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Hedging Performance and Fair-Value Financial Reporting: Evidence from Bank Holding Companies

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Abstract: This study investigates whether the inclusion of the fair-value-based hedging performance measure improves the value and risk relevance of accounting earnings using data from the regulatory filings of bank holding companies required by the Federal Reserve Bank. Statement of Financial Accounting Standards No. 133 (SFAS 133) requires most types of hedge ineffectiveness to be measured on a fair value basis and reported in earnings. This earnings recognition requirement was the focal point of controversy surrounding the adoption of SFAS 133. This study provides new evidence that the fair-value-based earnings component required under SFAS has predictive power over future performance. I further show that incorporating this fair-value-based hedging performance measure helps improve the value and risk relevance of accounting earnings. The findings of this study help inform the broader debate over the effect of fair-value-based financial reporting on capital markets.

Keywords: fair value accounting; earnings recognition; derivatives

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1. Introduction

The Statement of Financial Accounting Standards No. 133 (SFAS 133), which became effective in 2000, is still considered one of the most controversial and challenging to implement of all accounting standards in the United States (Tessema 2016). Per SFAS 133, gains/losses on hedging derivatives will impact earnings to the extent that the hedge is ineffective. The earnings recognition requirement was the focal point of controversy surrounding the adoption of SFAS 133.[1] This study investigates whether the inclusion of the fair-value-based hedging performance measure that is intended to capture hedge ineffectiveness under SFAS 133 improves the value and risk relevance of accounting earnings.

The controversy over the income statement effect of SFAS 133 illustrates a general problem that has frequently arisen in the debate over fair-value-based financial reporting, namely, whether to extend fair value accounting treatment from the balance sheet to the income statement. Barth et al. (2003) show that, even when the fair values reported in the balance sheet are useful as stand-alone information, including in earnings the unrealized gains/losses that reflect the changes in these fair values may reduce the information content of earnings as a summary performance measure. In practice, a significant amount of attention has been directed toward the issue of whether to 'fair value' the earnings or insulate earnings from the balance-sheet changes in fair values through other comprehensive income (OCI).

The financial industries, in particular, extensively lobbied against extending fair value accounting to the income statement, especially in the aftermath of the global financial crisis. As an example, a few months after the onset of the global financial crisis, the FASB issued the FASB Staff Position Papers regarding the other-than-temporary impairment model for debt and equity securities. One of the most significant changes provided by the position papers is to require the recognition of only credit losses through earnings while allowing the remaining portion of fair value losses to be recorded in other comprehensive income (OCI). This move was strongly backed by major interest groups representing the financial

industries, including the American Bankers Association and the International Swaps and Derivatives Association.

Critics of the move towards more fair-value-based income measures argue that introducing fair-value components will impair earnings persistence by obscuring the ability of earnings to capture sustainable performance due to the transitory nature of fair-value-based gains/losses. Earnings persistence has long been considered a critical desirable feature of accounting earnings (Francis et al. 2004, 2008; Penman and Zhang 2002). Thus, the presumed transitory nature of fair value-based gains/losses provides a key argument against extending fair value accounting treatment to the income statement, as was the case surrounding the adoption of SFAS 133.

Despite the popularity of this argument, it is not clear whether introducing a fair value-based component invariably reduces earnings persistence by exposing earnings to asset fair value changes. As Laux and Leuz (2009, 2010) point out, fair value accounting rules in practice do not stipulate pure mark-to-market accounting and often have built-in mechanisms designed to limit the impact of market price changes. This is particularly the case for the income statement treatment of hedging derivatives under SFAS 133 as the changes in fair values of the hedging instrument will only impact earnings to the extent that the hedge is ineffective. Given these features of SFAS 133, the earnings component unique to SFAS 133 is designed to be a fair value-based hedging performance measure that have implications for future performance. Therefore, it is an empirical question whether the fair-value-based earnings component as stipulated by SFAS 133 is indeed transitory and thus the inclusion of this component impairs earnings persistence.

On the other hand, there is neither much evidence on the 'benefit' of fair-value oriented income measures. A key motivation for the support for more fair-value-based income measures comes from the notion that earnings variability under fair-value accounting provides better risk assessment (Ryan 1997). However, previous empirical studies have found mixed results regarding the risk relevance of fair-value income measures (Barth et al. 1995; Bratten et al. 2016; Hodder et al. 2006; Sangchan et al. 2022). These studies focus on the incremental volatility of a constructed aggregate fair-value income measure that is derived by adding to GAAP earnings all fair-value gains/losses available from required disclosures. As a result, it is difficult to identify the source of the examined earnings variability or to determine whether the disclosed fair-value gains/losses from different activities contribute uniformly to the results. In this study, I use a different approach by taking advantage of the setting of SFAS 133 where the variability of the hedging performance component recognized into earnings is directly attributed to firms' risk management activities.

Using a sample of bank holding companies, I document evidence inconsistent with the widely held notion that the fair-value-based earnings component required by SFAS 133 represents 'transitory' income that has no implications for future performance. Specifically, I find that the earnings measure including the fair-value-based hedging performance component recognized under SFAS 133 outperforms a constructed income measure that excludes this component in terms of the ability to explain concurrent stock returns. Moreover, I document a positive association between the volatility of the fair-value-based hedging performance measure and idiosyncratic stock return volatility. Taken together, the results from this study suggest that the recognition of the fair-value-based hedging gains/losses under SFAS 133 improves the value and risk relevance of accounting earnings.

This study focuses on the fair-value-based earnings component produced by an actual accounting standard and thus differs from previous research that uses researcher-constructed, disclosure-based income measures (Barth et al. 1995; Hann et al. 2007; Hodder et al. 2006). The empirical results suggest that the transitory nature of changes in balance-sheet derivative fair values does not apply to the actual component introduced into earnings under SFAS 133. The improved value and risk relevance of accounting earnings under SFAS 133 documented in this study adds to previous research that cautions against the assumption that introducing fair-value-based elements invariably leads to noisier and lower quality accounting earnings (Black 2016). The findings also highlight that a healthy debate over the income statement

treatment of fair-value-based gains/losses requires better clarification of the principles for distinguishing earnings from OCI, one of the key issues included in IASB's recent discussion paper on the conceptual framework for financial reporting.

The rest of the paper is organized as follows. The Section 2 reviews institutional background and the previous literature on derivative accounting. Section 3 develops testable hypotheses. Section 4 describes the data. Section 5 presents the results of the empirical tests. Section 6 concludes.

2. Institutional Background and Previous Research on Derivative Accounting

2.1. Accounting for Derivatives before SFAS 133

The primary authoritative literature of derivative accounting prior to SFAS 133 consisted of SFAS 52, *Foreign Currency Translation*, and SFAS 80, *Accounting for Futures Contracts*. By definition, these standards only cover a limited set of hedging instruments; consequently, a large number of derivative instruments (most notably, swaps and options) are not covered by any formal accounting standard. In practice, accounting treatment of these derivative instruments was determined by analogies to SFAS 52 and SFAS 80 and related consensus positions of the FASB's Emerging Issues Task Force (EITF). For example, EITF Issue No. 84-36 introduced the notion of 'synthetic alteration,' which developed into the standard way of accounting for interest swap contracts (Gastineau et al. 2001). Briefly, synthetic accounting bundles an interest swap hedging a floating-rate (fixed-rate) note with the hedged item and treats the combination as a fixed-rate (floating-rate) note. As a result, the swap contract itself is not recognized as an asset/liability on the balance sheet. Generally, gains/losses on a derivative instrument were mostly excluded from the income statement until net settlements hit cash flows in the pre-SFAS 133 regime, unless the instrument was held for trading or speculative purpose (i.e., no hedging relationship is designated/established for the instrument).

Disclosure requirements prior to SFAS 133 were governed by SFAS 119, *Disclosure of Information about Derivative Financial Instruments and Fair Value of Financial Instruments*, which amended two previous statements covering derivatives (SFAS 105, *Disclosure of Information about Financial Instruments with Off-Balance-Sheet Risk and Financial Instruments with Concentrations of Credit Risk*, and SFAS 107, *Disclosures about Fair Value of Financial Instruments*). SFAS 119 expanded the disclosure requirement under SFAS 105 and SFAS 107 by requiring firms to provide disaggregated information on notional amounts and fair values of derivatives instruments for each derivative category (interest rate, foreign currency, equity, commodity, and other), for derivatives held for trading purpose and non-trading purpose separately, and to clearly indicate whether the reported fair value of each derivative portfolio represents a net asset or a net liability position.

2.2. Accounting for Derivatives under SFAS 133

SFAS 133 requires all derivatives, regardless of the underlying purpose of the derivative holdings, to be carried at fair value on the balance sheet as either an asset or a liability. However, derivatives held for trading purpose were already recognized at fair value on the balance sheet with any gains or losses (both realized and unrealized) included in earnings before the adoption of SFAS 133. As such, SFAS 133 mainly changes the accounting treatment of non-trading/hedging derivatives.[2]

The income statement effect of a derivative instrument depends on the underlying risk being hedged. SFAS 133 identifies three types of hedge based on the source of the underlying risk: fair-value hedge, cash flow hedge, and foreign currency exposure hedge. A fair-value hedge is a hedge of the exposure to changes in the fair value of recognized assets/liabilities or off-balance-sheet firm commitments. A cash flow hedge is a hedge of the exposure to potential variability in future cash flows associated with recognized assets/liabilities or forecasted transactions. A foreign currency cash flow hedge is for a foreign-currency-denominated forecasted transaction or a hedge of the foreign currency exposure of a net investment in a foreign operation.

If a derivative instrument does not qualify for any one of the aforementioned types of hedge, its fair value must be recognized on the balance sheet, and any change in the holding position will immediately flow to the income statement without any 'offsetting' effects allowed. By contrast, a derivative instrument that qualifies as a hedge can have preferential accounting treatment because the change in the fair value of the instrument is either recognized together with the offsetting gains/losses on the hedged item (fair-value hedge) or allowed to be deferred to OCI (cash flow hedge). To qualify for the preferential accounting treatment, firms are required to designate the hedging instrument, the hedged item, and the specific risks being hedged at the inception of the hedge and to provide evidence confirming the effectiveness of the hedge on a continuous basis.

If the hedge is designated as a fair-value hedge, the gains/losses on the derivative instrument, together with the offsetting gains/losses on the hedged items, must be immediately recognized in current earnings. In practice, this means that not only the change in the fair value of the derivative contract but also the change in the fair value of the hedged item will directly flow to earnings. As a result, a fair-value hedge extends the fair-value accounting treatment to the hedged item that is otherwise accounted for at historical value or carried off-balance sheet.[3] For example, a fair-value hedge of an off-balance-sheet firm commitment will result in the firm commitment being recognized at fair value on the balance sheet. By contrast, a cash flow hedge only requires the ineffective portion of the hedging gains/losses to be recognized in earnings and allows the effective portion to be deferred to OCI. The hedging gains/losses parked in OCI are proportionally 'recycled' back into earnings as an offset to the earnings effect of the hedged item when the hedged item impacts earnings.

2.3. Previous Research on Derivative Accounting

The evolution of accounting standards covering derivatives has largely followed a path of transition towards expanded disclosure and more fair-value-based accounting treatment of derivative instruments. The rationale for such a transition is that more current and better presented information about derivative instruments will make financial statements more transparent and thus more useful to investors. In this section, I briefly review previous research that examines whether past accounting standards covering derivatives achieved this purpose.

Most studies in this category evaluate the accounting standard of interest by examining the valuation implications of the newly available information about derivative instruments. Specifically, these studies usually use a cross-sectional regression approach and examine whether the derivative information mandated by the standard of interest provides incremental explanatory power over equity prices or returns beyond traditional financial statements items. The derivative information is considered value-relevant and thus useful when the associated regression coefficient is statistically different from zero.

Using such an approach, Barth et al. (1996); Eccher et al. (1996) and Nelson (1996) examine the value relevance of fair-value information of a variety of banks' financial assets/liabilities (including derivatives) that is mandated to be disclosed under SFAS 107. All three studies found evidence that fair values of investment securities have explanatory power beyond book value. Barth et al. (1996) find fair values of loans to be consistently value-relevant, while Eccher et al. (1996) and Nelson (1996) find no reliable evidence of loans' value relevance. None of the studies finds the fair values of deposits and off-balance sheet instruments (including derivatives) to have incremental power in explaining equity values.

Attributing the insignificant results for off-balance sheet financial instruments in the above studies to the ambiguities in the derivative fair-value disclosures under SFAS 107, Venkatachalam (1996) examines the value relevance of derivative fair-value disclosures under SFAS 119 based on a sample of 99 bank holding companies. The findings suggest that the disclosed derivative fair values are positively associated with equity values and have incremental explanatory power beyond notional amounts of derivatives. By contrast,

Ahmed et al. (2006) document that derivative fair values disclosed but not recognized under SFAS 119 are not value-relevant. Using the adoption of SFAS 133 as a setting to examine the differential valuation implications of recognized and disclosed assets/liabilities, Ahmed et al. (2006) find that fair values of recognized derivatives have incremental explanatory power over equity prices but that fair values of disclosed derivatives do not.

It is noteworthy that the studies discussed above focus on the value relevance of derivative fair value as standalone information, which is a different issue than whether incorporating derivative gains/losses into earnings will improve the ability of earnings to reflect underlying economic performance. As a summary measure of firm performance, accounting earnings is intended to capture information predictive of future performance rather than information that reflects the firm's current financial position but has no implications for future performance. Therefore, fair-value change that represents a completely transitory income shock is expected to be value-relevant as standalone information because it reflects the firm's current financial position and should be reflected in the end-of-period equity price. However, incorporating this fair-value change into core earnings will obscure the ability of earnings to reflect firm performance because it has no implications for future performance and thus should be reported separately from core earnings.

Barth et al. (2003) demonstrate this tension by illustrating how recognition affects the quality of the recognized accounting amount in a separate recognition regime versus an aggregate recognition regime, where quality is defined as the accounting amount's explanatory power of concurrent stock returns (R^2 from the regression of equity value on the accounting amount). In a separate recognition regime (i.e., the recognized amount in question refers to a financial statement line item), recognition of a previously only disclosed value-relevant accounting amount always increases the quality of that accounting amount given the assumption that the information processing cost is lower for recognized information than for disclosed information. In an aggregate recognition regime (i.e., the recognized amount in question refers to a summary accounting measure such as earnings); however, recognition of a previously only disclosed value-relevant accounting amount can decrease the quality of the summary measure if the signal-to-noise ratio of the new component is sufficiently lower than the signal-to-noise ratio of the previously recognized amount. Given this tension, it is not surprising that the income statement effect of SFAS 133 was the focal point of controversy surrounding the adoption of SFAS 133.

Prior studies investigating the income statement effect of SFAS 133 (Park 2004; Singh 2004) focus on observed earnings volatility and find no significant change in the standard derivation or coefficient of variation of quarterly earnings following the adoption of SFAS 133. However, comparing overall earnings volatility across the pre- and post-SFAS period is not a promising avenue to investigate SFAS 133's income statement effect because there is no reason to expect ex ante a significant change in *average* earnings volatility unless firms on average are highly ineffective in using derivatives to hedge risks.

As SFAS 133 only requires hedge ineffectiveness to be recognized in current earning, observed earnings volatility will increase only if hedging derivative users on average experience earnings shocks from hedge ineffectiveness that are sufficiently significant to have a sizable impact on overall earnings volatility. This is unlikely given the evidence that firms on average effectively use derivatives to reduce risks (e.g., Guay 1999). Therefore, the income effect of SFAS 133 is unlikely to be borne out through a shift in average earnings volatility for derivative users.

In summary, while previous research provides a fair amount of evidence on the value-relevance of either disclosed or recognized derivative fair values as standalone information, no study has provided a direct answer to the highly debated question of whether the required recognition of hedge ineffectiveness under SFAS 133 improves or obscures earnings as a performance summary measure. The present study fills this gap in the literature.

3. Hypothesis Development

3.1. Relative Explanatory Power of Alternative Income Measures

One primary purpose of this study is to investigate how the ability of earnings to summarize firm performance is affected by the earnings recognition requirement under SFAS 133. According to the extant literature, the most direct way to examine this issue is to compare two alternative 'versions' of earnings, one including the fair-value-based hedging performance measure and the other excluding it, in terms the ability to explain concurrent stock returns. Initiated in Dechow (1994), this approach represents a significant departure from the emphasis on unexpected components of performance measures in capital market research. Instead, the comparison focuses on performance measures in their realized form based on the argument that only realized summary performance measures are used for contracting purpose. Under this approach, concurrent stock returns serve as a proxy or benchmark for 'true' firm performance and the objective is to evaluate the relative superiority of alternative performance measures rather than to identify incremental price relevant information.

As the focal point of controversy surrounding the adoption of SFAS 133 centers on the earnings recognition requirement rather than on disclosing hedging performance information to investors, evaluating earnings measures in their realized form is well suited for the purpose of this study. Along this line, the impact of the SFAS 133's earnings recognition requirement can be borne out through the relative explanatory power of two alternative earnings measures (one including the fair-value-based hedging performance measure and the other excluding it) over concurrent stock returns. This generates the following hypothesis (in null form):

H1. *The two earnings measures (one including the fair-value-based hedging performance measure and the other excluding it) do not differ in terms of the ability to explain concurrent stock returns, regardless of the level of hedging derivative exposure.*

3.2. Hedge Ineffectiveness and Idiosyncratic Volatility

Proponents of fair-value income measures argue that fair-value accounting's role as an early warning mechanism can only be effectively fulfilled when fair-value losses are reflected in both balance sheet and income statement. Along this line, the variability of earnings produced by a 'complete' fair-value accounting regime is considered to provide better risk assessment (Ryan 1997). However, empirical studies (Barth et al. 1995; Hodder et al. 2006) have found mixed results regarding the risk relevance of the volatility of fair-value-based income measures.

Both Barth et al. (1995) and Hodder et al. (2006) use an aggregated approach and examine the risk relevance of the incremental volatility of a constructed fair-value income measure that is derived by adding to GAAP earnings all fair-value gains/losses available from required disclosures. The fair-value-based earnings components are considered to be risk relevant when higher incremental volatility of the hypothetical income measure is shown to attenuate valuation coefficients of earnings in a cross-sectional price-earnings regression. The underlying assumption is that all value-relevant risk factors are linearly aggregated into the cost of equity, which is essentially the reciprocal of the earnings multiple in the earnings-based valuation model. Therefore, the valuation coefficient of earnings is assumed to be negatively associated with value-relevant risk factors.

Clearly, the existing literature on the risk relevance of fair-value income measures almost exclusively focuses on systematic (diversifiable risk). While such an approach is consistent with the tenets of classic asset pricing theories[4], there seems to be a disconnection between accounting research and practice about what would constitute 'relevant' risk factors. As Ryan (1997) notes, focusing on diversifiable risk may limit the implications of risk relevance research to important financial statement stakeholders (e.g., SEC) who are

most concerned about how particular classes of assets/liabilities contribute to the firm's downside performance potential.

A focus on firm-specific risk is well suited for the context of SFAS 133. Most notably, hedging is a firm-specific activity. Due to the highly leveraged nature and the non-linearly payoff feature associated with derivative instruments, the fluctuation in hedging performance needs to be closely monitored. The application of hedge accounting under SFAS 133 requires hedge ineffectiveness to be immediately recognized in earnings. From a risk management perspective, the ideal case is for the firm to be able to consistently minimize hedge ineffectiveness over time. This would translate into close-to-zero volatility in the hedge ineffectiveness measure. By contrast, high volatility in the hedge ineffectiveness measure may signal potentially serious problems with risk management practice and potential large losses in the future, an uncertainty factor that can contribute to firm-specific risk that is associated with greater downside performance potential. To examine the risk relevance of the hedge ineffectiveness measure under SFAS 133, I test the following hypothesis (in null form):

H2. *There is no correlation between the volatility of the hedge ineffectiveness measure and the firm's idiosyncratic risk, regardless of the level of hedging derivative exposure.*

4. Data

4.1. Sample Selection

Financial industries are the most important users of derivatives. Thus, derivative accounting should be of economic significance to bank holding companies. Moreover, bank holding companies are required by law to provide detailed information on derivative holdings in a uniform format through regulatory filing (Quarterly FR-Y9C reports filed with the Federal Reserve Bank). The sample used in this study covers bank holding companies during the period from 2001 through 2005. The sample period is restricted up to 2005 because the key variable in this study that captures the hedging derivatives' impact on income were only included in the FR-Y9C reports during this period.[5]

Bank holding companies in my sample must meet the following criteria: (1) quarterly financial statement data are available through COMPUSTAT, (2) stock return data are available through CRSP, and (3) the bank holding company filed FR-Y9C reports with the Federal Reserve Bank during the sample period, (4) This selection procedure yields a final sample of 168 unique bank holding companies.

4.2. Descriptive Statistics

Table 1 provides descriptive statistics for the sample used in this study. Table 1 Panel A reports the characteristics of the bank holding company population based on information from the quarterly FR-Y9C filing. The bank holding company population has a mean assets book value of $14.37 billion and a median assets book value of $1.03 billion. More than 95% of the bank holding companies have a Tier 1 capital ratio above 6% and a total risk-based capital ratio above 10%, which are the threshold value to be considered well-capitalized under federal bank regulatory agency definitions.

Table 1. Descriptive Statistics.

Panel A: Bank Holding Company Characteristics								
FR-Y9C Filing Variables	**N**	**Mean**	**STD**	**p5**	**Q1**	**Median**	**Q3**	**p95**
Total assets (book value millions $)	5652	14,366	81,009	249	518	1033	3488	45,168
Total assets (risk-weighted millions $)	5652	10,701	57,911	165	361	754	2439	33,918
Tier1 risk-based capital ratio	5652	0.1223	0.0376	0.0821	0.1010	0.1142	0.1335	0.1857
Total risk-based capital ratio	5652	0.1382	0.0359	0.1055	0.1171	0.1288	0.1485	0.2009
Notional amount of non-trading derivatives (millions $)	5587	3859	29,744	0	0	0	60	6876
Absolute net fair value of non-trading derivatives (millions $)	5588	25.27	189.68	0.00	0.00	0.00	0.42	60.51
Percentage of observations with non-zero hedging derivatives	38.29%							
Panel B: Hedging Derivative Exposure								
Exposure (Scaled by Beginning Market Value of Equity)	**N**	**Mean**	**STD**	**P5**	**Q1**	**Median**	**Q3**	**P95**
Earnings component attributed to non-trading derivatives	2159	0.0020	0.0111	−0.0036	−0.0002	0.0001	0.0019	0.0130
Change in fair value of non-trading derivatives	2129	−0.0004	0.0372	−0.0100	−0.0012	0	0.0010	0.0107
ABS earnings component attributed to non-trading derivatives	2159	0.0037	0.0107	0	0.0001	0.0009	0.0031	0.0157
ABS change in fair value of non-trading derivatives	2129	0.0062	0.0366	0	0.0002	0.0012	0.0041	0.0194

The use of hedging derivatives is highly concentrated among heavy derivative users. Only 38.29% of the observations in the bank holding company population report non-zero amount of hedging derivatives, resulting a median of zero and a mean dollar value of $3.86 billion in notional amount of hedging derivatives. Panel B of Table 1 provides a summary of the level of exposure to hedging derivatives in the sample of bank-holding companies that report non-zero outstanding trading derivatives.

4.3. Fair-Value-Based Hedging Performance Measure

The purpose of this paper is to evaluate how the fair-value accounting treatment of hedging derivatives as stipulated by SFAS 133 impacts the value and risk relevance of accounting earnings. As such, the fair-value-based hedging performance measure (the earnings component attributed to risk management/non-trading derivatives under SFAS 133) serves as a key metric in interpreting the income statement effects of SFAS 133. In this section, I discuss the conceptual construct underlying this accounting measure and its empirical construction in more detail.

It is clear that SFAS 133 intends for the newly recognized earnings component attributed to risk management derivatives to timely reflect hedge ineffectiveness, a key concept emphasized throughout the statement. This is achieved by the application of hedge accounting, defined as "special accounting treatment that alters the normal accounting for one or more components of a hedge so that counterbalancing changes in the fair values of hedged items and hedging instruments, from the date the hedge is established, are not included in earnings in different periods" (SFAS 133, Paragraph 320). In fact, a lot of the technical complexities of SFAS 133 are associated with the application of hedge accounting, particularly the qualifying requirement and the measurement of hedge ineffectiveness. The implicit assumption behind this accounting manoeuvre is that, by carefully matching the fair-value gains/losses of the hedging instrument and the hedged item, SFAS 133 requires accounting earnings to capture an important aspect of underlying firm performance (i.e., hedge ineffectiveness) rather than simply the effect of market price fluctuations during the period.

Consistent with this conceptual framework, the earnings recognition requirement under SFAS 133 ensures that most types of hedge ineffectiveness are immediately incorporated into earnings.[6] In addition, if a non-trading derivative instrument does not qualify for hedge accounting under SFAS 133, the entire gains/losses on the derivative instrument has to be immediately recognized into earnings without any offsetting effect allowed. As most derivatives classified as other than trading by bank holding companies are reported as hedging rather than speculative derivatives, this situation arises mostly when the hedging relationship fails to meet the minimum effectiveness threshold required for hedge accounting. In this case, the recognized derivative gains/losses can be viewed as a measure of hedge ineffectiveness when the ability of the hedging pair to offset each other seriously deteriorates.

The fair-valued hedging performance measure used in this study is derived from bank holding companies' FR-Y9C reports in the post-SFAS 133 period. Specifically, the variable is the sum of three Schedule HI (income statement) memoranda item M10(a), (b) and (c) "Impact on income of derivatives held for purposes other than trading" (i.e., bhck8761, bhck8762, and bhck8763). According to FR-Y9C instructions, the three M10 items should report the net sum of all amounts recognized in the income statements that are attributable to the use of non-trading derivatives based on whether the amounts impact interest income (M10a), interest expense (M10b), or other (non-interest) allocations (M10c). Moreover, one of the edit tests designed to check the internal consistency of the data reported in FR-Y9C form (listed in December 2005 FR-Y9C instruction form) explicitly states that the aggregated income effect of non-trading derivatives should be non-zero as long as the total notional amount of non-trading derivatives exceeds one million.

Table 1 Panel A reports the characteristics of the bank holding company population in this study based on information from the quarterly FR-Y9C filing. All dollar variables

are reported in millions. Total assets (book value) are the balance sheet book value of all assets held by the bank holding company (bhck2170). Per the regulatory requirement set by the Federal Reserve Bank, bank holding companies are required to calculate and report Total risk-weighted assets, Tier 1 capital and Total risk-based capital. Tier 1 capital ratio is calculated as Tier-1 capital (bhck8274) divided by Total risk-weighted assets (bhckA223). Total risk-based capital ratio is calculated as Total risk-based capital (bhck3792) divided by Total risk-weighted assets (bhckA223). Notional amount of non-trading derivatives is the sum of total notional amount of all derivatives held for non-trading purpose across all categories. Absolute net fair value of non-trading derivative is the absolute value of the net fair value of all derivatives held for non-trading purpose across all categories. Percentage of observations with non-zero hedging derivatives is the percentage of bank-quarters with a non-zero notional amount of derivatives for non-trading purpose.

Panel B of Table 1 provides a summary of the level of exposure to hedging derivatives in the sample of bank-holding companies that report non-zero outstanding trading derivatives. All variables reported in Panel B are scaled by the market value of equity at the beginning of the quarter. Earnings component attributed to non-trading derivatives is calculated as the sum of Schedule HI memoranda item M10(a), (b) and (c) 'Impact on income of derivatives held for purposes other than trading' (bhck8761 + bhck8762 + bhck8763). Change in fair value of non-treading derivatives is the change in the net fair value of non-trading derivative positions last quarter's value. Each period's net fair value of derivative positions is calculated based on information reported in Schedule HC-L (bhck8741 + bhck8742 + bhck8743 + bhck8744 − bhck8745 − bhck8746 − bhck8747 − bhck8748). ABS earnings component attributed to non-trading derivatives and ABS change in fair value of non-trading derivatives are the absolute value of the two variables described above, respectively.

It is important to differentiate the hedging performance measure discussed above from the change in the fair value of non-trading derivatives. In particular, the fair-valued hedging performance measure captures the effect of hedge accounting under SFAS 133 and therefore incorporates the offsetting gains/losses on the hedged item. As a check for data validity, I calculated the change in the fair value of non-trading derivatives in each period based on non-trading derivative fair values reported in FR-Y9C Schedule HC-L and compared it to the earnings component attributed to non-trading derivatives under SFAS 133. The two values diverge significantly. This is still the case for bank holding companies that do not use cash flow hedges (when the accumulated net gains/losses on cash flow hedges reported in Schedule HC-R, i.e., bhck4336, has consistently zero values across all periods) and thus no gains/losses from non-trading derivatives are deferred to OCI. Further analysis confirms that the two measures are not correlated with a very low correlation coefficient of 0.0039 and a corresponding p value of 0.86. Descriptive statistics for the two measures are reported in Panel B of Table 1. I also include descriptive statistics for the absolute value of the two measures to indicate the two measures' relative magnitude.

5. Empirical Tests and Results

5.1. Relative Explanatory Power of Alternative Income Measures (H1)

This section reports analysis comparing two alternative 'versions' of earnings, one including the fair-value-based hedging performance measure and the other excluding it, to determine which one has the superior ability to reflect firm performance (H3). Following Dechow (1994) and Dhaliwal et al. (1999), I compare the two performance measures based on a likelihood ratio test designed to evaluate competing non-nested models (Vuong 1989). Intuitively, Vuong's test provides a statistical procedure to determine which model 'fits' the data better (i.e., which model has relatively more explanatory power over the dependent variable for the given data). Consistent with Dechow (1994) and Dhaliwal et al. (1999), I use concurrent stock returns as the benchmark to evaluate the relative ability of the two performance measures to reflect firm performance based on the assumption that stock prices efficiently impound all information concerning firm performance.

As with most capital-market accounting research that assesses the information content of accounting numbers based on stock market patterns, this study faces the choice between the return model (in which stock returns are regressed on scaled earnings variables/components) and the price model (in which stock prices are regressed on earnings variables/components on a per share basis) in the empirical analyses. I choose to use the return model to better match the nature of the research question. Kothari and Zimmerman (1995) point out that the return model exhibits less serious heteroscedasticity and/or other specification problems compared to the price model. This is important to the context of this study because the research question requires the explicit comparison of alternative income measures with or without a potentially transitory earnings component. This represents a direct violation of the assumption of earnings following a random walk, which is an important condition to allow the price model to yield unbiased slope or earnings response coefficients as pointed out by Kothari and Zimmerman (1995).

Naturally, one expects hedging performance to contribute more to earnings' ability to summarize information on firm performance for sections where hedging derivatives are most likely to have material impact on firm performance. As such, I sort the sample of hedging derivative users into quintiles based on the level of hedging derivative exposure and perform Vuong's tests for that sample and for each quintile. Consistent with previous research (Barton 2001; Guay 1999), I measure hedging derivative exposure as the total notional amount of non-trading derivatives scaled by the market value of equity at the beginning of the quarter.

Table 2 reports results of tests comparing the explanatory power for two alternative income measures (earnings and earnings excluding the earnings component attributed to hedging derivatives under SFAS 133) based on the sample of hedging derivative users in the bank holding company population. This sample is sorted into quintiles based on the level of hedging derivative exposure, measured as the total notional amount of non-trading derivatives scaled by the market level of equity at the beginning of the quarter.

Table 2. Relative Explanatory Power of Alternative Income Measures.

Panel A: Exposure to Hedging Derivatives					
	Mean Exposure Level	**Median Exposure Level**	**Average Notional Amount Non-Trading Derivatives (millions $)**	**Average Market Value of Equity (millions $)**	**Number of Observations**
Sample	0.8783	0.2518	9964	11,344	2164
Quintile 1	0.0251	0.0220	32	1256	432
Quintile 2	0.1164	0.1139	246	2112	433
Quintile 3	0.2547	0.2518	1064	4177	433
Quintile 4	0.5468	0.5161	3393	6205	433
Quintile 5	3.4467	1.7580	45,062	13,074	433
Panel B: Relative Explanatory Power over Concurrent Stock Returns					
	R-Squared (Model: Earnings)	**R-Squared (Model: Earnings Adj. for Hedging Derivatives)**	**Vuong's Z Statistic**	***p*-Value**	**Number of Observations**
Sample	0.0938	0.0485	4.42	0.00	2133
Quintile 1	0.0324	0.0283	1.36	0.17	429
Quintile 2	0.1255	0.1053	1.13	0.26	431
Quintile 3	0.1091	0.0887	1.69	0.09	421
Quintile 4	0.1280	0.0955	1.97	0.05	426
Quintile 5	0.0972	0.0296	3.42	0.00	426
Panel C: Relative Explanatory Power over Future Earnings					
	R-Squared (Model: Earnings)	**R-Squared (Model: Earnings Adj. for Hedging Derivatives)**	**Vuong's Z Statistic**	***p*-Value**	**Number of Observations**
Sample	0.2628	0.1638	2.13	0.03	1940
Quintile 1	0.1558	0.1729	−1.52	0.13	372
Quintile 2	0.1194	0.0947	0.97	0.33	385
Quintile 3	0.3977	0.3567	2.62	0.00	387
Quintile 4	0.3445	0.2821	1.73	0.08	399
Quintile 5	0.3351	0.0910	1.64	0.10	397

Panel A reports descriptive statistics on hedging derivative exposure for the overall sample and for each hedging derivative exposure quintile within the sample.

Panel B reports results comparing the following two models:

$$R_{i,t} = \beta_0 + \beta_1 IB_{i,t} + \beta_2 LOSS_{i,t} + \beta_3 IB_{i,t}\_LOSS_{i,t} + \varepsilon_{i,t}$$

Model (Earnings Adj. for hedging derivatives):

$$R_{i,t} = \beta_0 + \beta_1 EXIB_{i,t} + \beta_2 LOSSE_{i,t} + \beta_3 EXIB_{i,t}\_LOSSE_{i,t} + \varepsilon_{i,t}$$

The dependent variable is the bank holding company's cumulative stock returns during the same quarter. $IB_{i,t}$ is bank holding company's income before extraordinary items during quarter t, scaled by the market value of equity and the beginning of the quarter. EXIB is quarterly income before extraordinary items excluding the earnings component attributed to hedging derivatives under SFAS 133, scaled by the market value of equity and the beginning of the quarter. LOSS is a dummy variable coded as 1 if IB is negative and LOSSE is a dummy variable coded as 1 EXIB is negative. Panel B reports R^2 for each model and Vuong's (1989) Z-statistic comparing the explanatory power of the two models for the overall sample and for each hedging derivative exposure quintile within the sample.

Panel C reports results comparing the following two models:

$$IB_{i,t+1} = \beta_0 + \beta_1 IB_{i,t} + \beta_2 LOSS_{i,t} + \beta_3 IB_{i,t}\_LOSS_{i,t} + \varepsilon_{i,t}$$

Model (Earnings Adj. for hedging derivatives):

$$IB_{i,t+1} = \beta_0 + \beta_1 EXIB_{i,t} + \beta_2 LOSSE_{i,t} + \beta_3 EXIB_{i,t}\_LOSSE_{i,t} + \varepsilon_{i,t}$$

The dependent variables is next quarter's earning scaled by the market value of equity at the beginning at the quarter. All the independent variables are the same as discussed above. Panel C reports R^2 for each model and Vuong's (1989) Z-statistic comparing the explanatory power of the two models for the overall sample and for each hedging derivative exposure quintile within the sample.

Panel A of Table 2 reports the descriptive statistics on hedging derivative exposure across quintiles. As discussed earlier, the use of hedging derivatives is highly concentrated among heavy derivative users. This translates into a highly rightly skewed distribution as indicated in Panel A of Table 2, with observations in the top quintile accounting for more than 90% of hedging derivatives outstanding measured by the total notional amount. This pattern still holds for the size-adjusted measure of hedging derivative exposure. Most notably, observations in the top quintile have an average exposure level of 3.45, while observations in the bottom quintile have an average exposure level of 0.02.

For the sample of hedging derivative users and for each quintile within the sample, I perform Vuong's tests to compare the relative explanatory power of the following two models:

(1) $R_{i,t} = \beta_0 + \beta_1 IB_{i,t} + \beta_2 LOSS_{i,t} + \beta_3\ IB_{i,t}\_LOSS_{i,t} + \varepsilon_{i,t}$
(2) $R_{i,t} = \beta_0 + \beta_1 EXIB_{i,t} + \beta_2 LOSSE_{i,t} + \beta_3 EXIB_{i,t}\_LOSSE_{i,t} + \varepsilon_{i,t}$

The dependent variable is the bank holding company's cumulative stock returns during the same quarter. IB is a bank holding company's income before extraordinary items during the quarter, scaled by the market value of equity at the beginning of the quarter. EXIB is quarterly income before extraordinary items excluding the earnings component attributed to hedging derivatives under SFAS 133, scaled by the market value of equity at the beginning of the quarter.

I also include LOSS (a dummy variable coded as 1 if IB is negative) and LOSSE (a dummy variable coded as 1 if EXIB is negative) in Models (1) and (2) above, respectively. This is to control for the well-known differential power of losses versus profits in explaining stock returns (Collins et al. 1999; Hayn 1995; Lawrence et al. 2018). The recent literature

provides new evidence that the lower explanatory power of losses versus profits interacts with the classic relevance/reliability tradeoff. Notably, Shust and Weiss (2022) show that losses underperform in the relevance dimension while the relatively high reliability of losses does not sufficiently compensate for the deficit in relevance, thus resulting in losses' lower power in explaining stock returns. Given such evidence, it is important to control for this differential explanatory in our analysis as the debate around SFAS 133 is directly related to the impact of incorporating into earnings a potentially transitory fair-valued component on the relevance/reliability tradeoff.

One issue of concern regarding this analysis is whether stock returns efficiently impound all available information. If investors are 'fixated' on earnings, Vuong's tests using stock returns as the benchmark will be biased in favour of the earnings measure in the reported form. Therefore, it is important to corroborate the results using an alternative benchmark based on future realized measures of performance such as future earnings (Skinner 1999). To address this problem, I use future earnings as an alternative benchmark and replicate Vuong's tests for the sample of hedging derivative users and for each quintile of hedging derivative exposure.

Panel B of Table 2 reports the results for Vuong's tests using concurrent stock returns as the benchmark. For the sample of bank holding companies in the post-SFAS 133 period, the earnings model has a R^2 of 0.0938 while the model based on the income measure excluding the earnings component attributed to hedging derivatives has a R^2 of 0.0485. Vuong's test confirms that accounting earnings outperforms the alternative income measure in terms of the ability to explain concurrent stock returns with a Z statistic of 4.42. Results by hedging derivative quintiles show that the superior explanatory power of earning is more prominent among sections with higher level of hedging derivative exposure, both in terms of statistical significance and the magnitude of the difference in explanatory power. Moving from the lowest to the highest quintile, the difference in R^2 between the two models increases from 0.004 (0.0324 vs. 0.0283) to 0.068 (0.0972 vs. 0.0296). The results suggest that the recognition of the fair-value-based hedging performance measure improves earnings as a summary measure of firm performance.

As reported in Panel C of Table 2, Vuong's tests using future earnings as the benchmark yield similar results. For the sample of bank holding companies in the post-SFAS 133 period, the earnings model has a R^2 of 0.2628 while the model based on the income measure excluding the earnings component attributed to hedging derivatives has a R^2 of 0.1638. Vuong's test confirms that earnings outperform the alternative income measure with a Z statistic of 2.13. Moving from the lowest to the highest quintile, the difference in R^2 between the two models consistently and significantly increases. The findings corroborate the results based on analyses using stock returns as the benchmark to evaluate alternative income measures.

5.2. Hedge Ineffectiveness and Idiosyncratic Volatility (H2)

This section reports analysis on the association between idiosyncratic volatility and hedge ineffectiveness recognized in earnings under SFAS 133 based on the sample of hedging derivative users in the post-SFAS 133 period. As I expect the impact of hedging activities on firm-specific risk to be most significant for firms with the highest level of hedging derivative, I perform a double-sort analysis based on the sample of hedging derivative users in the post-SFAS 133 period to examine whether a greater level of hedge ineffectiveness over time is associated with higher idiosyncratic risk for firms with higher level of hedging derivative exposure.

Specifically, like the analysis reported in the last section, I first sort the observations into five groups based on the same measure of hedging derivative exposure used earlier (total notional amount of hedging derivatives scaled by the market value of equity at the beginning of each quarter). Then, within each group, I further sort observations into quintiles based on hedge ineffectiveness over time (measured as the volatility of the earnings component attributed to hedging derivatives over the most recent eight

quarters, scaled by the market equity value at the beginning of the quarter). Consistent with Ang et al. (2006) and Jiang et al. (2009), I measure idiosyncratic risk for each bank-quarter as the standard deviation of the residuals from the time series regression based on the Fama-French three-factor model using daily CRSP return data.

Table 3 reports the results from the double sorting analysis that examines the association between hedge ineffectiveness and idiosyncratic risk. Within each quintile portfolio formed based on the level of size-adjusted hedging derivative exposure, the observations are further sorted into quintiles based on hedge ineffective measured as the size-adjusted volatility of the earnings component attributed to hedging derivatives from the most recent eight quarters. For each level of hedging derivative exposure, Table 3 reports the average idiosyncratic stock return volatility for each quintile and the difference between the top and bottom quintiles along with the corresponding Newey–West t statistic.

Table 3. Hedge Ineffectiveness and Idiosyncratic Volatility.

Hedging Derivative Exposure	**Q1 (Low)**	**Q2**	**Q3**	**Q4**	**Q5 (High)**
Hedge ineffectiveness					
Q1 (Low)	1.19	1.30	1.38	1.12	1.03
Q2	1.27	1.28	1.11	1.11	1.09
Q3	1.33	1.38	1.41	1.07	1.03
Q4	1.28	1.33	1.35	1.22	1.21
Q5 (High)	1.40	1.42	1.21	1.15	1.39
Q5 (High)-Q1 (Low)	0.21	0.12	−0.17	0.03	0.36
Newey–West t statistic	1.46	1.52	−1.60	0.34	2.20 **

Table 3 reports the average idiosyncratic stock return volatility (in percentage) for each quintile portfolio, along with the differences between the top and bottom quintiles and the corresponding Newey–West t-statistics. Like the analysis reported in Table 2, I first sort the observations in the sample into five groups based on a size-adjusted measure of hedging derivative exposure level (total notional amount of hedging derivatives scaled by the market equity value at the beginning of the quarter). Then within each group, I further sort observations into quintiles based on hedge ineffectiveness over time (measured as the volatility of the earnings component attributed to hedging derivatives over the most recent eight quarters, scaled by the market equity value at the beginning of the quarter). Idiosyncratic volatility for each bank-quarter is measured as the standard deviation of the residuals from the time series regression based on Fama-French three-factor model using CRSP daily data. ** indicates statistical significance at 0.1, 0.05, and 0.01 level, respectively (two-tailed test).

The results show that for the top quintile of hedging derivative users, idiosyncratic stock return volatility increases from 1.03% for the low hedge ineffectiveness portfolio to 1.39% for the high hedge ineffectiveness portfolio, resulting in a statistically significant difference of 0.36%. In contrast, the difference between the top and bottom hedge ineffectiveness portfolios is not statistically significant and of a noticeably smaller magnitude for the other four quintiles of hedging derivative users. As the use of hedging derivatives is highly concentrated among the heavy users, this finding is consistent with the notion that hedge ineffectiveness signals increased firm-specific risk when hedging derivatives have the potential to materially impact the firm's financial results. The results provide evidence in support of the claim by the financial analyst community that SFAS 133 helps improve the risk relevance of accounting numbers (Gastineau et al. 2001).

6. Conclusions

SFAS 133 requires most types of hedge ineffectiveness to be measured on a fair-value basis and reported in earnings. This earnings recognition requirement was the focal point of controversy surrounding the adoption of SFAS 133. The debate over the earnings recognition requirement under SFAS 133 demonstrates that there is often not enough evidence to support arguments commonly used in evaluating whether to enforce 'fair-value' earnings as more assets in balance sheet are measured on a fair-value basis. Using a sample of bank holding companies, I find evidence that the newly recognized earnings component following the adoption of SFAS 133 (i.e., the fair-value-based hedging performance measure) improves the value and risk relevance of accounting earnings. The

findings of this study are relevant to the evaluation of SFAS 133 as well as the ongoing debate on the income statement treatment of net asset changes due to the application of fair-value accounting.

This study is subject to some limitations. First, the study is based on the sample period from 2001 to 2005 due to data availability restrictions. While the insights from this study on the controversy around extending fair-value accounting treatment from the balance sheet to the income statement likely continue to be valid, the lack of more recent data inevitably limits the generalizability of the results. Second, this study does not cover the period around the 2008 global financial crisis, which has significant implications for the impact of hedging derivatives. Finally, this study focuses on bank holding companies only. As a result, the inferences from this study may not be valid for non-financial firms that use derivatives to hedge operational risks.

Future research may examine the accounting implications of hedging derivatives using more diverse sample and data sources. Another promising avenue for future research on derivate accounting is the implications for earnings management. For example, firms may take advantage of the differential accounting treatment for fair value and cash flow hedge under SFAS 133 to manipulate earnings. The high-profile cases of Fannie Mae's abuse of cash flow hedge accounting provide anecdotal evidence for such a scenario. Further research that simultaneously considers firms' incentive to manage earnings and a benchmark model for hedging decisions is important to better understanding the consequences of derivate accounting standards.

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Notes

1 Singh (2004) reports that almost two thirds of the comment letters in response to the exposure draft list the standard's earnings impact as a major point of discussion.

2 Following the previous literature in the area (Ahmed et al. 2006; Venkatachalam 1996), I use the terms 'non-trading derivatives' and 'hedging derivatives' interchangeably throughout this paper even though I recognize that they are not strictly overlapping.

3 SFAS 133 does *not* allow assets/liabilities that are already measured at fair value (e.g., trading securities) under otherwise applicable GAAP to be designated as the hedged item for a fair value hedge.

4 It is worth noting that recent studies (Ang et al. 2006; Jiang et al. 2009) have documented a negative association between idiosyncratic risk and stock returns. Moreover, the findings from these studies suggest that this relation cannot be explained by classic asset pricing risk factors or known market anomalies.

5 The variable is constructed based on FR-Y9C Schedule HI (income statement) memoranda item M10(a), (b) and (c) labeled as "Impact on income of derivatives held for purposes other than trading".

6 The exception is for under-hedged cash flow hedges.

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