When a Loss is More Than Just a Loss: The Market Pricing of Other-Than-Temporary Impairments

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Abstract: When the fair value of an investment security falls below amortized cost and there is significant doubt that the firm can hold the security until the fair value recovers, managers must recognize an other-than-temporary impairment (OTTI) in net income. Thus, OTTIs represent managers' attempts to distinguish more certain from less certain losses. We find that the distinctions between more and less certain losses made by commercial bank managers during the financial crisis were informative to investors. Investors were unable to fully anticipate quarterly OTTI charges, and priced OTTIs incrementally to reported fair value gains/losses. We also find that the recent OTTI bifurcation rule isolated a useful component of OTTIs for investors. Our results suggest that investors do not assign the same valuation multiple to all types of unrealized security losses, even though unrealized losses are commonly thought of as transitory items. The results inform recent standard-setting initiatives to expand disclosure about the reasons for changes in fair value.

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I. INTRODUCTION

The Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) have the shared long-term objective of expanding fair value accounting for financial instruments.[1] In a strict fair value accounting system, the balance sheet is the primary financial statement and net income is derived from the change in the fair value of net assets during the period. Thus, strict fair value accounting for financial instruments would recognize all unrealized gains and losses in net income in the period in which they occur. Under current U.S. rules, only trading securities are subject to strict fair value accounting. For other securities, unrealized gains do not affect net income, and unrealized losses affect net income only when there is significant doubt that the firm can hold the security until the price recovers. The resulting income statement charge is called an "other-than-temporary impairment" (OTTI), and represents an attempt to distinguish more certain from less certain losses.

Some standard setters prefer stricter forms of fair value accounting that would recognize more unrealized gains and losses on the income statement. Such an expansion of fair value accounting would blur the distinction between more and less certain losses unless managers provide supplemental disclosures. In this study we examine whether managers' distinctions between more and less certain losses are informative to investors. The results may help standard setters understand the consequences of expanding fair value accounting and the potential benefits of supplemental disclosure about the nature of fair value changes.

In recent years, the FASB and IASB have intensified their efforts to expand fair value accounting, and are contemplating what impairment, presentation, and disclosure practices to mandate in an expanded fair value accounting regime (see FASB 2010a; FASB 2008, 3; and

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[1] The boards describe the objective as follows: "One long-term objective is to require that all financial instruments be measured at fair value with realized and unrealized gains and losses recognized in the period in which they occur" (FASB 2005).

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IASB 2008, 60). Separately, the boards have undertaken a financial statement presentation project that would require a special section on the income statement for fair value remeasurements, and would require footnote disclosure to "place the remeasurement information in context" (FASB 2010b, ¶ 242). Our results may be helpful to standard-setters in shaping the impairment, presentation, and disclosure requirements. The debate over how much to expand fair value accounting is decades old, and the current proposals are controversial; in short, the debate will continue. Beyond informing the current proposals, this study provides insight on the fundamental issues of how investors perceive reported changes in fair value and how investors use disclosures that provide an indication of certainty regarding value changes.

The distinction between more and less certain losses conveyed by OTTIs may not be meaningful to investors because designating a decline in value as an OTTI is subject to a high degree of manager judgment and discretion. Managers' attempts to manage the information conveyed in the financial statements, their biases, or their inability to forecast market price movements may render the OTTI distinction useless. Even if OTTI judgments are sound, they might not be informative to investors because OTTIs often are not recorded until security values have been depressed for several periods. Finally, nvestors may be able to infer relatively certain losses without relying on OTTIs by analyzing the firm's fair value disclosures and external market conditions. On the other hand, OTTIs may be meaningful because they inform investors about the precision of unrealized gains and losses. In addition, OTTIs may reveal relatively certain losses elsewhere in the portfolio that have yet to be designated as OTTIs. Finally, OTTIs may useful because they help investors distinguish between naturally hedged and non-hedged losses on securities.

In addition to examining the usefulness of OTTIs as a whole, we examine the usefulness of OTTI components following a rule change in 2009 that required managers to separate the

portion of OTTIs due to credit losses from the portion due to other factors like market illiquidity. Evidence on how investors price the credit and non-credit OTTI components is relevant to the FASB's and IASB's proposed new approach to financial instrument impairment. Under the new approach, impairment charges are driven by declines in expected cash flows rather than by the difference between fair value and amortized cost, which reflects both declines in expected cash flows and market illiquidity (FASB 2010a, ¶ IG108). If investors believe managers' judgments about the credit and non-credit portions of the OTTIs, investors should price the credit portion more negatively than the non-credit portion because the credit portion has a lower chance of recovery. On the other hand, distinguishing credit from non-credit losses can be highly subjective, potentially rendering the distinction useless to investors.

Using a sample of commercial banks during the financial crisis, we find that investors relied on managers' OTTI designations. We find statistically significantly negative stock price reactions when banks warn about OTTIs at times other than their earnings announcement dates. We also find that stock prices react to OTTI charges around 10-Q/10-K filing dates and that information in past 10-Q/10-K filings help investors predict future OTTIs. Using multiple regression analyses, we find that OTTIs explain stock returns incrementally to reported fair value gains/losses, suggesting that investors weigh OTTI losses more heavily than other unrealized gains/losses. Results indicate that investors weigh OTTIs more heavily because they inform not only about the certainty of the losses that are designated as OTTI, but also about the certainty of other unrealized losses in the portfolio. Finally, it appears that investors reliably price only the credit loss portion of OTTIs, not the portion related to market illiquidity.

Our results suggest that disclosures about the certainty of unrealized losses are worth preserving in an expanded fair value accounting regime. The results are important because the informational value of OTTIs may be underappreciated by standard setters. For example, in

2010 the FASB proposed a rule that would recognize all unrealized gains and losses on equity securities in net income with no requirement to distinguish relatively certain losses as a supplemental disclosure (FASB 2010a). Our results may also help standard setters tailor disclosure requirements; standard setters can require firms to disclose a host of information about changes in fair value, but expansive disclosures may be costly to prepare and difficult for investors to process. For example, aside from OTTI-related disclosures about the certainty of unrealized losses, standard setters could require preparers to segregate interest income from other changes in fair value, segregate credit from non-credit losses, or disaggregate fair value changes by instrument type, fair value hierarchy level, or business purpose (IASB 2010, 60). Evidence about the informational benefits of OTTIs may aid standard setters in designing the optimal set of required fair value disclosures. Finally, our results from the credit versus non-credit OTTI tests suggest that an impairment model that focuses on credit losses will provide investors with the information they desire for assessing the certainty of losses. Thus, our results support the FASB's and IASB's choice of credit losses as the basis for the newly proposed impairment model.

Our study also adds to the understanding of the usefulness of fair value accounting information during the financial crisis. During the crisis the banking industry complained that OTTI charges did not reflect the underlying creditworthiness of the securities because the charges included illiquidity discounts that the banks would not bear if they continued to hold the securities and collect the contractual cash flows. Our results indicate that investors largely agreed with the banking industry's position; investors priced only the credit portion of OTTIs after banks began to separate the non-credit portion.

Finally, viewing OTTI as a label that is applied to a point estimate of an unrealized loss to convey certainty, this study is one of the few to examine an accounting convention that

conveys information about the variance around a point estimate. Our results indicate that investors rely on managers' judgments about the variance of unrealized losses, which is evidence in favor of expanding disclosures about variance and uncertainty.

In the next section, we provide a review of the applicable standards and academic literature. Section III explains research objectives. Sections IV and V describe the sample and research design. Section VI discusses results and section VII concludes.

II. BACKGROUND

Accounting Standards

Statement of Financial Accounting Standards (SFAS) 115 requires managers to distinguish between temporary and other-than-temporary losses for most investment securities. Many standard setters, regulators, and investors have been dissatisfied with the standard since its passage in 1993. Leading up to passage, the SEC chairman and some FASB members argued for strict fair value accounting for all securities, with all unrealized gains and losses recognized in net income. However, strict fair value accounting was opposed by the financial services industry and some bank regulators, including the Federal Reserve chairman. Ultimately, the FASB compromised by basing the treatment of unrealized gains and losses on management's intended strategy for the security (Johnson and Swieringa 1996). For securities that management intends to resell in the near term (labeled "trading" securities), unrealized gains and losses are recognized in earnings. For securities that management intends to hold to maturity (labeled "held to maturity" (HTM) securities), unrealized gains and losses typically are not recognized in net income or other comprehensive income (OCI). For all other securities (labeled "available for sale" (AFS) securities), unrealized gains and losses typically are recognized in OCI. Unrealized losses in the latter two categories of securities are recognized in net income only when management judges the losses to be "other-than-temporary," meaning that there is significant

doubt about the firm's intent or ability to hold the security until the fair value recovers (FSP FAS 115-1 and 124-1, ¶ A2-A4).

One member of the FASB derided SFAS 115 as "a patchwork solution" that drew "arbitrary lines" across securities and across unrealized losses (Johnson and Swieringa 1996, 165). Many in the standard setting community have continued to express dissatisfaction with the seemingly arbitrary and judgmental nature of OTTIs, and advocate stricter fair value approaches to loss recognition that would reduce management discretion over the losses' impact on net income. When reviewing the OTTI provisions of SFAS 115 during the financial crisis, a member of the FASB's Investors Technical Advisory Committee (ITAC) stated, "ITAC supports measuring financial instruments at fair value, which would make impairment testing unnecessary" (FASB ITAC 2008, 3). When Congress pressured the FASB to reduce the impact of OTTIs on net income, two of the five FASB members dissented from the final rule because it diverted even more unrealized losses away from net income and into OCI. The two FASB members "believe that investors generally have opined that their preference is for the fair value of financial instruments to be reflected in net income…This [rule change] serves to increase the unrealized losses reported in other comprehensive income, exacerbating investors' concerns…" (FSP FAS 115-2 and 124-2, 17).

While some believe that the original OTTI rule was an insufficient form of fair value accounting, others believe that it was excessive because it required firms to recognize losses on the income statement that were not necessarily imminent. When a security was judged to be other-than-temporarily impaired, the rule required firms to expense the entire difference between fair value and amortized cost, even if a portion of the difference was due to market illiquidity discounts that the firm would not bear if it continued to hold the security and collect the

underlying cash flows. According to the American Bankers Association (ABA), the illiquid

conditions inflated OTTI charges during the financial crisis of 2008:

> One key factor that is recognized as having exacerbated these problems is fair value
> accounting, which influences the recognition of OTTI. In today's illiquid market the
> results can be severe: (1) capital is artificially eroded despite solid fundamental credit
> performance, (2) the lending capability of a bank is reduced as much as $13 for every $1
> of needless OTTI, and (3) the accounting formula is driving economic outcomes –
> including reduced availability of consumer and small business credit, with a negative
> impact on the health of individual institutions – and does not reflect economic reality
> (American Bankers Association 2008, 2).

As a result of ABA lobbying, Congress pressured the FASB to exclude the non-credit

portion of OTTI charges from the income statement and to include it in OCI (Pulliam and

McGinty 2009). However, proponents of fair value accounting criticized this bifurcation of

OTTIs as too subjective to be useful to investors:

> [The two dissenting FASB members] object to bifurcating the impairment loss into credit
> and noncredit components because they do not believe the expected loss approach (as
> prescribed in this [FASB Staff Position]) can isolate the credit loss from other losses
> (particularly liquidity risk) as is advocated by those supporting this approach. In current
> market conditions, liquidity risk is inextricably intertwined with credit risk, representing
> the discount associated with uncertainty about the collectability of contractual cash flows
> in the security (FSP FAS 115-2 and 124-2, 17-18).

In summary, proponents of fair value accounting criticized the original OTTI rule on the

grounds that it was atheoretical and allowed managers too much discretion in determining what

losses to recognize in net income. In contrast, opponents of fair value accounting believed that

the rule did not give managers enough discretion in determining what losses to recognize in net

income. We test whether the OTTI charges were informative to investors despite their

discretionary nature. We also test whether the market was informed by the additional discretion

given to managers under the OTTI bifurcation rule.

Prior Research

Prior research has examined whether investors price unrealized gains and losses even

though they are not included in earnings, and whether the pricing of unrealized gains and losses

differs from the pricing of realized gains and losses. In a study of banks' annual reports, Barth (1994) finds that *accumulated* unrealized gains/losses are related to stock *prices*, but the *new* unrealized gain/loss in each period is not related to stock *returns* over the period. Her follow up analyses suggest that the lack of relation is due to imprecise accounting measurement of security fair values.

In contrast, Ahmed and Takeda (1995) examine whether the lack of an observed relation is due to a correlated omitted variable: unrealized gains/losses on other assets and liabilities caused by interest rate changes. For example, an increase in economy-wide interest rates would decrease the value of investment securities, creating unrealized losses that would decrease the bank's stock price, all else held constant. However, if the bank has few other assets and is highly levered with long-term liabilities, the increase in interest rates would also decrease the market value of the liabilities, which would increase the bank's stock price. The econometric model would need to include both effects in order to observe a positive relation between stock returns and unrealized gain/loss on securities. Ahmed and Takeda (1995) observe this relation when including a proxy for unrealized gain/loss on other assets and liabilities related to interest rate changes. Also supporting the pricing of unrealized gains/losses on securities, studies of OCI document a relation between stock returns and the unrealized security gains/losses in OCI (Biddle and Choi 2007; Chambers et al. 2007).

Our study contributes to this literature by examining the market pricing of OTTIs, which are a subset of unrealized losses. The objective of some of the previously mentioned studies was to determine the relative usefulness of fair values and amortized costs. OTTIs require both measurement bases because OTTIs represent persistent differences between a security's fair value and amortized cost. Dong et al. (2010) examine another joint output of the two measurement bases: realized gain/loss on the sale of AFS securities. Realized gains and losses

8

represent the difference between a security's selling price, which reflects fair value, and amortized cost. Dong et al. (2010) find that realized gain/loss on AFS securities incrementally affects stock prices even though the gain/loss has already been reported to investors on a fair value basis (as unrealized gain/loss in OCI). In other words, the stock price reacts to realized gains/losses even though they do not change the book value of equity. The only change is the measurement basis of the gain/loss; the basis changes from fair value to amortized cost as the amount is transferred out of accumulated OCI and into retained earnings, yet this change in basis affects the stock price. Dong et al. (2010) conclude that if the FASB and IASB expand fair value accounting, they should preserve some aspects of amortized cost accounting, such as the reporting of realized gains and losses. Our study provides evidence about whether another aspect of amortized cost accounting should be preserved: the reporting of unrealized but relatively certain cost-basis losses.

III. HYPOTHESIS DEVELOPMENT

The Pricing of OTTIs

Most prior studies find that unrealized gains/losses are priced. Our first objective is to determine whether reported OTTIs are priced incrementally to reported unrealized gains/losses. There are two reasons why OTTIs would not be priced incrementally. First, OTTIs tend not to be recorded until a security's fair value has been significantly depressed for an extended period of time, meaning that the underlying losses tend to have already been disclosed to investors through fair value reporting. Many firms state that the duration of the unrealized loss is a primary consideration in OTTI judgments, consistent with accounting and auditing standards.[2]

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[2] FASB Staff Position FAS 115-2 and 124-2 (¶ 25) and Auditing Standard AU 332.47 recommend OTTIs when fair value is significantly below amortized cost and the difference has existed for an extended period of time. The standards also cite other reasons for OTTIs, such as rating downgrades or failure to pay interest. Firms rarely disclose how long the unrealized losses had existed prior to the OTTI. One exception is Countrywide Financial Corporation. In each quarter from June 2007 to June 2008, Countrywide stated that OTTIs on U.S. Government-

To understand whether OTTI losses are predictable, we examined banks' portfolio loss positions before managers recognized OTTIs, and found that the beginning loss positions were larger during the firm-quarters that contain an OTTI charge. In these firm-quarters, risky securities had beginning fair values that were only 86 percent of amortized cost on average, compared to 94 percent for the firm-quarters that did not contain OTTI charges (the difference is statistically significant, p-value=0.01).[3] We also computed a metric that reflects both the magnitude and duration of loss positions by taking the ratio of fair value to amortized cost for the prior four quarters and multiplying the ratios together. The mean was 0.64 for the firm-quarters with OTTI charges and 0.80 for the firm-quarters without OTTI charges (the difference is statistically significant, p-value=0.01). Thus, it appears that both the magnitude and duration of the unrealized losses were at least partially observable before the OTTIs were recognized.

The potential arbitrariness of the decision to label a loss as OTTI is the second reason why the announcement of an OTTI may not incrementally affect stock prices. One potential source of arbitrariness is the inability of managers to provide information that is not already embedded in the market prices of the securities. In a highly efficient securities market, prices embed substantially all information about future value, meaning that managers would be able to provide little or no incremental information about future price movements (Grossman and Stiglitz 1980). Former FASB member Edward Trott holds a similar view: "Because the [OTTI] model depends on predictions of the future and preparers, auditors, the SEC, and financial statement users have ever-changing biases of what the future will be, the information resulting from the OTTI model is biased and of little use" (Trott 2009).

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sponsored enterprise obligations and prime non-agency mortgage-backed securities had already been reported in prior quarters as unrealized losses in OCI.
[3] Footnote 19 describes the securities that we classify as risky.

Another potential source of arbitrariness is rules of thumb for recognizing OTTIs that have little to do with underlying economic fundamentals. For example, in discussing the analogous OTTI requirement under International Financial Reporting Standards to impair equity securities after a "significant or prolonged" decline in fair value below cost (International Accounting Standard No. 39, ¶ 61), an Ernst & Young LLP publication states that "it would be difficult to argue that a decline of more than 20% is not significant," and "we consider that a decline that had persisted for more than twelve months would typically be seen as prolonged" (Ernst & Young 2010, 2475). As another example, in 2011 the SEC pressured Berkshire Hathaway Inc. to record a $938 million OTTI because the securities had been in a loss position for several quarters; Berkshire recorded the OTTI but at the same time publicly predicted that the security values would soon recover (Holm 2011).

On the other hand, there are three features of OTTIs that would make them incrementally informative to reported unrealized gains and losses. First, OTTIs may inform investors about the precision of unrealized gains and losses. Many banks hold securities that have sparse or nonexistent trading, meaning that the estimated fair values for the securities are noisy. Goh et al. (2009) find that investors place significantly less reliance on the reported fair values of securities that do not trade in active markets. Noisy fair value estimates create noisy estimates of unrealized gains and losses (which are based on estimates of the change in fair value). An OTTI likely reduces the noise that investors perceive around reported unrealized gains/losses. In principle, an OTTI means that the manager does not believe that future realizations of fair value will exceed amortized cost, thus tightening the variance that investors perceive around reported fair values and unrealized losses. Consequently, when investors update their estimate of the

firm's equity value, they may place more weight on the unrealized losses that are designated as OTTIs.[4]

The second feature of OTTIs, which may lead to incremental informativeness, is that they may reveal relatively certain losses elsewhere in the portfolio that have yet to be designated as OTTIs. Because losses must be highly certain before managers recognize them as OTTIs, reporting an OTTI in the current period may signal that the portfolio contains other losses that are approaching the OTTI certainty threshold. We find that reported OTTIs do, in fact, appear to signal the existence of a pipeline of other unrealized losses that are approaching the OTTI threshold. In our sample, the unconditional probability of reporting an OTTI in a given quarter is 44 percent. However, the probability of reporting an OTTI jumps to 77 percent if the firm reported an OTTI in the previous quarter. Investors may sense this pipeline of OTTIs and price reported OTTIs incrementally to other unrealized gains/losses.

The third feature of OTTIs, which may lead to incremental informativeness, is that they may help investors distinguish between naturally hedged and non-hedged losses on securities. Securities can decline in value because of increases in economy-wide interest rates or because of declines in the issuer's financial performance. An increase in economy-wide interest rates would affect the fair value of both sides of a bank's balance sheet, so some of the resulting unrealized losses on securities would be offset by unrealized (and largely unrecorded) gains on liabilities. In contrast, a loss that the bank experiences due to a decline in the issuer's financial performance is

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[4] To illustrate this point with a numeric example, assume that a bank holds two securities, each having beginning amortized cost and fair value of $100. At the end of the period, the manager believes that the fair value of Security A is equally likely to be either $70 or $100 (perhaps the security traded only once during the period, at $70, but the manager is 50 percent sure that this sale was made by a distressed seller facing a margin call and is not indicative of the price in an orderly transaction). The manager would assign a fair value of $85 and record a $15 unrealized loss, but would not book an OTTI because there is a 50 percent chance that no loss has been sustained. Turning to Security B, the manager believes its fair value ranges from $83 to $87 (perhaps the issuer restructured the debt and agreed to pay creditors between $0.83 and $0.87 on the dollar). The manager would assign a fair value of $85, record a $15 unrealized loss, and designate the loss as an OTTI. The OTTI signals to investors that the precision of the $15 loss on Security B is greater than that of the $15 loss on Security A.

less likely to be offset by liability-related gains, meaning that shareholders bear more of the loss.[5] OTTIs alert investors to issuer-specific losses that are likely to be less hedged.

The discussion thus far has described how OTTI can be incrementally informative about the true economic nature of unrealized losses. However, there are two other reasons that OTTIs may be priced incrementally to reported unrealized gains/losses. First, OTTIs affect bank regulatory capital but other unrealized losses do not, meaning that OTTIs uniquely increase the risk of regulatory sanctions. This effect of OTTIs likely plays a minor role in our sample because all but four banks are well capitalized by Federal Deposit Insurance Corporation (FDIC) standards during the sample period. The FDIC considers a bank "well capitalized" at a Tier 1 ratio of 6 percent or above.[6] The 25th percentile of Tier 1 capital ratio in our sample is 9.4 percent, which is significantly above the "well capitalized" threshold. Furthermore, Badertscher et al. (2011) show that OTTIs had a negligible effect on banks' regulatory capital during the crisis. To investigate this explanation, we check the robustness of results to banks with above-median capital ratios.

Investor fixation on net income is the second reason that OTTIs might be priced even if they are not incrementally informative about the economic nature of losses. OTTIs are recognized in net income, while other unrealized losses are recognized in OCI (for AFS securities) or not at all (for HTM securities). We believe fixation on net income is an unlikely explanation because most unrealized gains/losses have been prominently displayed in the financial statements since 1998 when the OCI standard was implemented (SFAS No. 130).

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[5] In theory, losses related to the issuer's performance are naturally hedged to a degree because the losses increase the holder's own credit risk, reducing the fair value of the holder's liabilities (Barth et al. 2008). However, liabilities are affected by these types of performance-related losses less directly than they are affected by increases in economy-wide interest rates; the rates have a direct effect on the discount rate applied to liabilities, whereas a performance-related loss on a security would affect the discount rate only to the extent that the loss affects the holder's solvency.

[6] A bank is considered "adequately capitalized" at 4 percent. The minimum Tier 1 capital ratio is 3 percent for "strong" bank holding companies and 4 percent for all others. See capital adequacy guidelines at http://www.fdic.gov/regulations/laws/rules/2000-5000.html and http://www.fdic.gov/regulations/laws/rules/6000-2200.html.

Chambers et al. (2007) find that after this time investors priced OCI on a dollar-for-dollar basis, consistent with economic theory for transitory items. We believe that fixation on net income is even less of a factor in our setting because the financial crisis provided strong incentive for investors to scrutinize all elements of banks' financial reports.

Credit and Non-credit OTTIs

Our second and final research objective is to determine whether investors distinguish between credit and non-credit OTTIs. Investors would price credit and non-credit OTTIs similarly if they believe that managers' bifurcations are arbitrary. On the other hand, investors would price the non-credit component less negatively if they believe that the bifurcation reflects managers' information about: (1) market liquidity conditions; and, (2) the firm's ability to hold the security and collect the underlying cash flows. If a security's fair value is, in fact, temporarily depressed because of market illiquidity, and if the firm has the ability to hold the security and collect the underlying cash flows, the expected payoff from the security is higher. Thus, investors would price the non-credit portion of OTTIs less negatively than the credit portion.

IV. SAMPLE

The sample consists of quarterly observations for commercial banks during 2008 and 2009. Many banks recorded OTTIs during these years because of security price declines related to the financial crisis. Because we must handcollect OTTIs from 10-Qs and 10-Ks filed with the Securities and Exchange Commission, we limit the sample to 150 bank holding companies that are among the largest holders of non-Treasury AFS and HTM securities. We choose the banks as of June 30, 2006, before the crisis began, to focus on the period when OTTIs were common.[7] We identify the banks using Federal Reserve Y-9C reports filed by bank holding companies with total consolidated assets of at least $500 million. All test variables are obtained from these

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[7] Ryan (2008) provides a timeline of the financial crisis, tracing the first public signs of distress to February 2007 when two subprime mortgage originators announced major increases in loss reserves.

reports unless we state otherwise. To form the sample, we first rank all report filers by the amortized cost of their portfolio of non-Treasury AFS and HTM securities. To obtain 150 usable banks, we expand the sample search to the top 208 banks because 46 banks are private or foreign, and thus they do not file with the SEC, and an additional 12 banks did not file the Y-9C and 10-Q for the first quarter of 2007. The combined non-Treasury AFS and HTM amortized holdings of the 150 banks exceeds $1.5 trillion, which represents over 82 percent of the holdings reported by all of the 998 banks filing a Y-9C report.

Figure 1 plots the total OTTI charges taken on AFS and HTM securities each quarter from 2007 to 2009. The sample size varies by quarter because we selected it at a single point in time. In this figure, we maintain a constant sample size each quarter by including only the top 100 banks ranked by beginning holdings of non-Treasury HTM and AFS securities. Figure 1 shows that OTTIs are concentrated in the years 2008 and 2009, so we confine our tests to these years. The figure suggests that OTTIs lag adverse market movements. Ryan (2008) reports that the Markit BBB-rated subprime MBS index began to fall sharply in July 2007. However, OTTI charges did not become large until September 2008, despite the fact that the values of subprime MBS securities had fallen by an average of 50 percent by the end of 2007 (based on Vyas (2010) which reports an average of all series and tranches of Markit's ABX subprime MBS index). Also supporting the notion that OTTI charges are recognized with a lag, OTTIs were higher in 2009 than in 2008 ($31 billion in 2009 versus $18 billion in 2008) even though 2008 is generally considered the peak of the financial crisis; markets began to stabilize in 2009 following government capital-injections and other rescue efforts in late 2008.

Figure 1 shows that after the bifurcation rule went into effect in 2009, banks classified over 40 percent of OTTI charges as non-credit ($13.5 billion out of $31 billion total).[8] The years 2008 and 2009 contain 958 firm-quarter observations with the necessary data for the market pricing tests (across 127 of the 150 original banks).

V. RESEARCH DESIGN

Information Content of OTTIs

Our first set of tests examines the extent to which investors react to, as opposed to anticipate, the information in OTTI disclosures. During the crisis, many banks issued warnings about OTTIs at times other than earnings announcement dates. The market reaction to the warnings represents a highly controlled test of OTTIs' information content because OTTIs were the only item discussed in most of these disclosures. Additionally, we test whether the market reaction varies with the magnitude of the OTTI and with the bank's regulatory capital ratio using the following regression:

$$RET\_WARN_i = \beta_0 + \beta_1 OTTI\_WARN_i + \beta_2 LOW\_CAPITAL_i + \beta_3 OTTI\_WARN_i * LOW\_CAPITAL_i + e_i \quad (1)$$

where RET_WARN is the three-day market adjusted return (obtained from CRSP) around OTTI warning announcement i, OTTI_WARN is the magnitude of the OTTI reported in the warning scaled by the bank's beginning-of-quarter market value of equity, and LOW_CAPITAL is a [0, 1] indicator variable capturing whether the bank's Tier 1 capital ratio is below the sample median. We include LOW_CAPITAL as an intercept term and interact it with OTTI_WARN to determine whether the market reacts more negatively to OTTI news when the bank is less

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[8] To a small degree, the non-credit OTTIs reported each quarter are mechanically reduced by past non-credit OTTIs. Firms accrete past non-credit OTTIs on HTM securities into earnings when accruing interest revenue each quarter (FSP FAS 115-2 and FAS 124-2, ¶ 34), which decreases the non-credit OTTI reported for the current quarter. Additionally, we noted a few cases when firms reclassified a past non-credit OTTI as a credit OTTI, which also decreases reported non-credit OTTI for the current quarter. Neither of these effects appears to be large because less than one percent of our observations have negative reported non-credit OTTIs, meaning that the new non-credit impairments for the quarter almost always exceed the non-credit OTTI reversals related to past quarters.

capitalized. The coefficients on the terms involving LOW_CAPITAL help us understand

whether the market reacts negatively to OTTIs in part because OTTIs increase the risk of

regulatory sanctions related to low regulatory capital. The regression is estimated using ordinary

least squares with heteroscedasticity-consistent standard errors (White 1980).

Our next pricing test examines periods outside of OTTI warning windows to determine

when stock prices impound the information reflected in OTTIs. If investors can at least partially

distinguish between more and less certain losses by analyzing external market conditions and the

firms' prior disclosures about OTTIs and fair values, then stock prices should be related to OTTI

charges in advance of the explicit OTTI disclosures. To understand when investors price the

OTTI charges, we use a regression of OTTI charges on stock returns during various intervals.

For comparison purposes, we also examine when prices impound other financial statement items

by replacing the OTTI dependent variable with unrealized gains/losses, bad debt expense, and

earnings excluding OTTI and bad debt expense. Warfield and Wild (1992) use a similar

approach to determine if stock returns recognize economic events in advance of earnings. For

each firm quarter q, we measure buy-and-hold stock returns for the five quarters ranging from q-

3 to q+1. Each of the five quarterly returns is an explanatory variable in the regression (denoted

RET_{q-3} through RET_{q+1}). We use raw returns, rather than market-adjusted, because the dependent

variables are levels of earnings components rather than idiosyncratic surprises.

We also include as explanatory variables the short window returns in three days around

earnings announcements and 10-Q/10-K filing dates during the five quarters. The five quarterly

earnings announcement (10-Q/10-K filing) variables are denoted RET_EARN (RET_FILING),

and each is subscripted to indicate the quarter when it occurred. For example, the announcement

of earnings for quarter q is subscripted q+1 because the announcement does not occur until

quarter q+1. We also include an explanatory variable capturing the three-day return around the

OTTI warning date for quarter q (RET_WARN).[9] The returns from these three types of event variables are omitted from the quarterly return (RET) variables.

The regression is estimated using ordinary least squares with standard errors clustered at the firm level. All dependent variables are scaled by beginning-of-quarter market value of equity (firm and quarter subscripts omitted):

$$Financial\ Statement\ Item = \beta_0 + \beta_1 RET_{WARN} + \sum_{t=-3}^{1} \delta_t RET_{q+t} + \sum_{t=-3}^{1} \theta_t RET_{EARN_{q+t}} + \sum_{t=-3}^{1} \omega_t RET_{FILING_{q+t}} + e \tag{2}$$

When OTTI is the dependent variable, significantly positive coefficients on RET_WARN, RET_EARN$_{q+1}$, or RET_FILING$_{q+1}$ indicate that the market did not fully price the unrealized losses until the firm designated them as OTTIs. Significantly positive coefficients on earlier quarters' RET_EARN or RET_FILING variables indicate that items disclosed in these earnings announcements or 10-Q/10-K filings helped investors anticipate the current quarter's OTTI charge. Significantly positive coefficients on earlier quarters' RET variables indicate that investors can at least partially anticipate OTTIs by analyzing external market conditions.

Even if the results suggest that investors did not fully anticipate the OTTIs until the firm disclosed them, this is not necessarily evidence that OTTIs are priced incrementally to unrealized losses because the OTTI disclosure may have revealed previously unreported unrealized losses. For example, the OTTI may have been triggered by an issuer's sudden bankruptcy during the quarter. Additionally, even when a security's fair value has been depressed for several periods, the fair value could decline further during the quarter in which the OTTI is recognized, meaning that the firm will not have revealed a portion of the unrealized loss until it recognizes the OTTI. Cases like these could result in positive estimated coefficients on the event variables even if investors do not price OTTIs incrementally to unrealized losses.

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[9] Approximately half of the warnings occur in the last month of quarter q and the remaining half occur after quarter q ends (but before 10-Q/10-Ks are filed). For firm quarters that do not have OTTI warnings, we code RET_WARN as zero.

Incremental Pricing of OTTIs

We further investigate the incremental pricing of OTTIs by estimating the relation between stock returns and OTTIs after controlling for the unrealized gains/losses disclosed during the quarter. We regress quarterly stock returns on OTTI, unrealized gain/loss, and controls for other performance-related items (firm and quarter subscripts omitted):

$$Return = \beta_0 + \beta_1 \Delta EARN + \beta_2 \Delta BDE + \beta_3 OTTI + \beta_4 UNREAL\_GL + \beta_5 OCI$$
$$+\beta_6 GAP\_GL + e \quad\quad\quad (3)$$

We choose a return window that includes the period when firms are likely to release information related to OTTIs, unrealized gains/losses, and other earnings components. We begin the window with the last month of the current quarter because over half of the OTTI warnings occur during this time. We end the window three months after the quarter-end because firms announce earnings and file 10-Q/10-Ks during this time. We measure returns over the entire four-month period, rather than just around the event windows, because other formal and informal information flows about earnings and its components likely occur throughout this time. We market-adjust the returns to remove the effects of economic events that occur during the four-month time period but will not be reflected in the bank's financial reports until future quarters.

Because we use market-adjusted returns as the dependent variable, we attempt to define the explanatory variables so they reflect the unexpected portions of financial statement items. All explanatory variables are scaled by beginning-of-quarter market value of equity. We attempt to capture the unexpected portion of pre-tax earnings and bad debt expense by using quarter-over-quarter changes (variables are denoted ΔEARN and ΔBDE). We base the change on the prior quarter's value, rather than on the value four quarters ago, because the financial crisis involved a stark shift to a period of abnormally poor performance, rendering performance from four quarters ago a poor predictor of performance during the crisis. Because bad debt expense was a major expense for banks during the crisis (Badertscher et al. 2011), we include ΔBDE as its own term

and remove it from ΔEARN. We also remove from ΔEARN the other explanatory variables that are components of earnings.

We do not difference the other explanatory variables because they are based on changes in fair value, which are largely unpredictable. The OTTI variable is the total OTTI recorded on AFS and HTM securities during the period (handcollected from 10-Q and 10-K filings). The variable includes both credit and non-credit OTTI. In later tests we split OTTI into credit and non-credit components. UNREAL_GL captures unrealized gains and losses from changes in the fair value of AFS and HTM securities during the quarter. We compute unrealized gain/loss similar to Barth (1994) using values from the FR Y-9C reports and handcollected OTTIs:[10]

$$
\begin{aligned}
\text{UNREAL\_GL} = &[\textit{Fair value of securities}_q - (\textit{Amortized cost of securities}_q - \\
&\textit{OTTI}_q)] - (\textit{Fair value of securities}_{q-1} - \textit{Amortized cost of securities}_{q-1}) + \\
&\textit{Realized gain/loss on sale of securities}_q \quad\quad\quad\quad\quad\quad\quad\quad (4)
\end{aligned}
$$

Consistent Biddle and Choi (2006) and Chambers et al. (2007), we control for quarterly OCI. We remove quarterly unrealized gain/loss on AFS securities from OCI because it is already reflected in UNREAL_GL.

The final control variable is GAP_GL, which proxies for unrealized gains/losses on other assets and liabilities arising from changes in interest rates (Ahmed and Takeda 1995). These gains/losses generally are not recognized in net income or OCI but likely are priced by investors. GAP_GL multiplies the quarterly change in the five-year Treasury rate by a measure of the gap between long term assets (other than AFS and HTM securities) and long term liabilities. Following Ahmed and Takeda (1995), our proxy for this gap is the difference between assets and

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[10] Because we sign OTTI negatively, the subtraction of OTTI in line 2 actually increases the amortized cost component of the equation. After firms adopt the OTTI bifurcation rule, we subtract only the credit portion of the OTTI because the non-credit portion does not affect amortized cost. In the quarter that the firm adopts the bifurcation rule, we also adjust for the cumulative adoption effect to correct for the effect on amortized cost. Barth (1994) does not adjust for OTTI charges because they are rare in her sample period. Without this adjustment, the accumulated unrealized gain/loss at the end of the current quarter would be overstated, which would also overstate UNREAL_GL. Barth (1994) uses an after-tax value of realized gain/loss on sale of securities (3rd line), so she must compute the after-tax value of the difference between fair values and amortized costs (1st and 2nd lines). We do not have to adjust for taxes because we are able to obtain all amounts on a pre-tax basis.

liabilities maturing or repricing in more than one year. Consistent with prior studies, we expect GAP_GL to negatively affect stock returns.[11]

Pricing of Credit and Non-Credit OTTIs

Our final test examines whether investors distinguish between the credit and non-credit components of OTTI charges. We augment equation (3) by splitting OTTI into CREDIT and NON_CREDIT components. We also add a variable called CUMUL_EFFECT, which captures the amount of past OTTI that the banks classified as non-credit OTTI when adopting the OTTI bifurcation rule (handcollected from 10-Q/10-Ks). Firms adopted the rule in either the first or second quarter of 2009. For any previously impaired security that the adopting firm still held, the firm estimated the non-credit portion of the impairment, and reclassified the amount out of retained earnings and into accumulated OCI (which does not change book value). If investors believe that non-credit OTTI losses are more likely to reverse than credit OTTI losses, the reclassified amounts represent positive signals about firm value. Thus, we expect a positive coefficient on CUMUL_EFFECT. The regression is as follows:

$$Return = \beta_0 + \beta_1 \Delta EARN + \beta_2 \Delta BDE + \beta_3 CREDIT + \beta_4 NON\_CREDIT + \beta_5 UNREAL\_GL$$
$$+ \beta_6 OCI + \beta_7 GAP\_GL + \beta_8 CUMUL\_EFFECT + e \qquad (5)$$

VI. RESULTS

OTTI Warnings

The short-window stock price reaction to OTTI warnings represents a highly controlled test of OTTI's information content. We identify 50 OTTI warnings by keyword searching 8-K forms filed with the SEC.[12] Panel A of Table 1 shows that the mean (median) market-adjusted return in the three-day window around the warning (RET_WARN) is -4.2 (-3.3) percent, which

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[11] The intuition is as follows. GAP_GL is positive under either of two scenarios: 1) Treasury rates increase during the quarter and the bank has more long-term assets than liabilities; or, 2) Treasury rates decrease during the quarter and the bank has more long-term liabilities than assets. Either scenario ought to decrease the bank's market value of equity, resulting in a negative coefficient on GAP_GL.

[12] The search terms were "other-than-temporary," "other than temporary," or "OTTI."

is statistically significantly less than zero at the one-percent level. Fourteen of the 50 observations warn about items in addition to OTTI. However, market-adjusted returns continue to be statistically negative for the 36 warnings that involve OTTI exclusively (mean and median of -2.2 and -2.5 percent). In eight cases, the firm actually warns *after* its quarterly earnings announcement because it identifies additional OTTIs that were not included in announced earnings. Mean and median market-adjusted returns are -3.4 and -3.5 percent for these eight cases, but only the median is significantly less than zero (p-value < 0.10).

Panel B of Table 1 shows coefficient estimates from regression (1), which tests the relation between market-adjusted returns and the amount of OTTI mentioned in the warning (OTTI_WARN). In two cases where the bank provided a range for the OTTI amount we use the midpoint of the range. We sign the OTTI_WARN variable negatively so that the predicted coefficient is positive. We run the regression on the 36 announcements that warn exclusively about OTTIs. The estimated coefficient on OTTI_WARN is significantly positive as predicted (p-value < 0.10). The coefficient magnitude of 1.02 is close to 1.00, the magnitude that would be expected for an unanticipated, transitory loss (the coefficient is 1.13 when the OTTI_WARN*LOW_CAPITAL interaction is omitted from the regression). It is surprising that the coefficient is as high as 1 because investors had ample opportunity to anticipate some of the underlying losses, which have likely been reflected in reported security fair values for several quarters. Such a high coefficient supports the idea that OTTIs inform about more than just the certainty of the losses designated as OTTI.

The coefficients on LOW_CAPITAL and OTTI_WARN*LOW_CAPITAL are not statistically different from zero, providing no evidence that the market reacts more negatively to OTTI news when the bank is less capitalized. This result casts doubt on the claim that investors

22

react negatively to OTTIs simply because they reduce regulatory capital; rather, it appears that investors believe that OTTIs are informative about the economic nature of losses.

Timing of OTTI Pricing

We now examine the pricing of OTTIs across the entire sample of 958 firm-quarter observations in 2008 and 2009. Table 2, Panel A presents descriptive statistics for the raw stock returns used as explanatory variables in regression (2). All of the mean returns for the five earnings announcements and five 10-Q/10-K filing variables (RET_EARN and RET_FILING) are within 1 percentage point of zero. Three of the ten mean returns are statistically significantly positive at the 5 percent level, suggesting that investors are slightly pessimistic ahead of these information releases during the sample period. Each quarterly return variable (RET_{q-3} through RET_{q+1}) has a significantly negative mean (p-value <0.01), ranging from -3.5 to -8.5 percent, consistent with the banking industry downturn during this period.

Panel B of Table 2 summarizes the results of the regressions of OTTI and other financial statement items on the return variables (regression 2). When OTTI is the dependent variable, the estimated coefficients on RET_WARN and RET_FILING_{q+1} (0.218 and 0.017) are statistically significantly positive at the one percent level, suggesting that investors do not fully price the implications of OTTIs until they are disclosed in warnings and 10-Q/10-K filings. The estimate of the coefficient on RET_EARN_{q+1} is not statistically significantly different from zero, suggesting that information at earnings announcements tends not to highlight the OTTI component of earnings; rather, investors learn the details of OTTIs when the bank warns about them or files the 10-Q or 10-K. Investors also appear to learn about future OTTIs from the 10-Q/10-K filings, as evidenced by the statistically significantly positive coefficients on

RET_FILING for quarters q-1, q-2, and q-3.[13] None of the other lagged return variables have

statistically significant coefficients.[14]

In the regression with unrealized gain/loss (UNREAL_GL) as the dependent variable, the

estimates of the coefficient on RET_WARN and RET_FILING_{q+1} are statistically significantly

positive as predicted (0.648 and 0.088, respectively). The statistically significant estimate of the

coefficient on RET_WARN likely occurs because a portion of UNREAL_GL is included in the

OTTI warnings. The estimated coefficient on RET_EARN_{q+1} is not statistically different from

zero. This is not surprising because unrealized gains/losses on AFS and HTM securities are not

included in earnings, and thus may not be discussed in earnings announcements. There is

evidence that investors anticipate unrealized gains/losses for quarter q in quarter q-1; the

estimated coefficients on RET_{q-1} and RET_FILING_q (which pertains to the q-1 10-Q/10-K filing)

are statistically significantly positive. Surprisingly, UNREAL_GL is negatively related to returns

around earnings announcements in quarter q-1 (RET_EARN_{q-1} coefficient magnitude is -0.060,

p-value < 0.05). It is unclear what is driving this negative relation because unrealized gain/loss

may not even be reported to investors during this return window.

In the final two regressions we use bad debt expense (BDE) and earnings (excluding

OTTI and bad debt expense) (EARN) as the dependent variables. The coefficients on the

explanatory variables have similar patterns in both regressions, and suggest that investors

anticipate bad debt expense and earnings using prior earnings announcements and general

analysis of economic conditions. The lagged earnings announcement variables (RET_EARNs)

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[13] To further examine where investors learn about future OTTIs, we re-ran the first column of Table 2, Panel B after including the reported OTTIs from quarters q through q-3. The untabulated results indicate that the coefficients on the prior quarter's OTTIs are positive and statistically significant. Moreover, the coefficients on RET_FILING_q through RET_FILING_{q-3} are also positive and statistically significant. This result suggests that prior OTTIs predict future OTTIs and investors also learn about future OTTIs from the additional information contained in the 10-Q/10-K filing.

[14] The OTTI dependent variable is oddly distributed because it is truncated at zero and contains many zero values. Regression results are quantitatively similar when using only non-zero OTTI observations.

and quarterly return variables (RETs) tend to have highly statistically significant coefficients in both regressions. Investors' ability to anticipate is not surprising because bad debt expense and earnings tend to be serially correlated. However, investors do not completely anticipate the information in earnings announcements, as evidenced by the statistically significantly positive estimated coefficient on RET_EARN$_{q+1}$ in both regressions. The 10-Q/10-K filing variables (RET_FILINGs) tend not to have statistically significant coefficients, which is not surprising given that earnings and bad debt expense would have already been disclosed in earnings announcements.

In summary, the results of regression (2) indicate that, unlike other financial statement items, OTTIs are difficult for investors to predict simply by analyzing external market conditions. Investors can, however, partially predict future OTTIs using information disclosed in 10-Qs and 10-Ks. This information is likely to be the OTTIs for the current quarter, which signal that the portfolio contains a pipeline of other unrealized losses that are approaching the OTTI certainty threshold. Thus, OTTIs appear to be incrementally useful because of their ability to inform about the certainty of other losses in the portfolio. Next we more directly test whether investors price OTTIs incrementally to unrealized gains/losses.

Incremental Pricing of OTTIs

Descriptive Statistics

Panel A of Table 3 presents descriptive statistics for the variables used in regressions (3) and (5), which examine the incremental pricing of OTTIs. We winsorize all variables at the 1st and 99th percentiles.[15] Market-adjusted stock returns over the four-month period that contains

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[15] We winsorize within each period because we separately test the periods before and after adoption of the OTTI bifurcation rule. To winsorize the CREDIT and NON_CREDIT components of OTTI, we map the winsorized OTTI values into CREDIT and NON_CREDIT values by applying the original CREDIT and NON_CREDIT proportions to the winsorized OTTI value. For example, if 75 percent of the original OTTI was CREDIT, then we would multiply winsorized OTTI by 75 percent to compute CREDIT and by 25 percent to compute NON_CREDIT. This

disclosures about performance in quarter q (RET_DPERIOD) have a mean of -1.7 percent, which is not significantly different from zero at conventional levels. The mean market-adjusted return over the five quarters from q-3 to q+1 (RET_5QTRS) is -12.2 percent (p-value < 0.01).

Turning to the explanatory variables, mean earnings excluding OTTI and bad debt expense (EARN) is -17.0 percent of market value of equity and is much more negative than the median (-1.3 percent), consistent with the large losses experienced by some banks during this time. First differencing EARN (denoted ΔEARN) results in a mean and median close to zero (0.47 and 0.01 percent). We sign all financial statement items according to their effect on the book value of equity (e.g., expenses are signed negatively). Mean (median) bad debt expense (BDE) is -9.5 (-2.3) percent of market value of equity, whereas the first difference (ΔBDE) has mean (median) of -1.3 (-0.2) percent.

Mean OTTI is only -0.6 percent of market value of equity because OTTI is zero for over half of the observations. Mean CREDIT-related OTTI is similar in magnitude to mean NON_CREDIT-related OTTI (-0.6 versus -0.5).[16] Mean and median unrealized gain/loss (UNREAL_GL) are near zero, despite declines in the fair value of mortgage-backed securities during the period (-0.5 and -0.2 percent of market value of equity). These losses were likely offset by holding gains created by the Federal Reserve's policy actions to decrease interest rates during the period. Mean and median OCI, excluding unrealized gains/losses on AFS securities, are near zero. CUMUL_EFFECT equals zero for most observations; it is non-zero only in the quarter that the bank adopts the OTTI bifurcation rule and only if the bank identifies non-credit OTTI in past OTTI charges.

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procedure maintains the additive relation between OTTI and its components even for the OTTI values that are winsorized.

[16] The means of the two OTTI components do not sum to the total OTTI mean because the components reflect only the period after firms adopted the OTTI bifurcation rule (beginning in the first or second quarter of 2009).

Panel B of Table 3 presents Pearson and Spearman correlations. All correlations between returns and the financial statement items are expected to be positive. The four-month disclosure period returns (RET_DPERIOD) have statistically positive Pearson correlations with all the financial statement items except for NON_CREDIT, UNREAL_GL, and CUMUL_EFFECT. The negative correlation with UNREAL_GL is statistically significant for both the Pearson and Spearman correlation, indicating that the correlation is not driven by outliers.

Regression Results

Panel A of Table 4 presents coefficient estimates from regression (3). We run the regression on the full sample period and on the periods before and after the OTTI bifurcation rule was adopted.[17] The estimated coefficient on ΔEARN is statistically significantly positive in the full sample regression (p-value < 0.10), but not in the pre- and post-rule change regressions. The estimate of the coefficient on ΔBDE is significantly positive in all three regressions. The estimated coefficient on OCI is significantly positive in the post-rule change regression (p-value < 0.05), but is not statistically significant in the other two regressions. The final control variable is GAP_GL, which has a statistically negative coefficient in the full sample regression and in the pre-rule change regression, consistent with investors pricing gains and losses related to asset-liability gaps.

Turning to the variables of interest, in the full sample regression, OTTI has explanatory power for returns that is incremental to UNREAL_GL and the other control variables. Specifically, the estimate of the coefficient on OTTI is 2.52 and is statistically significant at the 1 percent level. Contrary to expectation, the estimate of the coefficient on UNREAL_GL is -0.42 and is statistically significant (p-value < 0.05). A possible reason for the negative coefficient is that investors expected more favorable unrealized gains/losses than what banks reported.

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[17] Firms were required to adopt the rule by the second quarter of 2009 but could early adopt in the first quarter of 2009.

Consistent with this conjecture, in a later test we find that the estimated UNREAL_GL coefficient becomes positive and statistically insignificant from zero when using a longer return window that likely captures the period when investors formulated their expectations.

The magnitude of the estimate of the coefficient on OTTI differs statistically from the magnitude of the estimate of the coefficient on UNREAL_GL (p-value < 0.05). These coefficients could differ because investors priced the gains/losses before the four-month return window. We interpret the significant coefficient on OTTI itself as the strongest evidence that investors price OTTI incrementally to other unrealized gains/losses. By the end of the four-month return window, banks have disclosed all unrealized gains and losses to investors through the reporting of security fair values; this implies that OTTI should have no explanatory power for returns unless investors consider OTTI incrementally informative about the previously disclosed fair value changes. The estimated coefficient on OTTI is well above 1.00, the coefficient value that would be expected for an unanticipated transitory loss. It is remarkable that the OTTI coefficient is above 1.00 because a portion of the underlying OTTI losses were already disclosed to investors and thus should have been anticipated. We investigate the reasons for the large estimated coefficient later in the paper.

Inferences about the incremental explanatory power of OTTI are similar in the post-rule change regression; the estimated OTTI coefficient is 1.60 and is statistically significant at the 5 percent level. In the pre-rule change regression, the estimated coefficient on OTTI is not statistically significantly different from zero, but the magnitude of the coefficient estimate (1.74) is similar to that in the other regressions. It is possible that rule changes made OTTIs more value relevant in the later sample partition. Investors may have paid more attention to OTTIs after the credit and non-credit portions were separated. Also during this sample period, SFAS 157 was amended to allow managers to make more optimistic fair value estimates (FASB Staff Position

157-4), and the impairment test for OTTIs was amended to make it easier for managers to avoid recognizing OTTIs (FASB Staff Position 115-2 and 124-2, ¶ 7). OTTIs recognized despite the relaxed rules would represent particularly severe losses, adding to their value relevance.[18]

The results thus far support the incremental informativeness of OTTIs. We now test the sensitivity of results to the length of the return interval used to calculate the dependent variable. We extend the return interval backward over the prior four quarters so that the entire window spans the five quarters from q-3 to q+1 (RET_5QTRS). This lagged interval ensures that the return variable includes anticipatory pricing of quarter q unrealized gains/losses in prior quarters. The fourth column of Table 4, Panel A contains the regression results for the full sample. The estimated OTTI coefficient of 4.45 remains statistically significantly positive (p-value < 0.01) and remains statistically significantly more positive than the estimated coefficient of 0.05 on UNREAL_GL (difference-in-coefficients p-value < 0.01). This result shows that anticipatory pricing does not affect previous inferences about the incremental informativeness of OTTI.

Economic Explanations for Incremental OTTI Pricing

We now investigate why OTTIs are priced incrementally to unrealized gains/losses. Recall the three economic explanations for why OTTIs would be incrementally informative: (1) OTTI losses are more certain than other gains and losses; (2) OTTIs inform about relatively certain losses elsewhere in the portfolio that have yet to be designated as OTTIs; and, (3) OTTI losses are less hedged than other unrealized gains/losses. The first and third explanations would not explain why the estimated OTTI coefficient is higher than 1.00; transitory losses would not

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[18] Although we cluster standard errors by firm, Peterson (2009) also recommends including time fixed effects to correct standard errors for cross-sectional dependence within time periods. However, we find that including quarterly fixed effects dramatically affects the estimated coefficient magnitudes of many of the explanatory variables, which is a symptom of multicollinearity. The quarterly fixed effects appear to be competing with the primitives (i.e., the earnings-based explanatory variables) that drive returns. Thus, we do not include quarterly fixed effects in the main specification. When including quarterly fixed effects, the estimated coefficient on OTTI remains statistically significant at the 5 percent level in the full sample regression and in the post-rule change regressions (consistent with the main results). The estimated OTTI coefficient magnitude declines to 1.2 in both regressions.

result in a coefficient above 1.00 even if they were perfectly certain and completely unhedged. In contrast, consistent with the second explanation, the OTTI coefficient would be higher than 1.00 if investors use the disclosed OTTIs to project that the banks' securities portfolios contain other losses that are approaching, but have not yet crossed, the OTTI probability threshold. Also supporting the second explanation is the test in Table 2 that examined the timing of OTTI pricing; this test showed that investors price future OTTIs at the times that 10-Qs/10-Ks are filed, suggesting that the OTTIs disclosed in the filings inform investors about the certainty of other unrealized losses that eventually become OTTIs.

To further test the second explanation, we determine whether OTTI has a larger effect on stock price when the securities portfolio appears to have a large capacity for further losses even after the OTTI charge is recognized. To proxy for the remaining capacity for losses, we divide the fair value of the bank's risky securities by the amortized cost of the risky securities at the end of the quarter.[19] To ease interpretation and limit the influence of outliers, we create an indicator variable called LOSS_CAPACITY that equals 1 for the quartile of observations with the lowest ratios of fair value to amortized cost. We include this variable in regression (3) and interact it with OTTI. Results are in Panel B of Table 4. The estimated coefficients on OTTI decline in all four regressions. The estimated coefficient on the interaction term is statistically significantly positive only in the pre-rule change regression (p-value < 0.10) and in the full sample regression the uses the five-quarter return window (p-value < 0.05). However, in all four regressions the sum of the estimated coefficients on OTTI and OTTI*LOSS_CAPACITY is statistically significantly positive (p-values of 0.07, 0.02, 0.01, and <0.01 across the four regressions), while

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[19] The risky securities we include are non-agency mortgage backed securities, asset-backed securities, and debt securities other than those issued by federal or state governments. One could argue that debt obligations issued by states and mortgage-backed securities issued by Fannie Mae or Freddie Mac should be included because they lack explicit federal government guarantees. However, these securities often carried implicit guarantees and held their value well during the crisis. We also exclude equity securities because many banks' equity securities have fair values that are substantially higher than amortized cost due to stock price appreciation over many years.

the estimated coefficient on the OTTI variable is statistically significantly positive only in the full sample regression (p-value = 0.08). Thus, OTTI tends to be reliably related to returns only among firms with large loss capacity. The results are consistent with investors weighing reported OTTIs more heavily when the portfolio exhibits a large capacity for future OTTI losses.

To test the hedging explanation for the usefulness of OTTIs, we partition the sample by whether the five-year Treasury rate increased or decreased during the quarter. We expect OTTIs to be more useful to investors during quarters when economy-wide interest rates increase because this will create unrealized losses on the securities portfolio that are partially hedged but are difficult to distinguish from credit losses (absent OTTI disclosures). Thus, OTTIs should have the most incremental significance in the sample partition of quarters with interest rate increases. However, we find the opposite (results untabulated). During the three quarters that have interest rate increases, the estimated OTTI coefficient is 0.64 and not statistically significantly different from zero. During the four quarters with interest rate decreases, the estimated OTTI coefficient is 2.7 (p-value < 0.01).[20] In summary, the evidence suggests that the nature of the information provided via OTTIs is the certainty of losses rather than convey the hedged nature of losses.

Non-Economic Explanations for Incremental OTTI Pricing

We now investigate two non-economic explanations for why OTTI is incrementally priced. The first possibility is that OTTI affects banks' regulatory capital ratios while other unrealized gains/losses do not. However, as discussed earlier, almost none of the banks were in danger of falling below regulatory minimums during the sample period. Also, the market reaction to OTTI warnings did not vary with regulatory capital ratios. To further ensure that results are not driven by the unique effect of OTTIs on regulatory capital, we rerun regression (3)

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[20] We exclude the 4th quarter of 2009 because the change in interest rate is quite small (-0.03%).

using only the banks with above-median Tier 1 capital ratios (10.7 percent). In the full sample regression, the estimated coefficient on OTTI continues to be significantly positive (1.79, with a p-value = 0.01).

The second explanation for the incremental explanatory power of OTTI is that investors may asymmetrically price unrealized gains versus unrealized losses, which would cause OTTI to have explanatory power simply because it consists exclusively of losses while UNREAL_GL is a net of losses and gains. However, it is not clear why investors would asymmetrically price unrealized gains and losses, nor is the direction of the asymmetry clear. Even if investors have valid reason to price the gains and losses asymmetrically, current accounting rules do not require firms to separate unrealized gains from losses. At best, investors could value the net gain/loss one way if it was negative and another way if it was positive. Thus, we rerun regression (3) after breaking UNREAL_GL into two variables, one including the positive values of UNREAL_GL (0 otherwise) and the other including the negative values of UNREAL_GL (0 otherwise). In the full sample regression, the coefficient on OTTI remains statistically positive and statistically more positive than the coefficient on the variable that includes the negative UNREAL_GL values.

Pricing of Credit and Non-Credit OTTIs

To test whether the OTTI bifurcation rule provided additional information to investors, we run regression (5), which breaks OTTI into credit and non-credit components. As shown in the first column of Table 5, the estimated coefficient on the CREDIT portion of OTTI is statistically significantly positive (magnitude of 1.85, p-value < 0.05). In contrast, the estimated coefficient on the NON_CREDIT portion of OTTI (1.09) is not statistically significantly different from zero. Although the estimated CREDIT coefficient is higher in magnitude than the

estimated NON_CREDIT coefficient, the difference between the coefficients is not statistically significant.

Because the two variables are part of the same accounting charge, they may compete with each other to explain returns. We re-estimate the regression using one component at a time. As shown in the next two columns of Table 5, when using only the CREDIT (NON_CREDIT) component, the estimated CREDIT (NON_CREDIT) coefficient is 2.01 (1.51) with a p-value of 0.04 (0.12). Thus, investors seem to reliably price the CREDIT component but not the NON_CREDIT component. The estimate of the coefficient on CUMUL_EFFECT is not statistically significantly different from zero, providing no evidence that investors reacted positively to the adoption adjustment that reclassified some previous OTTI charges as non-credit OTTIs. The power of this test is low, however, because CUMUL_EFFECT is non-zero for only 1.7 percent of the observations. Bifurcating OTTI and adding CUMUL_EFFECT have little effect on the magnitudes and significance levels of the coefficients on the other explanatory variables.

VII. CONCLUSION

OTTIs convey managers' judgments about the certainty of losses on investment securities. Under current rules, managers designate relatively certain holding losses on AFS and HTM securities as OTTIs and recognize them in net income; other unrealized losses are not recognized in net income. In an expansion of fair value accounting, more unrealized gains and losses would be included in net income and the distinction between relatively certain and uncertain losses would become less clear without supplemental disclosures. We examine whether OTTIs are informative to investors, and whether investors gained information in 2009 when the FASB required managers to judge the extent to which fair values were affected by market illiquidity discounts, and adjust OTTIs accordingly.

We find that the OTTI designations made by commercial bank managers during the financial crisis were informative to investors, and were incrementally informative beyond the net unrealized gain/loss that banks would recognize in earnings under a strict fair value accounting system. We find reliably negative stock price reactions when firms warn about OTTIs outside of earnings announcements, and that investors price OTTIs at 10-Q/10-K filing dates. Using multiple regression, we find that investors react to OTTIs incrementally to reported fair value gains/losses. Investors appear to believe that OTTIs provide information about the certainty of the losses currently labeled as OTTI as well as the certainty of other unrealized losses in the portfolio. Finally, we find that bifurcating OTTIs into credit and non-credit components isolated a useful component of OTTIs for investors.

We conclude that managers' judgments about the certainty of unrealized losses are useful to investors. Our results provide evidence in favor of preserving similar disclosures in an expanded fair value accounting regime. The findings support two specific aspects of the FASB's and IASB's reforms. First, the finding that investors price the credit but not the non-credit portion of OTTIs supports the use of an impairment model based on credit losses (as opposed to a model that incorporates both credit and liquidity factors). Second, the finding that investors project the probable losses represented by OTTIs onto the rest of the portfolio suggests that investors prefer to price unrealized losses before they reach the "probable" threshold; this implies that the threshold should be lowered, consistent with the FASB's and IASB's proposal to use an "expected" rather than "probable" threshold.

The financial crisis represents a powerful setting for studying OTTIs because of the numerous and sizeable OTTI charges. Although the unique economic circumstances could limit the study's generality, many economic downturns involve market illiquidity and uncertainty,

which are the conditions that make OTTI useful. Future research could examine periods after the

financial crisis, other types of asset impairments, or non-financial firms.

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FIGURE 1
Industry-Level Other-than-Temporary Impairments by Quarter (in billions)
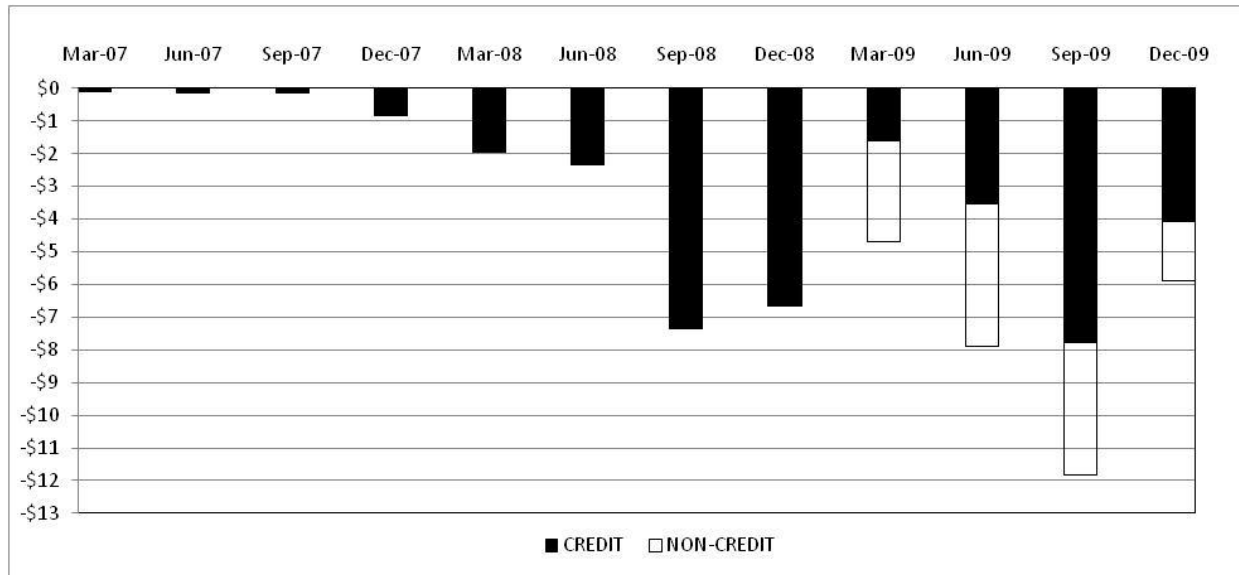
The sample consists of the top 100 banks each quarter ranked by beginning holdings of non-Treasury held-to-maturity and available-for-sale securities. The other-than-temporary impairments (OTTIs) depicted were recognized on available-for-sale and held-to-maturity securities (handcollected from 10-Q and 10-K filings). Beginning in 2009, CREDIT denotes the portion of the OTTI charge due to credit losses. NON_CREDIT denotes the portion of the OTTI charge due to non-credit losses.

TABLE 1
Short Window Returns around OTTI Warnings

Panel A: Descriptive Statistics (RET_WARN)

Sample partition	n	25th Percentile	mean		median		75th Percentile	Std. Dev.
All warnings	50	-0.075	-0.042	***	-0.033	***	0.021	0.079
Mention OTTI only	36	-0.054	-0.022	**	-0.025	**	0.033	0.075
Mention OTTI and other items	14	-0.165	-0.092	***	-0.073	***	-0.026	0.067
Warn before earnings announcement	42	-0.075	-0.043	***	-0.031	***	0.029	0.081
Warn after earnings announcement	8	-0.076	-0.034		-0.035	*	-0.003	0.078

***, **, * denote significantly different from zero at the 1, 5, and 10 percent levels, respectively (two-tailed). RET_WARN is the three day (-1,+1) market adjusted return around the OTTI warning date.

Panel B: Cross-sectional Determinants of the Market Reaction to OTTI Warnings

	Predicted	OTTI-only Warnings	
Intercept	?	-0.0047	
		(0.0173)	
OTTI_WARN	+	1.0231	*
		(0.7416)	
LOW_CAPITAL	-	0.0268	
		(0.0299)	
OTTI_WARN*LOW_CAPITAL	+	0.5799	
		(1.5270)	
Adjusted R-square		7.33%	
n		36	

***, **, * denote significantly different from zero at the 1, 5, and 10 percent levels, respectively (one-tailed if sign is in the predicted direction, two-tailed otherwise). The model is estimated using ordinary least squares. Heteroscedasticity-consistent standard errors are presented in parentheses below coefficient estimates (White 1980). The dependent variable is the three-day market adjusted return around the OTTI-warning date (RET_WARN). OTTI_WARN equals other-than-temporary impairments of available-for-sale and held-to-maturity securities included in the warning, scaled by beginning-of-quarter market value of equity (CSHPRQ x PRCCQ from Compustat). LOW_CAPITAL is an indicator variable equal to one if the firm's Tier1 Capital Ratio is below the sample median.

TABLE 2
Timing of OTTI Pricing

Panel A: Return Window Descriptive Statistics

Full Sample (n=958)	Mean		Std Err	Min	Q1	Median		Q3	Max
RET_EARN$_{q+1}$	-0.0003		0.1293	-0.6742	-0.0591	-0.0006		0.0624	0.6160
RET_FILING$_{q+1}$	0.0077	**	0.1012	-0.6141	-0.0327	0.0045	**	0.0419	1.0299
RET$_{q+1}$	-0.0351	***	0.2962	-1.3148	-0.1726	-0.0041	***	0.1185	1.3228
RET_EARN$_q$	0.0085	**	0.1279	-0.6742	-0.0499	0.0085	***	0.0711	0.6160
RET_FILING$_q$	0.0022		0.0933	-0.3496	-0.0449	0.0006		0.0413	0.6814
RET$_q$	-0.0496	***	0.2947	-1.1739	-0.2037	-0.0416	***	0.1075	1.5603
RET_EARN$_{q-1}$	0.0088	**	0.1210	-0.6742	-0.0516	0.0052	**	0.0680	0.6160
RET_FILING$_{q-1}$	0.0047		0.0959	-0.6141	-0.0432	0.0035		0.0453	0.6814
RET$_{q-1}$	-0.0651	***	0.2894	-1.1739	-0.2236	-0.0641	***	0.0958	1.5603
RET_EARN$_{q-2}$	0.0024		0.1127	-0.6110	-0.0527	-0.0031		0.0581	0.6160
RET_FILING$_{q-2}$	0.0031		0.0898	-0.6141	-0.0435	0.0015		0.0451	0.5572
RET$_{q-2}$	-0.0807	***	0.2595	-1.1739	-0.2143	-0.0688	***	0.0630	0.9036
RET_EARN$_{q-3}$	0.0039		0.1068	-0.6110	-0.0474	-0.0019		0.0513	0.5135
RET_FILING$_{q-3}$	-0.0025		0.0796	-0.6141	-0.0384	0.0000		0.0347	0.4138
RET$_{q-3}$	-0.0852	***	0.2315	-1.1739	-0.1855	-0.0627	***	0.0260	0.9036

***, **, * denote significantly different from zero at the 1, 5, and 10 percent levels, respectively (two-tailed).
RET_EARN$_{q+t}$, t=-3,-2,…,1 is the three day (-1,+1) raw return around the earnings announcement date for quarter q+t-1. RET_FILING$_{q+t}$, t=-3,-2,…,1 is the three day (-1,+1) raw return around the filing date of the 10K/10Q for quarter q+t-1. RET$_{q+t}$, t=-3,-2,…,1 is the raw return for the for fiscal quarter q+t, excluding RET_WARN, RET_EA$_{q+t}$, , and RET_FILING$_{q+t}$. All variables are winsorized at the 1st and 99th percentiles within each sample period before and after adoption of the OTTI bifurcation rule.

Panel B: Reverse Regressions of Financial Statement Items on Various Market Return Windows

	Predicted	OTTI		UNREAL_GL		BDE		EARN	
Intercept	?	-0.0057	***	-0.0012		-0.0328	***	-0.0625	***
		(0.0009)		(0.0028)		(0.0023)		(0.0209)	
RET_WARN	+	0.2183	***	0.6478	***	0.0917		1.0458	
		(0.0479)		(0.2340)		(0.0924)		(0.9448)	
RET_EARN$_{q+1}$	+	0.0056		-0.0352		0.1128	***	0.8544	***
		(0.0045)		(0.0249)		(0.0196)		(0.2322)	
RET_FILING$_{q+1}$	+	0.0167	***	0.0881	***	0.0059		0.0203	
		(0.0049)		(0.0323)		(0.0228)		(0.2913)	
RET$_{q+1}$	?	0.0023		-0.0060		0.0248	***	0.1553	***
		(0.0028)		(0.0170)		(0.0077)		(0.0634)	
RET_EARN$_q$	+	0.0020		0.0025		0.1177	***	0.8920	***
		(0.0032)		(0.0283)		(0.0204)		(0.1961)	
RET_FILING$_q$	+	0.0055		0.1443	***	0.0014		-0.5563	*
		(0.0055)		(0.0563)		(0.0232)		(0.2769)	
RET$_q$	?	-0.0010		0.0181		0.0250	***	0.1812	*
		(0.0019)		(0.0137)		(0.0082)		(0.1010)	
RET_EARN$_{q-1}$	+	-0.0021		-0.0600	**	0.0481	***	0.7049	***
		(0.0043)		(0.0285)		(0.0151)		(0.1409)	
RET_FILING$_{q-1}$	+	0.0108	**	0.0109		-0.0264		-0.4726	
		(0.0049)		(0.0375)		(0.0267)		(0.3602)	
RET$_{q-1}$	?	0.0016		0.0434	***	0.0458	***	0.5367	***
		(0.0022)		(0.0160)		(0.0085)		(0.0879)	
RET_EARN$_{q-2}$	+	-0.0031		-0.0384		0.0580	***	0.6992	***
		(0.0054)		(0.0274)		(0.0156)		(0.2474)	
RET_FILING$_{q-2}$	+	0.0165	**	0.0042		-0.0027		-0.0787	
		(0.0065)		(0.0617)		(0.0283)		(0.3153)	
RET$_{q-2}$	?	0.0032		0.0100		0.0557	***	0.4391	***
		(0.0032)		(0.0187)		(0.0093)		(0.0913)	
RET_EARN$_{q-3}$	+	0.0074		0.0263		0.0650	***	0.5874	**
		(0.0046)		(0.0358)		(0.0214)		(0.2602)	
RET_FILING$_{q-3}$	+	0.0180	***	-0.0698		0.0182		0.3393	
		(0.0064)		(0.0457)		(0.0257)		(0.2873)	
RET$_{q-3}$	?	0.0021		-0.0146		0.0510	***	0.3829	***
		(0.0043)		(0.0224)		(0.0078)		(0.1127)	
Adjusted R-square		11.88%		10.75%		31.88%		26.14%	
n		958		958		958		958	

***, **, * denote significantly different from zero at the 1, 5, and 10 percent levels, respectively (one-tailed if sign is in the predicted direction, two-tailed otherwise). The model is estimated using ordinary least squares. Robust standard errors clustered by firm are presented in parentheses below coefficient estimates. The dependent variable is OTTI, BDE, UNREAL_GL, or EARN. OTTI equals other-than-temporary impairments of available-for-sale and held-to-maturity securities (handcollected from 10-Q and 10-K filings), scaled by beginning-of-quarter market value of equity (CSHPRQ x PRCCQ from Compustat). BDE equals the charge related to management's expectations about future uncollectible loan and lease amounts (bhck4230), scaled by beginning-of-quarter market value of equity. UNREAL_GL is the unrealized gain/loss for the quarter, which equals the change in the difference between the current quarter and prior quarters fair value of held-to-maturity (bhck1771) and available-for-sale securities (bhck1773) and the amortized cost of held-to-maturity (bhck1754) and available-for-sale securities (bhck1772), adjusted for OTTI and realized gain/loss (bhck3521 + bhck3196), and scaled by beginning-of-quarter market value of equity (see equation 4). EARN equals pretax earnings (bhck4301) plus extraordinary items (bhck4320) minus other-than-temporary-impairments (OTTI) minus bad debt expense (bhck4230), scaled by beginning-of-quarter market value of equity. All items beginning with "bhck" come from Federal Reserve Y-9C reports. See Table 2, Panel A for other variable descriptions.

TABLE 3

Descriptive Statistics and Correlations for Firm Quarter Variables

Panel A: Descriptive Statistics

Full Sample (n=958)	Mean		Std Err	Min	Q1	Median		Q3	Max
Dependent Variables									
RET_DPERIOD	-0.0172		0.3375	-0.9465	-0.2118	-0.0213		0.2065	1.0238
RET_5QTRS	-0.1223	***	0.5261	-2.1213	-0.4294	-0.0450	***	0.2517	1.2286
Other Variables									
EARN	-0.1697		0.5406	-6.4056	-0.1048	-0.0126		0.0142	0.0823
BDE	-0.0954		0.2513	-3.1981	-0.0749	-0.0225		-0.0079	0.0000
ΔEARN	0.0047		0.1926	-1.3751	-0.0087	0.0001		0.0075	1.5289
ΔBDE	-0.0127		0.1201	-1.2942	-0.0112	-0.0016		0.0021	0.5721
OTTI	-0.0062		0.0164	-0.1013	-0.0032	0.0000		0.0000	0.0000
CREDIT	-0.0060		0.0166	-0.1013	-0.0037	-0.0001		0.0000	0.0000
NON_CREDIT	-0.0049		0.0137	-0.0960	-0.0019	0.0000		0.0000	0.0000
UNREAL_GL	-0.0053		0.0879	-0.5524	-0.0233	-0.0016		0.0177	0.4953
OCI	-0.0012		0.0096	-0.0579	-0.0004	0.0000		0.0005	0.0401
GAP_GL	0.3500		8.8178	-64.4078	-2.1887	0.5425		3.5195	29.8604
CUM_EFFECT	0.0003		0.0028	0.0000	0.0000	0.0000		0.0000	0.0366
Tier 1 Capital Ratio	11.15		2.96	0.12	9.42	10.66		12.34	30.00
Mkt Value of Equity	6,697		21,088	21	358	847		2,036	147,155

For the dependent variables, ***, **, * denote significantly different from zero at the 1, 5, and 10 percent levels, respectively (two-tailed). RET_DPERIOD is the market adjusted return for the four-month window starting the month before the fiscal quarter-end date and ending three months after the fiscal quarter-end date. For example, if a firm's fiscal quarter ends on 12/31, then RET_DPERIOD includes December, January, February, and March. RET_5QTRS is the market adjusted return for the five quarters from q-3 to q+1. For example, if a firm's fiscal year ends on 12/31/08, then RET_5QTRS includes all of calendar year 2008 and the first quarter of 2009. EARN equals pretax earnings (bhck4301) plus extraordinary items (bhck4320) minus other-than-temporary-impairments (OTTI) minus bad debt expense (bhck4230), scaled by beginning-of-quarter market value of equity (CSHPRQ x PRCCQ from Compustat). BDE equals the charge related to management's expectations about future uncollectible loan and lease amounts (bhck4230), scaled by beginning-of-quarter market value of equity. ΔEARN is EARN in quarter q minus EARN in quarter q-1, scaled by beginning-of-quarter market value of equity. ΔBDE is BDE in quarter q minus BDE in quarter q-1, scaled by beginning-of-quarter market value of equity. OTTI equals other-than-temporary impairments of available-for-sale and held-to-maturity securities (handcollected from 10-Q and 10-K filings), scaled by beginning-of-quarter market value of equity. CREDIT equals the OTTI charge due to credit losses, scaled by beginning-of-quarter market value of equity. NON_CREDIT equals the OTTI charge due to non-credit losses, scaled by beginning-of-quarter market value of equity. UNREAL_GL is the unrealized gain/loss for the quarter, which equals the change in the difference between the current quarter and prior quarters fair value of held-to-maturity (bhck1771) and available-for-sale securities (bhck1773) and the amortized cost of held-to-maturity (bhck1754) and available-for-sale securities (bhck1772), adjusted for OTTI and realized gain/loss (bhck3521 + bhck3196), and scaled by beginning-of-quarter market value of equity (see equation 4). OCI equals amount of other comprehensive income due to currency translation adjustments (CICURRQ), pension adjustments (CIPENQ), and derivative transactions (CIDERGLQ) (from Compustat), scaled by beginning-of-quarter market value of equity. GAP_GL equals the difference between assets and liabilities maturing or repricing in more than one year (bhck0395+bhck0397+bhck5369+bhckB529 - bhdm6636 - bhfn6636 - bhck3190 - bhck4062 - bhckC699 - bhck3197 - bhck3298 - bhck3409) multiplied by the change in the five-year Treasury bond rate, scaled by beginning-of-quarter market value of equity. CUMUL_EFFECT equals the amount of past OTTIs that banks classified as non-credit when adopting the OTTI bifurcation rule (handcollected from 10-Q/10-Ks), scaled by beginning-of-quarter market value of equity. Tier1 Capital Ratios come from bhck7206. Mkt Value of Equity equals beginning-of-quarter CSHPRQ x PRCCQ from Compustat (in $ millions). All variables except CREDIT, NON_CREDIT, and Tier 1 Capital Ratio are winsorized at the 1st and 99th percentile within each sample period before and after adoption of the OTTI bifurcation rule. To winsorize the CREDIT and NON_CREDIT components of OTTI, we map the winsorized OTTI values into CREDIT and NON_CREDIT values by applying the original CREDIT and NON_CREDIT proportions to the winsorized OTTI value. For example, if 75 percent of the original OTTI was CREDIT, then we would multiply winsorized OTTI by 75 percent to compute CREDIT and by 25 percent to compute NON_CREDIT. Because Tier 1 Capital Ratio has no extreme outliers in the left tail, we winsorize at the 99th percentile only. All items beginning with "bhck", "bhdm", or "bhfn" come from Federal Reserve Y-9C reports.

Panel B: Pearson (above the diagonal) and Spearman (below the diagonal) Correlations

Pearson (top) and Spearman (bottom) Correlations															
Full Sample (n=958)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RET_DPERIOD (1)		0.45*	0.11*	0.07*	0.07*	0.15*	0.08*	0.11*	0.06	-0.09*	0.07*	-0.13*	-0.04	0.04	-0.01
RET_5QTRS (2)	0.39*		0.35*	0.32*	-0.03	0.11*	0.12*	0.16*	-0.02	0.02	-0.07	-0.13*	0.00	0.16*	0.04
EARN (3)	0.21*	0.37*		0.96*	0.13*	0.62*	0.16*	0.12*	0.03	-0.01	0.08*	0.05	-0.07	0.13*	0.06
BDE (4)	0.16*	0.38*	0.87*		-0.02	0.62*	0.13*	0.07*	0.05	-0.07*	0.06	0.08*	-0.07*	0.13*	0.06
ΔEARN (5)	0.06	0.03	0.23*	0.10*		0.25*	-0.08*	-0.07*	-0.08*	0.05	-0.02	0.03	0.02	-0.01	-0.02
ΔBDE (6)	0.22*	0.11*	0.30*	0.30*	0.13*		0.05	0.03	0.03	0.03	0.08*	-0.03	-0.06	0.03	0.02
OTTI (7)	0.06	0.06*	0.24*	0.09*	0.08*	0.02		0.83*	0.74*	0.20*	0.01	0.20*	-0.19*	0.00	-0.01
CREDIT (8)	0.07	0.06*	0.14*	0.03	0.11*	-0.03	0.97*		0.23*	0.07	0.04	0.16*	-0.11*	0.04	-0.01
NON_CREDIT (9)	0.06	-0.08*	0.03	-0.06	0.13*	-0.06*	0.77*	0.65*		0.12*	0.05	0.21*	-0.17*	0.07*	-0.01
UNREAL_GL (10)	-0.25*	0.03	0.04	-0.07*	0.12*	0.03	0.27*	0.12*	0.11*		0.04	0.10*	0.01	0.07	-0.02
OCI (11)	0.03	-0.05	0.08*	0.05	0.02	0.08*	0.00	-0.02	0.00	0.05		-0.08*	-0.02	0.03	-0.05
GAP_GL (12)	-0.26*	-0.19*	-0.04	-0.03	0.00	-0.07	0.00	0.05	0.14*	0.23*	-0.08*		-0.178	-0.05	0.03
CUM_EFFECT (13)	-0.03	0.05	-0.06	-0.04	0.03	-0.02	-0.15*	-0.15*	-0.24*	-0.04	0.05	-0.19*		0.00	-0.01
Tier 1 Capital Ratio (14)	0.03	0.16*	0.15*	0.15*	0.00	0.11*	0.09*	0.17*	0.20*	0.15*	0.01	-0.17*	0.01		-0.11
Mkt Value of Equity (15)	0.04	0.20	0.25*	0.29*	0.01	0.06	-0.16*	-0.15*	-0.28*	-0.05	0.04	-0.01	0.05	-0.15*	

[*] denotes significantly different from zero at the 5 percent level or higher (two-tailed). See Table 3, Panel A for variable descriptions.

TABLE 4
Incremental Pricing of OTTI

Panel A: Regression of Market Adjusted Returns on Financial Performance Variables

		Dependent variable is RET_DPERIOD						RET_5QTRS	
	Predicted	**Pre-Rule Change**		**Post-Rule Change**		**Full Sample**		**Full Sample**	
Intercept	?	0.0296	**	-0.0139		0.0040		-0.0900	***
		(0.0147)		(0.0140)		(0.0104)		(0.0264)	
ΔEARN	+	0.0771		0.0683		0.1025	*	-0.1105	
		(0.2759)		(0.0613)		(0.0675)		(0.0963)	
ΔBDE	+	0.7285	**	0.2397	*	0.3463	**	0.5202	***
		(0.4011)		(0.1819)		(0.1820)		(0.2159)	
OTTI	+	1.7368		1.5968	**	2.5231	***	4.4458	***
		(3.0538)		(0.7413)		(0.6943)		(1.3463)	
UNREAL_GL	+	-0.2523		-0.5391	**	-0.4192	**	0.0509	
		(0.4348)		(0.2265)		(0.1945)		(0.1743)	
OCI	+	-2.3283		5.2815	**	1.7670		-5.1149	*
		(1.9645)		(1.6492)		(1.4234)		(2.5422)	
GAP_GL	-	-0.0151	***	-0.0009		-0.0054	***	-0.0098	***
		(0.0030)		(0.0019)		(0.0019)		(0.0030)	
Adjusted R-square		10.28%		10.63%		6.35%		5.84%	
n		584		374		958		958	

An F-test indicates that the OTTI coefficient is statistically different from the UNREAL_GL coefficient in all of the regressions (two-tailed p-value = 0.04, 0.04, 0.02, and 0.02, respectively).

***, **, * denote significantly different from zero at the 1, 5, and 10 percent levels, respectively (one-tailed if sign is in the predicted direction, two-tailed otherwise). The model is estimated using ordinary least squares. Robust standard errors clustered by firm are presented in parentheses below coefficient estimates. See Table 3 for variable descriptions.

Panel B: Regression of Market Adjusted Returns on Financial Performance Variables and a Proxy for Remaining Loss Capacity.

		Dependent variable is RET_DPERIOD						RET_5QTRS	
		Pre-Rule Change		Post-Rule Change		Full Sample		Full Sample	
	Predicted								
Intercept	?	0.0360	**	0.0120		0.0196		-0.0964	***
		(0.0171)		(0.0175)		(0.0121)		(0.0287)	
ΔEARN	+	0.1171		0.0647		0.1068	*	-0.0999	
		(0.2650)		(0.0579)		(0.0662)		(0.0882)	
ΔBDE	+	0.6788	**	0.2472	*	0.3523	**	0.5345	***
		(0.4101)		(0.1793)		(0.1823)		(0.2138)	
OTTI	+	-2.5300		0.3077		1.1491	*	2.0721	
		(3.6738)		(0.9653)		(0.8020)		(1.8946)	
LOSS_CAPACITY	-	-0.0584		-0.0997	***	-0.0844	***	0.0229	
		(0.0416)		(0.0324)		(0.0274)		(0.0585)	
OTTI*LOSS_CAPACITY	+	7.6215	*	1.5369		1.7177		4.7698	**
		(5.5601)		(1.6063)		(1.4523)		(2.5189)	
UNREAL_GL	+	-0.3360		-0.6250	**	-0.4788	**	-0.0009	
		(0.4095)		(0.2556)		(0.2037)		(0.1792)	
OCI	+	-2.8036		5.1355	***	1.5802		-5.2084	**
		(2.1136)		(1.6508)		(1.4592)		(2.5771)	
GAP_GL	-	-0.0152	***	0.0001		-0.0048	***	-0.0093	***
		(0.0030)		(0.0019)		(0.0019)		(0.0030)	
Adjusted R-square		11.84%		14.09%		7.92%		6.38%	
n		584		374		958		958	

An F-test indicates that the OTTI coefficient is not statistically different from the UNREAL_GL coefficient in the first and second regression but is statistically different from UNREAL_GL in the third and fourth regression (two-tailed p-value = 0.50, 0.30, 0.10, and 0.10, respectively).

An F-test indicates that the sum of the estimated coefficients on OTTI and OTTI*LOSS_CAPACITY is statistically positive in all four regressions (one-tailed p-value = 0.07, 0.02, 0.01, and <0.01 respectively.)

***, **, * denote significantly different from zero at the 1, 5, and 10 percent levels, respectively (one-tailed if sign is in the predicted direction, two-tailed otherwise). LOSS_CAPACITY equals 1 if the end-of-the-quarter fair value of risky securities divided by the end-of-the-quarter amortized cost of risky securities is in the lowest quartile and zero otherwise. The risky securities we include are non-agency mortgage backed securities, asset-backed securities, and debt securities other than those issued by federal or state governments.

The model is estimated using ordinary least squares. Robust standard errors clustered by firm are presented in parentheses below coefficient estimates. See Table 3 for variable descriptions.

TABLE 5

Regression Testing Differential Pricing of Credit and Non-Credit OTTIs

	Predicted	RET_DPERIOD					
Intercept	?	-0.0132		-0.0167		-0.0208	
		(0.0140)		(0.0131)		(0.0150)	
ΔEARN	+	0.0685		0.0639		0.0607	
		(0.0611)		(0.0586)		(0.0635)	
ΔBDE	+	0.2371	**	0.2396	*	0.2422	*
		(0.1824)		(0.1804)		(0.1815)	
CREDIT	+	1.8492	**	2.0130	**		
		(1.2140)		(1.1416)			
NON_CREDIT	+	1.0921				1.5132	
		(1.3035)				(1.2695)	
UNREAL_GL	+	-0.5336	**	-0.5225	**	-0.5277	**
		(0.2229)		(0.2255)		(0.2183)	
OCI	+	5.2443	***	5.2535	***	5.2607	***
		(1.6552)		(1.6444)		(1.6519)	
GAP_GL	-	-0.0010		-0.0008		-0.0007	
		(0.0019)		(0.0019)		(0.0018)	
CUMUL_EFFECT	+	-2.3952		-2.8092		-2.7809	
		(2.2653)		(2.1126)		(2.4759)	
Adjusted R-square		10.8%		10.6%		9.8%	
n		374		374		374	

An F-test indicates that the CREDIT coefficient is statistically different from the UNREAL_GL coefficient in the first and second regression (two-tailed p-value = 0.02, and 0.02, respectively).

An F-test indicates that the NON_CREDIT coefficient is not statistically different from the UNREAL_GL coefficient in the first regression but is statistically different from UNREAL_GL in the third regression (two-tailed p-value = 0.14, and 0.08, respectively).

An F-test indicates that the CREDIT coefficient is not statistically different from the NON_CREDIT coefficient in the first regression (one-tailed p-value = 0.15).

***, **, * denote significantly different from zero at the 1, 5, and 10 percent levels, respectively (one-tailed if sign is in the predicted direction, two-tailed otherwise). The model is estimated using ordinary least squares. Robust standard errors clustered by firm are presented in parentheses below coefficient estimates. See Table 3 for variable descriptions.