.398*** 11.62	0.704*** 25.24	0.687*** 9.32
negLOAN	0.321** 2.46	0.457** 2.39	0.136 1.11	-0.468 -1.13	0.386 1.56	0.143 0.63	-1.726*** -3.39	-0.449 -1.18
GDPR	0.017 0.78	-0.133*** -3.24	0.031 1.47	0.073 1.31	-0.045 -1.27	0.029 0.77	-0.064 -1.55	0.083* 1.93
LOTA	-0.018*** -2.68	0.008 0.56	-0.018* -1.97	-0.048*** -3.19	-0.075*** -5.71	-0.019 -1.44	-0.0176 -1.18	-0.045** -2.29
INGL	-0.103** -2.12	0.709*** 2.97	-0.055 -1.34	0.031 0.27	-0.462*** -5.18	-1.153*** -4.04	0.479*** 3.89	-0.097 -0.48
Adj R^2	75.35	72.39	82.95	81.66	73.01	83.42	91.78	76.96
F-stat	27.45***	19.18***	35.26***	33.29***	23.44***	31.57	66.34***	20.37***
Obsv.	745	105	170	190	283	80	77	59

6 Conclusions.

In this study, I investigated (i) the determinants of loan loss reserves, and (ii) whether banks tend to smooth bank credit supply due to unintended signaling effects. I find that the level of loan loss reserve is influenced by bank-specific factors, particularly, loan to asset ratio and loan portfolio size, and insignificantly influenced by current credit risk consideration proxy by loan growth. I conclude that this insignificant effect on reserves suggests that current credit risk tend to be reflected in provisions not necessarily in reserves.

Also, the findings that some banks use loan loss reserves to smooth credit to minimize unintended signaling appears to be in conflict with expectations of monetary authorities, particularly, when significant supply of credit is needed to boost the economy during a recession. Thus, managerial choice to smooth credit during a crisis further amplifies the existing recession. This is not to suggest that credit smoothing is unethical or inappropriate. Rather, I argue that, the appropriateness of credit smoothing tend to depend on the state of the economy when credit smoothing practices takes place. Finally, the extent of credit smoothing will depend on concerns about stock market signaling, the state of the business cycle, institutional and country specific factors and on whether investors view the level of reserve as a value-relevant accounting number.

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Appendix 1

Table 6

Full Sample Correlation

Variables	LLR	NPL	LOTA	LOAN	INGL	GDPR
LLR	1.000					
NPL	0.729***	1.000				
	0.000					
LOTA	-0.053	-0.049	1.000			
	0.149	0.174				
LOAN	-0.054	-0.151***	0.169***	1.000		
	0.142	0.000	0.000			
INGL	-0.251***	-0.276***	-0.227***	-0.284***	1.000	
	0.000	0.000	0.000	0.000		
GDPR	0.076**	-0.083**	0.222***	0.379***	-0.311***	1.000
	0.039	0.023	0.000	0.000	0.000	