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The Impact of SFAS 133 on Income Smoothing by Banks through Loan Loss Provisions

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Abstract

We examine the impact of SFAS 133, *Accounting for Derivative Instruments and Hedging Activities*, on the reporting behavior of commercial banks and the informativeness of their financial statements. We argue that because the stricter recognition and classification requirements of SFAS 133 reduced banks' ability to smooth income through derivatives, banks more affected by SFAS 133 will rely more on loan loss provisions to smooth income. We find evidence consistent with this argument. We also find that the increased reliance on loan loss provisions for smoothing income has impaired the informativeness of loan loss provisions.

Keywords: SFAS 133, Income Smoothing, Hedging, Derivatives, Loan Loss Provisions

JEL Classification: G12; G14; G21; G32; M41

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1. Introduction

This study examines the impact of SFAS 133 (1998), *Accounting for Derivative Instruments and Hedging Activities*, on the reporting behavior of commercial banks and the informativeness of their financial statements.[1] Barton (2001) and Pincus and Rajgopal (2002) document that hedging and reporting discretion are viewed as substitute mechanisms by firms to smooth income. Prior to SFAS 133, only trading derivatives were required to be marked to market and the relatively flexible criteria for classifying derivatives as hedging versus trading arguably allowed firms latitude in protecting the income statement from market volatility that might arise, for instance, from ineffective hedges (Ryan 2007; Ahmed et al. 2010). Consequently, firms did not have to resort to the use of reporting discretion in non-derivative items as much to achieve their smoothing objectives.

SFAS 133 changed accounting for derivatives substantially by enforcing recognition of *all* derivative instruments at their fair values and imposing stricter criteria for a derivative to classify as a hedge. The intention of the Financial Accounting Standards Board (FASB) in issuing this standard was presumably to increase the transparency of derivative positions and to ensure timely recognition/reporting of the associated gains and losses. Clearly, these changes

[1] Both SFAS 133 and SFAS 138, *Accounting for Certain Derivative Instruments and Certain Hedging Activities - an amendment of SFAS 133*, became effective for fiscal years beginning after June 15, 2000. In our discussions, we attribute the shift in reporting behavior and the market's response to earnings information to SFAS 133 because SFAS 133 is the paradigm-shifting standard, whereas SFAS 138 only made slight modifications to SFAS 133 such as allowing the risk of changes in a benchmark interest rate to be designated as the underlying risk in an interest-rate hedge. SFAS 149 (2003), *Amendment of SFAS 133 on Derivative Instruments and Hedging Activities*, became effective for contracts entered into or modified after June 30, 2003, and for hedging relationships designated after June 30, 2003, and therefore was not effective during our main sample period. SFAS 149 made a number of very specific technical modifications, which are not likely to affect banks.

result in the income statement being more exposed to fluctuations in the fair values of derivatives. Indeed, the Bankers' Roundtable opposed the draft proposal of the standard in 1997 by noting in a letter to the FASB that

> "…The draft proposes an unworkable framework that would introduce artificial and inappropriate volatility on the financial statements of corporations that safely use derivatives for hedging activities..."

If true, SFAS 133 would effectively limit the ability of derivatives to smooth income. This raises at least two interesting research questions regarding the impact of SFAS 133 on the reporting behavior of managers, and the consequent impact on the informativeness of financial statements. In particular,

1. Did firms using derivative instruments significantly alter their reporting behavior in the post-SFAS 133 era?
2. Notwithstanding any changes in reporting behavior, by enacting SFAS 133, did the FASB achieve its intended purpose of making financial statements informationally more transparent to users?

In this paper, we address these questions in the context of commercial banks. Derivative instruments present a natural way for banks to hedge exposures of their financial assets and liabilities to interest rate and exchange rate risks. Unlike non-financial firms, banks are extensive derivative users.[2] Effective hedging allows commercial banks to report a smoother income stream over time, all else equal. Indeed, evidence indicates that bank managers, on average, exhibit a proclivity to smooth reported income, and often use their reporting discretion through loan loss provisions to do so (Wahlen 1994; Collins et al. 1995; Kanagaretnam et al. 2003, 2004;

[2] Thus, by focusing on the banking industry, we allay concerns raised by Guay and Kothari (2003) about research focusing on non-financial firms whose derivative usage appears relatively modest.

Liu and Ryan 2006). More recently, Kanagaretnam et al. (2010) provide evidence that the extent of earnings management by banks through loan loss provisions is constrained by auditor independence.

Under SFAS 133, derivatives that do not qualify as hedges must be re-classified as trading and marked to market, potentially increasing income volatility. We use two different measures to capture the *extent* to which banks are affected by the pronouncements of SFAS 133.[3] The first measure is the transitional unrealized holding gains (losses) that banks have to report separately as the "*effect of adopting SFAS 133 on net income*" in their FR Y-9C reports in the year of transition (i.e., 2001). Banks reporting such transitional gains or losses are clearly affected by the stricter classification criteria under SFAS 133. Therefore, we hypothesize that banks reporting non-zero transitional amounts rely more on loan loss provisions in the post-SFAS 133 period to smooth income relative to banks that do not report such transitional amounts. The second measure, gains and losses from hedging ineffectiveness, relies on hand-collected data on derivative use for hedging to construct a more direct measure of effective and ineffective use of derivatives for hedging purposes. We examine whether ineffective hedgers rely more on loan loss provisions to accomplish their smoothing objectives.

Our results, using both the transitional gain/loss measure and the hedging effectiveness measure, indicate that banks more likely to face increasing income statement volatility as a result of the adoption of SFAS 133 rely more on loan loss provisions to offset that volatility. These results demonstrate how the stricter recognition and classification requirements of SFAS 133 impacted the discretionary accounting behavior of banks most affected by it. They indicate that the usefulness of derivatives for earnings management purposes documented in prior

[3] It is important to note that banks that engage in extensive hedging and do so effectively need not necessarily be affected by the adoption of SFAS 133.

literature has diminished for such banks and forced them to rely more on discretionary accruals (loan loss provisions) in order to report smoother income streams.

A question that naturally arises is whether the market is able to discern this shift in reporting behavior following the adoption of SFAS 133, i.e., whether there is a detectable shift in the market's response to earnings information from the pre-SFAS 133 era to the post-SFAS 133 era. If the adoption of SFAS 133 has had the intended impact on earnings quality, we should observe a stronger relation between earnings (before loan loss provisions and taxes) and market returns. We would also expect the market to impound the increased use of discretion in loan loss provisions by some banks post-SFAS 133. Indeed, our results indicate that the association between loan loss provisions and market returns is significantly lower (in magnitude) in the post-SFAS 133 period compared to the pre-SFAS 133 period, especially for banks that are more affected by SFAS 133 (as reflected by the two measures discussed earlier). This result suggests that increased use of loan loss provisions for smoothing income has impaired their informativeness from the market's perspective. However, we do not detect any statistically significant change in the relation between earnings (before provisions and taxes) and returns following the adoption of SFAS 133. Thus, we are unable to reject the null that SFAS 133 has not improved earnings quality following its adoption.

Our results are robust to a number of sensitivity checks. For example, we use Heckman's two-stage procedure to control for potential self-selection bias and obtain qualitatively similar results to those reported above. Our results are also robust to a variety of alternative model and sample period specifications.

Although SFAS 133 is one of the most controversial standards issued by the FASB, research on the effects of SFAS 133 is limited to the Standard's effect on corporate risk management behavior (Zhang 2009) and investor behavior (Ahmed et al. 2006; 2010). Our study adds to that literature in at least two important ways. First, it provides evidence on how SFAS 133 affected reporting behavior, an issue unexamined by prior literature. It documents that, in the context of derivatives, bank managers use their reporting discretion over loan loss provisions to counteract the "undesirable" effects of SFAS 133's classification and fair value requirements.

Second, prior evidence indicates that SFAS 133 altered the pricing of bank derivatives in equity markets (Ahmed et al. 2006) and bond markets (Ahmed et al. 2010). Our study adds to those findings by showing that, for banks, the effects of SFAS 133 go beyond derivatives. It documents that SFAS 133 also altered the information content of a non-derivative financial statement component (i.e., loan loss provisions) and the pricing of that component in equity markets.

Even as FASB continues in its quest for improving transparency and representative faithfulness of financial statements through regulation, our analysis reaffirms the collective wisdom in the extant earnings management literature that managers would also continue to seek alternate avenues to achieve their reporting objectives. We believe that our findings are particularly timely given the recent exposure draft on accounting for financial instruments (FASB 2010), wherein FASB proposes to substantially expand the scope of fair value reporting to cover almost all financial instruments including commercial and consumer loans.

The remainder of this paper proceeds as follows. We discuss institutional background and develop our hypotheses in Section II, describe the data, sample selection and research design in Section III, and present and discuss our results in Section IV. We provide some concluding remarks in Section V.

2. Background and Hypotheses

Hedge accounting helps banks avoid earnings volatility and smooth their earnings by allowing them to change the timing of recognition of gains and losses on either the hedged item or the hedging derivative and recognize offsetting gains and losses concurrently in earnings. Unlike the earlier standards governing classification of and accounting for derivatives, SFAS 133 imposes stringent criteria for derivatives to qualify for hedge accounting. Derivatives that do not qualify for hedge accounting are classified as trading. Unlike most hedging derivatives, fair value changes of trading derivatives are recognized in the income statement as they occur. Therefore, income volatility can be significantly affected by whether derivatives are classified as hedging or as trading.

Prior to SFAS 133, accounting for derivatives was guided by SFAS 52 (1981), *Foreign Currency Translation*, and SFAS 80 (1984), *Accounting for Futures Contracts*. In addition, Emerging Issues Task Force (EITF) Issue No. 84-36 addressed the accounting for interest rate swaps and for some hedging activities not covered in either SFAS 52 or SFAS 80. However, the accounting guidance for derivative instruments and hedging activities was incomplete (SFAS 133, paragraph 235) and inconsistent (SFAS 133, paragraph 236).[4] As a result, many derivative instruments were accounted for as hedging derivatives regardless of whether they were formally part of a hedging strategy (SFAS 133, paragraph 235). This lack of consistent and authoritative guidance allowed managers a great degree of discretion in the classification of derivatives,

[4] Rane (1992), Montesi and Lucas (1996), Anson (1999), Gastineau et al. (2001) and SFAS 133 (paragraphs 233-237) present detailed discussions of the inconsistencies between SFAS 52 and SFAS 80.

particularly derivatives not directly covered by these standards, for achieving their income management objectives.[5]

SFAS 133 substantially eliminates the discretion that bank managers previously had in classifying certain types of derivatives as hedges for accounting purposes. The discretion in classifying derivatives is reduced by SFAS 133 for at least three reasons. First, most macro (portfolio) hedging derivatives do not qualify for hedge accounting under SFAS 133 because there is no objective method for gauging their effectiveness in the absence of linkage to a single identifiable asset or liability (SFAS 133, paragraph 447).[6] Second, some derivatives commonly used by banks in de facto hedging transactions do not qualify for hedge accounting under SFAS 133. Such derivatives include hedges of interest rate risk in held-to-maturity securities (SFAS 133, paragraphs 21(d) and 29(e)), hedges of long-term core deposits (SFAS 133, paragraphs 317 and 437), and hedges of prepayment risks of financial assets or liabilities (SFAS 133, paragraph 29(h)). Third, SFAS 133 places restrictions on the treatment of ineffective hedges. Hedge ineffectiveness implies that gains and losses from the hedged and the hedging items are not offsetting within an acceptable range. Previously, SFAS 52 specified no explicit level of correlation to assess hedge effectiveness and did not necessitate ongoing assessment of hedge effectiveness. In contrast, SFAS 80 required that value changes in the hedging and the hedged

[5] For example, in response to the Exposure Draft for SFAS 133, the Hartford Financial Services Group indicates that accounting guidance for derivatives prior to SFAS 133 "*requires users to interpret and develop their own accounting practices*".

[6] SFAS 133 significantly tightens the criteria for a portfolio of assets or liabilities to qualify for designation as a hedged item and makes implementing a macro hedge practically impossible (Gastineau e al. 2001). It requires that the individual components of the portfolio respond to a change in the relevant market risk factor almost identically, and requires that the value of each component responds similarly in direction and proportionately in amount to a change in the risk being hedged, such as market interest rate risk (SFAS 133, paragraph 447). An example included in SFAS 133 (paragraph 444) suggests that, when there is a change in the relevant market risk factor, the amounts of changes in the values of two components are considered to be proportionate if the amount of change in the value of one component is between 90 and 110 percent of the amount of change in the value of the other component.

items be highly and negatively correlated and called for an ongoing assessment of hedge effectiveness, but clearly permitted some room for judgment.[7] Since the income effects of the ineffective portions of hedges were generally ignored under these accounting standards (Ryan 2007), banks could potentially classify even ineffective (non-offsetting) derivatives as accounting hedges in order to reduce income volatility. SFAS 133 forces recognition in earnings of the ineffective portion of a hedge as it occurs, arguably increasing earnings volatility.[8]

Given these changes in accounting for derivatives, the income statement is arguably more exposed to unrealized gains and losses from derivatives that no longer qualify as hedges and from ineffective portions of derivatives that do qualify as hedges after SFAS 133. Faced with increased income volatility, banks relying on derivatives for hedging may have to look elsewhere to manage income patterns. In particular, if SFAS 133 makes it difficult for banks to engage in earnings management via derivative use, we should observe changes in the level of derivative usage and/or the use of loan loss provisions (hereafter LLP) for earnings management post SFAS133.[9] We focus on income smoothing through LLP as this is the largest accrual for banks and prior research has documented that banks do use LLP for earnings management (Wahlen 1994; Kanagaretnam et al. 2004; Liu and Ryan 2006; Kanagaretnam et al. 2010).

The extent to which these banks would seek alternate mechanisms for smoothing is likely a function of how much these banks are affected by SFAS 133. Banks that were more successful in their hedging activities, and whose derivative classifications are less likely to be affected by

[7] High correlation under SFAS 80 is interpreted in practice as cumulative changes in the value of the hedging instrument being between 80 and 120 percent of the inverse cumulative changes in the value or the cash flows of the hedged item (PricewaterhouseCoopers, 1998).

[8] While SFAS 133 does not provide a specific hedge effectiveness threshold, practitioners interpret high effectiveness under SFAS 133 similar to the SEC's effectiveness interpretation under SFAS 80.

[9] Barton (2001) states, "Because earnings volatility is costly to both managers and their firms, SFAS 133 may increase the costs of using derivatives vis-à-vis discretionary accruals. If managers view derivatives and discretionary accruals as substitute tools for smoothing earnings, then the imposition of SFAS 133 could reduce hedging and increase earnings management."

the new standard, would be less concerned about the standard's impact on income volatility. Consequently, we do not expect such banks to change their reporting discretion as much in the post-SFAS 133 period.

On the other hand, less successful hedgers could protect their income statements from volatility in the pre-SFAS 133 period by taking advantage of the less stringent hedge classification criteria, and by keeping unrealized gains and losses from ineffective hedging from affecting the income statement. These banks are more likely affected by the more stringent hedge classification criteria of SFAS 133 and, therefore, are more likely to change their reporting behavior following the adoption of this standard.

We use two alternate approaches to measure the extent to which banks might be affected by the adoption of SFAS 133. The first approach examines the transitional unrealized holding gains (losses) that banks have to report separately as the "*the cumulative effect on net income of adopting SFAS 133*" in their FR Y-9C reports in the year of transition (i.e., 2001). As discussed earlier, SFAS 133 disallows hedge accounting for derivatives hedging certain risks associated with specific assets and liabilities. Examples include derivatives that hedge the interest rate risk in held-to-maturity securities and macro-hedge a portfolio of held-to-maturity securities. Since recognizing the hedging derivative at fair value but the hedged security at cost would create excessive income volatility, SFAS 133 allows banks to transfer such hedged securities to the trading or available-for-sale categories and derivatives hedging these securities to the trading category (SFAS 133, paragraph 54). The transition from cost-based to market-based reporting of such transferred securities following adoption of SFAS 133 results in a one-time reporting of unrealized holding gains (losses) which are reported as "*the cumulative effect on net income of adopting SFAS 133*". Reclassifying such securities from held-to-maturity to trading or available-for-sale ensures that banks recognize offsetting gains and losses from the hedged items and hedging derivatives going forward because both positions are marked to market under the new standard. On the other hand, marking both positions to market, as opposed to reporting them at cost as in the pre-SFAS 133 period, significantly reduces banks' ability to shield earnings from ineffectiveness in such hedges. Given that banks reporting such transitional gains or losses are clearly affected by the stricter classification criteria under SFAS 133, we posit the following hypothesis:

> **Hypothesis 1A:** *The pre- to post-SFAS 133 change in income smoothing through loan loss provisions is greater for banks reporting a non-zero transitional amount (reclassifying banks) than for banks reporting a zero transitional amount (non-reclassifying banks).*

The second approach employs a more direct measure of effective and ineffective use of derivatives for hedging purposes. SFAS 133 requires firms to identify the extent to which derivative instruments are effective at offsetting the price fluctuations of the underlying. Unlike earlier standards, SFAS 133 mandates recognition of gains or losses from the ineffective portion of hedging instruments in the income statement. As noted by Ryan (2007), making hedge ineffectiveness more apparent than under prior accounting standards is the strongest feature of SFAS 133. We manually search the post-SFAS 133 10-K filings to identify banks that report gains or losses due to hedging ineffectiveness. We refer to banks with such gains or losses as *ineffective hedgers* and banks without ~~no~~ such gains or losses as *effective hedgers*. The income of banks that are *ineffective hedgers* will be relatively more affected by SFAS 133 than the income of banks that are *effective hedgers*. Accordingly, we examine the following hypothesis regarding whether less effective hedgers turn more to loan loss provisions for accomplishing their smoothing objectives:

> **Hypothesis 1B:** *The pre- to post-SFAS 133 change in income smoothing through loan loss provisions is greater for banks that are less effective at hedging (ineffective hedgers) than for banks that are more effective at hedging (effective hedgers).*

It is plausible that hedging behavior itself might change following adoption of SFAS 133. In particular, less effective hedgers are likely to have a stronger incentive to design more effective hedges. Using a sample of nonfinancial firms, Zhang (2009) finds empirical evidence in support of this notion. However, if the banks in our study were successful in doing so, then we would not expect to reject Hypothesis 1A or 1B. In other words, such a change in hedging behavior will bias against finding support for these hypotheses.

Next, we turn to the question of the impact of SFAS 133 on the informativeness of financial statements. Given the broad goals of standard-setting, the purpose of any standard, SFAS 133 included, is to enhance the informativeness of financial statements. However, critics argued that the standard would introduce 'artificial volatility' in financial statements and diminish their usefulness in assessing the financial condition of a firm. For instance, in a letter to the FASB, Bankers Roundtable (1997) claims:

> "…The requirement that derivative instruments be reported at fair value is fundamentally problematic. As many observers have already noted, the result would introduce artificial volatility into financial statements. This would have a deleterious effect for market participants attempting to determine the institutions' true financial condition…"

While proponents of SFAS 133 did not deny the potential for this increased volatility in financial statements, they argued that such increases would merely reflect economic reality that the prior standards governing derivative disclosures failed to capture (Smith et al. 1998):

> "…The new requirements do not create volatility but only unmask it. It requires the reporting of volatility that always existed, but was not reported…"

Naturally, FASB subscribes to this latter view (SFAS 133, paragraphs 224-228). If forcing the recognition of unrealized gains and losses resulting from marking to market all derivative instruments makes income a better measure of performance during the fiscal period, then we should find a stronger association between income before taxes and loan loss provisions (i.e., exclusive of any exercised reporting discretion but inclusive of these gains and losses) and market returns over the period. This should especially be the case for firms reporting non-zero transitional amounts (i.e., *reclassifying* banks) and banks that are relatively ineffective at hedging (i.e., *ineffective* hedgers). If, on the other hand, the concerns raised by critics were to be true and the increase in income volatility resulting from the inclusion of these losses and gains only adds noise to the performance measures, one could perhaps argue that such an association might actually be weaker. Thus, we test the following admittedly refutable hypotheses:

> **Hypothesis 2A:** *The pre- to post-SFAS 133 increase in informativeness of earnings (before taxes and loan loss provisions) is greater for banks reporting a non-zero transitional amount (reclassifying banks) than for banks reporting a zero transitional amount (non-reclassifying banks).*

> **Hypothesis 2B:** *The pre- to post-SFAS 133 increase in informativeness of earnings (before taxes and loan loss provisions) is greater for banks that are less effective at hedging (ineffective hedgers) than for banks that are more effective at hedging (effective hedgers).*

Moreover, if Hypotheses 1A and/or 1B receive empirical support, i.e., banks reporting non-zero transitional amounts and/or banks that are relatively ineffective at hedging resort more to loan loss provisions for smoothing in the post-SFAS 133 period, then we should expect a reduction in the perceived informativeness of loan loss provisions, leading us to the following hypotheses:

> **Hypothesis 3A:** *The pre- to post-SFAS 133 reduction in informativeness of loan loss provisions is greater for banks reporting a non-zero transitional amount (reclassifying banks) than for banks reporting a zero transitional amount (non-reclassifying banks).*

> **Hypothesis 3B:** *The pre- to post-SFAS 133 reduction in informativeness of loan loss provisions is greater for banks that are less effective at hedging (ineffective hedgers) than for banks that are more effective at hedging (effective hedgers).*

3. Data, Sample Selection, and Research Design

3.1 Data and Sample Selection

We obtain bank holding company financial data and derivative data from 10-K filings and FR Y-9C filings. We obtain share price data from the CRSP data files. We restrict our pre-SFAS 133 sample to fiscal years 1999 and 2000, and post-SFAS 133 sample to fiscal years 2001 and 2002 in order to better focus on the changes occurring around the enactment of SFAS 133 and avoid possible contamination from other events.[10]

Table 1 summarizes the sample selection criteria. Of the 2,283 banks with complete data for the sample period, only 448 use derivatives. We exclude an additional 250 banks that are privately held and 79 banks that were subject to acquisitions prior to the implementation of SFAS 133, leaving us with a final sample of 119 banks. This sample includes 235 bank-year observations from the pre-SFAS 133 period and 237 observations from the post-SFAS 133 period.[11] All sample banks have December 31 fiscal year ends.

As noted earlier, we use two approaches to measure the extent to which banks are affected by SFAS 133. The first approach classifies banks as *reclassifying* if they report transitional unrealized gains or losses due to adopting SFAS 133 in their FR Y-9C reports in the year of transition (i.e., 2001) and *non-reclassifying* if they do not report any transitional amount. Of the 119 sample banks, 55 are classified as *reclassifying* and 64 as *non-reclassifying*. The second approach classifies banks as *ineffective hedgers* if they report gains or losses due to hedging ineffectiveness in the income statement, and as *effective hedgers* if they do not report

[10] As discussed in the Robustness Checks section, we also test our hypotheses over an expanded sample period, which includes the period 1996-2006.

[11] We are missing 3 bank-year observations in the pre- and 1 bank-year observation in the post-SFAS 133 period due to missing price data in the CRSP files.

such gains or losses. Of the 119 sample banks, 41 are classified as *ineffective hedgers* and 78 as *effective hedgers*. A total of 23 banks that are *ineffective hedgers* are also *reclassifying* banks.

3.2 Research Design

We compare the propensity to smooth income through loan loss provisions and the informativeness of loan loss provisions and earnings before taxes and provisions in the pre- and post-SFAS 133 periods for banks that are differentially affected by SFAS 133. Following prior literature (Kanagaretnam et al. 2004; Liu and Ryan 2006), we estimate smoothing propensity as the coefficient relating loan loss provisions (*LLP*) to earnings before taxes and provisions (*EBTP*) after controlling for differences in the amount of loans, type of loans, nonperforming loans, capital ratio and size.

Hypotheses 1A and 1B predict that, because SFAS 133 may have reduced the ability to smooth income through hedging and increased income volatility, banks affected by SFAS 133 are likely to rely more on LLP for smoothing income following SFAS 133. In contrast, banks not affected by SFAS 133 will exhibit a relatively smaller change in smoothing income through LLP following SFAS 133. As discussed earlier, we use two approaches to measure the extent to which banks are affected by SFAS 133. The first approach partitions sample banks into *reclassifying banks/non-reclassifying banks,* and the second approach classifies sample banks into *effective hedgers/ineffective hedgers*. We estimate separate regressions for the affected and unaffected banks because we hypothesize that the change in smoothing propensity from the pre- to the post-SFAS 133 period differs across affected and unaffected banks. We estimate the following model to test Hypotheses 1A and 1B:

$$LLP_{it} = \alpha_0 + \alpha_1 POST_t + \alpha_2 EBTP_{it} + \alpha_3 POST_t * EBTP_{it} + \alpha_4 NPL_{i,t-1} + \alpha_5 \Delta NPL_{it} + \alpha_6 LOAN_{i,t-1} + \alpha_7 \Delta LOAN_{it} + \alpha_8 CAP_{it} + \alpha_9 SIZE_{it} + \varepsilon_{it} \quad (1a)$$

where, for bank i and year t,

LLP_{it}	=	Loan loss provisions scaled by beginning total assets;
$POST_{it}$	=	An indicator variable which equals 1 if the observation belongs to the post-SFAS 133 period, and 0 otherwise;
$EBTP_{it}$	=	Earnings before taxes and provisions scaled by beginning total assets;
$NPL_{i,t-1}$	=	Beginning nonperforming loans scaled by beginning total assets;
ΔNPL_{it}	=	Change in nonperforming loans scaled by beginning total assets;
$LOAN_{i,t-1}$	=	Beginning total loans outstanding scaled by beginning total assets;
$\Delta LOAN_{it}$	=	Change in total loans outstanding scaled by beginning total assets;
CAP_{it}	=	Tier I risk-based capital ratio;
$SIZE_{it}$	=	Natural logarithm of total assets.

The coefficient relating *LLP* to *EBTP* in Model (1a) measures the extent of income smoothing through loan loss provisions. To smooth income, banks increase the level of *LLP* when *EBTP* is high and reduce the level of *LLP* when *EBTP* is low. Consequently, a positive coefficient on *EBTP* reflects smoothing via *LLP*. The coefficient on the interaction term *POST*EBTP* represents the difference in income smoothing coefficients between pre- and post-SFAS 133 periods. Following prior studies (Wahlen 1994; Kim and Kross 1998; Ahmed et al. 1999; Kanagaretnam et al. 2004; Liu and Ryan 2006; Kanagaretnam et al. 2010), we use *LOAN*, *ΔLOAN*, *NPL* and *ΔNPL* to control for the nondiscretionary component of loan loss provisions. The size of the loan portfolio relative to total assets (*LOAN*) varies across banks, and banks with more assets in the form of loans at the beginning of the period are expected to have higher *LLP*. Also, *LLP* may be positively or negatively related to the change in the amount of loans during the year (*ΔLOAN*) depending on the level of default risk associated with incremental loans. Because higher levels of beginning nonperforming loans and change in nonperforming loans during the current period will require a higher provision in the current period, we expect *NPL* and *ΔNPL* to be positively related to LLP. Model (1a) also includes Tier I regulatory capital (*CAP*) as a control variable. As Ahmed et al. (1999) find evidence consistent with banks using loan loss provisions to raise their capital ratio, we expect a negative relation between *LLP* and

CAP. Following Kim and Kross (1998), we include bank size (*SIZE*) as an additional control variable.

As discussed in Liu and Ryan (1995), provisions for homogeneous loans, which are small and infrequently renegotiated, are based on statistical analyses or historical data at the portfolio level, whereas provisions for heterogeneous loans, which are large and frequently renegotiated, are based on judgment on a loan-by-loan basis.[12] Because banks have differential ability to exercise discretion over provisions for homogeneous and heterogeneous loans, the composition of the loan portfolio, in addition to its size, likely affects *LLP*. Consequently, we also test Hypothesis 1 using the following model that allows the relation between *LLP* and each component of the loan portfolio (i.e., homogeneous and heterogeneous loans) to differ:

$$\begin{aligned} LLP_{it} = {} & \beta_0 + \beta_1 POST_t + \beta_2 EBTP_{it} + \beta_3 POST_t * EBTP_{it} + \beta_4 NPL_{i,t-1} + \beta_5 \Delta NPL_{it} + \beta_6 HMGLOAN_{i,t-1} \\ & + \beta_7 \Delta HMGLOAN_{it} + \beta_6 HTRLOAN_{i,t-1} + \beta_7 \Delta HTRLOAN_{it} + \beta_8 CAP_{it} + \beta_9 SIZE_{it} + \varepsilon_{it} \end{aligned} \qquad (1b)$$

where, for bank i and year t,

$HMGLOAN_{i,t-1}$ = Beginning homogeneous loans outstanding scaled by beginning total assets;
$\Delta HMGLOAN_{it}$ = Change in homogeneous loans outstanding scaled by beginning total assets;
$HTRLOAN_{i,t-1}$ = Beginning heterogeneous loans outstanding scaled by beginning total assets;
$\Delta HTRLOAN_{it}$ = Change in heterogeneous loans outstanding scaled by beginning total assets.

We categorize a bank as *reclassifying (RC)* if it reports transitional unrealized gains or losses from adopting SFAS 133 in its FR Y-9C reports in 2001, the year of transition. Given the higher income volatility introduced by SFAS 133, the use of loan loss provisions to smooth post-SFAS 133 income is likely to be higher for *reclassifying* banks. The interaction coefficients represent the difference in smoothing propensity between pre- and post-SFAS 133 periods.

[12] As in Liu and Ryan (2006), homogeneous loans include consumer loans (credit card loans, auto loans, student loans etc.), 1-4 family residential mortgages, loans to financial institutions, and acceptances of other banks. Heterogeneous loans include commercial and industrial loans, direct lease financing, all other real estate loans, agriculture loans and foreign loans.

Accordingly, we test Hypothesis 1A by testing whether α_3^{RC} and β_3^{RC}, the interaction coefficients for *reclassifying* banks, are greater than α_3^{NRC} and β_3^{NRC}, the corresponding interaction coefficients for *non-reclassifying* banks.

We classify banks according to the extent (lack) of hedging effectiveness to test Hypothesis 1B. A bank is classified as *ineffective* if it reports derivative gains or losses due to hedging ineffectiveness in the post-SFAS 133 period. Banks that are *ineffective hedgers (IEH)* likely have higher income volatility following SFAS 133 than banks that are *effective hedgers (EH)*. If *ineffective hedgers* increase their dependence on loan loss provisions to moderate this higher volatility, we expect α_3^{IEH} and β_3^{IEH}, the coefficients on the interaction terms in Models (1a) and (1b) for ineffective hedgers, to be more positive than α_3^{EH} and β_3^{EH}, the corresponding interaction coefficients for effective hedgers.

Hypotheses 2 and 3 investigate the impact of SFAS 133 on the informativeness of earnings (before taxes and loan loss provisions) and loan loss provisions. We estimate the following model to test these hypotheses:

$$R_{it} = \chi_0 + \chi_1 POST_t + \chi_2 EBTP_{it}^{MVE} + \chi_3 POST_t * EBTP_{it}^{MVE} + \chi_4 LLP_{it}^{MVE} + \chi_5 POST_t * LLP_{it}^{MVE} + \chi_6 \Delta NPL_{it}^{MVE} + \chi_7 LCO_{it}^{MVE} + \varepsilon_{it} \quad (2)$$

R is annual equity return measured from April 1 of year t to March 31 of year t+1 (note that all banks in our sample have December 31 fiscal year ends). The binary variable *POST* equals 1 for post-SFAS 133 years and 0 otherwise. As the potential change in informativeness of earnings is likely more pronounced for banks that are likely to be more affected by SFAS 133, we estimate Model (2) after partitioning our sample into *reclassifying banks/non-reclassifying banks* and *effective hedgers/ineffective hedgers*. All continuous independent variables in Model

(2) are deflated by beginning market value of equity. Following Liu and Ryan (1995) and Beaver et al. (1997), we include change in nonperforming loans (*ΔNPL*) and loan charge-offs (*LCO*) to control for the nondiscretionary portion of the loan loss provisions.

Hypothesis 2A (2B) examines whether the pre- to post-SFAS 133 change in informativeness of *EBTP* is greater for *reclassifying* (*ineffective* hedger) banks than for *non-reclassifying* (*effective* hedger) banks. If SFAS 133 improved *EBTP* as a measure of performance by forcing banks to recognize unrealized gains and losses from changes in market value of derivatives, then the coefficient on *EBTP* should increase post-SFAS 133. In addition, this increase should be greater for *reclassifying* than for *non-reclassifying* banks (Hypothesis 2A) and for banks with *ineffective* hedges than for banks with *effective* hedges (Hypothesis 2B). Accordingly, as argued by its proponents, if SFAS 133 leads income to be a better measure of firm performance, χ_3 should be positive and significant. Alternatively, if SFAS 133 introduces artificial volatility in earnings, as argued by its opponents, then *EBTP* may not be more informative or may be less informative after SFAS 133 and we would fail to reject Hypotheses 2A and 2B. We test these hypotheses by testing whether the coefficient χ_3^{RC} (χ_3^{IEH}), which reflects the change in informativeness of *EBTP* following SFAS 133 for *reclassifying* (*ineffective* hedger) banks, is greater than χ_3^{NRC} (χ_3^{EH}), the corresponding coefficient for *non-reclassifying* (*effective* hedger) banks.

Hypothesis 3A (3B) examines whether the pre- to post-SFAS 133 reduction in informativeness of *LLP* is greater for *reclassifying* (*ineffective* hedger) banks than for *non-reclassifying* (*effective* hedger) banks. Consistent with investors viewing LLP as an expense (Liu and Ryan 1995; Ahmed et al. 1999), we expect the coefficient on LLP to be negative. If SFAS 133 leads to more income smoothing through LLP, then the coefficient on *LLP* should be less negative post-SFAS 133. In addition, this change in the coefficient on *LLP* should be greater for *reclassifying* than for *non-reclassifying* banks (Hypothesis 3A), and for banks with *ineffective* hedges than for banks with *effective* hedges (Hypothesis 3B). We test these hypotheses by testing whether the coefficient χ_5, which reflects the change in informativeness of *LLP* following SFAS 133, is greater for *reclassifying* than for *non-reclassifying* banks, and for *ineffective* than for *effective* hedgers, i.e., whether $\chi_5^{RC}(\chi_5^{IEH})$ is greater than $\chi_5^{NRC}(\chi_5^{EH})$.

4. Results

4.1 Univariate Comparisons and Correlations

We report descriptive statistics for the variables used in Models (1) and (2) in Table 2. Panels A and B present descriptive statistics for partitioning based on *reclassifying* and *non-reclassifying* banks and on *ineffective* and *effective* hedging, respectively. The mean loan loss provisions scaled by beginning value of assets varies from 0.2% to 0.3% and is consistent with prior research. Over our sample period, the average earnings before taxes and provisions scaled by beginning value of assets is around 2%. Taken together, this implies that the magnitude of loan loss provisions is between 10% and 15% of earnings, and indicates that it is a significant component of earnings for banks. Mean annual returns range between 8.5% and 10.2%. Nonperforming loans average 0.4% of total assets. The descriptive statistics also indicate that loans account for approximately two-thirds of total assets on average. While the average bank holds more homogenous loans relative to heterogeneous loans in its portfolio, the distributions of *HMGLOAN* and *HTRLOAN* vary widely, suggesting that banks specialize in each type of loan. The mean Tier I capital ratio is nearly 8%, indicating that the average bank is well-capitalized.[13]

[13] The minimum level of primary capital to total assets established by the Federal Reserve System is 5.5%

Untabulated correlations between the variables used in Models (1) and (2) for *reclassifying/non-reclassifying* banks and for *effective hedgers/ineffective hedgers* provide preliminary evidence of income smoothing through LLP. As expected, *LLP* and *EBTP* are significantly positively related for each sub-group in both the pre- and the post-SFAS 133 periods. In the pre-SFAS 133 period, the correlation between *LLP* and *EBTP* for *reclassifying* banks is 0.287 ($p < 0.001$), and the corresponding correlation for *non-reclassifying* banks is 0.265 ($p < 0.001$). In the post-SFAS 133 period, the correlation between *LLP* and *EBTP* for *reclassifying* banks is 0.312 ($p < 0.001$), and the corresponding correlation for *non-reclassifying* banks is 0.272 ($p < 0.001$).

As for ineffective hedgers, the correlation between *LLP* and *EBTP* in the pre-SFAS 133 period is 0.274 ($p < 0.001$). The corresponding correlation for effective hedger banks is 0.288 (p-value < 0.001). In the post-SFAS 133 period, the correlation between *LLP* and *EBTP* for ineffective hedger banks is 0.324 ($p < 0.001$). The corresponding correlation for non-reclassifying banks is 0.282 (p-value < 0.001). The results also indicate a strong positive correlation between *RETURN* and *EBTP* across all subsamples.[14]

4.2 Income Smoothing through LLP in the Pre- and Post-SFAS 133 Periods

Hypothesis 1A examines the extent of income smoothing through LLP conditional on the effect of SFAS 133 on banks' hedging activities. Banks more likely to be affected by SFAS 133 will rely more on LLP for income smoothing following SFAS 133.[15] Panel A of Table 3 reports estimation results for Models (1a) and (1b) which estimate income smoothing in the pre- and the

[14] The correlation between *RETURN* and *EBTP* ranges from 0.388 to 0.431 depending on the sub-group of banks.

[15] Following Barton (2001) and Pincus and Rajgopal (2002), we also test whether banks use LLP and derivatives as partial substitutes in income smoothing. Consistent with the findings of these two studies, we find that banks that are high users of derivatives smooth less through LLP than banks that are low users of derivatives.

post-SFAS 133 periods for *reclassifying* and *non-reclassifying* banks, i.e., banks that reported and did not report a nonzero transitional gain or loss from adopting SFAS 133 in 2001. The coefficient on *EBTP* for *reclassifying* banks is positive and significant ($p < 0.039$ and $p < 0.012$ in Models (1a) and (1b), respectively) in the pre-SFAS 133 period indicating that *reclassifying* banks smooth income through loan loss provisions during this period. More importantly, *reclassifying* banks rely more on loan loss provisions for smoothing income in the post-SFAS 133 period as evidenced by the significant positive coefficients on *POST*EBTP* ($p < 0.021$ and $p < 0.030$ in Models (1a) and (1b), respectively).

By contrast, while *non-reclassifying* banks rely on loan loss provisions for smoothing income in the pre-SFAS 133 period (the coefficient on *EBTP* is positive and significant for both models), they do not increase their reliance on loan loss provisions for smoothing income post-SFAS 133. This is indicated by the coefficient on *POST*EBTP* which is not significantly different from zero ($p < 0.783$ and $p < 0.552$ for Models (1a) and (1b), respectively). To test Hypothesis 1A, we test the difference between the coefficients on *POST*EBTP* for *reclassifying* and *non-reclassifying* banks. The results of this test, presented in Panel B of Table 3, indicate that the pre- to post-SFAS 133 change in income smoothing through loan loss provisions is significantly greater for *reclassifying* than for *non-reclassifying* banks ($p < 0.021$ and $p < 0.062$ for Models (1a) and (1b), respectively). In other words, reclassifying banks rely more on loan loss provisions for smoothing income following SFAS 133 than do *non-reclassifying* banks.

Hypothesis 1B tests the extent of income smoothing through LLP conditional on the effectiveness of banks' hedging activities following SFAS 133. Banks that report gains or losses due to ineffective hedging activities are more likely to have higher income volatility and, consequently, to rely more on LLP for income smoothing following SFAS 133. Panel A of Table

4 reports estimation results for Models (1a) and (1b) which estimate income smoothing in the pre- and the post-SFAS 133 periods for *ineffective hedgers* and *effective hedgers*, i.e., banks that reported and did not report gains or losses due to hedge ineffectiveness following SFAS 133. As expected, both *ineffective hedgers* and *effective hedgers* smooth income through LLP in the pre-SFAS 133 period. The coefficient on *EBTP* is significantly positive for both groups of banks and for both models. The results also show that *ineffective hedgers* increase their reliance on LLP for smoothing income in the post-SFAS 133 period as evidenced by the significant positive coefficients on *POST*EBTP* ($p < 0.004$ and $p < 0.016$ for Models (1a) and (1b), respectively). By contrast, the coefficient on *POST*EBTP* is not significantly different from zero for *ineffective hedgers* ($p < 0.373$ and $p < 0.362$ for Models (1a) and (1b), respectively) indicating no greater reliance on LLP for smoothing income post-SFAS 133. We test Hypothesis 1B by testing the difference between the coefficients on *POST*EBTP* for *ineffective hedgers* and *effective hedgers*. The results of this test, presented in Panel B of Table 4, indicate that the pre- to post-SFAS 133 change in income smoothing through loan loss provisions is significantly greater for *ineffective hedgers* than for *effective hedgers* ($p < 0.001$ and $p < 0.070$ for Models (2a) and (2b), respectively). This indicates that *ineffective hedgers* rely more on LLP for smoothing income in the post-SFAS 133 period than do *effective hedgers*.

The signs of the coefficients on the control variables in Models (1a) and (1b) as presented in Tables 3 and 4 are consistent with prior research. Both *NPL* and *ΔNPL* are significantly positively related to *LLP*, indicating that banks with higher nonperforming loans have higher loan loss provisions. The coefficient on *LOAN* in Model (1a) is positive as expected, consistent with prior research (e.g., Wahlen 1994; Kim and Kross 1998; Kanagaretnam et al. 2004). The positive association between *LLP* and *LOAN* indicates that banks with more assets in the form of loans have higher loan loss provisions. When the loan portfolio is decomposed into homogeneous and heterogeneous loans in Model (1b), the coefficients on *HMGLOAN* and *HTRLOAN* are positive as expected. Also, unreported statistical tests indicate that the relation of *LLP* with *HTRLOAN* is weaker than the corresponding relation with *HMGLOAN*. This is consistent with heterogeneous loans being subject to more discretion (Liu and Ryan 1995; 2006). While the coefficient signs on *CAP* and *SIZE* are consistent with prior studies, they are not statistically significant across all specifications.

Taken together, our results support the conjecture that because SFAS 133 limited banks' ability to use derivatives for income smoothing purposes by limiting certain derivatives from being classified as hedging and/or making hedge ineffectiveness more visible, affected banks reacted to this constraint by increasing their reliance on loan loss provisions to achieve smooth income.

4.3 Informativeness of EBTP and LLP in the Pre- and Post-SFAS 133 Periods

Hypotheses 2A and 2B examine changes in the informativeness of EBTP following SFAS 133 conditional on the effect of SFAS 133 on banks' hedging activities. If recognition of unrealized gains and losses as required by SFAS 133 improves the quality of reported income, then EBTP should be more strongly related to bank returns following SFAS 133, especially for *reclassifying* banks and for banks that are *ineffective hedgers*. Alternatively, if recognition of previously unrecognized gains and losses induces artificial income volatility (noise), the relation between bank returns and EBTP may be attenuated following SFAS 133.

We estimate Model (2) to test these hypotheses and report the results for the *reclassifying/non-reclassifying* partitioning in Panel A of Table 5 and for the *ineffective hedgers/effective hedgers* partitioning in Panel B of Table 5. The coefficients on *POST*EBTP* in

Panel A are insignificant for the *reclassifying* and *non-reclassifying* bank subsamples ($p < 0.177$ and $p < 0.287$, respectively), as are the coefficients on *POST*EBTP* in Panel B for the *ineffective hedgers* and *effective hedgers* subsamples ($p < 0.405$ and $p < 0.367$, respectively). In addition, as reported in Panel C of Table 5, the coefficient on *POST*EBTP* for *reclassifying* banks is not significantly different from the corresponding coefficient for *non-reclassifying* banks ($p < 0.402$). Similarly, the coefficient on *POST*EBTP* for *ineffective hedgers* is not significantly different from the corresponding coefficient for *effective hedgers* ($p < 0.253$). Accordingly, we fail to reject Hypothesis 2A or 2B and find no evidence to suggest that SFAS 133 improved the informativeness of EBTP.

Our tests of Hypotheses 1A and 1B indicate greater reliance on loan loss provisions for smoothing income following SFAS 133 for *reclassifying* banks than for *non-reclassifying* banks, and for *ineffective hedgers* than for *effective hedgers*. Increased use of LLP for income smoothing should reduce its perceived informativeness. Hypotheses 3A and 3B test whether the post-SFAS 133 informativeness of LLP is reduced more for *reclassifying* banks than for *non-reclassifying* banks and for *ineffective hedgers* than for *effective hedgers*. The results in Panels A and B of Table 5 are consistent with these hypotheses. The coefficient on *POST*LLP* for *reclassifying* banks in Panel A is positive and significant ($p < 0.011$), indicating a reduction in informativeness of LLP (i.e., LLP is less negatively related to returns after SFAS 133) for *reclassifying* banks following implementation of SFAS 133. By contrast, we do not observe a significant reduction in informativeness of LLP for *non-reclassifying* banks ($p < 0.325$). The results reported in Panel B, indicate a significant ($p < 0.022$) reduction in informativeness of LLP for *ineffective hedgers* following implementation of SFAS 133 but no significant ($p < 0.346$) reduction for *effective hedgers*. In addition, as reported in Panel C of Table 5, the coefficient on

*POST*LLP* for *reclassifying* banks is significantly greater than the corresponding coefficient for *non-reclassifying* banks ($p < 0.009$). Similarly, the coefficient on *POST*LLP* for *ineffective hedgers* is significantly grater than the corresponding coefficient for *effective hedgers* ($p < 0.023$).

Collectively, these results suggest that although SFAS 133 did not significantly alter the informativeness of earnings before taxes and provisions, it significantly reduced the informativeness of loan loss provisions for banks that are more affected by the standard. If enhancing the informativeness of financial statements is a broad goal of any accounting standard, these results question whether SFAS 133 met that goal. While the standard may have increased the disclosure relating to derivatives usage, it does not appear to have had a positive effect on the value relevance of aggregate income measures.

4.4 Robustness Checks

4.4.1 Control for Self-Selection

Endogeneity induced by self-selection bias is a concern in much of derivatives research because users (heavy users) of derivatives are likely to systematically differ from non-users (sporadic users) (Barton 2001; Pincus and Rajgopal 2002). However this is unlikely to be a major concern in our study due to the difference-in-differences approach adopted in our research design. That is, we analyze changes in the coefficients of interest *within* a partition from the pre- to the post-SFAS 133 period and the comparative magnitude of such changes *across* partitions. If the implementation of SFAS 133 is assumed to be an exogenous shock our results cannot be attributed to self-selection issues. Nevertheless, we adopt Heckman's two stage approach to correct for (any) self-selection.

Finance theory suggests that the probability of financial distress (Smith and Stulz 1985), the level of risk faced by a bank and the costs of managing that risk (Géczy et al. 1997), CEO risk-taking incentives (Tufano 1996; Rogers 2002), and tax incentives (Nance et al. 1993; Dolde 1995; Mian 1996) affect the decision to use derivatives. Consequently, we conjecture that derivative use is positively related to bank size (*SIZE*), leverage (*LEV*), interest rate risk (*GAP*), nonperforming loans (*NPL*), liquidity (*LIQUIDITY*) and tax convexity (*CONVEXITY*), and negatively related to net interest margin (*NIM*) and managerial incentives to take risk (*INCENTIVE*). We specify our first-stage probit model as follows:

$$USER_{it} = \alpha_0 + \alpha_1 SIZE_{it} + \alpha_2 LEV_{it} + \alpha_3 GAP_{it} + \alpha_4 NIM_{it} + \alpha_5 NPL_{it} + \alpha_6 LIQUIDITY_{it} + \alpha_7 INCENTIVE_{it} + \alpha_8 CONVEXITY_{it} + \varepsilon_{it} \quad (3)$$

where, for bank i at time t, *USER* is a dummy variable that equals 1 if the bank holds derivatives, and 0 otherwise. *GAP*, a measure of interest rate risk, serves as an exclusion restriction in our two-stage estimation procedure because, while both finance theory and empirical evidence suggest a direct link between maturity gap and derivative usage, it is unlikely that *GAP* and *LLP* are directly linked because the former is a measure of market risk, whereas the latter is driven by credit risk. Imposing an exclusion restriction in the Heckman procedure is critical because the absence of such a restriction can lead to severe multicollinearity problems in the second stage estimation (Francis and Lennox 2008). The two-stage estimation procedure yields results that are qualitatively similar (untabulated) to our primary results. The results of the probit model indicate that banks systematically differ when categorized based on the decision to use derivatives or not. They are generally in line with the conjectures of risk management theory and the findings of prior empirical studies. The sample period is 1999-2002. The model is based on 713 publicly-traded banks, 198 of which are derivative-users. 79 of these derivative-user banks are acquired prior to SFAS 133 and therefore excluded from the analyses. The tests are based on 11,038 bankquarters. 1,876 of these observations belong to banks with derivatives, whereas 9,162 observations belong to banks with no derivatives. Banks with higher probability of financial distress and riskier balance sheet composition (*LEV*), higher interest rate risk exposure (*GAP*), lower net interest income (*NIM*), higher credit risk (*NPL*), larger asset portfolio (*SIZE*), executive compensation plans with weaker incentives to take risk (*INCENTIVE*) and facing convex tax functions (*CONVEXITY*) are more likely to use derivatives. The coefficient on *GAP*, the exclusion restriction, is positive and significant at conventional levels ($p < 0.001$). The model correctly classifies 83.4 percent of user banks and 87.8 of non-user banks. Overall, 87.1 percent of observations are classified correctly whereas a naive model that classifies all banks as a user (non-user) would correctly classify 17.0 (83.0) percent of total observations.

4.4.2 Alternative Model Specifications

Our results also remain robust to various alternative model specifications. For example, our inferences are unaltered when the variables in Models (1a), (1b) and (2) are scaled by alternative scalars including beginning total loans (as in Liu and Ryan 2006), average loans outstanding (as in Ahmed et al. 1999), or beginning book value of equity (as in Kanagaretnam et al. 2004).

We also test Hypotheses 1A and 1B using the model employed by Liu and Ryan (2006), where control variables include only *CAP* and *ΔNPL*. In addition, we use the beginning allowance for loan losses (*ALL*) as an additional control variable as in Wahlen (1994). Our results remain qualitatively unchanged.

4.4.3 Alternative Sample and Measurement Periods

SFAS 119, *Disclosure about Derivative Financial Instruments and Fair Value of Financial Instruments,* became fully effective for fiscal years ending after December 15, 1995.

This statement required comprehensive derivative disclosures, thus making detailed derivative data available in 1996 fiscal year filings. Expanding the window over which we conduct the tests to include the period 1996 to 2006 does not alter any of our inferences.[16]

Our estimates of Model (2), which are used to test the informativeness of *EBTP* and *LLP* in the pre- and post-SFAS 133 periods, use annual returns measured from April to March. To examine the sensitivity of our results to the return measurement window, we re-estimate Model (2), using calendar year returns. Our findings regarding Hypotheses 3A and 3B are not robust to this alternative return window. We do not find a statistically significant pre- to post-SFAS 133 reduction in the coefficient on *LLP* for both *reclassifying* and *ineffective hedger* banks. However, we note that association between calendar year returns and financial statement components may be weaker as December year-end banks report their annual financials during the first quarter of the following year. Therefore, market reactions to information contained in these annual reports will not be captured in calendar year return windows.

5. Conclusion

SFAS 133 has been one of the most intensely debated accounting standards in recent times. Proponents of the standard welcomed it as a comprehensive approach to reporting risk management activities, addressing concerns about incompleteness, inconsistencies and ambiguities of prior standards. On the other hand SFAS 133 came under heavy criticism from the industry, which argued that the new rules would introduce artificial volatility to financial reports. Given prior findings that derivatives and accruals are used as partial substitutes in managing reported earnings (Barton 2001; Pincus and Rajgopal 2002), this paper investigates

[16] We exclude periods beyond 2006 to avoid possible contamination from the effects of the subprime crisis.

how the more stringent hedge accounting rules of SFAS 133 impacted the earnings management behavior and the value relevance of earnings and loan loss provisions of commercial banks.

Using a sample of US bank holding companies over the period of 1999-2002, we find that banks which are likely to be most impacted by SFAS 133 have increased their reliance on loan loss provisions for income smoothing following its adoption. We also find that subsequent to SFAS 133, informativeness of loan loss provisions have deteriorated for such banks. We do not find evidence of SFAS 133 affecting the informativeness of earnings before provisions and taxes for bank holding companies. Our results highlight how changes in disclosure regulation impact discretionary accounting behavior of firms in an unintended manner. Assuming increasing informativeness of aggregate financial disclosures is a broad goal of any accounting standard; our empirical results question whether SFAS 133 was successful in doing so.

Future research can examine other implications of the increased emphasis on LLP for smoothing after SFAS 133, such as on analyst forecast properties. Whether analysts' forecasts incorporate the increased use of LLP for smoothing is a potentially interesting research question.

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TABLE 1
Sample Selection Criteria

	No. of Banks	No. of Observations
Bank holding companies with no missing data in FR Y9-C files during the 1999-2002 period	2,283	7,391
Less: Derivative non-user banks	1,835	6,271
Derivative user banks	448	1,120
Less: Derivative user banks with no return data	250	533
Publicly traded derivative user banks	198	587
Less: Banks acquired prior to SFAS 133	79	115
Publicly traded derivative user banks with both pre- and post-SFAS 133 data	**119**	**472**
Pre-SFAS 133 (1999 and 2000) data sample	119	235
Post-SFAS 133 (2001 and 2002) data sample	119	237

TABLE 2
Descriptive Statistics for Regression Variables

Panel A: Reclassifying and Non-reclassifying (*in italics*) Derivative User Banks

	Mean	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
LLP	0.0032	0.0000	0.0014	0.0027	0.0043	0.0155
	0.0028	*0.0000*	*0.0010*	*0.0022*	*0.0037*	*0.0419*
R	0.0854	-0.4838	-0.1180	0.0675	0.2764	0.7260
	0.1018	*-0.5692*	*-0.1021*	*0.0884*	*0.2872*	*1.2777*
EBTP	0.0226	-0.0111	0.0181	0.0225	0.0265	0.0553
	0.0221	*-0.0191*	*0.0175*	*0.0218*	*0.0272*	*0.0591*
NPL	0.0049	0.0000	0.0022	0.0039	0.0058	0.0277
	0.0039	*0.0000*	*0.0016*	*0.0031*	*0.0048*	*0.0474*
ΔNPL	0.0004	-0.0166	-0.0006	0.0003	0.0013	0.0174
	0.0004	*-0.0077*	*-0.0006*	*0.0001*	*0.0011*	*0.0358*
LOAN	0.6451	0.1805	0.5825	0.6524	0.7219	0.8892
	0.6242	*0.0121*	*0.5837*	*0.6647*	*0.7108*	*0.8705*
ΔLOAN	0.0332	-0.0594	0.0119	0.0375	0.0705	0.0995
	0.0341	*-0.0441*	*0.0131*	*0.0380*	*0.0636*	*0.0845*
HMGLOAN	0.3825	0.0120	0.3060	0.3886	0.4854	0.8390
	0.3732	*0.0000*	*0.3189*	*0.3973*	*0.5074*	*0.7310*
ΔHMGLOAN	0.0245	-0.0489	0.0028	0.0268	0.0506	0.0830
	0.0295	*-0.0222*	*0.0040*	*0.0282*	*0.0558*	*0.0772*
HTRLOAN	0.2627	0.0023	0.2109	0.2750	0.3811	0.8036
	0.2511	*0.0000*	*0.1638*	*0.2568*	*0.3734*	*0.8539*
ΔHTRLOAN	0.0197	-0.0469	-0.0029	0.0181	0.0425	0.0671
	0.0220	*-0.0393*	*-0.0001*	*0.0218*	*0.0543*	*0.0597*
CAP	0.0770	0.0423	0.0672	0.0747	0.0831	0.1490
	0.0777	*0.0444*	*0.0669*	*0.0770*	*0.0880*	*0.1756*
SIZE	24.2826	19.1263	21.9013	23.0815	24.4170	27.2845
	24.2745	*19.1574*	*21.1080*	*22.5792*	*23.7283*	*28.0120*

Variable Definitions: LLP = loan loss provisions scaled by beginning total assets; *R* = annual return from April 1st to March 31st; *EBTP* = earnings before taxes and provisions scaled by beginning total assets; *NPL* = beginning nonperforming loans scaled by beginning total assets; *ΔNPL* = change in nonperforming loans scaled by beginning total assets; *LOAN* = beginning total loans outstanding scaled by beginning total assets; *ΔLOAN* = change in total loans outstanding scaled by beginning total assets; *HMGLOAN* = beginning homogeneous loans outstanding scaled by beginning total assets; *ΔHMGLOAN* = change in homogeneous loans outstanding scaled by beginning total assets; *HTRLOAN* = beginning heterogeneous loans outstanding scaled by beginning total assets; *ΔHTRLOAN* = change in heterogeneous loans outstanding scaled by beginning total assets; *CAP* = Tier I risk-based capital ratio; *SIZE* = Natural logarithm of total assets.

TABLE 2 (continued)
Descriptive Statistics for Regression Variables

Panel B: Ineffective and Effective (*in italics*) Hedger Banks

	Mean	Minimum	Lower Quartile	Median	Upper Quartile	Maximum
LLP	0.0030	0.0000	0.0012	0.0026	0.0042	0.0290
	0.0029	*0.0000*	*0.0011*	*0.0023*	*0.0036*	*0.0419*
R	0.0937	-0.5692	-0.1076	0.0877	0.2046	0.8570
	0.0982	*-0.4483*	*-0.0789*	*0.0949*	*0.3344*	*1.2777*
EBTP	0.0235	-0.0191	0.0193	0.0231	0.0275	0.0591
	0.0213	*-0.0128*	*0.0165*	*0.0209*	*0.0259*	*0.0553*
NPL	0.0044	0.0000	0.0023	0.0034	0.0051	0.0277
	0.0041	*0.0000*	*0.0015*	*0.0033*	*0.0055*	*0.0474*
∆NPL	0.0003	-0.0155	-0.0005	0.0001	0.0011	0.0152
	0.0004	*-0.0166*	*-0.0007*	*0.0001*	*0.0012*	*0.0358*
LOAN	0.6203	0.0121	0.5723	0.6661	0.7185	0.8690
	0.6410	*0.2809*	*0.5881*	*0.6566*	*0.7104*	*0.8892*
∆LOAN	0.0329	-0.0594	0.0177	0.0342	0.0593	0.0866
	0.0346	*-0.0374*	*0.0149*	*0.0329*	*0.0539*	*0.0995*
HMGLOAN	0.3698	0.0000	0.2993	0.3846	0.4775	0.7140
	0.3673	*0.0421*	*0.3256*	*0.3597*	*0.5257*	*0.8390*
∆HMGLOAN	0.0280	-0.0489	0.0088	0.0273	0.0518	0.0830
	0.0295	*-0.0222*	*0.0040*	*0.0282*	*0.0558*	*0.0772*
HTRLOAN	0.2506	0.0000	0.2001	0.2669	0.3868	0.8539
	0.2737	*0.0011*	*0.1604*	*0.2628*	*0.3661*	*0.8443*
∆HTRLOAN	0.0209	-0.0327	-0.0008	0.0203	0.0565	0.0597
	0.0214	*-0.0469*	*-0.0004*	*0.0202*	*0.0562*	*0.0671*
CAP	0.0739	0.0439	0.0649	0.0718	0.0804	0.1235
	0.0803	*0.0423*	*0.0704*	*0.0793*	*0.0899*	*0.1756*
SIZE	24.9687	20.5113	22.7919	24.0660	25.0161	28.0120
	22.5572	*19.1263*	*20.6244*	*21.6059*	*22.9064*	*24.9326*

Variable Definitions: LLP = loan loss provisions scaled by beginning total assets; *R* = annual return from April 1st to March 31st; *EBTP* = earnings before taxes and provisions scaled by beginning total assets; *NPL* = beginning nonperforming loans scaled by beginning total assets; *∆NPL* = change in nonperforming loans scaled by beginning total assets; *LOAN* = beginning total loans outstanding scaled by beginning total assets; *∆LOAN* = change in total loans outstanding scaled by beginning total assets; *HMGLOAN* = beginning homogeneous loans outstanding scaled by beginning total assets; *∆HMGLOAN* = change in homogeneous loans outstanding scaled by beginning total assets; *HTRLOAN* = beginning heterogeneous loans outstanding scaled by beginning total assets; *∆HTRLOAN* = change in heterogeneous loans outstanding scaled by beginning total assets; *CAP* = Tier I risk-based capital ratio; *SIZE* = Natural logarithm of total assets.

TABLE 3
Income Smoothing Behavior of Banks before and after SFAS 133

Panel A: Reclassifying vs. Non-reclassifying Banks

$$Model\ (1a): LLP_{it} = \alpha_0 + \alpha_1 POST_t + \alpha_2 EBTP_{it} + \alpha_3 POST_t * EBTP_{it} + \alpha_4 NPL_{i,t-1} + \alpha_5 \Delta NPL_{it} + \alpha_6 LOAN_{i,t-1} + \alpha_7 \Delta LOAN_{it} + \alpha_8 CAP_{it} + \alpha_9 SIZE_{it} + \varepsilon_{it}$$

$$Model\ (1b): LLP_{it} = \beta_0 + \beta_1 POST_t + \beta_2 EBTP_{it} + \beta_3 POST_t * EBTP_{it} + \beta_4 NPL_{i,t-1} + \beta_5 \Delta NPL_{it} + \beta_6 HMGLOAN_{i,t-1} + \beta_7 \Delta HMGLOAN_{it} + \beta_6 HTRLOAN_{i,t-1} + \beta_7 \Delta HTRLOAN_{it} + \beta_8 CAP_{it} + \beta_9 SIZE_{it} + \varepsilon_{it}$$

	Reclassifying (RC) Banks[1]				Non-reclassifying (NRC) Banks[2]			
	Model (1a)		Model (1b)		Model (1a)		Model (1b)	
	Coefficient Estimate	**P-value**	**Coefficient Estimate**	**P-value**	**Coefficient Estimate**	**P-value**	**Coefficient Estimate**	**P-value**
Intercept	-0.0072	0.0405	-0.0009	0.8014	-0.0034	0.1168	-0.001	0.6323
POST	-0.0003	0.8490	0.0006	0.6336	-0.0014	0.4645	-0.0015	0.5878
EBTP	0.0897	0.0386	0.1001	0.0123	0.1015	0.0118	0.1226	0.0008
POST*EBTP	0.0256	0.0213	0.0263	0.0300	0.0089	0.7833	0.0109	0.5522
NPL	0.3581	<.0001	0.2947	<.0001	0.3407	<.0001	0.3926	<.0001
ΔNPL	0.3584	<.0001	0.3502	<.0001	0.4843	<.0001	0.4105	<.0001
LOAN	0.0024	0.0205			0.0018	0.0632		
ΔLOAN	-0.0007	0.7657			0.0056	0.0029		
HMGLOAN			0.0038	0.0354			0.0034	<.0001
ΔHMGLOAN			-0.0055	0.0881			0.0087	0.0013
HTRLOAN			0.0018	0.0277			0.0013	0.0504
ΔHTRLOAN			0.0040	0.1898			0.0023	0.3740
CAP	-0.0200	0.2115	-0.0146	0.3308	-0.0371	0.6154	-0.0337	0.5964
SIZE	0.0003	0.0883	0.0001	0.1181	0.0002	0.0715	0.0001	0.2177
F-Value	10.12	<.0001	10.15	<.0001	17.69	<.0001	19.11	<.0001
Adj. R-Sq.	0.508		0.517		0.497		0.515	

Panel B: Tests of Hypothesis 1A

	Model (1a)	P-value	Model (1b)	P-value
Hypothesis 1A	$\alpha_3^{RC} > \alpha_3^{NRC}$	0.0214	$\beta_3^{RC} > \beta_3^{NRC}$	0.0619

1) The *reclassifying* bank sample consists of 217 bank-year observations (for 55 banks) from 1999 to 2002.
2) The *non-reclassifying* sample consists of 255 bank-year observations (for 64 banks) from 1999 to 2002.
3) All results are based on standard errors clustered simultaneously by bank and by year. All p-values are based on two-tailed t-tests.
4) *Variable Definitions: LLP* = loan loss provisions scaled by beginning total assets; *POST* = 1 if the observation belongs to the post-SFAS 133 period, and 0 otherwise; *EBTP* = earnings before taxes and provisions scaled by beginning total assets; *NPL* = beginning nonperforming loans scaled by beginning total assets; *ΔNPL* = change in nonperforming loans scaled by beginning total assets; *LOAN* = beginning total loans outstanding scaled by beginning total assets; *ΔLOAN* = change in total loans outstanding scaled by beginning total assets; *HMGLOAN* = beginning homogeneous loans outstanding scaled by beginning total assets; *ΔHMGLOAN* = change in homogeneous loans outstanding scaled by beginning total assets; *HTRLOAN* = beginning heterogeneous loans outstanding scaled by beginning total assets; *ΔHTRLOAN* = change in heterogeneous loans outstanding scaled by beginning total assets; *CAP* = Tier I risk-based capital ratio; *SIZE* = Natural logarithm of total assets.

TABLE 4
Income Smoothing Behavior of Banks before and after SFAS 133

Panel A: Ineffective vs. Effective Banks

$$Model\ (1a): LLP_{it} = \alpha_0 + \alpha_1 POST_t + \alpha_2 EBTP_{it} + \alpha_3 POST_t * EBTP_{it} + \alpha_4 NPL_{i,t-1} + \alpha_5 \Delta NPL_{it} + \alpha_6 LOAN_{i,t-1} + \alpha_7 \Delta LOAN_{it} + \alpha_8 CAP_{it} + \alpha_9 SIZE_{it} + \varepsilon_{it}$$

$$Model\ (1b): LLP_{it} = \beta_0 + \beta_1 POST_t + \beta_2 EBTP_{it} + \beta_3 POST_t * EBTP_{it} + \beta_4 NPL_{i,t-1} + \beta_5 \Delta NPL_{it} + \beta_6 HMGLOAN_{i,t-1} + \beta_7 \Delta HMGLOAN_{it} + \beta_6 HTRLOAN_{i,t-1} + \beta_7 \Delta HTRLOAN_{it} + \beta_8 CAP_{it} + \beta_9 SIZE_{it} + \varepsilon_{it}$$

	Ineffective Hedger (IEH) Banks[1]				Effective Hedger (EH) Banks[2]			
	Model (1a)		Model (1b)		Model (1a)		Model (1b)	
	Coefficient Estimate	P-value	Coefficient Estimate	P-value	Coefficient Estimate	P-value	Coefficient Estimate	P-value
Intercept	-0.0056	0.0839	0.0030	0.4003	-0.0020	0.3311	0.0001	0.9627
POST	0.0017	0.1493	0.0015	0.1777	-0.0004	0.6362	-0.0005	0.4846
EBTP	0.0852	0.0478	0.0783	0.0324	0.1207	0.0283	0.1089	0.0421
POST*EBTP	0.0320	0.0041	0.0289	0.0156	0.0115	0.3730	0.0200	0.3617
NPL	0.2178	0.0001	0.2183	<.0001	0.4134	<.0001	0.4077	<.0001
ΔNPL	0.5082	<.0001	0.4169	<.0001	0.3269	<.0001	0.3132	<.0001
LOAN	0.0049	0.0001			0.0030	0.0119		
ΔLOAN	-0.0088	0.0271			-0.0018	0.4057		
HMGLOAN			0.0067	<.0001			0.0034	0.0054
ΔHMGLOAN			-0.0122	0.0048			-0.0046	0.0947
HTRLOAN			0.0019	0.1760			0.0022	0.0018
ΔHTRLOAN			0.0026	0.6158			-0.0005	0.8003
CAP	-0.0312	0.0703	-0.0563	0.0010	-0.0394	0.0983	-0.0247	0.1401
SIZE	0.0003	0.0608	-0.0001	0.1353	0.0002	0.1130	0.0001	0.1012
F-Value	15.07	<.0001	15.48	<.0001	17.13	<.0001	19.83	<.0001
Adj. R-Sq.	0.479		0.536		0.505		0.518	

Panel B: Tests of Hypothesis 1B

	Model (1a)	P-value	Model (1b)	P-value
Hypothesis 1B	$\alpha_3^{IEH} > \alpha_3^{EH}$	0.001	$\beta_3^{IEH} > \beta_3^{EH}$	0.0700

1) The *ineffective* hedger sample consists of 162 bank-year observations (for 41 banks) from 1999 to 2002.
2) The *effective* hedger sample consists of 310 bank-year observations (for 78 banks) from 1999 to 2002.
3) All results are based on standard errors clustered simultaneously by bank and by year. All p-values are based on two-tailed t-tests.
4) *Variable Definitions: LLP* = loan loss provisions scaled by beginning total assets; *POST* = 1 if the observation belongs to the post-SFAS 133 period, and 0 otherwise; *EBTP* = earnings before taxes and provisions scaled by beginning total assets; *NPL* = beginning nonperforming loans scaled by beginning total assets; *ΔNPL* = change in nonperforming loans scaled by beginning total assets; *LOAN* = beginning total loans outstanding scaled by beginning total assets; *ΔLOAN* = change in total loans outstanding scaled by beginning total assets; *HMGLOAN* = beginning homogeneous loans outstanding scaled by beginning total assets; *ΔHMGLOAN* = change in homogeneous loans outstanding scaled by beginning total assets; *HTRLOAN* = beginning heterogeneous loans outstanding scaled by beginning total assets; *ΔHTRLOAN* = change in heterogeneous loans outstanding scaled by beginning total assets; *CAP* = Tier I risk-based capital ratio; *SIZE* = Natural logarithm of total assets.

TABLE 5
The Association between Returns and Earnings Components before and after SFAS 133

Panel A: Reclassifying vs. Non-reclassifying Banks

$$Model\ 2: R_{it} = \chi_0 + \chi_1 POST_t + \chi_2 EBTP_{it}^{MVE} + \chi_3 POST_t * EBTP_{it}^{MVE} + \chi_4 LLP_{it}^{MVE} + \chi_5 POST_t * LLP_{it}^{MVE} + \chi_6 \Delta NPL_{it}^{MVE} + \chi_7 LCO_{it}^{MVE} + \varepsilon_{it}$$

	Reclassifying (RC) Banks[1]		Non-reclassifying (RC) Banks[2]	
	Coefficient Estimate	**P-value**	**Coefficient Estimate**	**P-value**
Intercept	-0.0486	0.0023	-0.0824	0.0002
POST	-0.0205	0.0089	-0.0311	0.0111
$EBTP^{MVE}$	2.1219	0.0010	2.3931	<.0001
POST* $EBTP^{MVE}$	-0.1804	0.1765	-0.1335	0.2872
LLP^{MVE}	-1.8248	0.0077	-1.6600	0.0009
POST*LLP^{MVE}	0.2562	0.0108	-0.1318	0.3245
ΔNPL^{MVE}	-0.7503	0.0300	-1.0291	0.0001
LCO^{MVE}	-1.6130	0.0211	-0.8881	0.0554
F-Value	42.22	<.0001	48.33	<.0001
Adj. R-Sq.	0.392		0.357	

Panel B: Ineffective vs. Effective Banks

$$Model\ 2: R_{it} = \chi_0 + \chi_1 POST_t + \chi_2 EBTP_{it}^{MVE} + \chi_3 POST_t * EBTP_{it}^{MVE} + \chi_4 LLP_{it}^{MVE} + \chi_5 POST_t * LLP_{it}^{MVE} + \chi_6 \Delta NPL_{it}^{MVE} + \chi_7 LCO_{it}^{MVE} + \varepsilon_{it}$$

	Ineffective Hedger (IEH) Banks[3]		Effective Hedger (EH) Banks[4]	
	Coefficient Estimate	**P-value**	**Coefficient Estimate**	**P-value**
Intercept	-0.0259	0.0010	-0.0591	0.0001
POST	-0.0100	0.0037	-0.0202	0.0319
$EBTP^{MVE}$	2.2864	<.0001	2.1198	<.0001
POST* $EBTP^{MVE}$	-0.1022	0.4050	-0.1604	0.3667
LLP^{MVE}	-2.0027	0.0322	-1.8091	0.0005
POST*LLP^{MVE}	0.3925	0.0224	0.0841	0.3462
ΔNPL^{MVE}	-1.3647	0.0001	-0.9628	0.1152
LCO^{MVE}	-1.2503	0.0717	-0.6577	0.0001
F-Value	32.23	<.0001	27.41	<.0001
Adj. R-Sq.	0.342		0.318	

Panel C: Tests of Hypotheses 2A, 2B, 3A and 3B

	Model (2)	P-value		Model (2)	P-value
Hypothesis 2A	$\chi_3^{RC} > \chi_3^{NRC}$	0.4019	**Hypothesis 3A**	$\chi_5^{RC} > \chi_5^{NRC}$	0.0092
Hypothesis 2B	$\chi_3^{IEH} > \chi_3^{EH}$	0.2525	**Hypothesis 3B**	$\chi_5^{IEH} > \chi_5^{EH}$	0.0232

1) The *reclassifying* bank sample consists of 217 bank-year observations (for 55 banks) from 1999 to 2002.
2) The *non-reclassifying* sample consists of 255 bank-year observations (for 64 banks) from 1999 to 2002.
3) The *ineffective* hedger sample consists of 162 bank-year observations (for 41 banks) from 1999 to 2002.
4) The *effective* hedger sample consists of 310 bank-year observations (for 78 banks) from 1999 to 2002.
5) All results are based on standard errors clustered simultaneously by bank and by year. All p-values are based on two-tailed t-tests.
6) *Variable Definitions: RETURN* = annual return from April 1st to March 31st; *POST* = 1 if the observations belongs to the post-SFAS No. 133 period, and 0 otherwise; $EBTP^{MVE}$ = earnings before taxes and provisions scaled by beginning market value of equity; LLP^{MVE} = loan loss provisions scaled by beginning market value of equity; ΔNPL^{MVE} = change in nonperforming loans scaled by beginning market value of equity; LCO^{MVE} = loan charge-offs scaled by beginning market value of equity.