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Value Relevance of Add-back of Loan Loss Reserves*

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ABSTRACT

Under the current bank regulatory capital framework, loan loss reserves (LLR) are added back to regulatory capital up to a certain limit (henceforth, 'add-backs'). This study examines how equity investors value these add-backs. Decomposing LLR into add-backs and other LLR, we find that add-backs have positive value relevance if such add-backs increase total regulatory capital and other LLR has negative value relevance. This positive value relevance of add-backs is driven by banks with low capital levels. Our finding indicates that the market perceives add-backs as capital rather than as an expense.

Keywords: Add-backs, regulatory capital, loan loss reserves, value relevance

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1. INTRODUCTION

Loan loss reserve (LLR) is a major accrual in the bank industry (Ryan 2011; Beatty and Liao 2014). Interestingly, LLR plays two conflicting roles. On the one hand, LLR captures accumulated loan losses under the accounting rule. On the other hand, a portion of LLR, up to a certain limit, is added back to regulatory capital under the current bank regulatory capital framework.[1] Thus, add-backs of LLR contain good and bad news from the economic and accounting perspectives, respectively. Due to this conflicting role of LLR, there is controversy over whether and how much LLR should be included in regulatory capital (Wall and Koch 2000; American Banker 2010). Despite its importance in the banking industry, there is only one study, Ng and Roychowdhury (2014), which investigate the impact of add-backs on bank failures during the recent financial crisis. In a recent review on bank accounting research, Beatty and Liao (2014) argue that despite the importance of research on the value relevance of LLR, such studies on the topic are under-explored. Adding to academic studies examining the value relevance of LLR (Beaver et al. 1989; Elliott et al. 1991; Griffin and Wallach 1991; Beaver and Engel 1996; Ahmed et al. 1999), our study investigates whether and how investors value add-backs of LLR.

Bank capital regulation has evolved over time.[2] In the 1980s, LLR was included in regulatory capital (primary capital) with other capital components. In 1988, the BASEL Committee introduced a new definition of bank regulatory capitals: Tier 1 and and Tier 2 capital. Under this new bank regulatory capital regime, LLR was excluded in Tier 1 capital but was included in Tier 2 capital up to a certain limit. We refer to the period before the change in capital regulation as the pre-BASEL period and the period after the change in capital regulation as the post-BASEL period.[3]

Prior studies examine the effect of the change in capital regulation on capital management, and they document that banks tend to decrease regulatory capital management through LLR in the post-

1) The limit of LLR to be added back to regulatory capital is 1.25% of the bank's gross risk-weighted assets (GRWA). LLR exceeding such a limit plays a reserve role for future loan losses. Section 2 discusses the details of add-backs.

2) History of bank capital regulation is well summarized in Beatty and Liao (2014).

3) The BASEL capital framework has continued evolving from BASEL I up to BASEL III up to now.

BASEL period (Kim and Kross 1998; Ahmed et al. 1999). However, no study examines the effect of the regulatory capital change on the value relevance of LLR. There are only a handful of studies on this topic based on pre-BASEL period data (Beaver 1989; Wahlen 1994; Beaver and Engel 1996). These studies document that non-discretionary and discretionary LLR respectively have negative and positive value relevance. These results thus imply that bank managers use LLR as a signal to the market that they can address bad loans. However, using the post-BASEL period, recent studies report that the positive value relevance of discretionary LLR has disappeared (Ahmed et al. 1999; Beck et al. 2016). Beatty and Liao (2014) conjecture that the disappearing positive value relevance of LLR may be attributed to the change in capital regulation, which excludes LLR from Tier 1 capital. Still, it is unresolved whether and how investors value LLR as capital. Examining value-relevance of add-backs provides an interesting setting in which to examine how the equity market prices LLR as capital. In addition, testing the value relevance of LLR without decomposing it into add-backs and other LLR may lead to mixed results due to the offsetting effect of add-backs and other LLR.

Using the Beaver and Engel (1996) model, we examine the value relevance of add-backs. We use U.S. bank data during 2001–2014 and find the following. First, add-backs have positive value relevance if such add-backs increase total regulatory capital, whereas other LLR has negative value relevance. Furthermore, this positive value relevance of add-backs is driven by banks with low capital levels. Lastly, we run additional tests to explore whether the value relevance of *LLR* changes with the extent of which newly added LLR is included in regulatory capitals. We divide our sample into three groups: (i) full add-back, (ii) partial add-back, and (iii) no add-back groups. We find that LLR is not significantly value-relevant for full add-back group, whereas LLR is significantly negatively value-relevant for partial add-back and no add-back groups. These findings can be indirect evidence that disappearance of positive market pricing of LLR in the post-BASEL period is driven by the change in capital regulations (Beatty and Liao 2014).[4)]

4) The full add-back sample denotes bank-year that all amounts of newly added LLR at the current fiscal year are included in Tier 2 capital. The partial add-backs refer to bank-year that only a part of the amount of newly added LLR at

The findings of Ng and Roychowdhury (2014) that add-backs is positively associated with future bank defaults seem to be inconsistent with our findings that the equity market positively views add-backs. These two inconsistent findings could be reconciled as follows. First, Ng and Roychowdhury (2014) sample includes both private and public banks, while our sample includes only public banks.[5] Private banks by natures could have riskier loans than public banks due to different operating and regulatory environments.[6] Second, even if add-back of public banks predicted bank defaults, investors of public banks could not impound such information into bank prices due to naivety of investors (Sloan 1996).

Our study contributes to the literature in two ways. First, our study contributes to the literature on capital market pricing of LLR by providing regulatory capital explanations for the disappearing value relevance of LLR. Although approximately 30 years have passed since the change in regulatory capital regime, few study has examined the effect of a capital portion of LLR on its capital market pricing (Beatty and Liao 2014). Our study is the first to examine how equity investors view the capital portion of LLR, add-backs. Second, our study contributes to the literature on add-backs of LLR. Ng and Roychowdhury (2014), which is the only prior study in this area, investigate associations between add-backs and bank defaluts, while our study explores associations between add-backs and equity value, proxied by stock prices. In addition, our study use more comprehensive data on add-back than Ng and Roychowdhury (2014). Ng and Roychowdhury (2014) examine the effect of one specific year (year 2007) add-back information on bank failures over three years (2008–2010). However, our study uses 14-year add-back information and explores the long-run relation between market value of equity and add-backs.

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the current fiscal year is included in Tier 2 capital. The no add-back sample refers to bank-year in which no amount of newly added LLR at the current fiscal year is included in Tier 2 capital.

5) Rigorously speaking, public banks in our sample are all bank holding companies.

6) Investors of public banks could have positive perceptions of add-backs increasing regulatory capitals relying on possible regulatory forebearance. There is evidence that large banks are implicitly guaranteed by the government and regulators apply regulatory forbearance (Brown and Dinc, 2011). “Too-big-too-fail” expresses such situations.

The remainder of the paper is organized as follows. Section 2 reviews the bank capital regulation and related literature and develops the hypothesis. Section 3 presents the research design, and Section 4 describes the sample and provides variable definitions. Section 5 reports the empirical results. Section 6 concludes.

2. BANK CAPITAL REGULATION AND HYPOTHESES DEVELOPMENT

2.1 Bank capital regulation

Banks are required to maintain a certain amount of regulatory capital by financial regulators. In the 1980s, primary capital was defined by federal banking regulators. Under this regulatory capital regime, LLR was included in regulatory capital (i.e., primary capital) with other capital components.[7] In 1988, the Basel Committee introduced a new definition of bank regulatory capital and U.S bank regulators adopted the new regulatory capital framework.[8] Under the new framework, regulatory capital consists of two components: Tier 1 and Tier 2 capital. Tier 1 capital is the core capital, which includes common equity, qualifying perpetual preferred stock, retained earnings, and minority interest and deducts disallowed goodwill and other intangible assets. Notably, LLR is excluded from Tier 1 capital. Tier 2 capital is the supplemental capital, which consists largely of LLR.[9] Hence, an increase in LLR, to a certain limit, increases total regulatory capital by increasing the Tier 2 component of total regulatory capital. However, an increase in LLR decreases total regulatory capital by decreasing the Tier 1 component of total regulatory capital because LLR reflects accumulated loan loss provisions (LLP), an expense item that reduces shareholders' equity. Hence, an increase in LLR has two

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7) Other components in primary capital include common equity, perpetual preferred stock, minority interests, mandatory convertible instruments.

8) This new capital regulation become fully effective in 1992 in US. (Beatty and Liao 2014).

9) In our sample, the percentage of LLR to Tier 2 capital is about 85.37%. Other components of Tier 2 Capital includes redeemable preferred stock, non-qualifying perpetual preferred stock, unrealized gains on available for sale securities, and qualifying subordinated debt.

offsetting effects on total regulatory capital. Whether an increase in LLR increases or decreases total regulatory capital depends on two factors. First, regulatory capital guideline restricts that the amount of add-backs in Tier 2 capital cannot exceed 1.25% of the bank's gross risk-weighted assets (GRWA).[10)11)] Therefore, if LLR at the beginning of the year already exceeds 1.25% of the bank's GRWA, then additional LLR cannot increase Tier 2 capital. Second, tax mitigates the amount of deductions of LLP in shareholders' equity. LLP reduces Tier 1 capital by (1-tax rate)*LLP. Taken together, the effect of add-backs on total regulatory capital depends on whether the amount of LLR under the 1.25% of GRWA limit is greater than (1-tax rate)*accumulated LLP. For example, suppose that LLR at the beginning of the year is less than 1.25% of GRWA by $1,000 and the tax rate is 30 percent. Then, $1,000 of LLP during the year reduces Tier 1 capital by $700(= $1,000*(1-0.3)) and increases Tier 2 capital by $1,000. Overall, $1,000 of LLP during the year increases total regulatory capital by $300. However, if LLR at the beginning of the year is less than 1.25% of GRWA by $500, $1,000 of LLP during the year reduces Tier 1 capital by $700, but it increases Tier 2 capital by $500. Overall, $1,000 of LLP during the year decreases total regulatory capital by $200. These examples show that the limit of add-backs and the effect of tax determine whether an increase in LLR leads to an increase or decrease in total regulatory capital.

2.2 Hypotheses Development

Our study follows two lines of literature. First, the line of literature that is closely related to our study is on the capital market pricing of LLR or LLP.[12)13)] Beaver et al. (1989), a seminal study in this area,

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10) Gross risk-weighted assets (GRWA) is the sum of risk-weighted assets, excess allowance for loan and lease losses, and the allocated transfer risk reserve.

11) Under the regulatory capital framework, banks are required to maintain capital requirements. The capital requirements are typically expressed as a capital adequacy ratio (= regulatory capital/ risk-weighted assets). Risk-weighted assets are the sum of asset values weighted by assets' riskiness.

12) LLP measures the amount of bank's expected future loan losses during a fiscal period. LLP is an expene item in the income statement. LLP is a flow variable. LLR measures accumulated amount of expected future loan losses as of fiscal year-end. LLR is a contra asset item associated with loans in the balance sheet. LLR is a stock variable (Ryan 2007).

13) Studies on the loan loss information cover either LLR or LLP. We focus on LLR

document a positive association between the market value of equity and LLR. Using an event study methodology, Elliot et al. (1991) and Griffin and Wallach (1991) report positive stock market reactions to the announcements of increase in LLP for loans of less-developed countries. All these studies interpret the positive association as banks' signaling to convey their confidence to address bad loans. However, later studies find a negative relation between market value of equity and LLR/LLP. Furthermore, they decompose LLR/LLP into non-discretionary (expected) and discretionary (unexpected) parts and report a still positive association between discretionary (unexpected) LLR/LLP and market value of equity. For instance, Wahlen (1994) finds that stock returns are positively related to unexpected LLP only when controlling for unexpected non-performing loans (NPLs) and unexpected charge-offs. Beaver and Engel (1996) document that the market value of equity is negatively and positively related to non-discretionary and discretionary LLR, respectively. Both studies support the signaling role of LLR. However, these findings are based on the data in the early 1990s. Regulatory capital regime (Basel Capital Accord; BASEL) is effective after 1992 in the U.S. Using pre- and post-BASEL periods, Ahmed et al. (1999) find that the market value of equity is negatively associated with both non-discretionary and discretionary LLR. They argue that the signaling role of LLR does not exist. However, Ahmed et al. (1999) do not directly examine the effect of regulatory change on the market value of bank equity.

Beatty and Liao (2014) suggest potential regulatory capital explanations for the disappearing positive value relevance of LLR in the pre-BASEL period. Specifically, in the pre-BASEL regime, an increase in LLR unconditionally leads to an increase in regulatory capital, which results in positive value relevance of LLR. However, in the post-BASEL regime, a portion of LLR is included in regulatory capital, and an amount of LLR above a certain limit is excluded ('other LLR'). Thus, an increase in other LLR leads to a decrease in capital. This regulatory capital change could potentially explain the change in value relevance of LLR. However, few studies test for the effect of this regulatory change on the market pricing of LLR using pre- and post-BASEL data (Ahmed et al. 1999). In this regard, examining value relevance of add-backs of LLR enables us to infer the reason

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because add-backs are a component of LLR.

why market pricing of LLR becomes negative in the post-BASEL era.

Another line of the literature related to our study is studies on add-backs of LLR. In a recent study, Ng and Roychowdhury (2014) examine the effect of year 2007 add-backs on bank failures over three year during the recent financial crisis (2008–2010). They document that add-backs are positively associated with bank failure when add-back increases regulatory capital. Their analyses show that year 2007 add-backs are positively associated with year 2008 loan growth and non-performing loans and negatively associated with a decrease in return on assets (ROA). They interpret their findings that bank managers are less restrictive in lending during the financial crisis, which leads to poor operating performance. To the best of our knowledge, no study investigates market valuation of add-backs of LLR.

Our research question is to examine how and whether add-backs of LLR counting toward capital are value relevant. On the one hand, as supporters of LLR as regulatory capitals argue, including LLR in regulatory capital enables banks to have more cushion against adverse economic shocks to banks (American Banker 2010). It is likely that add-backs provide a buffer against pro-cyclicality of lending and enhance bank safety (Beatty and Liao 2011). Thus, equity investors may positively price add-backs. On the other hand, the market may negatively price add-backs for the following reasons. First, as opponents argue, LLR containing expected loan losses could decrease the quality of capital. Second, year 2007 add-backs increase the likelihood of bank failure during the recent financial crisis (Ng and Roychowdhury 2014).

Based on the above arguments, it is an empirical question whether capital market pricing implications of add-backs are positive or negative. Thus, we present the following hypothesis in null form.

> **H1:** Equity market does not price add-backs that increase regulatory capital.

Next, we attempt to examine whether the market valuation of add-backs of LLR counting toward regulatory capital changes with the capital level of banks. To the best of our knowledge, there is only one prior study that examines the effect of bank's capital level on the value relevance of LLR/LLP using the pre-BASEL data in which all LLR amounts are treated as primary capital. Liu et al. (1997)

examine how the market valuation perceives LLP as a level of bank regulatory capital change using the data of the pre-BASEL period. They document that the market positively views LLP for banks with low capital but not banks with high capital. This finding is interpreted in the following. Since LLP is included in the primary capital in the pre-BASEL period, banks with low capital benefit more from the increase in one unit of regulatory capital through LLP than banks with high capital. Extending this logic to the post-BASEL period, one could have following prediction. If the market views add-backs of LLR as capital rather than as an expense, then the benefit of capital is greater for banks with low capital than banks with high capital. Based on this idea, equity investors are expected to more positively price add-backs for banks with low capital than for banks with high capital. However, the opposite prediction is also possible. In the post-BASEL period, add-backs are not Tier 1 capital but Tier 2 capital, which is a lower quality of capital than Tier 1 capital. If the market views add-backs of LLR as an expense rather than as capital, then the loss of the expense is greater for banks with low capital than banks with high capital. In this case, equity investors are expected to more negatively price add-backs for banks with low capital than for banks with high capital. Based on the aforementioned arguments, it is an empirical question whether the market pricing of add-backs of LLR counting toward capital changes with the capital level of banks. Thus, we present the second hypothesis in null form.

> **H2:** Equity market does not differentiate pricing add-backs that increase regulatory capital for low capital banks from those for high capital banks.

3. RESEARCH DESIGN

To test for the value relevance of add-backs, we estimate the following regression models which a dependent variable is stock price per share (*PRC*).

$$PRC_{it} = \gamma_0 + \gamma_1 GBV_{it} + \gamma_2 LLR_{it} + \gamma_3 NPL_{it} + \gamma_4 EBP_{it} + \varepsilon_{it} \quad (1)$$

$$PRC_{it} = \gamma_0 + \gamma_1 GBV_{it} + \gamma_2 ADD_{it} + \gamma_3 OTHER\_LLR_{it} + \gamma_4 NPL_{it} + \gamma_5 EBP_{it} + \varepsilon_{it} \quad (2)$$

$$PRC_{it} = \gamma_0 + \gamma_1 GBV_{it} + \gamma_2 ADD_{it} + \gamma_3 ADD^{*}CAPINC_{it} + \gamma_4 CAPINC_{it} + \gamma_5 OTHER\_LLR_{it} + \gamma_6 NPL + \gamma_7 EBP_{it} + \varepsilon_{it} \quad (3)$$

Following Beaver and Engel (1996),[14] we include the gross book value of equity before loan loss reserve (*GBV*), loan loss reserve (*LLR*), non-performing loans (*NPL*) in Eq. (1). Following Ng and Roychowdhury (2014), we also decompose LLR into two parts—add-backs of LLR (*ADD*), which are added back to Tier 2 regulatory capital, and other LLR (*OTHER_LLR*), which are not added back to regulatory capital in Eq. (2). We want to investigate market pricing of add-backs of LLR, which increase total regulatory capital. Hence, we add an interaction term between *ADD* and *CAPINC*. *CAPINC* equals 1 if regulatory capital increases result from add-backs; otherwise, 0. Specifically, we identify that a bank-year in regulatory capital increases result from add-backs if the following three conditions are met: (i) positive LLP, (ii) LLR at the beginning of the fiscal year was less than 1.25% of GRWA (the limit of LLR that can be recognized as Tier 2 capital), and (iii) LLR at the end of the fiscal year does not exceed 1.25% of GRWA.[15] If we expect that the coefficient on *ADD*CAPINC* (i.e., γ_3) is positive, it indicates that the market perceives LLR as a good signal for the value of bank when LLR increases the total regulatory capital. All variables are scaled by the number of outstanding shares to mitigate the scale effect (Barth

14) This model is a modified version of the Ohlson (1995) type regression, which expresses firm value, proxied by stock price, as a linear combination of book value and net income. Beaver and Engel (1996) partition book value into gross book value of equity before loan loss reserve (*GBV*), and *LLR*. They include non-performing loan (*NPL*) as a control variable.

15) In Ng and Roychowdhury (2014), one of three conditions for *CAPINC* = 1 is that the commercial banks are not registered as S-corporations that are exempt from federal income tax. However, we exclude that condition because we focus on listed bank holding companies, which are relatively large entities that are unlikely to be registered as S-corporations. Instead, we add one additional condition that LLR at the end of the fiscal year does not exceed 1.25% of GRWA. If LLR at the beginning of the fiscal year is less than 1.25% of GRWA, but LLR at the end of the fiscal year is greater than 1.25% of GRWA, then an increase in LLR will be partially added to Tier 2 capital (partial add-backs). In this case, an increase in Tier 2 capital through add-backs is less likely to be greater than the decrease in Tier 1 capital (= LLP*(1-tax rate)). Hence, we include the third condition to rule out the case of partial add-backs among observations with the variable *CAPINC* taking 1. Our test results are qualitatively similar whether we include this condition or not.

and Clinch 2009; Song et al. 2011). Appendix A provides the detailed definitions of all variables used in this study. We winsorize all continuous variables at the 1% and 99% levels in each year. We use standard errors clustered by bank level with year dummy variables to address heteroscedasticity of residuals (Petersen 2009).

4. DATA AND DESCRIPTIVE STATISTICS

We obtain financial data of bank holding companies from FR-Y9C regulatory reports and stock price and outstanding shares from Compustat.[16] We start with December year-end bank holding companies from 2001 to 2014 (81,077 bank-year observations) because add-backs (= BHCK5310) are available from 2001 in FR-Y9C. We further require corresponding price data from the Center for Research in Security Prices (CRSP) database. Using CRSP-FRB link provided by the Federal Reserve Bank of New York, we link CRSP data, which include PERMCO, to FR-Y9C data, which contain entity identification number (RSSD9001). These procedures leave us with 7,373 bank-year observations. In addition, we exclude bank-year observations without price and add-backs. The final sample size comprises 5,432 bank-year observations for our tests.

Table 1 presents the descriptive statistics of the variables across the sample. In Panel A for the full sample, the mean and median of stock price per share (*PRC*) are 22.008 and 19.410, respectively. The mean value of add-back LLR per share (*ADD*) is 1.346 and mean value of LLR per share is 1.694. Approximately 79% of LLR are added back to Tier 2 regulatory capital, on average. The mean value of *CAPINC* is 0.446, suggesting that 44.6% of banks experience capital increase from add-backs (banks with *CAPINC* = 1).[17] Furthermore, the amount of LLR added back to Tier 2 capital is offset by the cumulative deductions in Tier 1 capital from LLP. Hence, the remaining 55.4% of banks unable to increase regulatory

16) Following the literature, we refer bank holding companies to banks (Ahmed et al. 1999; Huizinga and Laeven 2012; Beck et al. 2016).

17) As mentioned in footnote 15, banks with *CAPINC* = 1 increase total regulatory capital from all amounts of increase in LLR (i.e add-backs) in the current reporting period. We call banks with *CAPINC* = 1 'full add-back' banks in the later additional analysis section.

Table 1. Descriptive statistics

Panel A: Summary statistics for all banks

Variables	N	Mean	STD	Q25	Median	Q75
PRC	5,432	22.008	14.624	12.040	19.410	28.485
GBV	5,432	17.606	10.546	11.047	15.402	21.077
NPL	5,432	1.848	2.789	0.388	0.905	2.172
LLR	5,432	1.694	1.346	0.934	1.361	1.990
OTHER_LLR	5,432	0.343	0.776	0.000	0.010	0.330
ADD	5,432	1.346	0.833	0.840	1.193	1.619
EBP	5,432	1.899	1.661	1.047	1.701	2.465
CAPINC	5,432	0.446	0.497	0.000	0.000	1.000

Panel B: *CAPINC* = 0

Variables	N	Mean	STD	Q25	Median	Q75
PRC	3,012	19.589	14.783	8.875	17.137	26.300
GBV	3,012	17.645	11.434	10.792	15.399	20.864
NPL	3,012	2.573	3.393	0.583	1.397	3.243
LLR	3,012	2.081	1.590	1.164	1.665	2.449
OTHER_LLR	3,012	0.618	0.957	0.081	0.270	0.758
ADD	3,012	1.457	0.922	0.914	1.274	1.728
EBP	3,012	1.907	1.897	0.983	1.696	2.500

Panel C: *CAPINC* = 1

Variables	N	Mean	STD	Q25	Median	Q75
PRC	2,420	25.020	13.848	15.228	22.500	31.435
GBV	2,420	17.558	9.325	11.367	15.405	21.370
NPL	2,420	0.946	1.291	0.262	0.608	1.154
LLR	2,420	1.213	0.709	0.762	1.099	1.501
OTHER_LLR	2,420	0.001	0.010	0.000	0.000	0.000
ADD	2,420	1.209	0.683	0.759	1.099	1.499
EBP	2,420	1.887	1.311	1.114	1.713	2.395

Notes: This table presents the descriptive statistics of variables used in the empirical analyses. All variables are defined in Appendix A.

Table 2. Correlation coefficients

	PRC	*GBV*	*NPL*	*LLR*	*OTHER_ LLR*	*ADD*	*EBP*	*CAPINC*
PRC	1.000	0.672***	−0.089***	0.209***	−0.114***	0.425***	0.646***	0.185***
GBV	0.672***	1.000	0.312***	0.594***	0.233***	0.732***	0.705***	−0.004
NPL	−0.089***	0.312***	1.000	0.725***	0.719***	0.503***	0.208***	−0.290***
LLR	0.209***	0.594***	0.725***	1.000	0.810***	0.842***	0.497***	−0.321***
OTHER_ LLR	−0.114***	0.233***	0.719***	0.810***	1.000	0.387***	0.200***	−0.395***
ADD	0.425***	0.732***	0.503***	0.842***	0.387***	1.000	0.607***	−0.148***
EBP	0.646***	0.705***	0.208***	0.497***	0.200***	0.607***	1.000	−0.006
CAPINC	0.185***	−0.004	−0.290***	−0.321***	−0.395***	−0.148***	−0.006	1.000

Notes: This table reports the Pearson correlation coefficients. The sample comprises 5,432 bank-years from 2001 to 2014. All variables are defined in Appendix A. *** denotes significance at the 1% level.

capital through add-backs (banks with *CAPINC* = 0).[18] In Panel B for banks with *CAPINC* = 0, the mean *ADD* and *LLR* are 1.457 and 2.081, respectively. This result indicates that only 69% of *LLR* is added back to Tier 2 capital, on average. In Panel C for banks with *CAPINC* = 1, the mean *ADD* and *LLR* are 1.209 and 1.213, respectively. When *CAPINC* = 1, all amounts of *LLR* are used to increase Tier 2 capital. In addition, the mean value of *PRC* is greater for the subsample for *CAPINC* = 1 (mean = 25.020) than for the subsample for *CAPINC* = 0 (mean = 19.589). We skip further discussion on the descriptive statistics for brevity.

Table 2 shows the Pearson correlation coefficients among variables used in our empirical models. Above all, total *LLR* is positively correlated with stock prices (*PRC*). Among LLR components, LLR added back to Tier 2 capital (*ADD*) has a positive correlation with *PRC* (ρ = 0.425, p < 0.001). However, LLR that is not added back to Tier 2 capital (*OTHER_LLR*) are negatively correlated with *PRC* (ρ = −0.114, p < 0.001). In addition, *CAPINC* is positively associated with *PRC* (ρ = 0.185, p < 0.001). These results hint the notion that the

18) Rigorouly speaking, banks with *CAPINC* = 0 partially increase or do not increase regulatory capital through add-backs at all. We call them 'partial add-back' or 'no add-back' banks, respectively, in the later additional analysis section.

market may perceive LLR as good news only when LLR increases the total regulatory capital, which provides preliminary evidence on why prior literature has presented mixed results for the market pricing of LLR (Ahmed et al. 1999). Correlation of other control with stock prices is consistent with prior studies. *NPL*s are negatively associated with *PRC*, and income (loss) before tax and LLR (*EBP*) is positively related with *PRC*.

5. EMPIRICAL RESULTS

In this section, we examine the relation between market value of equity and add-backs, and incremental effect of add-backs to market value of equity when add-backs increase regulatory capital. Next, we investigate whether bank capital level affects value relevance of add-backs. Finally, we conduct an additional test to investigate whether the value relevance of *LLR* changes with the extent of which newly added LLR is included in regulatory capital.

Main results

We first investigate whether the value relevance of LLR differs between add-backs (*ADD*) and other LLR (*OTHER_LLR*). Table 3 reports the multivariate regression results. Column (1) shows the baseline regression results of valuation of total *LLR* without decomposing *LLR*. Total *LLR* is negatively related to stock prices (coefficient = −1.549, t = −3.19). Column (2) presents the regression result of Eq. (2), which decomposes *LLR* into *ADD* and *OTHER_LLR*. The coefficient on *OTHER_LLR* is −2.402 and significant at a 1% level, whereas the coefficient on *ADD* is insignificant, hinting that add-backs that do not increase capital may offset the effect of add-backs that do increase capital. In Column (3), we include *CAPINC* and its interaction with *ADD*. *CAPINC* is an indicator variable for the banks that experience capital increase from add-backs. The coefficient on *ADD* becomes significantly negative (coefficient = −1.736, t = −2.15), and the coefficient on the interaction term between *ADD* and *CAPINC* is significantly positive (coefficient = 1.715, t = 2.11). These findings support our prediction that only LLR, which increases the amount of total regulatory capital through the add-back portion in Tier 2 capital, have a positive influence on

Table 3. Full sample regression results

	(1)	(2)	(3)
VARIABLES	*PRC*	*PRC*	*PRC*
GBV	0.822***	0.803***	0.801***
	(16.68)	(13.51)	(13.52)
LLR	−1.549***		
	(−3.19)		
ADD		−1.134	−1.736**
		(−1.37)	(−2.15)
CAPINC			−1.367
			(−1.31)
ADD_CAPINC			1.715**
			(2.11)
OTHER_LLR		−2.402***	−1.989***
		(−3.69)	(−3.02)
NPL	−0.586***	−0.466**	−0.464**
	(−3.01)	(−2.56)	(−2.55)
EBP	2.814***	2.804***	2.813***
	(9.75)	(9.71)	(9.82)
Constant	4.911***	4.707***	5.016***
	(5.65)	(5.87)	(5.38)
Observations	5,432	5,432	5,432
Adjusted R-squared	0.686	0.689	0.691
Year FE	YES	YES	YES
Clustered by	Bank	Bank	Bank

Notes: This table presents the multivariate regression results of testing for H1. All variables are defined in Appendix A. We use standard errors clustered by the bank-level. The t-statistics are reported in the parenthesis. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

the value of banks. The coefficients on other control variables are consistent with prior studies. *NPL* has negative and *EBP* has positive associations with stock prices, and they are statistically significant at $p < 0.05$ and $p < 0.01$, respectively.

High vs. low capital

We further investigate whether the market valuation of add-backs differs by bank's capital level. To do so, we classify banks as banks

Table 4. Cross-sectional variation (High cap versus low cap)

	(1)	(2)	(3) = (1)–(2)
	High_cap	*Low_cap*	Difference
VARIABLES	*PRC*	*PRC*	
GBV	0.795***	0.823***	−0.028
	(9.75)	(11.16)	(−0.27)
ADD	−1.741	−1.801**	0.060
	(−1.38)	(−1.99)	(0.04)
CAPINC	0.822	−4.238***	5.060**
	(0.61)	(−2.73)	(2.48)
ADD_CAPINC	−0.320	3.396***	−3.715**
	(−0.26)	(3.03)	(−2.20)
OTHER_LLR	−3.214***	−1.325*	−1.889*
	(−3.33)	(−1.78)	(−1.73)
NPL	−0.681**	−0.438**	−0.242
	(−2.39)	(−2.31)	(−0.82)
EBP	3.515***	2.259***	1.255**
	(7.95)	(6.20)	(2.32)
Constant	2.777**	6.899***	6.899***
	(2.41)	(4.32)	(4.33)
Observations	2,709	2,723	
Adjusted R-squared	0.670	0.726	
Year FE	YES	YES	
Clustered by	Bank	Bank	

Notes: This table presents the multivariate regression results of testing for H2. Column (1) reports the results for banks with high regulatory capital whose total regulatory capital is above the median in each year. Column (2) shows the regression results for banks with low regulatory capital whose total regulatory capital is below the median in each year. Column (3) shows the differences in each regression coefficient in Columns (1) and (2). All the other variables are defined in Appendix A. We use standard errors clustered by the bank-level. The t-statistics are reported in the parenthesis. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

with high (low) capital if the total regulatory capital is above (below) median in each year. Using the partitioned sample by capital level, we estimate the regression equation (3). Columns (1) and (2) of Table 4 report estimated regression results for high and low capital banks, respectively. Column (3) presents testing results for the difference in regression coefficients between columns (1) and (2). Columns (1) and (2) show that the coefficients on *ADD* and *OTHER_LLR* are insignificant for banks with high capital but significantly negative for banks with low capital. More importantly, the coefficient on the interaction term between *ADD* and *CAPINC* is significantly negative (coefficient = 3.396, t = 3.03) for only banks with low capital but not for banks with high capital. Column (3) shows that the difference in the coefficients on the interaction (*ADD*CAPINC*) is significantly greater for banks with low capital than banks with high capital. This result implies that the market perceives add-back for banks with low capitals than for banks with high capitals because marginal benefit for regulatory capital is greater for banks with low capitals than banks with high capitals.

Additional Analyses

We further explore whether the value relevance of *LLR* changes with the extent of which newly added LLR at the current fiscal year is included in regulatory capital. To do so, we split our full sample into three groups: i) full add-back, ii) partial add-back, and iii) no add-back groups. The full add-back sample denotes bank-year that all amounts of newly added LLR at the current fiscal year are included in Tier 2 capital. The full add-back is a sample with the variable *CAPINC* taking 1. The partial add-backs refer to bank-year that only a part of the amount of newly added LLR at the current fiscal year is included in Tier 2 capital. Specifically, the partial add-backs are defined as follows: (i) positive LLP, (ii) LLR at the beginning of the fiscal year was less than 1.25% of gross risk weighted asset, and (iii) LLR at the end of the fiscal year exceeds 1.25% of the gross risk weighted asset. The no add-back sample refers to bank-year in which no amount of newly added LLR at the current fiscal year is included in Tier 2 capital. The no add-back is defined as banks that do not belong neither to full add-back group nor to partial add-back group.

Prior studies using pre-BASEL data report that LLR is positively

value-relevant. In addition, prior studies using data on mixed pre- and post-BASEL period document that LLR is negatively value-relevant. Now, using a subsample that has a different extent of which newly added LLR is included in regulatory capital, market pricing of LLR is expected to be more positive as more amount of newly added LLR is included in regulatory capital. To test for such conjecture, we estimate the original Beaver and Engel (1996)'s regression model in Eq. (1).

Columns (1), (2), and (3) of Table 5 report the estimated regression results for full add-back, partial add-back, and no add-back groups, respectively. Column (1) shows that the regression coefficient on *LLR* is insignificant (coefficient = −0.499, t = −0.41) for the full add-back. By contrast, each coefficient on *LLR* is significantly negative for partial add-back and no add-back in columns (2) and (3), respectively. To test whether the coefficient on *LLR* for full add-back group is statistically different from the corresponding coefficient on *LLR* for partial add-back and no add-back group, we make three add-back groups into full sample and use a dummy variable, *CAPINC*, indicating full add-back group. We intereact *CAPINC* with *LLR* and include such an intereaction term (*CAPINC*LLR)* and dummy variable (*CAPINC*) in the regression model in Eq. (1) using full sample consisting of three add-back groups, in order to test whether there is a significant difference in the LLR coefficient between the full-add back group and the other groups (partial add-back or no add-back group). The untaulated result shows that the coefficient on the interaction term, *CAPINC*LLR*, is significantly different from zero (coefficient = 1.82, t = 2.17).[19] These results imply that the equity market more positively views LLR for the full add-back group than for partial add-back or no add-back group. It is noted that our results are not directly comparable with prior studies that document positive market pricing of LLR using the pre-BASEL data. In the post-BASEL period, add-backs are a component of Tier 2 capital (supplemental capital), which is a lower quality of capital than Tier 1 capital (core capital). In the pre-BASEL period, LLR was primary capital. Our findings cannot serve as direct evidence that the disappearance of positive market pricing of LLR in the post-

19) We appreciate an anonymous referee for suggesting a statistical test for difference in the coefficient on LLR between full add-back group and the other groups (partial add-back and no add-back group).

Table 5. Subsample test for changing the level of LLR regulatory capital

	Full add-back	*Partial add-back*	*No add-back*
	(1)	(3)	(3)
Variables	*PRC*	*PRC*	*PRC*
GBV	0.722*** (11.08)	0.830*** (7.38)	0.795*** (11.91)
LLR	−0.499 (−0.41)	−1.459* (−1.89)	−1.248*** (−2.59)
NPL	−2.153*** (−5.92)	−0.456* (−1.72)	−0.351 (−1.55)
EBP	5.141*** (7.99)	2.195*** (6.08)	1.995*** (5.52)
Constant	0.063 (0.05)	4.669 (1.52)	−0.668 (−0.38)
Observations	2,420	810	2,202
Year FE	0.699	0.683	0.705
Adjusted R-squared	YES	YES	YES
Clustered by	Bank	Bank	Bank

Notes: Table 5 presents subsample test results for changing the level of regulatory capital. Columns (1), (2), and (3) report the regression results for the full add-back, partial add-back, and no add-back subsamples. The full add-back is a sample with the variable CAPINC taking 1. The partial add-back subsample is included if bank-year meets the (i) and (ii) above conditions, but loan loss reserves at the end of the fiscal year exceed 1.25% of gross risk weighted asset. The no add-back is defined as banks that do not belong neither to full add-back group nor to partial add-back group. All variables are defined in Appendix A. We use standard errors clustered by the bank-level. The t-statistics are reported in the parenthesis. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

BASEL periods is driven by a change in capital regulations (Beatty and Liao 2014), but they can serve as its indirect evidence.

6. CONCLUSION

This study investigates how the market value of bank equity is associated with add-backs of LLR, which has two countervailing

characteristics, namely, regulatory capital and reserves. We find that the equity investors perceive add-backs of LLR as capital rather than as reserves. This finding is pronounced for banks with low capital levels.

Whether LLR should be included in regulatory capital and whether the limit for LLR added back to regulatory capital should increase or decrease are subject to a hot debate (Wall and Koch 2000; American Banker 2010). An important caveat with our findings is that ours are not supporting evidence of increasing the limit for LLR add-backs. Our results might be driven by risk profile of public banks' loans or naivety of investors.

Our findings provide following policy implications. First, regulators should investigate difference in add-back natures and risk profiles of loans between private banks and public banks. Second, regulators could require banks to provide external information users with detailed disclosure on loan reserves, which contain add-backs and other loan loss reserves mapping into specific loan types, such as commercial loan and consumer loans. We hope regulators consider our policy implications in the foreseeable future.

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APPENDIX A. VARIABLE DEFINITIONS

Variables	Definition
PRC	Stock price (= prc) at the fiscal year-end
GBV	Gross book value of equity (= BHCK3230 + BHCK3240 + BHCK3247) before loan loss reserves (= BHCK3123) scaled by outstanding shares (= shrout)
LLR	Loan loss reserves (= BHCK3123) scaled by outstanding shares (= shrout)
NPL	Nonperforming loans, which consist of loans past due 90 days or more and nonaccrual loans (= BHCK5525 + BHCK5526) scaled by outstanding shares (shrout)
ADD	Loan loss reserves added back to Tier 2 capital (= BHCK5310) scaled by outstanding shares (= shrout)
OTHER_LLR	Loan loss reserves that are not added back to Tier 2 capital (= BHCK3123 − BHCK5310) scaled by outstanding shares (= shrout)
EBP	Income (loss) before loan loss provision (= BHCK4340 + BHCK4230) scaled by outstanding shares (= shrout)
CAPINC	Indicator for the banks that experience capital increase from add-back loan loss reserves takes 1, if the bank-year meets the following three conditions: (i) positive loan loss provision, (ii) loan loss reserves at the beginning of the fiscal year were less than 1.25% of gross risk weighted asset, and (iii) loan loss reserves at the end of the fiscal year do not exceed 1.25% of gross risk weighted asset; otherwise, 0.

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