The Information Content of Commercial Banks' Fair Value Disclosures of Loans under SFAS 107

By

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Abstract

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This dissertation utilizes empirical methods to shed light on the current debate over whether to adopt fair value accounting for loans held for long term. Proponents of fair valuing loans argue that reporting loans at their fair values enhances the overall transparency of financial reporting. In contrast, opponents are against applying fair value accounting to loans because fair values cannot be measured reliably in the case of loans held for long term. Therefore, the key question here is whether loan fair values are sufficiently reliable to provide more relevant and transparent information compared to traditional measurements of loans.

To explore this, I compare fair value disclosures of loans under Statement of Financial Accounting Standards No. 107 **(**SFAS 107), *Disclosures about Fair Value of Financial Instruments,* with traditional measurements of loans reported on balance sheets. More specifically, this study asks two research questions; (i) whether loan fair values provide more relevant information about future loan losses compared to traditional measurements of loans and (ii) whether banks intentionally manage their fair value estimates of loans when they are financially distressed.

SFAS 107 mandates the disclosure of fair values for financial instruments with the objective of providing investors with more relevant information about firms' future cash flows. However, the results show that fair value measurements of loans explained variation in future loan losses, which capture cash flows from loans, *less* than traditional cost-based measurements of loans. In addition, I find evidence suggesting that financially distressed banks overstated the fair values of their loan portfolios and that fair values of loans in the aggregate lagged considerably behind the market values of loans during the recent credit crisis. Overall, my results suggest that fair value disclosures in bank loan portfolios contain relatively less information about future cash flows because they are measured unreliably and they suffer from a similar lack of timeliness as reported carrying values.

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To my family,
whose never ending support
sustained me through the completion of my thesis

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Chapter 1

Introduction

The ongoing debate over whether to adopt fair value accounting is heated and divisive; this is especially so in the case of loans held for long term. In fact, the Financial Accounting Standards Board (FASB) even retreated from its position of expanding fair value accounting into a wide range of financial instruments, including loans held for long term (FASB Proposed Accounting Standards Update; FASB 2010), as a result of strong opposition from stakeholders such as the American Bankers Association, many large commercial banks, and some academicians. Proponents of fair valuing loans argue that reporting loans at their fair values enhances the overall transparency of financial reporting. In contrast, opponents are against applying fair value accounting to loans because fair values cannot be measured reliably in the case of loans held for long term. Therefore, the key question here is whether loan fair values are sufficiently reliable to provide more relevant and transparent information compared to traditional measurements of loans.

1.1 Relevance of fair value measurements of loans: Do fair values of loans explain future loan losses better than traditional measurements of loans?

To explore the relevance of loan fair values, this study examines whether loan fair values predict future loan losses better than traditional cost-based measurements of loans. This paper focuses on fair values' ability to predict future loan losses because loan losses measure cash flows from loans held for long term and the demand for timely information about future loan defaults has increased due to widespread concern about the possible bank defaulting since the recent credit crisis. However, whether loan fair values predict future loan losses better than traditional measurements of loans is not obvious. Even though fair value estimates of loans are conceptually more timely and forward-looking, they are in practice bank own estimates because loans are not actively traded on the market. Hence, fair value estimates contain errors and I examine whether the estimated amount of overstatement of fair values is negatively related with earnings, capital level and liquidity consistent with bank's opportunism.

To investigate my research question, I compare fair value disclosures of loans with traditional measurements of loans. On balance sheets, loans are carried at traditional cost-based

measurements which are calculated by subtracting allowances for loan losses from historical cost amount of loans. In footnotes, banks are required to disclose fair values of their loan portfolios under Statement of Financial Accounting Standard No. 107, *Disclosures about Fair Value of Financial Instruments* (SFAS 107; FASB 1991). Fair value disclosures of loans are handcollected from footnotes of commercial banks for the sample period from 1999 to 2009.

I investigate the information content of loan fair values separately for the period leading up to and during the credit crisis (sample periods of 1999-2007 and 2008-2009). My focus is on the credit crisis because the period provides a powerful setting to test credit risk information embedded in fair value estimates of loans. During an earlier sample period (1999-2007) with low aggregate loan defaults, loan fair values in the aggregate were dominated by market interest rate news which obscures credit risk information. However, during the credit crisis, loan fair values in the aggregate were dominated by credit risk information and the interest rate effect was naturally controlled as both the magnitude and the cross-sectional variation of credit default risk was substantially great during this period.

The results show that fair values did not predict future loan losses better than traditional measurements of loans. During the credit crisis, loan fair values, loan carrying values, and nonperforming loans together predicted future loan losses with approximately 52% of R^2. However, only 2% of total R^2 was explained by variation in loan fair values while 53%, 9%, and 36% of the R^2 were explained by variation in loan carrying values, variation in nonperforming loans, and cross-correlation of each variable. Also, the economic significance[1] of loan fair values in predicting future loan losses was much smaller (0.098) relative to the economic significance of loan carrying values (0.525). The results imply that the role of fair value accounting as an early warning system was only marginal during the credit crisis. Moreover, the joint significance of nonperforming loans suggests that fair value estimates of loans did not subsume readily available credit risk information such as nonperforming loans. This finding highlights the gap between economic constructs that are supposed to be employed and the actual input that managers use in implementing fair value measurements.

This study adds to the prior literature investigating the usefulness of fair value information. Most prior research examines the usefulness of fair value information in explaining stock prices (Barth, Beaver, and Landsman 1996; Eccher, Ramesh, and Thiagarajan 1996; Nelson 1996; Kolev 2009). In particular, Barth, Beaver, and Landsman (1996) focus on loan fair values and find that they are useful in explaining stock prices. Rather, this paper employs future loan losses capturing future cash flow realizations from loans instead of stock prices and directly examines FASB's assumption about fair values providing more relevant information about future cash flows. Finding evidence that loan fair values are not timely in predicting future loan losses sheds light on the current debate over fair valuing loans.

[1] Relative economic significance is calculated by adjusting estimated coefficient by scaling standard deviation of each variable.

1.2 Reliability of fair value measurements of loans: Do banks intentionally manage their fair value estimates of loans when they are financially distressed?

My research also tests whether banks manipulate fair value estimates of loans intentionally. The subjectivity and unverifiable nature of fair value estimates of loans enable bank managers to more easily manipulate fair value estimates of loans. Fair value estimates of loans are difficult to verify as unobservable input is usually used in their estimation. Input is not observable since the benchmark for the assumptions used in estimating loan fair values is not directly available on the market and is subject to significant adjustments to reflect the unique characteristics of each loan. Moreover, loan fair value estimates are affected not only by expectation about future cash flows but also other factors such as market illiquidity and current market interest rates. However, ex post, what investors actually observe is only cash flow realization. Hence, even though fair value estimates are not realized ex post, the mismatch between the estimates and their realization can be attributed to other factors such as interest rate effect and other market conditions. These factors together make loan fair values even more difficult to verify. Hence, I hypothesize that a bank's incentives to manipulate loan fair values increase depending upon the level of financial distress the bank is experiencing because the benefit of manipulating investors' perception about bank risk and performance by managing fair values is greater for financially distressed banks.

I begin by showing that during the recent credit crisis, fair values of loans in the aggregate lagged considerably behind the market values of loans when loan market values were proxied by Barclays' index of securities backed by loan portfolios. This was the case regardless of the types of indices used, whether backed by different loan portfolios such as credit card loans, mortgage loans, auto loans, or a combination of each. Untimeliness of fair values in reflecting market prices in the aggregate suggests that fair value estimates were largely measured based on unobservable input rather than market-based input during the credit crisis.

My results suggest that banks manipulated fair value estimates of loans during the recent credit crisis. Consistent with managerial opportunism, the estimated extent of overstatement of loan fair values was negatively related with regulatory capital and earnings level during the credit crisis. The result suggests that variation in loan fair values was driven not only by differences in quality of loans but also by intentional measurement errors.

Overall, my results suggest that fair value disclosures of bank loan portfolios contain relatively less information about future cash flows because disclosed fair values are measured unreliably and they suffer from a similar lack of timeliness as reported carrying values. While fair value measurements are conceptually superior in measuring the underlying economics of loans, actual implementation of fair valuing loans is difficult in the absence of benchmark market prices. Therefore, as it is now, fair valuing loans is insufficient to achieve FASB's intended purpose of providing better information about future cash flows of firms.

This study adds to the literature suggesting that fair values of loans are not being estimated in a reliable manner. Nissim (2003) documents that banks managed loan fair values during a sample period of 1994-1995. In testing the reliability of loan fair values, the greatest challenge would be to effectively control for nondiscretionary or intrinsic portion of loan fair values. However, this was less of an issue during the credit crisis since factors affecting intrinsic value of loans other than credit quality information were naturally controlled. Consequently, significant results are shown only for the credit crisis out of my entire sample periods. This research attempts to provide insights to standard setters on where to draw the line when considering the tradeoff between relevance and reliability, because without sufficient reliability, the additional relevance of loan fair values will only be marginal.

1.3 Summary

Statement of Financial Accounting Standards No. 107 **(**SFAS 107), *Disclosures about Fair Value of Financial Instruments,* mandates the disclosure of fair values for financial instruments with the objective of providing investors with more relevant information about firms' future cash flows. However, the results show that fair value measurements of loans explained variation in future loan losses, which capture cash flows from loans, *less* than traditional cost-based measurements of loans. In addition, I find evidence suggesting that financially distressed banks overstated the fair values of their loan portfolios and that fair values of loans in the aggregate lagged considerably behind the market values of loans during the recent credit crisis. Overall, my results suggest that fair value disclosures in bank loan portfolios contain relatively less information about future cash flows because they are measured unreliably and they suffer from a similar lack of timeliness as reported carrying values.

Chapter 2

Aggregate Loan Fair Values and Their Relationship with Market Index of Loans, Interest Rates, and Credit Risks of Loans

2.1 The data and Variable Measurements

The empirical tests are conducted using all commercial banks (SIC code: 6020) with available data from the intersection of the 1999-2009 of the Compustat bank file and the Direct Edgar 10-K files. I hand-collected fair value estimates of loans as required by SFAS No. 107, from footnote disclosures in the 10-K filings available through Direct Edgar. Other variables were obtained from the Compustat bank file. Carrying amounts for loans from 10-K footnote disclosures were compared with the net book value of loans from the Compustat bank files. If the amounts did not match, loans held for sale, loan impairments and/or leases were adjusted. If the amounts still did not match, the observations were deleted from the sample. The final sample consists of 2,597 firm-year observations with the required data.

Important variables are discussed in more detail as follows:

Charge-offs: Loan charge-offs proxy for future cash flow realization from loans. Loans are charged off when they are deemed uncollectible. Outstanding loans and the allowances for loan losses are reduced by the amount of principal lost, net of any expected recovery. Regulatory factors such as bankruptcy proceedings determine certain loan charge-offs. Additionally, according to some banks' policies, loans are automatically charged off after they have been delinquent for a specific period of time.

Using charge-offs as a dependent variable in evaluating the usefulness of fair value information has its limitation. While charge-offs are considered non-discretionary in most prior studies, some studies such as Liu and Ryan (2006) consider loan charge-offs as discretionary. To address this concern, I use charge-offs aggregated over multiple years and obtain qualitatively similar results

Nonperforming loans (NPA): Nonperforming loans include the total principal outstanding in three categories of loans: non-accrual, past due, and troubled debt restructurings. Non-accrual

and past-due loans all have principal or interest payments at least 90 days overdue. Non-accrual loans (which typically comprise the majority of nonperforming loans) are considered more likely to default and are accounted for on a cash basis. Loan loss provisions are recorded if non-accrual or past-due loans appear likely to default. I use nonperforming assets as a firm-level proxy for credit default risks since nonperforming assets are considered nondiscretionary.

Book values of loans (LN_BV): The book values of loans, traditional cost-based measurements, are the net amount expected to be collected, calculated by subtracting allowances for loan losses from the gross loan amount. In the current historical cost accounting regimen, banks are required to estimate loans that are evaluated as probably uncollectible. Impaired loans are recorded as allowances for loan losses as a counter account to gross loans, and incur bad debt expense by a corresponding amount. In estimating allowances for loan losses, banks should consider only a deterioration of credit quality, and not changes in the market rates of interests (SFAS 114 and SFAS 5).

Fair values of loans (LN_FV): Fair value disclosures for loans are collected from footnote disclosures on financial statements and compared with book values of loans. Fair values are required to be measured at market prices if available. If market prices are not available, which is usually the case for loans, fair value estimates are measured based on a model. Banks usually use the discount cash flow model based on the expectation about future cash flows from loans and current interest rates for loans with similar characteristics as illustrated in SFAS 107.

ABS index: This study uses Barclay's ABS index backed by a combination of credit card, mortgage, and auto loans as a benchmark of loan market price at the aggregate level (hereafter referred to as the ABS index). The time-series pattern of ABS index is compared with that of loan fair values. Appendix A explains the validity of using the ABS index as a benchmark for loan market values.

Table 2.1 summarizes the definition and measurement of each variable used.

Table 2.1 Variable Definitions

Variable	Formula	Definition
LN_BV	[Gross loans $_t$ – Allowances for loan losses $_t$] / Gross loans $_t$	Net book values of loans
LN_FV	Fair value of loans $_t$ / Gross loans $_t$	Net fair values of loans
PA $_t$	[Gross loan $_t$ - Nonperforming assets $_t$] / Gross loan $_t$	Performing assets at time t
NPA $_t$	Nonperforming assets $_t$ / Gross loans $_t$	Non-performing assets at time t
CHOFF $_t$	Net Charge-Offs $_t$ / Gross loans $_t$	Net charge-offs of loans at time t
RLNS $_t$	Interest income / Average gross loans $_t$	Effective interest rate on loans at time t
Loan Growth $_t$	Rate of change in gross loans relative to the previous year	Growth of loans at time t
LN/TD $_t$	Net Loans $_t$ / Total Deposits $_t$	Liquidity risk at time t
BVE_PreALL $_t$	[Common Equity $_t$ +Loan loss allowances$_t$] / Total Assets $_t$	Common equity before loan loss allowances at time t
ROE_PreProv $_t$	[Earnings $_t$ – Tax $_t$ – Loan loss provisions$_t$]/Average Equity $_t$	Earnings before tax & loan loss provisions at time t
Aggregate Measures:		
Agg. BV $_t$	[Sum of net loan book values of all sample] $_t$ / [Sum of gross loans] $_t$	Aggregate book values at time t
Agg. FV $_t$	[Sum of loan fair values of all sample] $_t$ / [Sum of gross loans] $_t$	Aggregate fair values at time t
Agg. PA $_t$	[Sum of gross loans – Sum of NPA of all sample] $_t$ / [Sum of gross loans]$_t$	Aggregate performing assets at time t
Mean BV $_t$	Mean of each firm's [Net loan book values/ Gross loans] at time t	Mean book values at time t
Mean FV $_t$	Mean of each firm's [Loan fair values/ Gross loans] at time t	Mean fair values at time t
Mean PA $_t$	Mean of each firm's [(Gross loans – NPA)/ Gross loans] at time t	Mean performing assets at time t

2.2 Basic facts

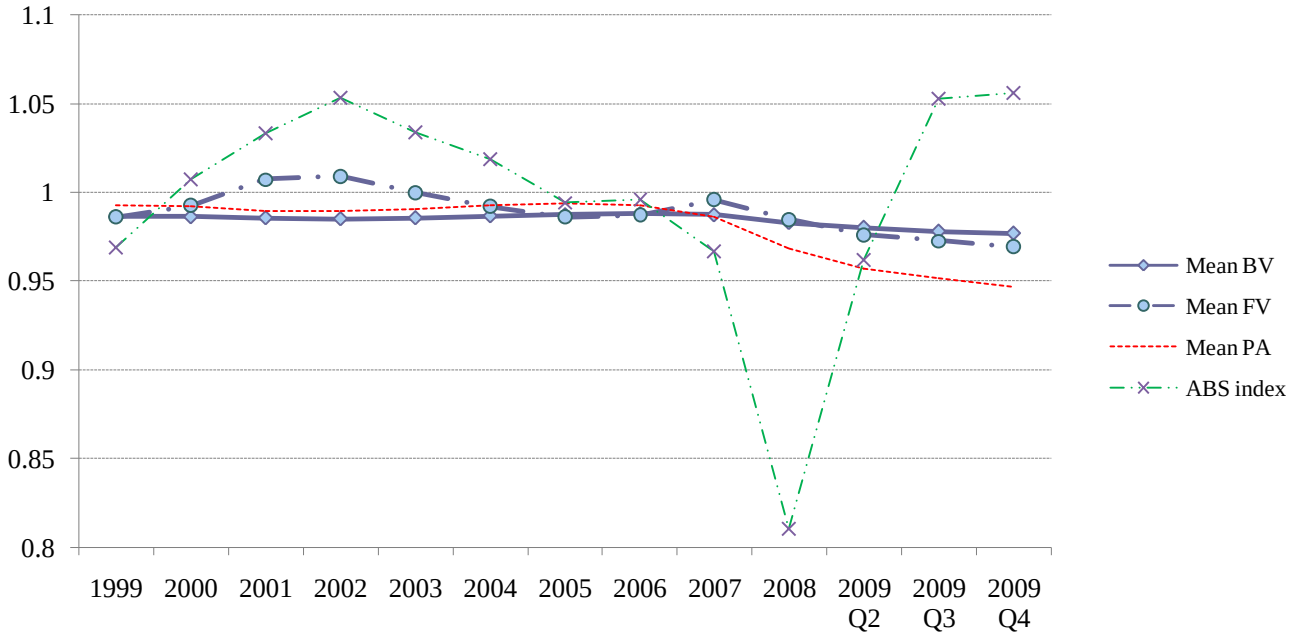
This section presents the basic facts about aggregate loan values and their relationship with Barclay's ABS market index of loans, market interest rates, and aggregate credit risks during the sample period. Loan fair values are considerably affected by various macro factors such as aggregate loan default risk, market illiquidity, market interest rates, and other market conditions. Therefore, assessing the relationship among aggregate variables helps to understand the extent to which each macro factor determines aggregate loan fair values and how the extent varies depending on the economic cycle.

Figure 2.2 shows the time-series pattern of loan carrying values, loan fair values, performing loans, and ABS index for the sample banks in the aggregate from 1999 through 2009; and Table 2.2 shows correlations among these variables.

Loan values for the overall commercial banks are calculated in two ways and referred as aggregate values (Panel A of Figure 2.2) and mean values (Panel B of Figure 2.2). The aggregate loan fair value and book value of loans are the cross-sectional sum of loan fair values and loan net book values scaled by the sum of the gross loan values for firms in each sample year**.** The aggregate performing loans are the cross-sectional sum of performing loans, which is calculated by subtracting the nonperforming loans from the gross loans and scaled by the sum of the gross loans. The mean loan fair value is the cross-sectional mean of the firm-level ratio of loan fair values to gross loans for all firms each year. The mean loan book value is defined accordingly. The mean performing loan is the cross-sectional mean of the firm-level ratio of performing loans to gross loans for all firms each year. Both methods of calculating yearly loan values in the aggregate track each other quite closely.

Figure 2.2 Panel A: Time-series pattern of loan fair values, loan book values, and nonperforming assets in aggregate level. Time-series pattern of loan fair values, loan book values, and nonperforming assets in aggregate level. The sample consists of 2,331 firm-year observations from 1999 to 2009. Variable definition is provided in Table 2.1.

Figure 2.2 Panel B: Time-series pattern of mean loan fair values, loan book values, and nonperforming assets.



2.2.1 Aggregate Loan Fair Values and the Market Values of Loans

During the sample period of 1999-2007, which had relatively low aggregate loan defaults, aggregate fair values and market values of loans proxied by Barclay's ABS index[2] of securities backed by loans show almost perfect positive rank correlations of 0.802 (Table 2.2). However, during the credit crisis of 2008-2009, aggregate loan fair values seemed to reflect changes in market values with a considerable lag. As Figure 1 shows, the ABS index started to deteriorate in 2007, even before the banking panic in the fourth quarter of 2008, but fair values did not reflect this drop in the market index. In the fourth quarter of 2008, loan fair values did not reflect decreases in market values proportionately, and they further deteriorated during 2009 when market values bounced back. This observation suggests the untimeliness of loan fair values in reflecting market values during the recent credit crisis even though FASB's procedures for determining fair value require reference to the market value of financial instruments.

The extent to which fair value information reflects market price limits the usefulness of fair value information. This is because market price incorporates most forward-looking information about future cash flows (relevance), and it reflects the market's expectations rather than firms' own estimates (reliability). However, untimeliness of loan fair values in reflecting market values in the aggregate suggests that fair values are measured based on unobservable input rather than market input to a great extent and that banks' own assumptions deviate from the market's expectations in the aggregate.

[2] The time-series pattern of Barclay's ABS index of securities, backed by loans, is used as a benchmark for market values of loans to examine the timeliness of aggregate loan fair values in reflecting market values across sample periods. The Appendix A provides an explanation for the choice of the ABS index as a benchmark.

Table 2.2: Correlation matrix – Pearson (above diagonal) and Spearman (below diagonal) for aggregate variables over the periods of 1999-2007 (Prior to Credit Crisis). The correlation coefficient estimates are bolded if significant at 5% level.

	Agg. BV	Agg. FV	Agg. PA	ABS index	10 yr Tbill R
Agg. BV		**-0.627**	**0.607**	**-0.772**	-0.133
Agg. FV	**-0.550**		**-0.689**	**0.802**	**-0.541**
Agg. PA	**0.617**	**-0.617**		-0.360	0.179
ABS index	**-0.783**	**0.767**	-0.383		-0.401
10 yr Tbill R	0.033	**-0.667**	0.417	-0.300	1.000

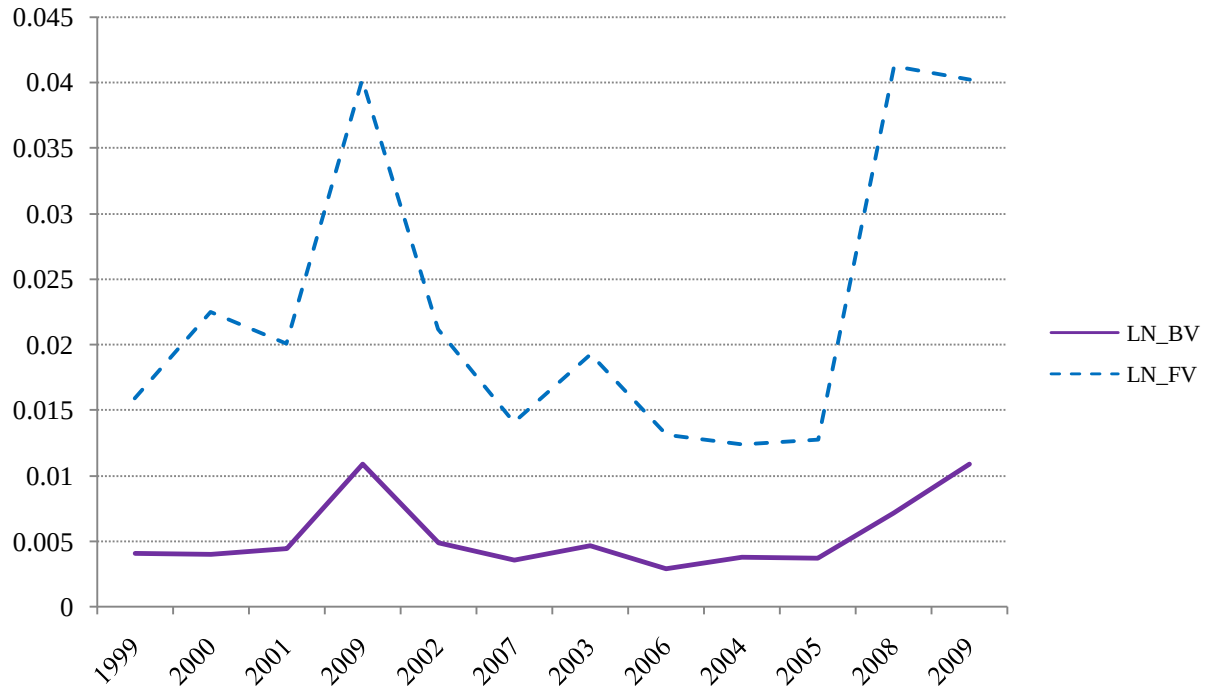
ABS is a BARCLAYS' index of securities backed by composition of home equity loans, credit card loan and auto loans (investment grade). CMBS is a BARCLAYS' index of securities backed by commercial mortgage backed securities (investment grade). Definitions of other variables are provided in Table 2.1.

2.2.2 Aggregate Fair Values and Aggregate Carrying Values of Loans

The fact that the fall of aggregate loan fair values was significantly larger than aggregate carrying values in the fourth quarter of 2008 suggests that fair values in the aggregate were more timely in reflecting banking panic during the credit crisis. However, the reliability of a measurement system is determined by both bias and objectivity (Ijiri and Jaedicke 1966). Even though the mean is closer to the true values of loans, fair value estimates might be less reliable if the measurement system is less objective and thus applied inconsistently by different managers.

Figure 2.3 shows the cross-sectional variation of loan fair values scaled by their yearly mean values. The variation is larger for fair value estimates than traditional measurements of loans. Whether this large cross-sectional variation in fair value estimates is due to variation in loan quality or due to errors is an empirical question. The cross-sectional tests in the next section examine the question of whether and how much the differences between fair value estimates and traditional measurements of loans explain the differences in the quality of loans.

Figure 2.3: Time-series pattern of standard deviation of loan book values and fair values deflated by mean of loan book values and fair values, respectively



2.2.3 Relation between loan fair values and credit risk of loans in the aggregate

In the fourth quarter of 2008, both loan fair values and carrying values fell in the aggregate, along with performing loans, reflecting increased credit risk. However, during the period prior to the credit crisis, loan fair values failed to reflect credit risk information in the aggregate. Loan fair values were significantly and negatively correlated with performing loans in the aggregate (Pearson (Spearman) correlation of -0.689 (-0.617), Table 2) even though performing loans inversely proxy for credit risk of loans.

The relation between loan fair values and risk-free rates is expected to be negative. If the risk-free rate increases, the discount rate of future cash flows for loans increases and loan fair values are expected to decrease. During the sample period of 1999–2007, which had relatively low aggregate loan defaults, the correlation between aggregate fair values and 10-year treasury bill rates is negative and significant with a Pearson (Spearman) correlation coefficient of -0.541 (-0.667), as expected (Table 2).

The relation between aggregate performing assets and aggregate loan fair values is expected to be positive since aggregate performing assets are an inverse proxy for aggregate loan default risks. However, Figure 2.2 and Table 2.2 show that the relation is significantly negative with a Pearson (Spearman) correlation coefficient of -0.689 (-0.617). This suggests that loan fair values in the aggregate failed to reflect macro information about the credit default risk of loans in the earlier sample periods. This is because market interest rate news dominated credit risk information in determining aggregate loan fair values during periods of low aggregate loan defaults. Prior research shows that interest rates tend to move in opposite direction to credit risk information (Duffee 1998). Hence, interest rates and credit risk offset each other's effect in determining loan values and the larger risk dominates the other effect. During the earlier sample period of low aggregate loan defaults, fair value estimates in the aggregate were determined by changes in market interest rates and failed to reflect credit risk information.

In contrast, during the recent credit crisis, loan fair values in the aggregate dropped significantly due to increases in credit risk despite a large decrease in interest rates. Hence, credit risk information dominated interest rate news in determining aggregate loan fair values unlike in earlier periods. In this respect, the credit crisis provides a powerful setting to test credit risk information embedded in fair value estimates in that the interest rate confounding effect was naturally controlled relative to earlier periods.

Chapter 3

Do loan fair values provide more relevant information about future loan losses than traditional measurements of loans?

3.1 Related Literature Testing Value Relevance of Loan Fair values

Prior research has focused on value-relevance regressions to test the usefulness of fair value information under SFAS 107 (Barth, Beaver, and Landsman 1996; Eccher, Ramesh, and Thiagarajan 1996; Nelson 1996; Kolev 2009). Eccher, Ramesh, and Thiagarajan (1996) and Nelson (1996) do not find loan fair values useful in explaining stock prices. However, after controlling for firms' credit risk and interest sensitive financial instruments, Barth, Beaver, and Landsman (1996) show that the fair value disclosures of loans pursuant to SFAS 107 provide additional information over book values of loans in explaining banks' share prices. These results suggest that market participants consider loan fair values reliable enough to reflect in stock prices.

Another stream of research tests the value relevance of fair value measures recognized under SFAS No. 157, Fair Value Measurements (Goh, Ng, and Yong 2009; Kolev 2009; Song, Thomas, and Yi 2010). SFAS 157 provides a framework for applying fair value measurements and enhances disclosures about the fair value measurements. SFAS 157 does not change the definition of fair value measurements under SFAS 107, but provides more detailed guidance on how to measure and disclose fair values. Most notably, SFAS 157 requires fair value measurements to be disclosed by levels depending on inputs used in their estimation; level 1 (observable inputs from quoted prices), level 2 (indirectly observable inputs from quoted prices of comparable items or identical items in inactive markets), and level 3 (unobservable inputs).

Several studies test whether the value relevance of fair values is different depending on the reliability of fair value measurements (Kolev 2009; Song, Thomas, and Yi 2010). Level 3 fair values are less observable and more subjective in nature, and thus, they are likely to be less reliable and contain more errors. As investors discount less reliable accounting measures in valuating stocks, Kolev (2009) and Song et al. (2010) expect and find that level 3 fair values are less value relevant than the higher level fair values. Moreover, Song et al. (2010) find that the value relevance of fair values, especially for level 3 fair values, is greater for firms with strong governance, implying that the corporate governance mechanisms can play a role in mitigating the information asymmetry problem related with less reliable measurements.

Beaver and Venkatachalam (2003) examine how managerial opportunism affects the value relevance of fair value measurements. They investigate how the value relevance is different depending on managerial opportunism and the reliability of fair value measurements. They partition loan fair values of commercial banks into nondiscretionary, discretionary, and noisy components and find that investors price the discretionary component of loan fair values negatively if the motivation for discretion is managerial opportunism.

My research tests how loan fair values are related with future loan losses instead of stock prices since future loan losses directly measure future cash flow realizations from loans. Value relevance research is rather an indirect test since it is a joint test of whether fair values are used by investors, whether pricing model assumed by researcher is correct, and whether the market is efficient (Maines and Wahlen 2006). In addition, it is hard to effectively control for extraneous factors affecting market returns especially when returns are measured over the long term. Although significant association with returns is found, it cannot be reliably attributed to fair value disclosures. Hence, I directly test the usefulness of loan fair values in explaining future fundamentals of loans using future loan losses.

3.2 Hypothesis Development

The primary goal of this paper is to understand the role of fair value accounting in predicting the credit losses of loans, as opposed to the role of traditional measurements of loans. The reason for my focus on credit risk information embedded in loan fair values is because, for loans held for long term, credit losses measure loan defaults and thus proxy for future cash flow realizations from loans. The purpose of SFAS 107's mandating fair value disclosures for financial instruments is to provide investors with more relevant information about firms' future cash flows. By investigating the ability of loan fair values to predict future credit losses that proxy for future cash flows from loans, this paper tests whether FASB's purpose of requiring fair value information works for loans held for long term.

Proponents of fair valuing loans argue that fair value measurements provide more relevant and timely information about future credit losses of loans. Prior studies have criticized the lack of timeliness in traditional measurements' reflecting of future loan losses (Trott 2009). Concerns over outside investors' possible adverse selection due to uncertainty in future losses were elevated during the recent credit crisis. In response to these concerns, in July 2009 the Financial Crisis Advisory Group (advisory group to the FASB and IASB) recommended a fair value model as an alternative to current loan loss accounting in its Final Report (to accelerate timely recognition of loan losses). More recently, in explaining the benefits of its proposal, FASB argues that fair value measurements allow more timely recognition of losses for financial instruments held for long term, including loans (FASB 2010).

Loan fair values[3] arguably provide more timely and forward-looking information than traditional measurements of loans. Fair values of financial instruments are supposed to reflect market values, which immediately incorporate changes in the market's expectation about future cash flows. Even when loan fair values are measured based on a model, which is usually the case for loans, fair values and traditional measurements of loans differ in how they assess credit risk information. For fair value measurements of loans, credit risk is estimated based on the *expected loss* model (SFAS 107, SFAS 157), while for traditional measurements of loans, credit risk is measured based on the *incurred loss* model (SFAS 5, SFAS 114). In estimating loan fair values, banks do not have to wait until the loans are actually impaired and the losses become probable, unlike in estimating traditional measurements of loans. Instead, bank managers are supposed to immediately incorporate changes in the expectations about future loan losses in estimating loan fair values. Thus, conceptually, fair value information is more timely and forward-looking than traditional measurements in reflecting credit risk information.

However, the timeliness, and thus the usefulness of information, is likely to be compromised through the actual implementation of fair value accounting in the case of loans. In practice, fair values of loans are usually banks' own estimates as loans are usually not actively traded on the market and thus are measured with a model based on banks' own assumptions (Barth, Beaver, and Landsman, 1996). Some argue that these estimates reveal information from management that might not otherwise surface (Penman 2007). If managers use such estimates to convey their private information about the quality of loans, the flexibility allowed in estimating loan fair values will improve relevance of financial reporting related to loans held for long term. But it also means that loan fair values can differ depending on a manager's outlook about the future and are subject to estimation errors or even manipulation by the management. The concern about the reliability of loans was highlighted when Paul Volcker, a former chairman of the Federal Reserve and the Economic Recovery Advisory Board, stated "I'm not in favor of fair valuing bank loans because we don't know their fair value anyway..." at the International Finance Forum (November, 2010).

In response to the reliability concern, proponents of fair value accounting sometimes argue that historical cost accounting also involves estimates and that estimating fair values is no different. However, the degree of subjectivity involved in determining fair value estimates versus that used in traditional measurements differs significantly. While allowances for loan losses under historical cost accounting involve managers' estimations about future loan losses, traditional measurements are more narrowly defined compared to fair value estimates of loans. As Penman (2007) points out, traditional measurements are based on, and audited against, historical transactions such as the historical experience with credit losses. This is different from speculating about the present value of future cash flows when loans are marked to model.

[3] Fair values are required to be measured at market prices if available. If market prices are not available, which is usually the case for loans, fair value estimates are measured based on a model. Banks usually use the discount cash flow model based on the expectation about future cash flows from loans and current interest rates for loans with similar characteristics as illustrated in SFAS 107.

Taken together, even though loan fair values are conceptually a more timely measure relative to traditional measurements of loans, whether loan fair values actually provide more relevant information about future loan losses is not obvious due to the questionable reliability of fair value estimates. How fair value accounting is actually implemented will determine the relative usefulness of fair values versus traditional measurements of loans. Implementation of fair value accounting is affected by managers' subjective biases, integrity, and the effectiveness of monitors such as auditors and corporate governance (Song, Thomas, Yi 2010). Thus, the question of whether loan fair values provide more relevant information about future loan losses cannot be answered conceptually. Rather, it requires an empirical evaluation. This leads to my first hypothesis:

H1: Loan fair value disclosures under SFAS 107 provide better information about future loan losses on a bank's loan portfolios over and above traditional cost-based disclosures.

3.3 Data Description

Table 3.3 contains descriptive statistics for variables used in testing the predictive ability of fair values versus carrying values of loans. All variables are winsorized at the extreme 1%. Net charge-offs of loans are 1.8% of gross loans during the credit crisis while they are 0.3% of gross loans during the earlier sample period. Mean nonperforming loans grew to 2.8% of gross loans from 0.9% of gross loans for the earlier sample period. However, net carrying values of loans during the credit crisis are not significantly different from net carrying values of loans during the earlier sample period. Mean fair values are not significantly different from mean carrying values during the credit crisis, while they are much higher than carrying values during the earlier sample period, indicating that interest rate changes affect fair values of loans to a large extent during the earlier sample period. In addition, standard deviation of loan fair values is much larger than that of loan carrying values, suggesting that loan fair values are more volatile than loan carrying values.

Table 3.3 Summary statistics for variables used in testing hypothesis 1

Period	Variable	Mean	STD	Q1	Median	Q3
2008 Credit crisis N=257	$CHOFF_{t+1}$	0.018	0.015	0.007	0.013	0.025
	NPA_t	0.028	0.023	0.011	0.022	0.038
	LN_BV_t	0.983	0.006	0.981	0.985	0.988
	LN_FV_t	0.986	0.038	0.979	0.992	1.006
1999-2007 Prior to credit crisis N=2,194	$CHOFF_{t+1}$	0.003	0.005	0.001	0.002	0.004
	NPA_t	0.009	0.009	0.003	0.006	0.011
	LN_BV_t	0.986	0.004	0.985	0.987	0.989
	LN_FV_t	0.995	0.018	0.984	0.992	1.003

Table 3.4 presents Pearson correlation between variables used in testing the first hypothesis. The above diagonal shows the correlation during year 2008 and the below diagonal contains the correlation during the earlier sample period of 1999-2007. Future net charge-offs are positively correlated with nonperforming loans for both periods. Both carrying values of loans and fair values of loans are negatively correlated with future charge-offs as expected and loan fair values have higher correlation.

Table 3.4 Pearson Correlation Matrix– variables used in testing hypothesis 1

Sample period of 2008 (above diagonal) and sample period of 1999-2007 (below diagonal). The correlation coefficient estimates are bolded if significant at 5% level.

	$CHOFF_{t+1}$	NPA_t	LN_BV_t	LN_FV_t
$CHOFF_{t+1}$	–	**0.547**	**-0.400**	**-0.699**
NPA_t	**0.450**	–	**-0.236**	**-0.587**
LN_BV_t	-0.016	0.024	–	**0.477**
LN_FV_t	**-0.282**	**-0.333**	**0.090**	–

Note: Definition of each variable is in Table 2.1.

3.4 Empirical Results

3.4.1 Main Results

The first hypothesis tests whether loan fair value disclosures under SFAS 107 better predict future credit losses in a bank's loan portfolio, compared with traditional cost-based disclosures.

Equation (1) is estimated separately for the periods prior to and during the recent credit crisis.

$$CHOFF_{t+1} = \alpha_0 + \alpha_1 NPA_t + \alpha_2 LN\_BV_t + \alpha_3 LN\_FV_t + \varepsilon_t \quad (1)$$

To control for macro factors, regressions are conducted separately for each year. Coefficients and t-statistics are presented separately for periods prior to the credit crisis and for periods during the credit crisis.

The top portion of Table 3.5, Panel A provides the regression results for the period during the credit crisis. The sign is expected to be negative for both fair values and carrying values since higher net values of loans indicate lower credit risk. The fair value estimates have incremental power in explaining future charge-offs of loans during the credit crisis. However, the relative explanatory power is much smaller for fair value estimates compared to nonperforming assets or reported carrying values.

To gauge the relative economic significance of each variable, I standardized coefficients based on the standard deviation of each variable. The resulting economic magnitudes are 0.215, -0.525, and -0.098 for nonperforming assets, book value of loans, and fair value estimates of loans, respectively. This suggests that one standard deviation change in fair value estimates explains less than 10% of one standard deviation change in future loan charge-offs.

Table 3.5 Fama-Macbeth regressions of future charge-offs of loans on current loan values and nonperforming assets. T-statistics are *in italics.*

$$CHOFF_{t+1} = \alpha_0 + \alpha_1 NPA_t + \alpha_2 LN\_BV_t + \alpha_3 LN\_FV_t + \varepsilon_t$$

Sample Period	**Intercept**	**NPA**	**LN_BV**	**LN_FV**	**Adj. R2**
Expected Sign		-	+	+	
	0.007	0.367			0.296
	5.83	*10.43*			
2008 Credit crisis N=257	1.711		-1.722		0.486
	15.76		*-15.59*		
	0.176			-0.161	0.156
	7.74			*-6.96*	
	1.411	0.140	-1.420		0.513
	10.74	*3.86*	*-10.69*		
	0.123	0.322		-0.115	0.372
	5.98	*9.40*		*-5.62*	
	1.327	0.144	-1.295	-0.040	0.518
	9.66	*4.00*	*-8.85*	*-1.98*	
Economic significance		0.215	-0.525	-0.098	
% of R^2 explained		9%	53%	2%	
	0.002	0.196			0.222
	4.38	*10.82*			
1999-2007 Prior to credit crisis N=2,194	0.396		-0.398		0.163
	4.36		*-4.36*		
	0.026			-0.023	0.010
	3.38			*-3.09*	
	0.285	0.159	-0.287		0.292
	4.14	*9.99*	*-4.14*		
	0.016	0.194		-0.015	0.225
	3.91	*10.63*		*-3.66*	
	0.287	0.159	-0.287	-0.002	0.291
	4.15	*9.92*	*-3.96*	*-0.41*	

Note: Definition of each variable is in Table 2.1.

In addition, I decomposed R^2 into components explained by each variable (Table 3.5). Only 2% of R^2 is explained by variation in loan fair values while 53%, 9%, and 36% of R^2 are explained by variation in loan book values, variation in nonperforming loans, and cross-correlation of each variable, respectively. Moreover, the joint significance of nonperforming assets implies that book values and fair value estimates of loans did not subsume readily available credit risk information embedded in nonperforming assets.

The bottom portion of Table 3.5 provides the Fama-MacBeth coefficients for the period prior to the credit crisis. When both book value and fair value estimates are used as independent variables along with nonperforming assets, the coefficient of the loan book values is -0.287 with t-statistics of -3.96, but the coefficient of the fair value estimates is not significantly different from zero. This result suggests that during periods of low aggregate loan defaults, fair value estimates do not provide information about future charge-offs incremental to traditional measurements of loans. Also, the significant coefficient for nonperforming assets indicates that both book value and fair value estimates failed to incorporate readily available information about the quality of loan portfolios.

3.4.2 Robustness Test

Since estimates of future loan losses reflected by loan loss allowances are realized over the remaining life of loans, the use of charge-offs measured over the next one year has only limited implications for whether loan loss allowances provide relevant information about future cash flow realizations. Therefore, I conduct an additional test using future charge-offs over the next 3 to 5 years as a dependent variable. The top portion shows the results when charge-offs are measured over the next 3 years and the bottom portion shows the results when charge-offs are measured over the next 5 years. Fama-MacBeth regression results in Table 3.6, show that loan fair values do not provide any incremental information about future charge-offs aggregated over the next 3 to 5 years to book values of loans during the sample period. The test is not conducted during period of the credit crisis due to data availability.

Additionally, panel regression results are shown in Table 3.7. The hypothesis concerns whether loan fair value disclosures under SFAS 107 provide incremental information about the future cash flows for a bank's loan portfolio, compared with traditional cost-based disclosures. The following regressions are employed where D_CC is a dummy variable indicating periods of credit crisis.

$$CHOFF_{t+1} = \alpha_0 + Macro\ Factors + \alpha_1 NPA_t + \alpha_2 LN\_BV_t + \alpha_3 LN\_FV_t + \alpha_4 NPA_t \cdot D\_CC + \alpha_5 LN\_BV_t \cdot D\_CC + \alpha_6 LN\_FV_t \cdot D\_CC + \varepsilon_t$$

Table 3.6: Fama-Macbeth regressions of future charge-offs of loans measured over future 3 to 5 years on current loan values and nonperforming assets. T-statistics are in parenthesis.

$$CHOFF_{t,\,t+3} = \alpha_0 + \alpha_1 NPA_t + \alpha_2 LN\_BV_t + \alpha_3 LN\_FV_t + \varepsilon_t$$

Sample Period	Dep. V'ble	N	LN_BV_t	LN_FV_t	NPA_t	Adj. R^2
1999~2006	$CHOFF_{t,\,t+3}$	1701	-0.757			0.091
			(-21.440)			
		1701		-0.058		0.007
				(-1.840)		
		1701	-0.563		0.334	0.167
			(-8.960)		(9.530)	
		1701		-0.049	0.412	0.131
				(-1.66)	(12.170)	
		1701	-0.518	-0.029	0.339	0.166
			(-10.360)	(-1.210)	(10.510)	
1999~2004	$CHOFF_{t,\,t+5}$	1318	-1.024			0.053
			(-11.230)			
		1318		-0.121		0.004
				(-1.180)		
		1318	-0.810		0.384	0.097
			(-4.780)		(3.180)	
		1318		-0.125	0.526	0.078
				(-1.260)	(5.630)	
		1318	-0.713	-0.102	0.390	0.099
			(-6.050)	(-1.210)	(3.210)	

Note: Definition of each variable is in Table 2.1.

Table 3.7 presents the panel regression results with controls for macroeconomic factors such as GDP growth, risk-free rate, and credit spread. While this method may not fail to control for macroeconomic factors exhaustively, the above equation enables statistically comparing the value of the coefficients across time periods. Top portion of Table 3.7 presents the regression results when level variables are used and bottom portion of Table 3.7 shows the regression results when change variables are used. Both level and change specifications of Table 3.7 show that fair value estimates explain future charge-offs strongly only during the credit crisis, whereas traditional allowances for loan losses explain future loan defaults during the entire sample period.

Table 3.7 Results from Regressions of Future Charge-offs of Loans on Current Loan Values and Nonperforming Assets. T-statistics are *in italics.* Standard errors are adjusted for two-way clustering at the firm and year levels.

$$CHOFF_{t+1} = \alpha_0 + Macro\ Factors + \alpha_1 NPA_t + \alpha_2 LN\_BV_t + \alpha_3 LN\_FV_t + \alpha_4 NPA_t \cdot D\_CC + \alpha_5 LN\_BV_t \cdot D\_CC + \alpha_6 LN\_FV_t \cdot D\_CC + \varepsilon_t$$

Panel A: Level specification

Variable	*Prediction*	*Coefficient*	*t-statistics*
Macro Factors			
GDP growth		-0.132	*-2.39*
10 year Tbill rate		-0.083	*-1.02*
Credit Spread		-0.006	*-2.42*
Credit risk estimation			
LN_BV	-	-0.217	*-3.92*
LN_FV	-	-0.007	*-0.63*
NPA	+	0.193	*4.54*
LN_BV * D_CC	?	-0.892	*-5.40*
LN_FV * D_CC	-	-0.044	*-3.74*
NPA * D_CC	?	-0.056	*-2.43*
Panel B: Change specification			
Intercept		0.006	*3.35*
Macro Factors			
GDP growth		-0.053	*-1.93*
ch 10 year Tbill rate		0.004	*0.05*
Credit Spread		0.000	*0.36*
Credit risk estimation			
LN_BV	-	-0.044	*-0.44*
LN_FV	-	-0.000	*-0.02*
NPA	+	0.254	*3.11*
LN_BV * D_CC	?	-1.172	*-8.86*
LN_FV * D_CC	-	-0.084	*-10.78*
NPA * D_CC	?	-0.039	*-0.49*

Chapter 4

Do firms manipulate their estimates of loan fair values?

4.1 Prior Literature by Nissim (2003) Testing Reliability of Loan Fair values

Using the earlier sample period of 1994-1995, Nissim (2003) investigates whether banks manage fair value disclosures of loans and finds that banks with lower regulatory capital and higher credit losses were more likely to overstate their fair value estimates of loans. His methodology is different from that in this study. The most difficult part in detecting manipulation of loan fair values would be to control for the nondiscretionary or intrinsic values of loans. Especially interest rate effect in determining intrinsic values is likely to be measured with considerable errors due to variation in loan maturity and in the portion of fixed versus floating rate loans across banks.

To circumvent the problem of measurement errors, Nissim (2003) uses the Multiple Indicators Multiple Causes model (Goldberger 1972) and attempts to reduce errors in measuring intrinsic values of loans by extracting information about intrinsic values from the market value of common equity. Depending on stock prices in inferring intrinsic values of loans has only limited implication due to information asymmetry between managers and investors and due to the possibility of market inefficiency. Prior research has documented a number of situations where the market efficiency assumption does not hold (Hirshleifer and Teoh 2003, Sloan 1996). More practical assumption would be that the market cannot completely undo the discretion from the fair value disclosures of loans, thus motivating bank managers' manipulation of loan fair values.

My study focuses on the credit crisis which provides a unique setting where determinants of intrinsic values of loans are less susceptible to measurement errors. As discussed before, interest rate effect in determining loan fair values is subject to considerable measurement errors due to variation in loan maturity and the portion of fixed versus floating rate loans across banks. However, interest rate effect was naturally controlled during the credit crisis because loan fair values were mainly determined by variation in credit risk which is credibly proxied by nonperforming loans. Hence, I directly control intrinsic values of loans using variables such as nonperforming loans, loan charge-offs, and interest rate of loans without depending on stock prices of banks. Also, the power of test is likely to be greater during the credit crisis because

many banks became financially distressed, thereby providing incentives for managers to manipulate their fair value measurements.

Nissim (2003) finds that banks with low regulatory capital and high credit losses overstated their fair value estimates of loans. These incentives significantly affecting management of loan fair values in his study differ from incentive variables that I find significant results due to differences in methodology and sample period. Most notably, he finds that changes in credit losses have significantly positive relation with fair values of loans. He interprets this result as large credit losses providing managers with incentives to manipulate loan fair values. However, credit losses can be also interpreted as reflecting credit risk of loans, and thus, intrinsic values of loans. If credit losses capture intrinsic values of loans, they are expected to be negatively related with loan fair values. In his study, he finds positive relation between fair values and the level of credit losses while finding negative relation between fair values and changes in credit losses. It is not obvious why change specification capture the incentives and level specification captures the intrinsic values. My research finds negative relation between loan fair values and credit losses for both level and change specifications, implying that credit losses explain intrinsic credit risk of loans during the sample period of this study.

Nissim is the first to find evidence that firms manipulate fair value disclosures of loans under SFAS 107. The second hypothesis in my study investigates the same question, but my research benefits from focusing on the recent credit crisis in that the period enables more effectively controlling for the intrinsic values of loans as discussed before.

4.2 Hypothesis Development

As previously discussed, loan fair values are generally banks' own estimates since loans are not usually actively traded on the market. Thus, fair value estimates contain intentional and unintentional errors. Given the expectation of measurement errors in fair value estimates, this paper investigates whether these estimates show a systematic pattern that banks are more likely to manipulate fair values if the benefit of doing so is greater. Managers benefit from such manipulation as market participants use fair value information of loans in evaluating commercial banks (Barth et al. 1996) and the discretionary amount is difficult to undo due to lack of verifiability for the reasons discussed below.

First, loan fair values are difficult to verify since input used to estimate loan fair values is usually unobservable. Fair value estimation for loans involves multiple dimensions, such as assumptions as to uncertainty over future cash flows, interest rates, prepayment risks, and other market conditions. As each loan has unique characteristics, the benchmark for these assumptions is not directly available in the market and subject to managerial assessment. Naturally, when input is unobservable, it is more difficult to verify.

Second, loan fair value estimates are affected by both assumptions about future cash flows due to loan defaults (numerator effect) and interest rates (denominator effect). But *ex post*, what investors actually observe is only cash flow realizations as the changes in market interest rates just cause temporary fluctuations in fair values for loans held long term. Hence, even though fair value estimates are not realized *ex post*, the mismatch between the estimates and their realization can be attributed to other factors such as interest rate effect and other market conditions. This makes loan fair value estimates more difficult to falsify *ex post*.

Third, loan fair values are difficult to verify because there is no readily available reference point about what is normal. While allowances for loan losses for traditional measurements also involve estimation, they are based on and audited against the historical experience with credit losses (Penman 2007). However, for loan fair values, it is hard to know what is normal because loan fair values are more forward looking measurements and involve more active anticipation about the future. These factors together make loan fair values difficult to verify. Thus, I hypothesize that bank managers are more likely to misuse fair value estimates of loans when the resulting benefit of manipulation is greater.

Managers may manipulate fair value disclosures of loans to affect the market's assessment of a firm's risk and performance (Nissim 2003). An additional incentive to manipulate loan fair values is to conceal the manipulation of carrying values of loans. Prior studies have examined and found evidence of managerial discretion with respect to banks' loan loss provisions and allowances motivated by earnings and/or capital adequacy management (Moyer, 1990; Wahlen, 1994; Collins, Shackelford, and Wahlen, 1995; Beaver and Engel, 1996; Ahmed, Takeda, and Thomas, 1999). Earnings and regulatory capital are not affected by loan fair values since fair value estimates are only disclosed in footnotes and not recognized on balance sheets. However, when banks manage carrying values of loans to boost earnings or regulatory capital, they will likely manipulate fair value estimates as well since a large gap between the two estimates may draw attention from investors and regulators. Thus, I expect that the benefit of manipulating loan fair values is greater for firms with lower earnings and lower capital.

There is a growing body of anecdotal evidence suggesting that banks did manipulate both the fair values and book values of loans during the recent credit crisis. For example, Corus Bankshares' nonperforming loans grew from $436 million (10% of total loans) at the end of 2007 to $2,619 million (71% of total loans) by the end of the second quarter of 2009, shortly before that bank was closed. Subsequently, equity in Corus Bankshares was exhausted by loan losses during the credit crisis and the institution filed for bankruptcy in September 2009. However, both the fair value and book value estimates of loans were more than three times the total performing loans right before its bankruptcy. This example highlights the possibility that both fair values and book values of troubled banks suffer from a serious lack of timeliness in reflecting loan default risks.

My study focuses on a specific period of the credit crisis to test the manipulation of banks' fair value estimates of loans. The credit crisis provides a more powerful setting in testing the

manipulation of loan fair values. The greatest challenge in detecting manipulation of fair value estimates would be to separate out the nondiscretionary or intrinsic portion of loan values.

Controlling for the nondiscretionary portion of loans was easier during the credit crisis since extraneous factors affecting the intrinsic values of loans other than credit quality information were naturally controlled during this period. Fair value estimates incorporate changes in market interest rates as well as changes in credit default risks. However, it is difficult for investors to reliably separate market interest rate effects and credit default risk effects from loan fair value disclosures. This is because the sensitivity of fair values to changes in market interest rates differs substantially across firms depending upon the characteristics of the loans each firm holds. For example, interest rate changes affect fair values for fixed rate loans, but do so much less for floating rate loans. However, this was less of a concern during the recent credit crisis since variation in fair values ware dominated by credit quality information during this period. Thus, I conduct a test to investigate the following hypothesis separately for the period leading up to and during the credit crisis:

H2: Firms with lower earnings and lower capital level overstate their fair value estimates of loans.

4.3 Data Description

Table 4.3 contains descriptive statistics for variables used in testing manipulation of fair values of loans. All variables are winsorized at the extreme 1%. Mean nonperforming loans are to 4.2% of gross loans during the sample period of 2008-2009 while they were only 0.9% of gross loans for the earlier sample period. Mean fair values are lower than mean carrying values during the credit crisis, while they are higher than carrying values during the earlier sample period. Not surprisingly, profitability of banks measured by ROE before loan loss provisions is much lower during the sample period of 2008-2009 than the earlier sample period. In addition, capital level before deducting allowances for loan losses are lower during the sample period of 2008-2009 than the earlier sample period.

Table 4.3: Summary Statistics – variables used to test hypothesis 2

Period	Variable	Mean	STD	Q1	Median	Q3
Credit crisis	*Gross Loan*	13396.39	75420.60	676.20	1328.33	3512.05
2008-2009	*LN_BV*	0.980	0.009	0.976	0.983	0.987
N= 507	*LN_FV*	0.977	0.040	0.967	0.987	0.999
	RLNS	0.076	0.013	0.067	0.074	0.081
	NPA	0.042	0.037	0.016	0.032	0.054
	Δ CHOFF	0.008	0.010	0.002	0.004	0.011
	Loan Growth	0.041	0.141	-0.039	0.032	0.092
	LN/TD	0.905	0.141	0.817	0.912	0.995
	BVE_PreALL	0.095	0.024	0.080	0.093	0.112
	ROE_PrePROV	0.099	0.193	0.066	0.139	0.193
1999-2007	*Gross Loan*	5712.330	22321.410	405.111	876.438	2463.430
	LN_BV	0.986	0.004	0.985	0.987	0.989
N=2,090	*LN_FV*	0.995	0.019	0.984	0.992	1.003
	RLNS	0.096	0.022	0.081	0.091	0.107
	NPA	0.009	0.009	0.003	0.006	0.011
	Δ CHOFF	0.000	0.003	-0.001	0.000	0.001
	Loan Growth	0.151	0.182	0.049	0.112	0.202
	LN/TD	0.868	0.161	0.768	0.882	0.969
	BVE_PreALL	0.098	0.022	0.084	0.096	0.109
	ROE_PrePROV	0.218	0.090	0.167	0.215	0.265

Note: Definition of each variable is in Table 2.1.

Table 4.4: Pearson Correlation Matrix– variables used in testing hypothesis 2

Sample period of 2008-2009 (above diagonal) and sample period of 1999-2007 (below diagonal). The correlation coefficient estimates are bolded if significant at 5% level.

	LN_BV	*LN_FV*	*RLNS*	*NPA*	*Δ CHOFF*	*Loan Growth*	*LN/TD*	*BVE_ PreALL*	*ROE_ PrePROV*
LN_BV	–	**0.536**	**0.209**	**-0.658**	**-0.555**	**0.407**	0.039	**0.127**	**0.193**
LN_FV	**0.087**	–	**0.169**	**-0.344**	**-0.388**	**0.255**	-0.003	-0.010	**0.120**
RLNS	**-0.119**	**0.064**	–	**-0.217**	**-0.262**	**0.161**	**-0.388**	-0.029	**0.107**
NPA	**-0.331**	0.016	**0.081**	–	**0.468**	**-0.370**	**-0.102**	**-0.294**	**-0.350**
Δ CHOFF	0.009	**0.040**	**0.091**	**0.105**	–	**-0.295**	0.003	**-0.154**	**-0.241**
Loan Growth	**0.174**	**-0.040**	**0.131**	**-0.210**	**0.080**	–	**0.151**	0.027	**0.256**
LN/TD	**0.109**	-0.021	**-0.466**	**0.043**	**0.076**	**0.090**	–	0.069	0.039
BVE_PreALL	**-0.179**	-0.015	**-0.128**	**0.046**	-0.020	-0.033	**0.081**	–	**0.279**
ROE_PrePROV	**-0.076**	**0.079**	**0.131**	**-0.131**	**0.078**	**0.085**	**0.063**	**-0.297**	–

Note: Definition of each variable is in Table 2.1.

4.4 Empirical Results

The second hypothesis concerns whether banks manipulate fair value estimates of their loan portfolios in the same way that they manage reported carrying values. More specifically, the hypothesis tests whether financially distressed firms with lower earnings, lower capital, and higher liquidity constraint overstate their loan fair values.

Since managers have limited discretion over nonperforming assets (NPA), I used the amount of nonperforming assets to control for credit risk information embedded in the intrinsic value of loans. To gauge the validity of nonperforming assets as a proxy for credit default risk and to test what portion of nonperforming assets is actually realized as future charge-offs, I tested the following regression:

$$CHOFF_{t,\,t+n} = \alpha_0 + \alpha_1 NPA_t + \varepsilon_t \qquad (3)$$

Table 4.5 Fama-Macbeth regressions of future charge-offs of loans measured over future N years on current nonperforming assets. T-statistics are *in italics*.

$CHOFF_{t,\,t+n} = \alpha_0 + \alpha_1 NPA_t + \varepsilon_t$

Dependent Variable	N	Intercept	NPA_t	Adj. R^2
$CHOFF_{t,\,t+1}$	5,351	0.014	0.178	0.309
		22.010	*48.960*	
$CHOFF_{t,\,t+3}$	3,910	0.062	0.382	0.154
		30.700	*26.660*	
$CHOFF_{t,\,t+5}$	2,732	0.145	0.447	0.074
		32.260	*14.820*	
$CHOFF_{t,\,t+6}$	2,244	0.196	0.519	0.062
		30.490	*12.170*	
$CHOFF_{t,\,t+7}$	1,813	0.258	0.604	0.055
		28.180	*10.340*	
$CHOFF_{t,\,t+8}$	1,437	0.339	0.619	0.042
		26.580	*8.010*	
$CHOFF_{t,\,t+9}$	1,098	0.436	0.577	0.026
		23.420	*5.500*	
$CHOFF_{t,\,t+10}$	794	0.532	0.508	0.017
		20.340	*3.830*	

Note: Definition of each variable is in Table 2.1.

The above regression tests what portion of nonperforming assets is actually realized as future charge-offs aggregated over *n* years. Table 4.5 shows the results. The coefficient of current nonperforming assets increases as the aggregation period increases. The t-statistics are significant for all aggregation periods, and nonperforming assets seem to be a valid proxy for firm-level future loan defaults.

To test the reliability of fair value estimates of loan portfolios, the following regressions are conducted:

$$LN\_FV_t = \alpha_0 + \alpha_1 RLNS_t + \alpha_2 NPA_t + \alpha_3 \Delta CHOFF_t + \alpha_4 Loan\ Growth_t + \alpha_5 LN/TD_t + \alpha_6 BVE\_PreALL_t + \alpha_7 ROE\_PrePROV_t + \varepsilon_t \quad (4)$$

To proxy for the nondiscretionary portion of fair value estimates, effective interest rates of loans (RLNS), nonperforming assets (NPA), increases in loan charge-offs (*ΔCHOFF)*, and loan growth rates are controlled. Liquidity risk (LN/TD), equity level before deducting allowances for loan losses (*BVE_PreALL),* and return on equity before deducting loan loss provisions are used as incentive variables.

Table 4.6 provides the results for the test of whether financially distressed firms manipulate fair value disclosures of loans. This result indicates that financially distressed firms with lower earnings and lower capital tended to overstate their loan fair values during the credit crisis, which is consistent with my hypothesis.

The following equation is used to test whether firms manipulate their carrying values of loans for earnings or capital management. Variables capturing credit risk information such as nonperforming assets and changes in charge-offs are controlled to capture the nondiscretionary portion of loan values. However, other control variables used in testing loan fair values such as effective interest rates of loans and loan growth are not used in testing the manipulation of book values since the book values of loans are supposed to reflect credit risk information only.

$$LN\_BV_t = \alpha_0 + \alpha_1 NPA_t + \alpha_2 \Delta CHOFF_t + \alpha_3 LN/TD_t + \alpha_4 BVE\_PreALL_t + \alpha_5 ROE\_PrePROV_t + \varepsilon_t \quad (5)$$

Consistent with prior research, I find that banks overstated their book value of loans if they have lower earnings and lower capital (Table 4.7). Manipulation of reported carrying values is likely to work as an incentive to manipulate fair value estimates of loans to avoid attention from regulators and investors.

Table 4.6 Fama-Macbeth regressions of fair value estimates of loans on incentive variables. T-statistics are *in italics*.

$$LN\_FV_t = \alpha_0 + \alpha_1 RLNS_t + \alpha_2 NPA_t + \alpha_3 \Delta CHOFF_t + \alpha_4 Loan\ Growth_t + \alpha_5 LN/TD_t + \alpha_6 BVE\_PreALL_t + \alpha_7 ROE\_PrePROV_t + \varepsilon_t$$

		2008-2009 (N=507)		**1999-2007 (N=2189)**	
Variable	Sign	Coefficient	t-statistics	Coefficient	t-statistics
Intercept	?	1.023	*32.25*	0.975	*163.24*
RLNS	+	0.036	*0.12*	0.121	*2.78*
NPA	-	-0.245	*-37.90*	-0.135	*-1.71*
Δ CHOFF	?	-1.159	*-2.08*	-0.083	*-0.38*
Loan Growth	-	0.035	*1.23*	-0.002	*-0.65*
LN/TD	+	-0.012	*-0.86*	0.011	*3.96*
BVE_PreALL	-	**-0.188**	***-1.76***	0.004	*0.23*
ROE_PrePROV	-	**-0.006**	***-3.14***	0.002	*0.63*
R-square		0.189		0.030	

Note: Definition of each variable is in Table 2.1.

Table 4.7 Fama-Macbeth regressions of book value estimates of loans on incentive variables. T-statistics are *in italics*.

$$LN\_BV_t = \alpha_0 + \alpha_1 NPA_t + \alpha_2 \Delta CHOFF_t + \alpha_3 LN/TD_t + \alpha_4 BVE\_PreALL_t + \alpha_5 ROE\_PrePROV_t + \varepsilon_t$$

		2008-2009 (N=507)		**1999-2007 (N=2189)**	
Variable	*Sign*	*Coefficient*	*t-statistics*	*Coefficient*	*t-statistics*
Intercept	?	0.993	*2008.69*	0.992	986.64
NPA	-	-0.131	*-20.44*	-0.141	-8.33
Δ CHOFF	?	-0.281	*-3.80*	0.058	0.58
LN/TD	+	-0.003	*-3.88*	0.003	6.82
BVE_PreALL	-	**-0.020**	***-1.85***	**-0.046**	**-7.57**
ROE_PrePROV	-	**-0.002**	***-1.80***	**-0.010**	**-3.02**
R-square		0.482		0.247	

Note: Definition of each variable is in Table 2.1.

Chapter 5

Conclusion

This paper investigates the extent to which fair value disclosures under SFAS 107 provide relevant information about the future cash flows on banks' loan portfolios. The FASB's stated purpose in mandating these disclosures is to provide investors with more relevant information regarding firms' future cash flows. This paper evaluates whether the FASB's assumption is valid for the case of loan portfolios. To explore this question, I compare fair value estimates of loans disclosed in footnotes with traditional measurements of loans reported on the balance sheets for the sample period from 1999 to 2009 and reports three main findings during the recent credit crisis.

First, fair values had lower ability in predicting future loan losses compared to traditional measurements of loans. Second, financially distressed banks overstated both the fair values and the carrying amounts of their loan portfolios. Finally, fair values of loans in the aggregate lagged considerably behind the market values of loans during the credit crisis.

Overall, my results suggest that fair value disclosures of bank loan portfolios contain relatively less information about future cash flows because disclosed fair values are measured unreliably and they suffer from a similar lack of timeliness as reported carrying values. While fair value measurements are conceptually superior in measuring the underlying economics of loans, actual implementation of fair valuing loans is difficult in the absence of benchmark market prices. As a result, the role of fair value information as an early warning system for loan defaults was only marginal even during the recent credit crisis and fair valuing loans is insufficient to achieve FASB's intended purpose of providing better information about future cash flows of firms.

This research attempts to provide insights to standard setters on where to draw the line when considering the tradeoff between relevance and reliability, because without sufficient reliability, the additional relevance of loan fair values will only be marginal. The lack of reliability of loan fair values is an implementation issue. As Maines and Wahlen (2006) suggest, the reliability of accounting measurements can be enhanced by requiring managers to make judgments and estimates that more closely match the underlying economics of loans.

For this, accounting standards should provide more specific guidance on the underlying assumptions used for measuring loan fair values. Also the standards should require firms to make their estimates more transparent to outsiders by providing more thorough disclosure about the underlying economic assumptions on which the fair value measurements are based. In this respect, the role of corporate governance and auditor are important in improving the reliability of

loan fair values. Recent announcement by the FASB requiring more disclosures about credit risk information of bank loan portfolios is a step in the right direction. Future research may explore whether fair value disclosures of loans are more reliable and informative about future loan losses with stronger corporate governance.

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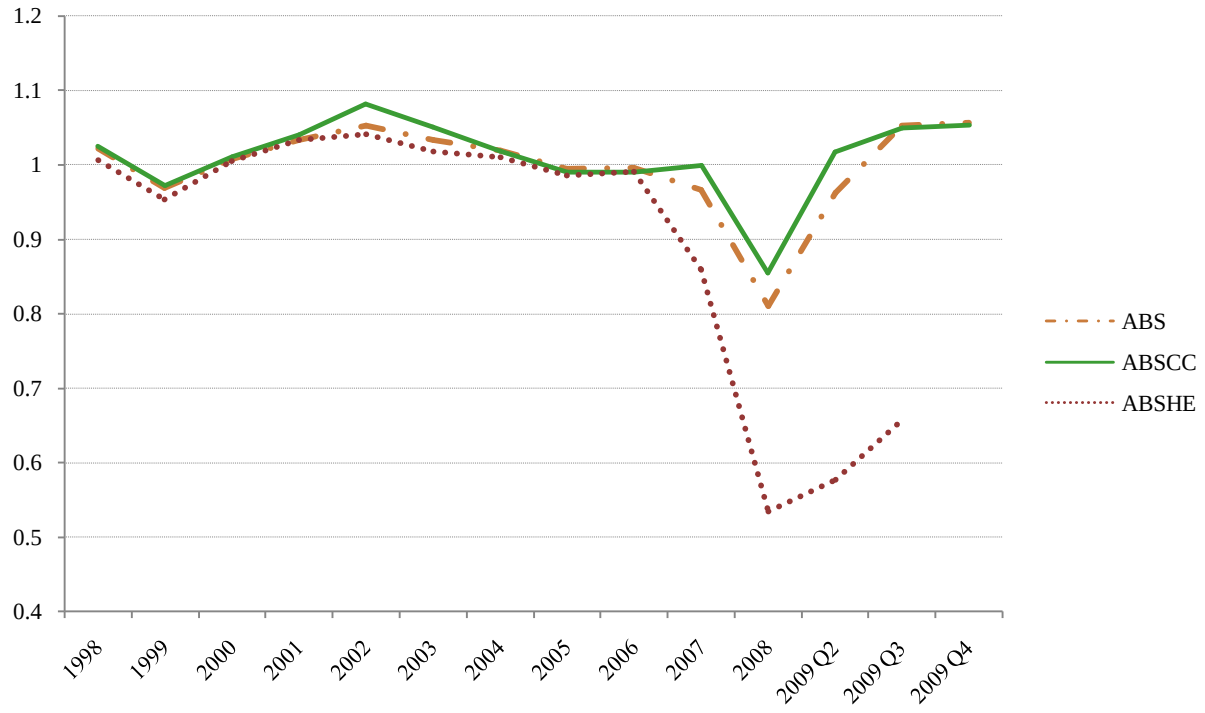
Appendix A: Time-series pattern of market indices of securities backed by loans

I use the time-series pattern of the market index of securities, backed by loans, to examine the timeliness of aggregate loan fair values in reflecting market values across sample periods. Recent research by Vyas (2009) employs credit indices to test the timeliness of accounting write-downs, including loan loss impairments during the financial crisis. This approach has only limited implications since the types and the characteristics of underlying loans in the market index are likely to differ from those of loans held by banks.

As suggested in the following figure, regardless of the loan types that are securitized, all of these indices show similar time-series patterns and are highly correlated with one another. Hence, I use the time-series pattern rather than magnitude of these indices as a proxy for loan market values. Among these indices, I choose the Barclays' index of securities, backed by a combination of credit card, mortgage, and auto loans (ABS index), of which the composition resembles that of loans that commercial banks typically hold.

Figure: Time-series pattern of indices backed by different types of loans.



Asset Backed Securities, Home Equity (ABSHE):
BARCLAYS' index of securities backed by home equity loans (investment grade)

Asset Backed Securities, Credit Card (ABSCC):
BARCLAYS' index of securities backed by credit card loans (investment grade)

Asset Backed Securities (ABS):
BARCLAYS' index of securities backed by composition of home equity loans, credit card loans and auto loans (investment grade)

Appendix B: Related rules

FAS 107. Disclosure about fair value of financial instruments

Effective Dates:	For fiscal years ending after December 15, 1992
Scope :	Requires all entities to **annually disclose the fair value of financial instruments**, both assets and liabilities **recognized and not recognized** in the statement of financial position.
Estimation of Fair Value:	**Quoted market prices**, if available. If not available, estimate fair value based on the quoted **market price of a financial instrument with similar characteristics or on valuation techniques** (for example, the present value of estimated future cash flows using a discount rate commensurate with the risks involved, option pricing models, or matrix pricing models). **Deleted by FAS 157, paragraph E14(e)**
Disclosure	Disclose either in the body of the financial statements or in the accompanying notes. Present fair value with the related carrying amount. Disclose the method(s) and significant assumptions used to estimate the fair value of financial instruments.
Encouraged disclosure about market risk:	Entity is encouraged, but not required to disclose quantitative information about the market risks of financial instruments that is consistent with the way it manages or adjusts those risks.

FSP FAS 107-1. Interim Disclosures about Fair Value of Financial Instruments

Effective Dates:	For interim reporting periods ending after June 15, 2009, with early adoption permitted for periods ending after March 15, 2009.
Scope:	**Amendment to Disclosure Requirements of Statement 107** Require disclosures about fair value of financial instruments for interim reporting periods of publicly traded companies

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FAS 114.Accounting by Creditors for Impairment of a Loan

Scope:	Specifying how allowances for credit losses related to certain loans should be determined. Applied to all loans that are individually and specifically evaluated for impairment
Recognition of impairment:	Impaired when, based on current information and events, it is probable that a creditor will be unable to collect all amounts due according to the contractual terms of the loan agreement. A loan is not impaired during a period of delay in payment if the creditor expects to collect all amounts due including interest accrued at the contractual interest rate for the period of delay.
Measurement of Impairment	(1) present value of expected future cash flows discounted at the loan's **effective interest rate** (the rate of return implicit in the loan, that is, the contractual interest rate) (2) measure impairment based on a loan's observable market price, or (3) the fair value of the collateral if the loan is collateral dependent. (4) fair value of the collateral when foreclosure is probable.
Recognition of impairment	By creating a valuation allowance with a corresponding charge to bad-debt expense or by adjusting an existing valuation allowance for the impaired loan with a corresponding charge or credit to bad-debt expense.
Effective date:	For fiscal years beginning after December 15, 1994.

FAS 5.Accounting for Contingencies

Scope:	Large groups of smaller-balance homogeneous loans that are collectively evaluated for impairment.
Collectability of receivables	If it is probable that the enterprise will be unable to collect all amounts due according to the contractual terms of the receivable. Whether the amount of loss can be reasonably estimated will normally depend on, among other things, the experience of the enterprise, information about the ability of individual debtors to pay, and appraisal of the receivables in light of the current economic environment.

EITF Abstracts No. D-80. Application of FASB Statements No. 5 and No. 114 to a Loan Portfolio

Type of loans accounted under FAS 114 vs. FAS 5	Accounted under FAS 114: Loans that are specifically identified for evaluation may be individually impaired. Accounted under FAS 5: Large groups of smaller-balance homogeneous loans that are collectively evaluated for impairment.

FAS 157-4. Determining fair value in exceptional situation

Determining fair value when the volume and level of activity for the asset or liability have significantly decreased and identifying transactions that are not orderly (April 2009)

Firms should evaluate factors to determine whether there has been a significant decrease in the volume and level of activity for the asset or liability. One of the factors: there is a significant increase in implied liquidity risk premiums, yields, or performance indicators (such as delinquency rates or loss severities) for observed transactions or prices when compared with the reporting entity's estimate of expected cash flows, considering all available market data about credit and other nonperformance risk for the asset or liability. If the reporting entity concludes that there has been significant decrease in the volume and level of activity, a significant adjustment to the transactions or quoted prices may be necessary to estimate fair value in accordance with 157.

FAS 157. Fair value measurements

	Defines fair value, establishes a framework for measuring fair value in generally accepted accounting principles (GAAP), and expands disclosures about fair value measurements
Definition of fair value:	The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.
Fair value hierarchy:	The fair value hierarchy gives the highest priority to quoted prices (unadjusted) in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). In some cases, the inputs used to measure fair value
Level 1 inputs	Quoted prices (unadjusted) in active markets for identical assets or liabilities that the reporting entity has the ability to access at the measurement date.
Level 2 inputs	a. Quoted prices for similar assets or liabilities in active markets b. Quoted prices for identical or similar assets or liabilities in inactive markets, c. Observable inputs other than quoted prices for the asset or liability.
Adjustments to level 2 inputs	Adjustments to Level 2 inputs will vary depending on factors specific to the asset or liability. Those factors include the condition and/or location of the asset or liability, the extent to which the inputs relate to items that are comparable to the asset or liability, and the volume and level of activity in the markets within which the inputs are observed.
Level 3 inputs	Unobservable inputs for the asset or liability. Unobservable inputs shall be used to measure fair value to the extent that observable inputs are not available.
Relation with FAS 107	This Statement encourages entities to combine the fair value information disclosed under this Statement with the fair value information disclosed under other accounting pronouncements, including FASB Statement No. 107, Disclosures about Fair Value of Financial Instruments, where practicable.