

Other-Than-Temporary Impairments of Investment Securities by Non-Financial Firms*

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Abstract: We study the characteristics of other-than-temporary impairments (OTTI) of investment securities and the drivers underlying their reporting for non-financial firms during the periods immediately preceding, covering, and following the Financial Crisis. Focusing on the industrial component of the S&P 1500 index, we find that more than one fifth of firms with investment securities report at least one OTTI during the sample period. We begin the analysis by providing a set of stylized facts regarding both the firms which recognize such impairments and the underlying depressed investments. Next, using non-parametric and parametric analyses we find that, consistent with the stated objective of FAS 115, the propensity to report an OTTI in the sample decreases in market-wide performance and firm-level proxies of intent and ability to hold the securities to recovery, and increases in the level and duration of unrealized loss on investment securities. Interestingly, we also find that the OTTI are distributed throughout the sample period and are not limited to the quarters with large economic shocks. Finally, we note that while proxies for income smoothing and big-bath behavior are positively associated with the incidence and magnitude of OTTI, subsequent patterns of securities trading do not support the conjecture that firms are successful in managing their post-Crisis earnings through the sale of previously impaired securities.

Keywords: Other-than-temporary impairment, OTTI, Fair value accounting, Mark-to-market accounting, Financial Crisis, Investment securities, Non-financial firms

JEL Codes: G01, M41, M48

1. Introduction

The recent Financial Crisis generated a renewed interest in the accounting for financial instruments. In particular, various constituents have claimed that the extant financial accounting rules increase balance sheet volatility and exacerbate economic downturns by inducing a feedback loop between the market performance and the values of these securities (e.g., Plantin et al. 2008, Allen and Carletti 2008). Academic research on the issue predominantly focuses on financial institutions: companies whose business model calls for holding large portfolios of financial instruments. Implicitly, this strand of the literature posits that the joint effect of the Financial Crisis and fair value accounting on non-financial companies manifests solely through credit tightening, relegating the relation as second-order. Consequently, little has been said on the role of accounting for financial instruments among non-financial institutions and on the performance of the investments of non-financial firms during the Financial Crisis. We take a step to filling this gap by exploring other-than-temporary impairments (OTTI) on investment securities held by non-financial firms.

Our focus on OTTI is driven by the observation that when non-financial companies opt to acquire investment portfolios, the component securities are typically classified as available-for-sale (AFS) or held-to-maturity (HTM).^{1, 2} Current accounting rules mandate that the income statement treatment of these investments reflects historical cost, hence, in the absence of security sales, the impact from a decline in their market value is limited to the recognition of OTTI. Since the extant guidance allows significant degree of discretion in the recognition and, possibly, measurement of OTTI, it remains an open question whether or not non-financial companies apply the standards properly and uniformly.

Several studies provide evidence on the impact and information content of OTTI during the Financial Crisis. These studies generally document a dramatic increase in the incidence of OTTI after

¹ We confirm this observation empirically: Very few of our sample firms designate any of their investment securities as trading.

² We do not examine other forms of investments such as equity method investments, joint ventures, special purpose entities, etc. We also do not examine derivatives which typically reflect hedging activities. These investments are guided by different accounting standards.

2007, however, the evidence fails to support that these OTTI materially impact the regulatory capital of banks or result in asset fire sales (Laux and Leuz 2010, Badertscher et al. 2012a, Shaffer 2010). In a direct examination of OTTI, Badertscher et al. (2012b) argue that these impairments provide important information on the upper bound of the realizable value of the underlying securities and support FASB's implementation of FSP FAS 115-2/124-2 which requires companies to reflect in net income only the credit portion, i.e. the effect of the lower expected future cash flows, of the OTTI. These studies focus exclusively on financial institutions in line with the evolution of the debate surrounding the measurement of financial instruments. Although the holdings of AFS and HTM securities are indeed highest for financial institutions, non-financial companies, which comprise a significant part of the economy, also bear a non-trivial exposure. Furthermore, the examination of OTTI as a strategic decision is complicated in the financial institutions setting by the fact that market declines that depress AFS and HTM investment values strongly impact other financial statement components of these entities, such as loans and trading portfolios. In contrast, core operations of non-financial firms tend to have a much weaker association with market performance. We seek to contribute to the existing literature by examining whether OTTI recognition decisions appear to be in line with accounting guidance or are influenced by reporting incentives.

To shed light on the issue, we first search the annual reports of the Russell 3000 firms for evidence of OTTI reporting in 2007, 2008, and 2009, a period directly preceding, covering, and immediately following the Financial Crisis.³ Consistent with prior research, we find that the frequency of recognized OTTI is highest among financial institutions. Non-financial companies, however, also report OTTI at relatively high rates.⁴ We next collect quarterly data on the characteristics of OTTI for the S&P 1500 industrial firms for the sample period. We focus on this group of non-financial companies since

³ We focus on the Financial Crisis period because instances of OTTI are very rare among non-financial firms in earlier periods. We review the 10-Ks of seven of our sample OTTI firms which have either the highest magnitude OTTI or OTTI in each of the three crisis years examined. For these firms we read the 10-Ks for fiscal years 2001 and 2002 (the most recent prior downturn period) and find only one instance of OTTI.

⁴ Consistent with the conjecture that the issue is not trivial for these firms, we find multiple cases of companies discussing at length why they choose not to recognize OTTI on their holdings during the particular period.

their business model does not encompass speculative investments and their holdings of strategic investments are minimal. During the examined period, we find that 13 percent of the sample firms report at least one OTTI; focusing on firms holding investment securities, this rate increases to more than 20 percent. Using these data, we examine whether recognition of OTTI reflects compliance with current accounting standards or, instead, is used to achieve a financial reporting objective. Specifically, we ask three interconnected questions: 1) What drives the recognition of OTTI?; 2) What determines the timing of OTTI recognition?; and, 3) What determines the magnitude of the recognized OTTI?

Our findings reveal that the recognition, timing, and magnitude of OTTI in the sample are largely consistent with the principles underlying the guidance provided by FASB. In particular, we note that OTTI reporting is negatively (positively) associated with the S&P 500 performance (unrealized loss on investment securities) consistent with the notion of an other-than-temporary decline in the value of the underlying securities. We also find that the propensity to report OTTI increases in periods of poor firm performance, which could either be consistent with the concept of “intent and ability” to hold the security or may indicate opportunistic reporting in times of increased complexity and underperformance.⁵ We note, however, that OTTI are associated with proxies for income smoothing and big bath behavior and are often reported contemporaneously with other income-decreasing special items. We find that the decline in the value of the investment securities of OTTI firms dramatically reverses as the Financial Crisis unwinds. Analyses of the subsequent trading patterns of OTTI firms, though, are not consistent with the conjecture that companies successfully manage their post-Crisis earnings through the sale of previously impaired securities.

Certain limitations apply to the study. In particular, the high data collection costs restrict the sample size, which, in turn, likely impacts the power of the tests and could limit the generalizability of the findings. Furthermore, the regression analysis could suffer from correlated omitted variables. Despite

⁵ As discussed in more detail in the next section, although the guidance on OTTI does not prescribe that the OTTI determination be reliant upon evaluation of firm performance (as is inherently the case for PP&E and Goodwill impairments), it does postulate that OTTI has to be recognized when the firm cannot demonstrate intent and ability to hold the security until its value recovers, considerations which are likely related to firm performance.

these limitations, we believe our study sheds light on an important, albeit overlooked, question and our evidence would be of interest to a wide audience as the debate on the role and information content of mark-to-market measurement is yet unresolved.

The rest of the paper is organized as follows. In Section 2 we provide a brief overview of the accounting treatment of investment securities, discuss the extant literature and motivate the study. In Section 3 we describe the sample construction and characteristics. In Section 4 we present our findings. Section 5 concludes.

2. Motivation

The primary objective of this study is to shed light on the determinants for and characteristics of OTTI for non-financial companies. As such, we first provide a brief overview of the accounting for investment securities and OTTI under U.S. GAAP. We then briefly discuss the extant literature and motivate our hypotheses.

2.1 U.S. GAAP on investment securities and OTTI

The general accounting rules for debt and equity securities are laid out in Financial Accounting Standards Board (FASB) Statement No. 115, “Accounting for Certain Investments in Debt and Equity Securities,” effective for fiscal years starting after December 15, 1993. Importantly, the statement establishes that investment securities held by a company have to be classified into three categories based on the intended use and holding horizon. In particular, securities bought and held with the intent to sell in the near term are classified as *trading*, debt securities acquired with the demonstrated intent and ability to be held to maturity are classified as *held-to-maturity* (HTM), and the securities that do not fit into either category are classified as *available-for-sale* (AFS). The accounting treatment among the three categories differs substantially. While trading securities are reported at fair value with unrealized gains and losses included in earnings, the unrealized gains and losses of AFS and HTM generally do not impact current

period earnings.⁶ In the case of AFS, the securities are carried at fair value on the balance sheet and the unrealized gains and losses are reported in accumulated other comprehensive income. Going further, HTM are reported at amortized historical cost, i.e. periodic fluctuations in market value of HTM securities do not impact the firm's financial statements.⁷

Relevant to our study, SFAS 115 also provides guidance on the treatment of unrealized losses that are deemed to be other-than-temporary. Generally, earnings are shielded from periodic fluctuations in market value for AFS and HTM securities and the cumulative effect is recognized when the gain/loss is realized through a sale or maturity of the security. However, for each AFS and HTM security firms must evaluate whether a decline in fair value below cost is other-than-temporary. In the event that the decline in the market value of a security below its cost is judged to be other-than-temporary, the company is required to write down the security so that the current fair value becomes the new cost basis.⁸ The write-down, in turn, is included in earnings as a realized loss. Any subsequent increases in the fair value of the security are included in the accumulated other comprehensive income portion of equity and are recognized in income only upon the sale of the security, rendering the other-than-temporary impairment generally irreversible.

Importantly, the guidance allows a high degree of subjectivity in the recognition of OTTI as both the choice to recognize an impairment and the timing of such recognition is meant to reflect managerial perception of whether the decline in value is temporary and whether the firm has the intent and ability to hold the security to recovery/collection. In fact, SFAS 115 explicitly states that “providing comprehensive guidance on other-than-temporary impairment involves issues beyond the scope of this

⁶ SFAS 159, “The Fair Value Option for Financial Assets and Financial Liabilities,” allows firms to elect to measure a wide range of financial assets and financial liabilities at fair value, flowing the unrealized gains and losses through the income statement. SFAS 159 is effective for fiscal years beginning after November 15, 2007 with early adoption allowed. No firms in our sample elect to apply the “fair value option” to their AFS or HTM holdings during the examined period.

⁷ To simplify the exposition, hereafter we refer to historical cost and amortized historical cost collectively as “cost.”

⁸ Similar to other studies, in this paper we use the terms “impair”, “write-down” and “write-off” interchangeably.

Statement.”⁹ Pronouncements which provide interpretive guidance on the evaluation of possible impairments include SEC Staff Accounting Bulletin No. 59 and AICPA Statement on Auditing Standards No. 92, both of which present examples of factors which are likely to impact such a determination but neither of which provides a bright-line or rule-of-thumb testing guidance. In 2004, the Emerging Issues Task Force (EITF) introduced more stringent guidelines, noting that ambiguities in the OTTI-related accounting guidance had resulted in inconsistent practices. The proposed modification, EITF Issue 03-01, met a strong negative reaction from the public. In November 2005 FASB issued a staff position which rescinded most of the guidance provided by Issue 03-01.¹⁰

In summary, at the onset of the Financial Crisis, the extant accounting rules permitted high levels of discretion in the determination OTTI recognition.¹¹ At the height of the Crisis, FSP FAS 115-2/124-2 (April 9, 2009) provided additional leeway allowing firms to keep the non-credit component of debt security OTTIs in accumulated other comprehensive income, so that only the credit component impacts current period net income.

2.2 Literature review

The research on other-than-temporary impairments of investment securities fits within the wider literature on fair value accounting. A vigorously debated subject among academics, standard setters and practitioners has been the merits and flaws of fair value accounting relative to historical cost accounting, and this debate has only intensified in the wake of the most recent Financial Crisis. Opponents of fair value accounting argue that using market value to price assets amplifies the severity of financial downturns, a view that is supported by theoretical models developed by Allen and Carletti (2008) and

⁹ Statement of Financial Accounting Standards No. 115 “Accounting for Certain Investments in Debt and Equity Securities,” par.16, 112-114.

¹⁰ EITF Issue 03-01 “The Meaning of Other-Than-Temporary Impairment and Its Application to Certain Investments” and FASB STAFF POSITION Nos. FAS 115-1 and FAS 124-1: The Meaning of Other-Than-Temporary Impairment and Its Application to Certain Investments.

¹¹ EITF 99-20 provides a more stringent guideline for the recognition of OTTI for securities that fall within its coverage (generally, credit-sensitive asset backed securities and prepayment-sensitive securities). Specifically, while FAS 115 allows a level of subjectivity requiring the company to determine whether the impairment is other-than-temporary, EITF 99-20 calls for using a trigger based on the information that a “market participant” would use. EITF 99-20-1 (January 12, 2009) effectively eliminates this difference, leaving the decision of whether or not to recognize OTTI at the discretion of the company.

Plantin et al. (2008), which analyze the (in)efficiencies of mark-to-market accounting relative to those of historical cost accounting during periods of market illiquidity. The primary findings from both papers imply that mark-to-market accounting exacerbates the illiquidity of markets when prices are spiraling downwards. Allen and Carletti (2008) argue that when asset prices are based on market values during financial crises, financial sectors experience contagion that spreads illiquidity as markets are flooded with impaired assets sold in fire sales which further depresses prices. In a similar vein of thought Plantin et al. (2008) contend that when financial markets are distressed under a mark-to-market regime, prices are simply indicative of illiquid markets. They further conjecture that decisions to liquidate impaired assets are driven by solvency concerns rather than by changes in fundamental values of the assets. Empirical support for these analytical models' predictions in Khan (2010) provides evidence that the extent of fair value accounting in an existing regime is positively associated with contagion among financial institutions. In relation to our study, the main take-away from this stream of research is that impairments may not necessarily be driven by declines in fundamental value of the investment securities. Rather, asset impairments are driven by market illiquidity at an economy-wide level and solvency concerns at a firm-level.

On the other side of the debate, proponents of mark-to-market accounting acknowledge that while there were sharp price declines and asset fire-sales during the Financial Crisis of 2007-2009, fair value accounting did not significantly contribute to the severity of the downturn (Laux and Leuz 2010). Moreover, empirical evidence supports that fair value disclosures are informative to investors. Prompted by changes to the accounting rules in 2009, which require firms reporting OTTI to distinguish between the credit and non-credit components of the write-downs, Badertscher et al. (2012b) examine OTTI recognized by banks during the Financial Crisis. The authors find that investors react to the OTTI in the expected manner, however, the reaction is driven solely by the credit component of the write-down.

The above papers assume that managers truthfully report the financial conditions of the firm's investment assets, whether in a fair-value accounting regime or in a historical cost regime, such that disclosures about impairments and sales of impaired assets are reliable and timely. However, prior

research documents extensive evidence that managers strategically delay asset write-down (e.g., Alciatore et al. 2000, Riedl 2004) and goodwill impairments (e.g., Gu and Lev 2011, Li et al. 2011). In a study related to ours, Vyas (2011) examines the current accounting standards on financial instruments, and specifically managerial judgment in determining whether unrealized losses on specific classes of financial instruments are non-temporary. Vyas (2011) examines the timeliness of write-downs on credit instruments relative to write-down schedules inferred from credit indices. Using a sample of financial institutions with write-downs during the Financial Crisis, the paper finds that firms delay recognizing impairments on credit instruments. Furthermore, he documents that securities with less risky exposures are written down later, which suggests that firms strategically postpone the write-downs rather than recording impairments to convey better information.

In summary, while there is a rich literature on the interaction between fair value accounting and financial crises, the extant evidence focuses on financial institutions and offers mixed conclusions. Empirical research provides evidence of material write-downs during the recent financial downturn, as well as significant market reactions to fair value disclosures made by financial institutions, suggesting that such disclosures are informative to investors. The extant literature, however, largely overlooks non-financial institutions. This gap is material: non-financial companies comprise a large part of the economy and, anecdotally, these firms hold non-trivial portfolios of investment securities rendering the application and impact of fair value accounting rules a first-order effect. Acknowledging that the investment securities held by non-financial companies are typically classified as AFS or HTM, we take a step in filling the gap by examining the determinants of OTTI recognition, focusing both on timing and magnitude.

2.3 Research Design

To shed light on the role of accounting for investment securities for non-financial firms we first explore the factors associated with reporting OTTI. We consider three sets of drivers: economic, accounting, and opportunistic.

A necessary condition for the reporting of OTTI is the holding of investment securities. While investment securities are wide-spread among financial institutions, the business model of industrial firms implies that, conceptually, they should be relatively rare in our sample. Thus, our first measure of economically-driven incidence of OTTI is the level of investment securities held by the firm.¹² Specifically, we expect that the propensity to report OTTI increases in the holdings of investment securities. Recognizing that the decision to hold securities is likely endogenous, we both model it explicitly and utilize a selection model in the analyses.

Our second “economic” measure draws from the audit literature. Evidence suggests that large auditors are likely to provide higher quality oversight as they have the necessary resources to develop technical expertise and face significant reputation and litigation risk (e.g., DeAngelo 1984; Becker et al. 1998). Since the core competencies of industrial firms generally do not include investments in financial instruments, we expect that firms with a Big 4 auditor are more likely to report OTTI during the Crisis period.

The vector of “accounting” drivers reflects the guidance on recognizing OTTI. As highlighted by Badertscher et al. (2012b), OTTI inform investors regarding the upper bound of the value of the investment securities. That is, OTTI should be recognized when the fair value of the securities declines below the historical cost basis and management believes this decline will not reverse during the period the company intends and is able to hold the securities. We operationalize this concept by exploring three sets of predictors capturing decline in value, intent to hold, and ability to hold the investment securities. To model the decline in value, we consider the level and change of a firm’s unrealized losses position. As a proxy for intent to hold, we consider the historical trading intensity, measured as the purchases and sales of investment securities. Finally, as measures of “ability to hold,” we consider the firm’s free cash flow, working capital, and historical leverage, as we expect that companies with liquidity needs would be likely

¹² The arguments in this section generally apply to the timing and magnitude of the OTTI as well. As such, the discussion to the forces underlying these issues abstracts from these factors.

to sell their investment securities.¹³ If the recognition of OTTI reflects the spirit of the accounting guidance, we expect the propensity to report the charge to increase in the unrealized losses, trading intensity, and liquidity needs.

Our third set of drivers reflects extant evidence that companies exercise judgment in applying accounting principles and structuring transactions to achieve a specific financial reporting objective. OTTI, in nature, are special items: income statement components that are infrequent or unusual. A large body of research examines the role of income-decreasing special items in financial reporting, and finds that financial statement users typically discount these as transitory charges and, consequently, managers are strategic in their timing and measurement (e.g., Lipe 1986, Francis et al. 1996, Riedl 2004, McVay 2006). While much of the literature treats income smoothing and “big-baths” as substitutes, Kirschenheiter and Melumad (2002) suggest that both strategies may be part of an equilibrium reporting strategy. They find that for sufficiently “bad” news, a manager is more likely to under-report earnings – thereby taking a “big-bath,” while for sufficiently “good” news, a manager is likely to smooth income. Consistent with this idea, Zucca and Campbell (1992) document that impairments of long-lived assets occur both in periods of abnormally high earnings, resulting in income smoothing, or in periods of below normal earnings, resulting in “big-baths.” Thus, we examine whether the recognition of OTTI is consistent with big bath or income smoothing behavior and whether it appears to be correlated with the contemporaneous firm decisions regarding the recognition of other income-decreasing special items.

The focus of the discussion so far has been on the likelihood of reporting OTTI. We supplement the analysis by exploring two additional interrelated questions pertaining to OTTI: Are these charges timely and what factors determine their magnitude. These questions are particularly pertinent in our setting as numerous studies suggest that during the Crisis period companies exercised considerable judgment in accounting for financial instruments (e.g., Vyas 2011). While these studies focus on financial institutions and explore the link between financial accounting, regulatory capital, and pro-

¹³ Firms may have alternative sources of funds, e.g. revolving lines of credit. Anecdotal evidence, however, suggests that during the Financial Crisis, these alternative sources of cash were rather limited.

cyclicality, the underlying arguments extend to non-financial firms as well. Similar to the incidence of OTTI reporting, we model the timing and magnitude of OTTI from the perspective of economic forces, accounting guidance, and managerial incentives.

3. Sample and descriptive statistics

3.1 Sample

Our sample construction begins with cataloging all instances of OTTI reported in the annual filings of firms in the Russell 3000 index as of June 2007. We first examine these firms' 10-K reports filed in calendar years 2008 through 2010 (generally corresponding to fiscal years 2007 through 2009) and search for paragraphs within the reports containing the phrase "other than temporary", as well as references to investments, securities, declines or impairments, and certain quantitative information (see Appendix A for a full description of the data collection process). Of the 7,593 annual reports examined, 2,450 (32 percent), corresponding to 1,156 individual firms, contain a matching paragraph. We then manually examine each instance of disclosure in order to confirm that the firm reported an OTTI during the examined period and identify a final sample of 769 OTTI-reporting firms (28 percent of the starting sample). Financial data required for our empirical analyses are from Compustat's annual and quarterly databases and analysts' forecast data are from I/B/E/S.

We report the distribution of OTTI firms by industry in Table 1, Panel A. Unsurprisingly, firms in the finance and insurance industries (GICS Industry Groups code 4010 through 4030) have high frequencies of OTTI during the sample period. These firms are expected to hold the largest and most diverse portfolios of investments, with many assets subject to OTTI testing. Firms in research and development intensive sectors, such as technology and pharmaceutical, also have relatively high rates of OTTI. A review of select disclosures from these firms indicates that these firms most frequently hold investments for purposes of strategic consolidations and control. We choose to focus our analysis on industrial firms (GICS Industry Groups 1510 through 2520 and 3020), where approximately 13 percent of all firms examined experienced an OTTI. This research design choice is motivated by evidence that these

firms' business models generally do not include financial investments and that they hold minimal strategic investments, thus providing a clean setting to examine impairment decisions by non-financial companies. Panel B of Table 1 presents the distribution of OTTI firms across the size indices. We observe that OTTI are most common among large firms. Driven by data collection constraints, all subsequent analyses are based on a sample of industrial OTTI and non-OTTI firms in the S&P 1500 index, unless otherwise noted. Panel C of Table 1 shows the distribution of the 52 OTTI firms of interest across the industry groups and size indices.

We present the descriptive statistics of OTTI and non-OTTI industrial firms for fiscal year 2008 in Table 2, Panel A. We include variables which capture various aspects of investment activity, such as levels of short and long term investments, unrealized gains and losses on marketable securities, and cash outflows and inflows associated with investment trading, among others. We also include other descriptive variables indicative of size, liquidity, leverage, and performance. We consider the snapshot of financial data as of 2008 since that fiscal year contains over half of our identified instances of OTTI. We note that OTTI firms are larger than non-OTTI firms in the mean, but the medians for the two groups are not statistically different in size, profitability, and cash flows. More importantly, there is a significant difference between the two groups in all variables related to investment activities. To better understand the differences between OTTI and their industry peers, we match each of the 52 OTTI firms to a non-OTTI firm with most similar reported total assets. Examining the financial statement items in Panel B of Table 2 (for brevity not tabulated in its entirety), we note that while the two groups are statistically identical with respect to size, profitability, and all other financial characteristics, the investment-related variables identified earlier are significantly different.¹⁴ For this reason, most of the subsequent analysis focuses on OTTI firms and a matched sample identified as industrial non-OTTI firms which had non-zero

¹⁴ The decision of industrial firms to partake in investment activity is a complex one and, as far as we know, remains unexplored in the literature. Review of a large number of disclosure examples pertaining to investment activity reveals these firms applying a wide spectrum of arguments to justify investment choices including, among others, perceived profit maximizing opportunities, liquidity concerns, strategic expansion, and competitive pressures. In our primary tests, we do not address this decision and instead focus on industrial firms which do have securities as a matched sample for most of the analyses. In robustness tests, reported in Table 6, we apply a two-stage selection model, taking a step in modeling the choice of industrial firms to hold financial investments.

short or long terms investments.¹⁵ Table 2, Panel C presents the descriptive statistics for the two groups in 2008. The firms are generally similar in size and financial characteristics. On average, however, OTTI firms have more current assets and current liabilities, likely reflecting greater attention to liquidity and working capital needs. This conjecture finds additional support in the observations that, in the median, these firms have higher levels of cash and liquid investments, albeit with difference only significant at 10.3 percent.

An important distinction between OTTI firms and their non-OTTI counterparts is reflected in the net cash flow components (bottom portion of Table 2, Panel C). In the median, operating cash flows of OTTI-firms are smaller, though, these firms invest more and borrow more (or repay/distribute less) than their non-OTTI peers. In a dynamic univariate analysis of operating (CFO), investment (CFI), and financing (CFF) cash flows from 2000 to 2011 (Table 2, Panel D), we note that the CFO of OTTI firms changes year-over-year in a similar trajectory as the CFO of non-OTTI firms from 2000 to 2007 (consistently higher levels of CFO among OTTI firms). Although all industrial firms experienced a drop in CFO during 2008, OTTI firms experienced a significantly higher decline of 37 percent vs. 8 percent for non-OTTI firms (in 2009 they recover, returning to levels above their peers). A review of CFI levels indicates that OTTI firms on average have more investment expenditures (and/or less investment sales) than their counterparts. Again, the cash flows from investing activities generally change at similar rates from 2006 onwards (although the investing patterns are not aligned prior to that). Conversely, the CFF for the two groups are similar until 2006 and diverge significantly during the three year Crisis period with OTTI (non-OTTI) firms experiencing higher (lower) net cash inflows from financing than usual and the patterns reversing in the post-Crisis period. Overall, these univariate comparisons suggest that, while OTTI firms and their peer firms (investment holding non-OTTI industrials) are well matched with respect

¹⁵ The short and long term investment levels are captured by Compustat variables IVST and IVAO, respectively. It is important to note that the IVAO variable may contain a variety of investments and advances in addition to securities subject to SFAS 115. These include, but are not limited to, long-term notes receivable, retained securitization interests, etc. We do not believe misclassifications of matched firms based on this variable will introduce bias. For the purposes of Table 2, Panel C the matched firms are identified as non-OTTI firms with non-zero investments in 2008. For the purposes of subsequent analysis, the matched firms are identified as non-OTTI firms with non-zero investments at any point in the three year window examined.

to general firm characteristics, the two groups differ in operating, investing and financing cash flow patterns during the Crisis period.

3.2 Descriptive statistics: OTTI

Of the 52 firms examined, 33 firms report one OTTI during the examined three year period (1 firm in 2007, 21 in 2008 and 11 in 2009), 13 firms have two instance of OTTI (1 firm in 2007-2008, 1 in 2007-2009 and 11 in 2008-2009) and 6 firms report an OTTI every year. Overall, our sample includes 77 firm-years with non-zero OTTI. Table 3 reports descriptive statistics regarding the nature and magnitude of OTTI. We find that most firms have either debt or equity impairments, but rarely both. Debt impairments are more common, however, equity impairments are larger and firms typically disclose that the impairment stems from specific investments (rather than being portfolio-wide). This is in line with both the guidance requirement of evaluating each investment on an individual basis and the observation, as gleaned from investment disclosures, that industrial firms tend to hold relatively undiversified portfolios. The most common type of investments linked to OTTI recognition are Auction Rate Securities (ARSs), although the range of impaired investments is wide.

Figures 1 A and 1 B present the distribution and average magnitudes of reported OTTI over the calendar quarters over the examined window. 60 percent of OTTI are disclosed in the quarterly reports for fiscal periods ending between July 2008 and June 2009, a period during which the S&P 500 fell by 30 percent. There is also a small number of OTTI in 2007, when the market declined only moderately, and in the second half of 2009, when it regained some of its value.¹⁶ Equity impairments are rare but relatively large until the fourth quarter of 2008 while debt impairments are non-existent until the second half of 2007 and exhibit a smoother ramp up and ramp down thereafter. Within the pool of debt OTTI, ARS impairments, which relate to uniform investments (not tabulated), are noteworthy as the ARS markets failed in February and March of 2008 although in most cases the underlying securities retained their creditworthiness. 14 firms recorded OTTI on ARS investments spread over 41 firm-quarters: 4 in

¹⁶ A review of selected disclosures in 2006 and earlier reveal that while OTTI were reported in these earlier periods, they were relatively rare for all firms and practically non-existent for industrial firms.

2007, 3, 4, 5, and 8 respectively in the four calendar quarters of 2008, and 17 more evenly spread throughout 2009 (although the average magnitudes were much lower in 2009). These observations highlight the significant discretion that managers have over the timing of OTTI disclosures. To the extent that an ARS market failure is a common economic event affecting all firms holding ARS investments during the sample period, it is interesting to note that some firms report related OTTI conservatively by recording an impairment early during the period, while others significantly delay the recognition of OTTI (and yet others, which we do not examine in a systematic manner, held ARS securities but never impaired them).

3.3 Unrealized gains and losses

The three panels of Figure 2 present the accumulated unrealized gains and losses from marketable securities reported in accumulated other comprehensive income. Panels A and C show the mean and median accumulated gains, respectively, of the OTTI and non-OTTI firms for the 6 years around the Crisis. The means exclude one OTTI firm (Newmont Mining) and one non-OTTI firm (Alcoa) which have uncharacteristically high unrealized gains and severely distort the means upward without changing the pattern. Mechanically, recording an OTTI on a security which has a prior unrealized loss will improve the unrealized position of the firm (as the unrealized loss is transferred to retained earnings through net income). Thus, we represent an accumulated adjusted unrealized gain/loss as the unrealized gain/loss less any OTTI taken during the period. Because the OTTI is likely taken in the amount representing a sum of the unrealized loss previously recorded in AOCI and the new unrealized decline experienced in the current period, the true value of unrealized gain/loss is likely to lie somewhere between the unadjusted and the adjusted lines. We note that while both OTTI and non-OTTI firms start with roughly equivalent accumulated unrealized gains of \$5 to \$8 million, OTTI firms experience a much greater run-up in 2006 and 2007 and a much sharper fall in 2008 and in the first half of 2009. Interestingly, both the mean and the median variables show a robust recovery after mid-2009. Panel B indicates that, as expected, the recovery is mostly driven by firms which recognized impairment on equity

investments, although we also observe a recovery among debt OTTI firms whose accumulated unrealized gain positions almost return to pre-Crisis levels. We do not pursue this subsequent recovery in great detail in our current analysis, however, these patterns suggest that while the OTTI is meant to represent a non-temporary decline in the value of the investment, at least some investment in the portfolios of firms choosing to take OTTI experienced declines which, ex post were revealed to be temporary in nature.¹⁷

4. Findings

4.1 Who reports OTTI?

Table 4 presents the results from a logistic regression examining the determining factors for the recognition of OTTI. The empirical model is as follows (firm and time subscripts are suppressed for parsimony):

$$\begin{aligned}
 Prob(OTTI) = & \alpha + \beta_1 ShortTermInvst + \beta_2 LongTermInvst + \beta_3 Big4 + \beta_4 UnrealizedGain \\
 & + \beta_5 \Delta UnrealizedGain07 + \beta_6 \Delta UnrealizedGain08 + \beta_7 InvstTrading \\
 & + \beta_8 WorkingCapital + \beta_9 Leverage06 + \beta_{10} MTB06 + \beta_{11} FCF + \beta_{12} Smooth \\
 & + \beta_{13} BigBath + \beta_{14} SpecialItems + \varepsilon
 \end{aligned}$$

The sample for the analysis consists of OTTI firms and industrial firms with non-zero levels of short term or long term investments at any point during the period spanning 2007 through 2009. The dependent variable takes a value of one if a firm recognized OTTI during any point of the three-year sample period in Model 1, the number of years in which OTTI are reported in Model 2, and the number of quarters in which OTTI are reported in Model 3. The explanatory variables aim to capture the information regarding the likelihood that the firm has an impaired investment and the likelihood that it is either unwilling or unable to hold it to maturity, as well as reporting incentives. We first discuss the results from Model 1.

Univariate analyses of OTTI firms and their peers presented in Table 2, Panel C suggest that OTTI firms have larger short terms and long term portfolios (both in the mean and median). We

¹⁷ It is often challenging to extrapolate from the reporting whether the recovery is driven by the same securities that were impaired earlier. While we see some examples where this was clearly the case and others where it clearly wasn't, a large number of disclosures are on a more aggregate level and preclude such analysis.

conjecture that the size of an investment portfolio is likely to be correlated with the number of individual investments contained therein and as such should be mechanically positively associated with the probability of an impairment on an investment. The coefficient on the short term (long term) investment value as of fiscal year 2006 is positive and significant (insignificant). We include an indicator variable set to 1 if the company has a Big 4 auditor during the period as a basic governance metric expected to increase the probability of recording an OTTI. We do not find this variable to be statistically significant, likely due to the small variation among auditor composition in the sample: 98 percent of OTTI firms and 92 percent of non-OTTI firms engage a Big 4 auditor. We expect that the more volatile the investment portfolio, the higher is the probability of impairment (reflecting a probability of an extreme loss within any given period). Since a more volatile portfolio is likely to yield a higher unrealized gain in bullish economy we expect the coefficient on Accumulated Unrealized Gain as of 2006 to be positive and find it to be statistically significant. Per the impairment guidance, OTTI is likely to be preceded by or associated with significant decline in the value of the underlying investment security. Thus, we include in the regression the periodic unrealized gains/losses in 2007 and 2008 and expect both coefficients to be negative. Surprisingly, while they are both significant, the coefficient on the 2007 unrealized gain/loss is positive, suggesting that at least some portions of the OTTI firms' investments continued to experience good performance in the early part of the Crisis period.

Next we attempt to capture the intent and ability to hold impaired securities until recovery. A history of active trading of investments indicates a lower intent to hold securities to maturity/recovery. Thus, we include the variable *Invst Trading* which is measured as cash proceeds from sales plus cash outflows from purchases of investments as a percentage of net cash flows from investing activities in 2006.¹⁸ We expect and find it to be positive. Liquidity pressure may weaken a firm's ability to hold impaired securities until recovery, and we include a pre-crisis modified measure of working capital equal

¹⁸ A limitation is that the Compustat variable *SIV (IVCH)* which reflects the cash flows associated with sale of (increase in) investments may also include items not related to the trading of investments, such as payments of interest and principal for debt securities, payments of long term notes receivable, investments in joint ventures, etc. It is not always possible to disentangle these components even using the company financial reports as a data source.

to cash minus current liabilities as of 2006 and a measure of leverage as of 2006 (long term debt scaled by total assets). In addition, we include the market to book ratio as of 2006 as a proxy for the investment opportunity set of the firm (which may require liquidation of investments) and the free cash flows during the crisis peak of 2008, calculated as CFO less CapEx and Cash Dividends and scaled by total assets. While all four of these variables are of the expected sign, none are statistically significant suggesting that either they do not capture well the “intent and ability” criteria or firms are deviating from this aspect of the guidance.

Lastly, we consider the role of financial reporting incentives and include the average probability that the firm strongly outperforms its peers during the Crisis period (and thus may have incentives to smooth earnings downward) or severely underperforms (and thus have incentives to engage in big bath behavior). We calculate this average Crisis period smoothing (big bath) tendency as the discreet (0, 1/3, 2/3, 1) probability that the firm reported annual change in net income scaled by total assets above (below) the median of all firms reporting positive (negative) change in a given year. While the coefficients are positive, as expected in the case of opportunistic reporting, they are not statistically significant.

Since there is cross-sectional variation in the number of OTTI recognized by the sample firms, estimating the model using a classical logistic regression potentially obscures some of the relations. To address this concern, we next estimate the model using an ordered logit estimator, defining the dependent variable as the number of years in which the firm reports OTTI during the sample period (dependent variable with values of 0 to 3). We report the regression results in Model 2 of Table 4. The main results and inferences are qualitatively similar to these in Model 1. Two differences emerge, however. First, while the estimated coefficient on unrealized gains is positive and marginally significant in the logit specification, when the model is estimated as an ordered logit it becomes statistically insignificant. Second, Big 4 Auditor remains positive but now becomes statistically significant, suggesting that firms with Big 4 auditors are more likely to report OTTI than their peers.

For completeness, we repeat this analysis defining the dependent variable relative to the number of quarters over the sample period in which an OTTI is reported by the firm (dependent variable with

values of 0 to 12). The results are presented in Model 3. While most of the inferences remain the same, one difference is that the Change of Unrealized Gain 07 variable becomes statistically insignificant.¹⁹

4.2 Timeliness of OTTI reporting

After examining the question of who reports OTTI, we proceed to the identification of the factors determining the timing of impairment recognition. Table 5 presents the analysis of the probability that a firm recognizes an OTTI in a given quarter of the three year period spanning 2007 through 2009. The empirical model is as follows (firm and time subscripts are suppressed for parsimony):

$$\begin{aligned} Prob(OTTI) = & \alpha + \beta_1 Q4 + \beta_2 \Delta SP500 + \beta_3 \Delta GDP + \beta_4 \Delta IndustryROA + \beta_5 UnrealizedLoss_{t-1} \\ & + \beta_6 LongDecline + \beta_7 OTTI_{t-1} + \beta_8 InvestTrading + \beta_9 WorkingCapital \\ & + \beta_{10} \Delta Sales + \beta_{11} \Delta CFO + \beta_{12} \Delta PreImpairedEarnings + \beta_{13} BigBath + \beta_{14} Smooth \\ & + \beta_{15} NegSpecialItems + \varepsilon \end{aligned}$$

Panel A focuses on OTTI firms, thus abstracting away from issues related to selection into the OTTI sample (addressed in the Additional Analysis section below). As in the preceding analysis, we consider explanatory variables which capture new information about the decline of the investment security, new information about the firm's intent and ability to hold the investments and reporting incentives. Mechanically, we expect more OTTI to be recognized in the fourth quarter of fiscal years, when auditors' scrutiny and management's focus on the appropriate application of accounting guidance is highest. We find the coefficient on the indicator variable for Q4 to be positive and significant. We capture the likely decline in the investment portfolio with a market-wide variable of the percent change in the value of the S&P500 index from the prior quarter end. As expected, the estimated coefficient is negative and statistically significant. To capture securities which experience a large decline or a long period of decline, we include an indicator variable for the accumulated unrealized loss reported at prior quarter and an indicator variable for three preceding consecutive quarterly declines in the accumulated unrealized gain/loss position, respectively. The coefficients on both variables are positive and statistically

¹⁹ We note that, consistent with theory, the intercept magnitudes are as expected, monotonically decreasing in the categories of the dependent variable.

significant. We also include a variable indicating whether the firm reports an OTTI during the prior period. It is possible that a prior OTTI determination signals a probability of further future permanent declines in value in which case the coefficient would be expected to be positive. On the other hand, because the OTTI lowers the cost basis of the investment, an OTTI should decrease the necessity of further write-downs, leading to a negative coefficient. The estimated coefficient is positive, providing support for the former relationship.

To capture low intent and ability to hold the security, we include investment trading (sum of cash inflows and cash outflows related to investment sales and increases) as a percent of CFI during the quarter and the balance of cash over current liabilities. Neither variable is found to be significant. Our measures of current period performance follow the metrics outlined in Riedl (2004), including the seasonally-adjusted percentage change in sales, a scaled change in cash flows from operations and a scaled change in pre-OTTI earnings. If poor operating performance is associated with contemporaneous or expected future liquidity pressures, then the ability to hold securities to recovery is impaired and the coefficient is expected to be negative. However, these coefficients must be interpreted with care because a negative association may also be due to “big bath” reporting incentives. That is, an alternative explanation for a negative coefficient is that firms recognize OTTI aggressively during quarters of inferior performance to lower the cost basis of the security, thus increasing potential gains in future sales. We do not find significant association for a change in sales or a change in operating cash flows (which, of the three performance metrics, should be most closely related to a contemporaneous liquidity squeeze) and document a negative coefficient on the change in pre-impairment earnings.

To directly capture the reporting incentives, we include an indicator variable for likely big bath (smoothing) behavior which is set to one when the firm reports a change in pre-impairment earnings as compared to four quarters ago below (above) the median of non-zero negative (positive) change in pre-impairment earnings of all industrial firms in the quarter. Interestingly, the coefficient on both reporting incentives variables is significant and large in magnitude. To capture another popular big-bath like strategy -- reporting multiple complex income-decreasing charges simultaneously -- we also include an

indicator variable set to one if a firm contemporaneously reports non-impairment related income-decreasing special items. The variable is positive as expected, but statistically insignificant.

We recognize that the forces underlying OTTI likely differ by security type so we repeat the analysis partitioning between debt and equity OTTI (Table 5, Panel B). While we observe coefficients of the expected sign in both regressions, statistical significance is lost on a number of variables which is likely attributable to the reduction of the already small sample of non-zero OTTI.

We next compare the determinants of OTTI reporting to those of other impairments, specifically of write-downs of Property, Plant and Equipment (PP&E) and Goodwill. Because OTTI should be linked to the underlying performance of investee firms while other impairments should be linked to the economic performance of the firm itself, we generally do not expect to observe the same results from these analyses.²⁰ We follow Riedl (2004) in including economic factors such as the change in the GDP and the median industry change in ROA, as well as the three firm-specific performance metrics and the three reporting incentives metrics outlined above. Interestingly, in our sample only two variables in the PP&E impairment model are significant: the change in GDP (an economic variable) and the income smoothing indicator (a proxy for reporting incentives). In the goodwill impairment model, we also find the change in the operating cash flow to be of an unexpected sign.²¹

In Panel C of Table 5 we present results from repeating the analysis of OTTI, PP&E Impairment and Goodwill Impairment timing, but on a full sample of OTTI firms as well as non-OTTI investment holding industrial firms (52 of the former and 211 of the latter). The results are generally similar, although we note some differences such as the newly emerged significance of reporting incentives in the PP&E impairment model (in line with Riedl 2004). Overall, we find that OTTI reporting both appears consistent with the principles underlying the guidance provided by the FASB in its reflection of the extent

²⁰ First we check whether OTTI are ever included as part of the write-down variable (WDP/WDPQ) available in Compustat. Of 119 firm-quarters with non-zero OTTI, 13 have non-zero write-down variable and of those 5 include OTTI and 8 do not. We adjust the Compustat variable to exclude OTTI whenever appropriate.

²¹ Riedl (2004) also uses variables capturing a change in management and private debt. We do not include these in the current draft due to data limitations.

and duration of the investment decline, and is indicative of big-bath and smoothing earnings management behavior.

4.3 Size of OTTI

Univariate analysis (not tabulated) indicates that the magnitude of OTTI is positively correlated with cash flows from investment trading activities (more sales and less purchases), contemporaneous unrealized losses in the period included in other comprehensive income, and inferior non-operating performance (income-decreasing special items and negative non-operating income). Overall, this suggests that firms recognizing the greatest unrealized losses in net income via OTTI are those which also have the largest unrealized losses not recognized in income in the period, as well as the greatest liquidation of investment positions (presumably recognizing realized losses if they are included in non-operating income variable). In panel D of Table 5 we report results from a multivariate analysis aimed at identifying the factors determining the size of OTTI. The dependent variable is the dollar amount of OTTI scaled by prior period's total assets. We consider both a TOBIT regression specification using the full set of OTTI firm-quarters in the three year period and an OLS specification on non-zero-OTTI-quarters only. Results from the TOBIT analysis suggest that OTTI are larger in the fourth quarter, in times of poor economy-wide and firm-specific performance, and for firms with large and continuing unrealized losses in their portfolios. The OLS specification reveals few variables with statistical significance, namely poor economy-wide performance and liquidity pressures captured by a decline in the cash from operations. Overall, the analysis of OTTI magnitude provides similar, though less robust, inferences to the timing analysis.

4.4 Additional analysis

4.4.1 Self-selection: Determinants of investment holdings

In the prior analyses we abstract from the factors determining whether a non-financial company holds AFS and HTM investment securities. As noted previously, while this question is both inherently relevant and interesting, it extends beyond the scope of our study. Ignoring this issue, however, could

limit the interpretability of our results. In this section we take a step towards modeling the factors underlying the investment decision and apply a two-stage model framework to examine the robustness of our findings to self-selection.²²

To identify candidate variables for the first stage of the model, we refer to Opler et al. (1999) who examine the determinants of holdings of liquid assets, particularly cash and marketable securities, among publicly-traded non-financial U.S. firms. The authors document that liquid assets are significantly associated with firm size, leverage, dividends, cash flow, and capital expenditures consistent with the theory that firms with ready access to capital markets hold less liquid assets while those with strong growth opportunities and riskier cash flows hold more. Calling on their findings, we model the choice of holding investment securities by our sample firms as a function of firm size, growth opportunities, free cash flows, capital expenditures, leverage, dividend payments, and the level of cash holdings.

Panel A of Table 6 reports the results of estimating a pooled logistic regression modeling the propensity to hold investment securities in sample years 2006 through 2009. The dependent variable, INVESTMENTS, is an indicator variable set to one if the firm has non-zero short-term investments or non-zero long-term investments during the year, and zero otherwise. The results suggest that, for the sample, the probability of holding investments is significantly positively associated with firm size, growth, capital expenditures, and cash, and significantly (insignificantly) negatively associated with leverage and free cash flows (dividends). These findings are generally consistent with Opler et al.'s (1999) findings, with two exceptions. In our sample, free cash flow is negatively associated with a firm's investment decision. More so, the estimated coefficient on firm size is positive and significant, suggesting that larger firms are more likely to hold investments. A potential explanation for these differences is that large firms hold low excess cash because of a wide range of investment opportunities, such as in financial investment securities, in which to reallocate cash holdings.

²² Since we conduct the empirical investigation within the set of OTTI and matched firms that choose to hold investment securities, we do not believe that self-selection bias is a significant cause of concern. Nevertheless, verifying that the results are robust to controls for self-selection provides an added level of comfort and allows us a first glimpse of what determinants may be significant for the decision to hold an investment portfolio.

We next repeat the analyses presented in Tables 4 including the Inverse Mills' Ratio from the investment holdings selection model as an additional regressor. The results are qualitatively similar under this specification (Panel B of Table 6), suggesting that self-selection bias is not likely to drive the documented relations.

4.4.2 Special items

Compustat identifies nine items which are classified as special. Comparing the means and medians of the various special items for OTTI and non-OTTI groups (not tabulated) we observe that, while not statistically different, OTTI firms appear to have larger (in absolute unscaled terms) income-decreasing special items during the crisis period. Because the multivariate analysis presented earlier provides mixed evidence of whether OTTI are used in the same manner as net Special Items, we consider exploring the relationship between the two on a more disaggregated level. Table 7 presents the correlations between OTTI and the nine special items in Compustat. All income-decreasing special items are positively correlated, consistent with big bath behavior as noted above. Interestingly, the OTTI are positively correlated with other income-decreasing special items to a greater degree than the other items are with each other (possibly indicating a greater role of managerial discretion in the OTTI recognition than in the decision pertaining to the recognition of other items such as asset sales, restructuring and impairments of other assets). Since the recognition of non-OTTI special items should be driven by distinct market and firm-level factors, these clustering patterns are ex ante unexpected and imply potential big bath accounting.

4.4.3 Analysts

As OTTI reflect a decrease in the value of financial assets for the investing firm, we also consider how equity analysts perceive the performance of OTTI and non-OTTI firms during the Financial Crisis. A comparison of OTTI firms to investment-holding non-OTTI industrials (not tabulated) indicates that during the Crisis, OTTI firms have higher coverage, in the median do worse than non-OTTI firms, have

higher forecast dispersion and miss the analysts' forecast at a slightly higher rate (the difference is not statistically significant).

As noted earlier, Figures 2 A through 2 C indicate a strong recovery for the portfolios of OTTI firms while the multivariate analysis suggests that big bath behavior may have contributed to the timing of the impairments. If firms recognize an OTTI when the decline in value is in fact temporary, they will be able to subsequently realize a gain upon the liquidation of the security. Anecdotal evidence, such as the disclosure provided by Coca-Cola Co. in their quarterly filings (included in Appendix B), suggest that this happened in practice. In an attempt to gage whether the practice of utilizing gains from sales of recovered securities strategically is wide-spread, we examine whether OTTI firms meet or beat analysts' targets at a higher rate after the Crisis period and, specifically, whether such positive surprises are associated with the sales of securities.²³ We present the univariate analysis in Table 8. We focus on OTTI firms with one to three quarterly impairments in the sample period (to exclude the few firms which are "habitual" OTTI takers) and consider all quarters with a fiscal period end in calendar years 2007 through 2010. Although the median forecast errors (against the last consensus analyst forecast before the earnings announcement) are highest in the post-OTTI period and the probability of missing estimates is lowest, we do not find an economically or statistically significant correlation between cash proceeds from investment sales and forecast errors. These findings are consistent with the conjecture that even if firms that recognize OTTI outperform their peers immediately after the Crisis period, we have no support for the conjecture that they do so through strategic disposition of previously impaired securities.

5. Conclusion

This study is the first to examine the non-financial firm's implementation of accounting rules for investment securities during the Financial Crisis. While the literature on the interaction between financial accounting and the economic downturns is significant and growing fast, it typically focuses on financial

²³ We use the cash from sales of investments variable from the statement of cash flows as a proxy although it is subject to limitations noted in footnote 20. We also attempt to collect more granular data regarding realized gains and losses from sales of securities both during and after the Crisis period but the level of disclosure is not consistent across firms limiting the tractability of the analysis.

institutions. We propose that non-financial institutions are not shielded from the accounting treatment of financial instruments as these companies often hold portfolios of investment securities.

Focusing on *available-for-sale* and *held-to-maturity* securities holdings of S&P 1500 industrial firms, we document that the reporting of OTTI is wide-spread during the most recent period of financial downturn and is negatively (positively) associated with indicators of market performance (unrealized loss on investment securities) consistent with the notion of other-than-temporary decline in value of the underlying securities. More so, consistent with the idea that OTTI should be reported when a firm does not have the intent or ability to hold the underlying securities, we document that the propensity to report OTTI increases in periods of poor firm performance and cash needs. We acknowledge that the association between firm performance and the probability and magnitude of impairments may also be driven by opportunistic reporting incentives. To this end, we find a positive association between OTTI and proxies for income smoothing and big bath behavior, as well as a surprising recovery in the value of the investment portfolios of OTTI firms. Subsequent trading patterns, however, do not support the conjecture that firms are able to strategically dispose of previously impaired securities.

While caveats pertaining to sample size and endogeneity apply, we believe this study addresses an important question which would be of interest to a wide audience in light of the unresolved debate on the interaction of mark-to-market accounting and the Financial Crisis, and accounting for financial instruments, in general. We provide preliminary evidence on the application by and role of financial instruments accounting non-financial institutions, with the intention of exploring the feedback effect between accounting choices and investment decisions / financial and operating performance in a subsequent study.

Appendix A
Full Data Collection Procedure

1. Firms in the Russell 3000 index as of June 2007: 2,979
2. Uniquely matched to CIK and GVKEY identifiers: 2,973
3. 7,593 annual reports filed in calendar years 2008-2010. Search criteria for a paragraph of interest:
 - a. “other than temporary”, “other-than-temporary”, “other than temporarily”, etc.
 - b. Impair, write-down, write off, decline, drop, etc.
 - c. Security, debt, equity, investment, instrument, bond, etc.
 - d. Quantitative information (excluding reference to guidance title).
4. 2,450 reports from 1,156 firms contain a paragraph of interest
5. Manual review to confirm an OTTI in the fiscal years 2007-2009 identifies 769 firms
6. Test data collection (by several participants) of 35 firms across various industries
7. Focus on SP1500 industrial firms in GICS groups 1510, 2010, 2020, 2030, 2510, 2520, 3020: 402 firms including 52 OTTI firms and 350 non-OTTI firms (excluding potential OTTI firms GE and Harley Davidson due to complexity of disclosure identification)
8. Identify all firms within the non-OTTI sample which have at least one non-missing, non-zero short-term or long-term investment variable or unrealized gain/loss variable in fiscal years 2007, 2008, 2009 and review their disclosures to check for existence of impairments which may have been missed by the original procedure. As a result, 9 firms were reclassified from non-OTTI to OTTI (the numbers in item 7 reflect this reclassification).

Appendix B Examples

3M Co., 10-K for FYE Dec. 31, 2008 (emphasis is ours):

“3M has a diversified marketable securities portfolio of \$725 million as of December 31, 2008. Within this portfolio, current and long-term asset-backed securities (estimated fair value of \$111 million) are primarily comprised of interests in automobile loans and credit cards. At December 31, 2008, the asset-backed securities credit ratings were AAA or A-1+, with the following exceptions: three securities rated BBB with a fair market value of \$5 million. 3M’s marketable securities portfolio also includes auction rate securities (estimated fair value of \$1 million) that represent interests in investment grade credit default swaps. During the second half of 2007 and all four quarters in 2008, these auction rate securities failed to auction due to sell orders exceeding buy orders. Liquidity for these auction-rate securities is typically provided by an auction process that resets the applicable interest rate at pre-determined intervals, usually every 7, 28, 35, or 90 days. The funds associated with failed auctions will not be accessible until a successful auction occurs or a buyer is found outside of the auction process. Based upon an analysis of “temporary” and “other-than-temporary” impairment factors, auction rate securities with an original par value of approximately \$34 million were written-down to an estimated fair value of \$16 million as of December 31, 2007 and subsequently written-down to an estimated fair value of \$1 million as of December 31, 2008. 3M recorded “other-than-temporary” impairment charges that reduced pre-tax income by approximately \$8 million in 2007 and approximately \$9 million in 2008. There are \$16 million (pre-tax) of temporary impairments at December 31, 2008, which were recorded as unrealized losses within other comprehensive income. As of December 31, 2008, these investments in auction rate securities have been in a loss position for approximately 15 months. These auction rate securities are classified as non-current marketable securities as of December 31, 2008 as indicated in the preceding table.”

Boeing, 10-K for FYE Dec. 31, 2008 (emphasis is ours):

Our investments in available-for-sale debt and equity securities consisted of the following at December 31:

	2008				2007			
	Cost	Gross Unrealized Gain	Gross Unrealized Loss	Estimated Fair Value	Cost	Gross Unrealized Gain	Gross Unrealized Loss	Estimated Fair Value
Debt: ⁽¹⁾								
Marketable Securities	\$449		\$ (102)	\$ 347	\$3,385	\$ 29	\$ (11)	\$ 3,403
ETCs/EETCs	8		(3)	5	145		(2)	143
Equity					2	10		12
	\$457		\$ (105)	\$ 352	\$3,532	\$ 39	\$ (13)	\$ 3,558

⁽¹⁾ At December 31, 2008, debt securities with estimated fair values of \$44 and cost of \$61 have been in a continuous unrealized loss position for 12 months or longer. We believe that the unrealized losses are not other-than-temporary. We do not have a foreseeable need to liquidate the portfolio and anticipate recovering the full value of the securities either as market conditions improve, or as the securities mature.

Coca-Cola Co., 10-Q for FQE Oct 2, 2009 (emphasis is ours):

“During the three months ended October 2, 2009, the Company realized a gain of approximately \$10 million in other income (loss) — net on the sale of equity securities that were classified as available-for-sale. In 2008, the Company recognized an other-than-temporary impairment on these same securities, primarily due to the length of time the market value had been less than our cost basis and the lack of intent to retain the investment for a period of time sufficient to allow for any recovery in market value. The gain on the sale of these securities represents the appreciation in market value since the impairment was recognized.”

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Figure 1A: Distribution of OTTI over Time

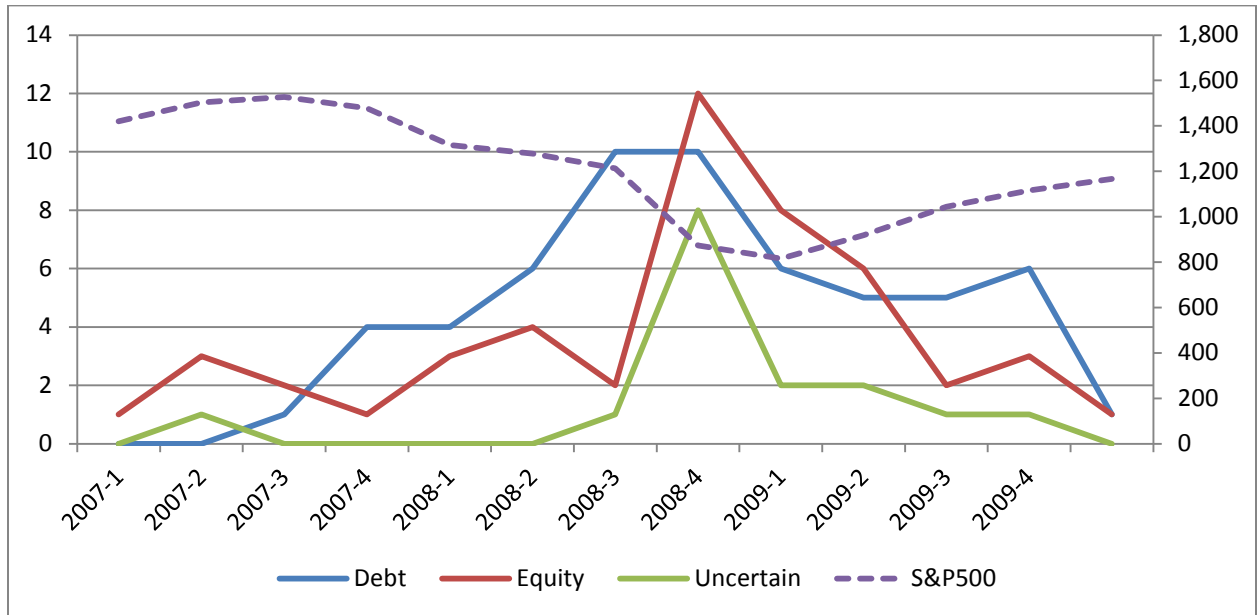


Figure 1B: OTTI Magnitudes over Time

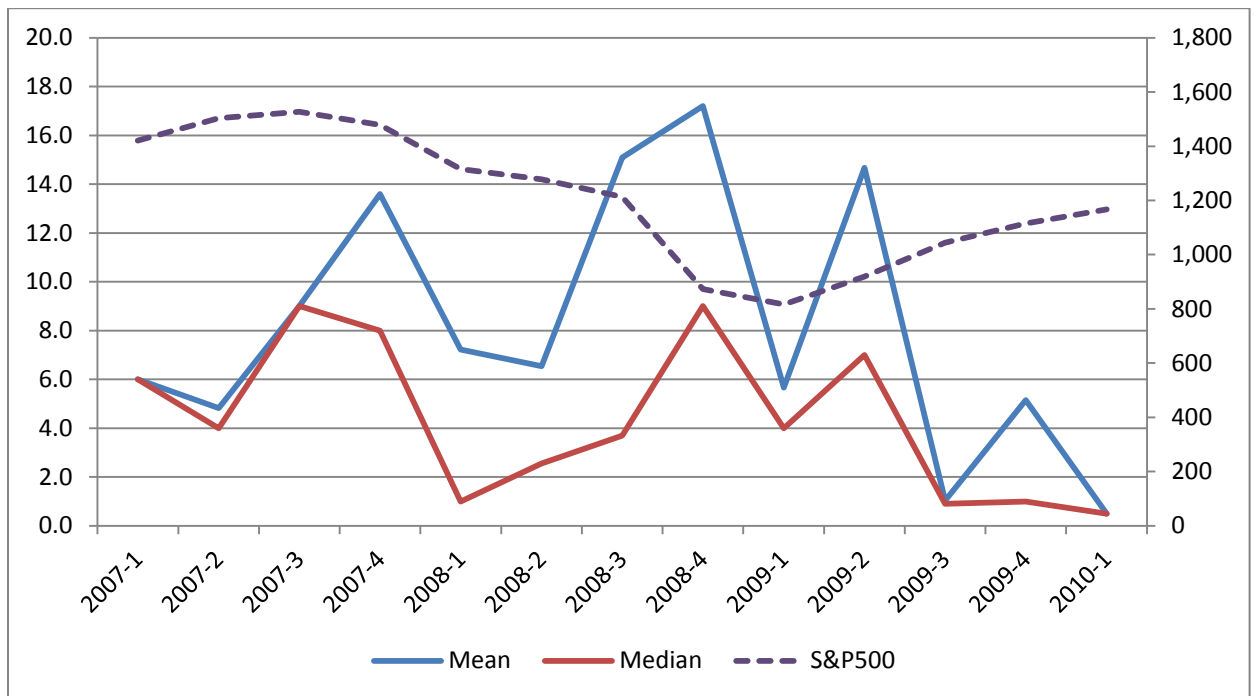


Figure 2A: Mean Accumulated Unrealized Gains/Losses over Time

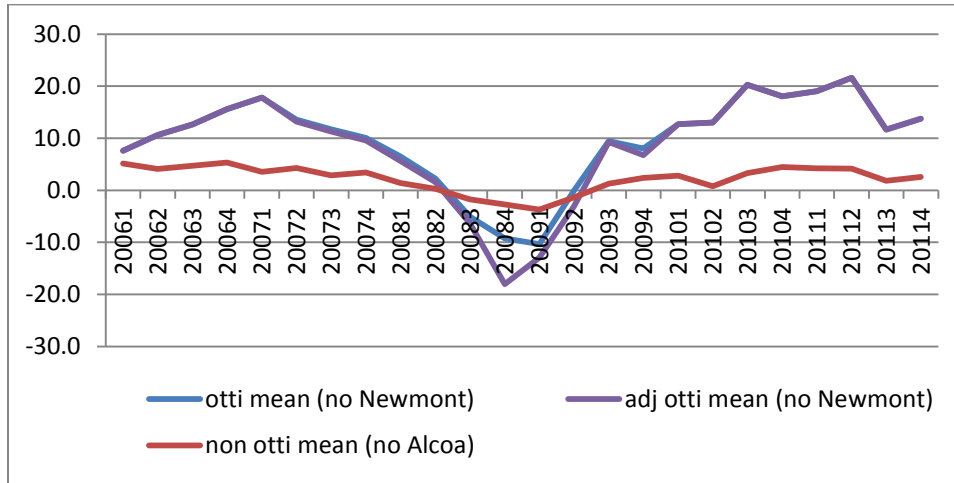


Figure 2B: Mean Accumulated Unrealized Gains/Losses over Time – Debt vs. Equity

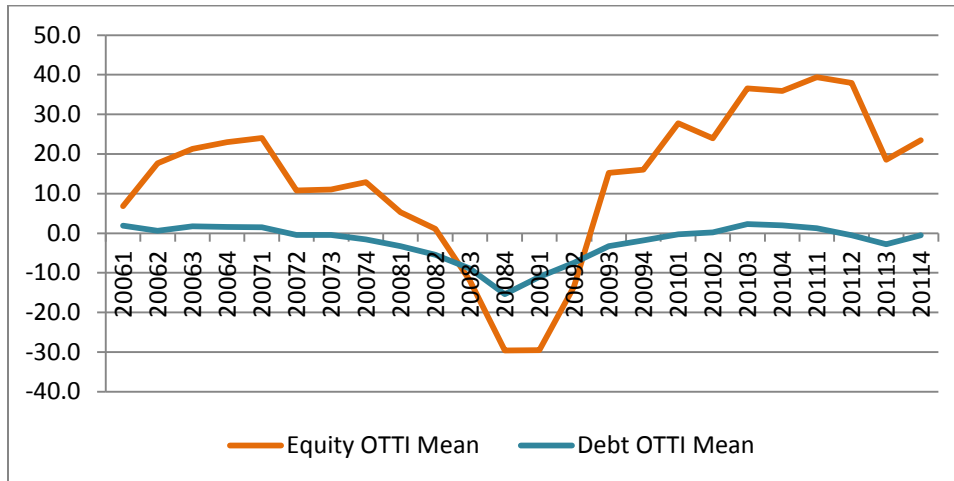


Figure 2C: Median Accumulated Unrealized Gains/Losses over Time

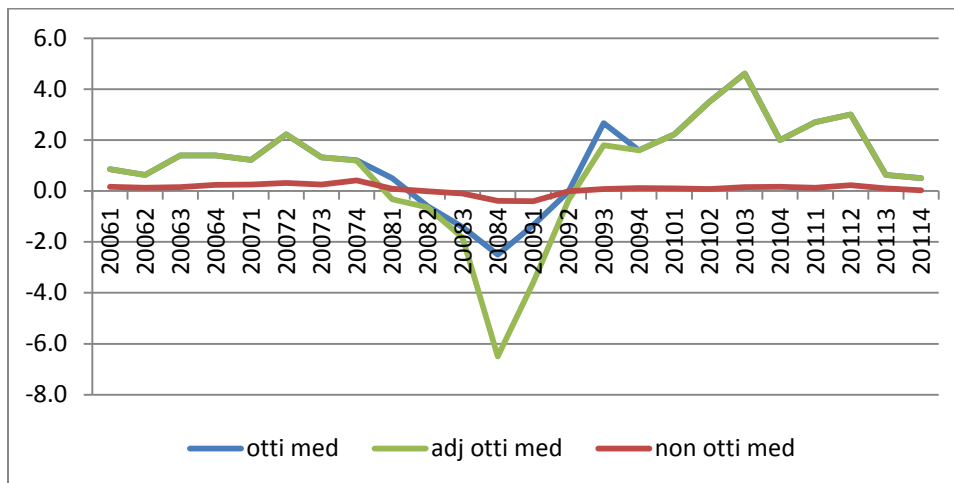


Table 1
OTTI Industry and Size Distribution

Panel A – Full Sample OTTI Industry Distribution

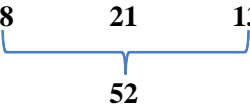
GICS Group	OTTI			nonOTTI		OTTI as % of group	
	#	%	rank	#	%		
1010 Energy	12	2%	17	162	8%	7%	22
1510 Materials	15	2%	14	118	6%	11%	18
2010 Capital Goods	23	3%	10	209	10%	10%	20
2020 Commercial & Professional Services	16	2%	13	84	4%	16%	15
2030 Transportation	14	2%	16	45	2%	24%	11
2510 Automobiles & Components	3	0%	22	24	1%	11%	19
2520 Consumer Durables & Apparel	12	2%	17	80	4%	13%	16
2530 Consumer Services	9	1%	21	99	5%	8%	21
2540 Media	15	2%	14	67	3%	18%	13
2550 Retailing	17	2%	12	118	6%	13%	17
3010 Food & Staples Retailing	1	0%	23	26	1%	4%	23
3020 Food, Beverage & Tobacco	10	1%	20	50	2%	17%	14
3030 Household & Personal Products	0	0%	24	25	1%	0%	24
3510 Health Care Equipment & Services	38	5%	8	131	7%	22%	12
3520 Pharmaceuticals, Biotechnology & Life Sciences	57	7%	4	115	6%	33%	6
4010 Banks	147	19%	1	73	4%	67%	2
4020 Diversified Financials	43	6%	6	70	3%	38%	4
4030 Insurance	104	14%	2	16	1%	87%	1
4040 Real Estate	34	4%	9	102	5%	25%	9
4510 Software & Services	66	9%	3	135	7%	33%	7
4520 Technology Hardware & Equipment	56	7%	5	99	5%	36%	5
4530 Semiconductors & Semiconductor Equipment	43	6%	6	58	3%	43%	3
5010 Telecommunication Services	12	2%	17	33	2%	27%	8
5510 Utilities	22	3%	11	68	3%	24%	10
	769	100%		2,007	100%		

Panel B – Full Sample OTTI Size Index Distribution

	OTTI		nonOTTI		OTTI as % of group
S&P 1500	397	52%	1,046	52%	28%
Large Cap	176	23%	313	16%	36%
Mid Cap	106	14%	295	15%	26%
Small Cap	115	15%	438	22%	21%
Non S&P 1500	372	48%	964	48%	28%

Table 1 (continued)
OTTI Industry and Size Distribution

Panel C – Final OTTI Sample Industry and Size Index Distribution

GICS Group		Large Cap	Mid Cap	Small Cap	Non S&P 1500
1510	Materials	3	5	2	5
2010	Capital Goods	8	2	5	7
2020	Commercial & Professional Services	0	6	2	8
2030	Transportation	1	2	1	10
2510	Automobiles & Components	0	1	0	1
2520	Consumer Durables & Apparel	2	2	3	5
3020	Food, Beverage & Tobacco	4	3	0	3
		18	21	13	39
					

** This excludes GE and Harley-Davidson*

Table 2
Descriptive Statistics

Panel A – All Industrial Firms: 2008

		OTTI			Non OTTI			Pr>F	Pr> Z
		N	Mean	Med	N	Mean	Med		
Items likely related to investment holdings									
CH	Cash	52	617	238	337	427	115	0.337	0.001
IVST	Short-Term Investments	52	118	4	337	46	-	0.327	<.0001
IVAO	Long-Term Investments*	52	510	21	337	101	-	0.009	<.0001
MSA	AOCI - Mark Sec Adj	52	(1.4)	(0.1)	337	(1.8)	-	0.926	0.002
CISECGL	CI - Securities Gains/Losses	52	(23)	(2)	337	(3)	-	0.000	<.0001
SIV	Sale of Investments CF	52	669	19	337	408	-	0.747	<.0001
IVCH	Increase in Investments CF	52	698	7	337	416	-	0.739	<.0001
IDIT	Interest and Related Income	52	23	4	337	11	2	0.162	0.071
Other Balance Sheet items									
ACT	Current Assets - Total	49	3,639	906	318	1,821	859	0.001	0.631
PPENT	PPE - Total (Net)	52	2,555	646	337	1,704	403	0.222	0.132
IVAEQ	Equity Method Investments	52	254	-	337	102	-	0.046	0.479
INTAN	Intangible Assets - Total	50	2,072	252	334	1,404	404	0.183	0.226
AT	Assets - Total	52	9,961	2,907	337	5,999	2,113	0.068	0.226
LCT	Current Liabilities - Total	49	2,736	535	319	1,305	432	0.003	0.444
DLTT	Long-Term Debt - Total	52	2,276	669	337	1,518	473	0.323	0.226
SEQ	Book Value of Equity	52	3,055	1,132	337	1,719	768	0.005	0.361
MKVALT	Market Value of Equity	52	8,139	1,519	337	4,137	1,441	0.008	0.751
Other Income Statement items									
REVT	Revenue - Total	52	10,302	3,172	337	6,015	2,479	0.018	0.361
SPI	Special Items	51	(198)	(40)	333	(137)	(16)	0.396	0.051
NOPIO	Nonop. Income (Exp) - Other	52	18	-	337	4	1	0.507	0.242
NI	Net Income (Loss)	52	509	107	337	139	91	0.052	0.751
EPSFX	EPS (Diluted) - Excl Ext. Items	52	0.92	1.41	337	0.67	1.65	0.737	0.781
Other Cash Flows items									
OANCF	Operating Activities - Net CF	52	837	183	337	517	200	0.056	0.781
FINCF	Financing Activities - Net CF	52	(169)	(44)	337	(197)	(65)	0.844	0.361
IVNCF	Investing Activities - Net CF	52	(686)	(144)	337	(315)	(97)	0.005	0.383
DV	Cash Dividends	52	278	42	336	118	21	0.007	0.137

Table 2 (continued)
Descriptive Statistics

Panel B – OTTI Firms and Non-OTTI Industrials Matched by Size: 2008

		OTTI			Non OTTI			<i>Pr>F</i>	<i>Pr> Z </i>
		N	Mean	Med	N	Mean	Med		
Items likely related to investment holdings									
CH	Cash	52	617	238	47	559	182	<i>0.751</i>	<i>0.613</i>
IVST	Short-Term Investments	52	118	4	47	44	-	<i>0.222</i>	<i>0.003</i>
IVAO	Long-Term Investments*	52	510	21	47	35	-	<i>0.170</i>	<i><.0001</i>
MSA	AOCI - Mark Sec Adj	52	(1.4)	(0.1)	47	(10.2)	-	<i>0.416</i>	<i>0.068</i>
CISECGL	CI - Securities Gains/Losses	52	(23)	(2)	47	(11)	-	<i>0.432</i>	<i>0.001</i>
SIV	Sale of Investments CF	52	669	19	47	38	-	<i>0.087</i>	<i><.0001</i>
IVCH	Increase in Investments CF	52	698	7	47	70	-	<i>0.130</i>	<i>0.006</i>
IDIT	Interest and Related Income	52	23	4	47	13	2	<i>0.248</i>	<i>0.365</i>
PPENT	PPE - Total (Net)	52	2,555	646	47	2,416	490	<i>0.882</i>	<i>0.613</i>
MKVALT	Market Value of Equity	52	8,139	1,519	47	8,322	1,749	<i>0.957</i>	<i>0.768</i>
REVT	Revenue - Total	52	10,302	3,172	47	9,379	3,014	<i>0.760</i>	<i>0.613</i>

Table 2 (continued)
Descriptive Statistics

Panel C – OTTI Firms and Non-OTTI Investment Holding Industrials: 2008

		OTTI			Non OTTI			Pr>F	Pr> Z
		N	Mean	Med	N	Mean	Med		
Items likely related to investment holdings									
CH	Cash	52	617	238	159	623	170	0.983	0.103
IVST	Short-Term Investments	52	118	4	159	97	0	0.844	0.103
IVAO	Long-Term Investments*	52	510	21	159	214	14	0.194	0.720
MSA	AOCI - Mark Sec Adj	52	(1.4)	(0.1)	159	(3.7)	-	0.695	0.014
CISECGL	CI - Securities Gains/Losses	52	(23)	(2)	159	(5)	-	0.030	0.000
SIV	Sale of Investments CF	52	669	19	159	781	-	0.924	<.0001
IVCH	Increase in Investments CF	52	698	7	159	788	-	0.942	0.012
IDIT	Interest and Related Income	52	23	4	159	17	3	0.622	0.499
Other Balance Sheet items									
ACT	Current Assets - Total	49	3,639	906	149	2,256	1,021	0.064	0.412
PPENT	PPE - Total (Net)	52	2,555	646	159	2,119	518	0.600	0.720
IVAEQ	Equity Method Investments	52	254	-	159	170	-	0.434	0.704
INTAN	Intangible Assets - Total	50	2,072	252	157	1,497	408	0.255	0.209
AT	Assets - Total	52	9,961	2,907	159	7,744	2,774	0.450	0.969
LCT	Current Liabilities - Total	49	2,736	535	149	1,661	539	0.095	0.870
DLTT	Long-Term Debt - Total	52	2,276	669	159	1,941	530	0.754	0.499
SEQ	Book Value of Equity	52	3,055	1,132	159	1,840	842	0.031	0.499
MKVALT	Market Value of Equity	52	8,139	1,519	159	5,261	1,765	0.154	0.780
Other Income Statement items									
REVT	Revenue - Total	52	10,302	3,172	159	7,402	3,034	0.231	0.720
SPI	Special Items	51	(198)	(40)	156	(150)	(19)	0.613	0.159
NOPIO	Nonop. Income (Exp) - Other	52	18	-	159	3	2	0.620	0.120
NI	Net Income (Loss)	52	509	107	159	129	93	0.151	0.720
EPSFX	EPS (Diluted) - Excl Ext. Items	52	0.92	1.41	159	0.83	1.84	0.916	0.550
Other Cash Flows items									
OANCF	Operating Activities - Net CF	52	837	183	159	600	219	0.277	0.550
FINCF	Financing Activities - Net CF	52	(169)	(44)	159	(299)	(70)	0.497	0.189
IVNCF	Investing Activities - Net CF	52	(686)	(144)	159	(332)	(109)	0.022	0.550
DV	Cash Dividends	52	278	42	158	164	25	0.161	0.339

* Long-Investments may contain a variety of investments and advances in addition to securities subject to SFAS 115. These include but are not limited to long-term notes receivable, retained securitization interests, etc.

Table 2 (continued)
Descriptive Statistics

Panel D – OTTI Firms and Non-OTTI Investment Holding Industrials Cash Flows from 2000 to 2011

	CFO				CFI				CFE			
	OTTI		Non OTTI		OTTI		Non OTTI		OTTI		Non OTTI	
	Med	Chg	Med	Chg	Med	Chg	Med	Chg	Med	Chg	Med	Chg
2000	123		98		-96		-70		-27		-20	
2001	147	20%	125	28%	-96	0%	-58	18%	-49	-80%	-21	-4%
2002	158	7%	128	2%	-69	28%	-79	-37%	-46	5%	-43	-106%
2003	157	-1%	120	-6%	-74	-7%	-52	34%	-29	38%	-36	16%
2004	177	13%	135	13%	-94	-27%	-88	-69%	-58	-101%	-24	35%
2005	204	16%	168	24%	-120	-28%	-79	11%	-65	-13%	-35	-46%
2006	222	9%	200	19%	-173	-44%	-111	-40%	-75	-15%	-54	-58%
2007	291	31%	238	19%	-154	11%	-108	3%	-52	31%	-68	-24%
2008	183	-37%	218	-8%	-144	6%	-100	7%	-44	16%	-66	2%
2009	266	45%	242	11%	-114	21%	-73	28%	-40	8%	-68	-3%
2010	249	-6%	199	-17%	-126	-11%	-92	-27%	-58	-43%	-63	7%
2011	251	1%	178	-11%	-172	-36%	-131	-42%	-66	-14%	-57	10%

Directions of year over year percent changes indicate the increase or decrease in net cash flows.

Table 3
Descriptive Statistics of Impairments

	N	Mean	Median	Minimum	Maximum
Total OTTI	77	16.4	5.2	0.2	118.6
Debt OTTI	36	12.7	4.0	0.5	118.6
Equity OTTI	31	20.4	10.0	0.3	114.0
Uncertain OTTI	13	12.9	5.2	0.2	81.0
115-2 Adjustment for prior years	1	2.1	2.1	2.1	2.1
115-2 current year OCI portion	1	1.1	1.1	1.1	1.1
Auction Rate Securities	23	15.8	4.0	0.5	118.6
Asset Backed Securities	2	3.1	3.1	2.2	4.0
Municipal Securities	1	1.0	1.0	1.0	1.0
Private Equity	4	13.0	10.0	9.0	23.0
Private Debt	1	1.0	1.0	1.0	1.0
Public Equity	16	25.4	9.5	0.4	114.0
Public Debt	5	7.5	3.0	0.8	26.6
Uncertain Equity	13	13.5	5.2	0.3	62.0
Uncertain Debt	6	8.4	5.4	2.0	27.0
Other/Unclear	13	12.9	5.2	0.2	81.0
Strategic Investments	2	17.1	17.1	9.0	25.1
Few (1 or 2) Securities	20	14.8	4.6	1.0	90.0
Fannie or Freddie	2	11.0	11.0	2.0	20.0
Lehman	2	4.0	4.0	3.0	5.0
Non marketable Securities	2	14.0	14.0	1.0	27.0
Time to collect (minutes)	77	10.5	9.0	3.0	26.0

Dollar amounts are in millions.

Table 4
Multivariate Regression of Probability of Recognizing OTTI

Dependent Variable:	Model (1) OTTI_ANY			Model (2) OTTI_ANN		Model (3) OTTI_QTR	
	Pred	Estimate	Std Err	Estimate	Std Err	Estimate	Std Err
Intercept 9						-9.206 ***	3.202
Intercept 8						-8.978 ***	3.182
Intercept 5						-8.723 ***	3.165
Intercept 4						-8.620 ***	3.160
Intercept 3				-12.518 ***	3.908	-8.088 **	3.140
Intercept 2				-11.580 ***	3.863	-7.710 **	3.133
Intercept 1				-10.702 ***	3.851	-6.962 **	3.126
Intercept		-5.515	134.05				
Invst ST 06	+	0.001 ***	0.001	0.001 ***	0.000	0.001 ***	0.000
Invst LT 06	+	-0.0001	0.000	0.000	0.000	-0.0001	0.000
Big 4 Auditor	+	3.944	134.05	9.275 **	3.836	5.572 *	3.114
Unrealized Gain 06	+	0.037 *	0.023	-0.003	0.008	-0.006	0.008
Ch Unrealized Gain 07	-	0.075 ***	0.026	0.011 *	0.007	0.009	0.006
Ch Unrealized Gain 08	-	-0.039 ***	0.011	-0.016 ***	0.005	-0.017 ***	0.005
Invst Trading % of CFI 06	+	0.110 *	0.061	0.121 ***	0.041	0.078 **	0.033
(Cash - Curr Liab) 06	-	0.000	0.000	0.000	0.000	0.000	0.000
Leverage 06	+	0.832	0.825	0.827	0.742	0.689	0.737
Market to Book 06	+	0.045	0.042	0.042	0.037	0.048	0.037
Free Cash Flow 08	-	-0.492	1.428	-0.147	1.298	0.004	1.258
Avg Prob Top E 07-09	+	0.150	0.371	0.186	0.334	0.106	0.331
Avg Prob Bottom E 07-09	+	0.188	0.376	0.142	0.342	0.185	0.333
Average Special Items 07-09	-	-0.0001	0.000	0.000	0.000	0.000	0.000
N (OTTI = 9)						3	
N (OTTI = 8)						1	
N (OTTI = 5)						2	
N (OTTI = 4)						1	
N (OTTI = 3)				6		7	
N (OTTI = 2)				13		8	
N (OTTI = 1)		51		32		29	
N (OTTI = 0)		190		190		190	
Likelihood Ratio		72.077		73.351		73.149	

***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variable Definition:

OTTI_ANY = 1 if company reported any other-than-temporary impairments during the period, and 0 otherwise.

OTTI_ANN = number of years during the sample period in which the company reported any other-than-temporary impairments.

OTTI_QTR = number of quarters during the sample period in which the company reported any other-than-temporary impairments.

Invst ST 06 = holdings of short-term investments in 2006.

Invst LT 06 = holdings of long-term investments in 2006.

Big 4 Auditor = 1 if the company's auditor for the period is Ernst & Young, Deloitte & Touche, KPMG, or PricewaterhouseCoopers, and 0 otherwise.

Unrealized Gain 06 = accumulated unrealized gain/loss in 2006.

Ch Unrealized Gain 07 (08) = unrealized gains/losses in 2007 (2008), measured as the unrealized gains/losses on securities reported in other comprehensive income less the amount of other-than-temporary impairment for the year.

Invst Trading % of CFI 06 = cash proceeds from sales plus cash outflows from purchases of investments as a percentage of the absolute value of net cash flows from investing activities in 2006.

(Cash – Curr Liab) 06 = the difference between cash and current liabilities in 2006.

Leverage 06 = long term debt scaled by total assets, in the 2006.

Market to Book 06 = market value of equity scaled book value of equity for 2006.

Free Cash Flow 08 = cash flows from operations less capital expenditures and cash dividends scaled by total assets for 2008.

Avg Prob Top E 07-09 = average propensity to outperform its peers from 2007-2009 as measured by the sum of annual probabilities that the firm was above the median of the change in net income for all positive changes.

Avg Prob Bottom E 07-09 = average propensity to underperform its peers from 2007-2009 as measured by the sum of annual probabilities that the firm was below the median of the change in net income for all negative changes.

Average Special Items 07-09 = average value of annual special items reported from 2007-2009.

Table 5
Multivariate Regression of OTTI Recognition Timing

Panel A – Quarterly Analysis of All Impairments for OTTI Firms

Dependent Variable:	OTTI		PP&E Imp		Goodwill Imp		All Imp	
	Est	Pr> χ^2	Est	Pr> χ^2	Est	Pr> χ^2	Est	Pr> χ^2
Intercept	-1.673	<.001	-1.861	<.001	-2.712	<.001	-1.129	<.001
4th Qtr	0.395	0.022	0.330	0.344	1.843	0.001	0.718	0.003
% Ch S&P 500	-0.016	0.022						
% Ch GDP			-7.937	0.052	-12.193	0.057	-10.921	0.000
Med Ch Industry ROA			53.108	0.440	169.600	0.107	63.129	0.201
Accum. Unrealized Loss at t-1	0.374	0.014						
Unrealized declines for 3 prior qtrs	0.414	0.020						
OTTI recorded at t-1	0.573	0.000						
Invst Trading % of CFI	-0.001	0.772						
(Cash - Curr Liab)	0.000	0.694						
% Ch Sales	-0.654	0.105	-0.219	0.583	-1.699	0.002	-0.843	0.007
Ch CFO / AT-1	-1.610	0.468	1.245	0.632	7.876	0.007	0.674	0.727
Ch pre-impair Earnings / AT-1	-79.387	0.002	-47.234	0.122	-10.846	0.786	-59.061	0.008
Bath (pre-impair E < Med of -)	70.202	0.006	44.796	0.140	-5.799	0.883	48.641	0.028
Smooth (pre-impair E > Med of +)	81.804	0.002	51.206	0.098	8.056	0.842	62.444	0.006
Negative non-impair Sp. Items	0.155	0.262	0.271	0.103	0.405	0.046	0.246	0.038
N (Imp=1)	114		42		44		164	
N (Imp=0)	464		572		570		450	
Likelihood Ratio	121.64		19.57		101.51		106.07	

Panel B – Quarterly Analysis of Debt and Equity OTTI

Dependent Variable:	Debt		Equity	
	Est	Pr> χ^2	Est	Pr> χ^2
Intercept	-2.191	<.001	-1.980	<.001
4th Qtr	0.474	0.028	0.142	0.518
% Ch S&P 500	0.003	0.724	-0.018	0.037
Accum. Unrealized Loss at t-1	1.016	<.001	-0.198	0.315
Unrealized declines for 3 prior qtrs	0.323	0.122	0.076	0.737
OTTI recorded at t-1	0.377	0.040	0.595	0.002
Invst Trading % of CFI	0.002	0.410	-0.001	0.806
(Cash - Curr Liab)	0.000	0.048	0.000	0.060
% Ch Sales	0.335	0.493	-0.998	0.037
Ch CFO / AT-1	-0.782	0.780	-0.390	0.884
Ch pre-impair Earnings / AT-1	-32.649	0.323	-56.446	0.073
Bath (pre-impair E < Med of -)	32.725	0.319	50.462	0.107
Smooth (pre-impair E > Med of +)	31.768	0.343	59.978	0.060
Negative non-impair Sp. Items	0.005	0.978	0.246	0.157
N (Imp=1)	53		48	
N (Imp=0)	525		530	
Likelihood Ratio	121.64		52.07	

Table 5 (continued)
Multivariate Regression of OTTI Recognition Timing

Panel C – Quarterly Analysis of All Impairments for All Firms (OTTI Firms and Non-OTTI Investment Holding Industrials)

Dependent Variable:	OTTI		PPE Imp		Goodwill Imp		All Imp	
	Est	Pr> χ^2	Est	Pr> χ^2	Est	Pr> χ^2	Est	Pr> χ^2
Intercept	-1.750	<.001	-1.846	<.001	-2.119	<.001	-1.508	<.001
4th Qtr +	0.146	0.271	0.405	0.003	0.670	<.001	0.543	<.001
% Ch S&P 500 -	-0.012	0.016						
% Ch GDP -			-1.741	0.315	-3.664	0.085	-3.783	0.009
Med Ch Industry ROA			-4.040	0.889	11.610	0.743	-0.723	0.976
Accum. Unrealized Loss at t-1 +	0.796	<.001						
Unrealized declines for 3 prior qtrs +	0.641	<.001						
OTTI recorded at t-1 ?	-0.923	<.001						
Invst Trading % of CFI +	0.002	0.466						
(Cash - Curr Liab) -	0.000	0.523						
% Ch Sales -	-0.473	0.067	-0.195	0.186	-1.030	<.001	-0.538	<.001
Ch CFO / AT-1 -	-0.593	0.693	-0.396	0.679	1.132	0.287	-0.251	0.761
Ch pre-impair Earnings / AT-1 -	-35.508	0.069	-35.514	0.008	-3.717	0.829	-37.884	0.001
Bath (pre-impair E < Med of -) +	33.453	0.085	30.885	0.020	-10.831	0.527	27.127	0.016
Smooth (pre-impair E > Med of +) +	36.954	0.060	35.278	0.008	5.966	0.730	39.442	0.001
Negative non-impair Sp. Items +	0.260	0.016	0.441	<.001	0.092	0.261	0.323	<.001
N (Imp=1)	114		249		206		489	
N (Imp=0)	2,733		2,819		2,862		2,579	
Likelihood Ratio	273.91		146.96		377.17		373.43	

Table 5 (continued)
Multivariate Regression of OTTI Recognition Timing

Panel D – Quarterly Analysis of Impairment Magnitudes

Dependent Variable:	Tobit		OLS	
	OTTI / AT-1 Est	Pr > t	OTTI / AT-1 Est	Pr > t
Intercept	-0.0055	<.0001	0.0016	0.020
4th Qtr +	0.0011	0.055	-0.0007	0.320
% Ch S&P 500 -	-0.0001	0.003	-0.0001	0.031
Accum. Unrealized Loss at t-1 +	0.0010	0.034	0.0004	0.567
Unrealized declines for 3 prior qtrs +	0.0013	0.019	0.0002	0.755
OTTI recorded at t-1 ?	0.0015	0.004	-0.0007	0.309
Invst Trading % of CFI +	0.0000	0.884	0.0000	0.875
% Ch Sales -	-0.0020	0.083	-0.0012	0.438
Ch CFO / AT-1 -	-0.0115	0.127	-0.0219	0.056
Ch pre-impair Earnings / AT-1 -	-0.1501	0.079	0.1375	0.228
Bath (pre-impair E < Med of -) +	0.1364	0.108	-0.1351	0.232
Smooth (pre-impair E > Med of +) +	0.1609	0.064	-0.1238	0.286
Negative non-impair Sp. Items +	0.0002	0.721	-0.0005	0.412
N	614		119	
Log Likelihood	372.07		--	
Adj R ²	--		3%	

Variable Definition:

OTTI = 1 if company reported any other-than-temporary impairments during the period, and 0 otherwise.

PPE Imp = 1 if company reported any impairments taken on property, plant and equipment during the period, and 0 otherwise.

Goodwill Imp = 1 if company reported any impairments taken on goodwill during the period, and 0 otherwise.

All Imp = 1 if company reported any other-than-temporary impairments on securities investments, impairments on PPE, or impairments on goodwill during the period, and 0 otherwise.

Debt = 1 if company reported an other-than-temporary impairment on a debt security, and 0 otherwise.

Equity = 1 if company reported an other-than-temporary impairment on an equity security, and 0 otherwise.

OTTI/AT-1 = amount of other-than-temporary impairment scaled by lagged assets.

4th Qtr = 1 if current quarter is in the fourth quarter of the fiscal year, and 0 otherwise.

% Ch S&P 500 = percentage change in value of the S&P500 index from prior quarter end to current quarter end.

% Ch GDP = percentage change in the U.S.'s gross domestic product from the prior period to the current period.

Med Ch Industry ROA = change in the industry's median return on assets from the prior period to the current period.

Accum. Unrealized Loss at t-1 = 1 if the accumulated unrealized gain/loss as of the prior period less the OTTI amount in the prior period was below zero, and 0 otherwise.

Unrealized declines for 3 prior qtrs. = 1 if company reported declines in accumulated unrealized gain/loss for three consecutive quarters, and 0 otherwise.

OTTI recorded at t-1 = 1 if company reported an other-than-temporary impairment in the prior period, and 0 otherwise.

Invst Trading % of CFI = cash proceeds from sales plus cash outflows from purchases of investments as a percentage of absolute value of net cash flows from investing activities during the quarter.

(Cash – Curr Liab) = the difference between cash and current liabilities for the current period.

% Ch Sales = percentage change in sales in the current period as compared to four quarters ago.

Ch CFO / AT-1 = change in cash flow from operations from four quarters ago, scaled by lagged total assets.

Ch pre-impair Earnings / AT-1 = change in earnings before other than temporary impairments from four quarters ago, scaled by lagged total assets.

Bath (pre-impair E < Med of -) = 1 if company reports change in earnings before impairments below the median of non-zero negative pre-impairment change in earnings of all industrial firms in the quarter, and 0 otherwise.

Smooth (pre-impair E > Med of +) = 1 if company reports change in earnings before other-than-temporary impairments above the median of non-zero positive change in pre-impairment earnings of all industrial firms in the quarter, and 0 otherwise.

Negative non-impair Sp. Items = 1 if company reports non-impairment related income-decreasing special items, and 0 otherwise.

Table 6
Two-stage Selection Model: Determinants of Holding Investments and OTTI

Panel A – Propensity to Invest

	Estimate	Std Error
Intercept	-0.757 ***	0.261
Size	0.111 ***	0.036
Market to Book	0.024 ***	0.009
Free Cash Flow	-1.399 ***	0.501
Capital Expenditure	0.0003 ***	0.000
Leverage	-1.104 ***	0.249
Dividends	-0.065	0.080
Cash	2.257 ***	0.407
N (INVESTMENTS=1)	846	
N (INVESTMENTS=0)	713	
Likelihood Ratio	119.062	

Panel B – Probability of Recognizing OTTI

Dependent Variable:	Model (1) OTTI_ANY			Model (2) OTTI_ANN		Model (3) OTTI_QTR	
	Pred	Estimate	Std Error	Estimate	Std Error	Estimate	Std Error
Intercept		-4.681	7.962				
Invst ST 06	+	0.001 ***	0.001	0.001 ***	0.0004	0.001 ***	0.0004
Invst LT 06	+	-0.0001	0.000	-0.0001	0.0001	-0.0001	0.0001
Big 4 Auditor	+	2.782	7.958	6.932 **	3.133	4.656 *	2.735
Unrealized Gain 06	+	0.049 **	0.024	-0.002	0.008	-0.006	0.008
Ch Unrealized Gain 07	-	0.091 ***	0.028	0.012 *	0.007	0.010	0.007
Ch Unrealized Gain 08	-	-0.044 ***	0.011	-0.016 ***	0.005	-0.018 ***	0.005
Invst Trading % of CFI 06	+	0.078 *	0.043	0.093 ***	0.033	0.066 **	0.028
(Cash - Curr Liab) 06	-	-0.00001	0.000	-0.00001	0.0001	-0.00003	0.0001
Leverage 06	+	0.348	0.766	0.288	0.690	0.201	0.687
Market to Book 06	+	0.048	0.036	0.046	0.033	0.046	0.033
Free Cash Flow 08	-	-0.537	1.386	-0.307	1.253	-0.284	1.225
Avg Prob Top E 07-09	+	0.233	0.352	0.209	0.317	0.167	0.313
Avg Prob Bottom E 07-09	+	0.336	0.364	0.255	0.331	0.303	0.323
Average Special Items 07-09	-	-0.0002	0.000	-0.00004	0.0004	0.0001	0.0004
Inverse Mills		0.501 ***	0.154	0.507 ***	0.141	0.518 ***	0.140
N (OTTI=1,2,3,4,5,8,9)						51	
N (OTTI=1,2,3)				51		--	
N (OTTI=1)		51		--		--	
N (OTTI=0)		312		312		312	
Likelihood Ratio		103.921		101.797		102.793	

***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. For ease of reading, intercepts in the ordered logit models (Model 2 and Model 3) are not reported here, but we note that the magnitudes are monotonically negative in the categories of the dependent variable, as expected.

Variable Definition:

INVESTMENTS = 1 if company had non-zero short-term investments or non-zero long-term investments during the period, and 0 otherwise.

OTTI_ANY = 1 if company reported any other-than-temporary impairments during the period, and 0 otherwise.

OTTI_ANN = number of years in which the company reported any other-than-temporary impairments, and 0 otherwise.

OTTI_QTR = number of quarters during the sample period in which the company reported any other-than-temporary impairments.

Size = logarithm of total assets for the period.

Market to Book = market value of equity to book value of equity for the period.

Free Cash Flow = cash flow from operations less capital expenditures and cash dividends, scaled by total assets.

Capital Expenditure = capital expenditures for the period.

Leverage = long-term debt scaled by total assets

Dividends = 1 if company paid cash dividends during the period, and 0 otherwise.

Cash = cash holdings scaled by total assets for the period.

Invst ST 06 = holdings of short-term investments in 2006.

Invst LT 06 = holdings of long-term investments in 2006.

Big 4 Auditor = 1 if the company's auditor for the period is Ernst & Young, Deloitte & Touche, KPMG, or PricewaterhouseCoopers, and 0 otherwise.

Unrealized Gain 06 = accumulated unrealized gain/loss in 2006.

Ch Unrealized Gain 07 (08) = unrealized gains/losses in 2007 (2008), measured as the unrealized gains/losses on securities reported in other comprehensive income less the amount of other-than-temporary impairment for the year.

Invst Trading % of CFI 06 = cash proceeds from sales plus cash outflows from purchases of investments as a percentage of the absolute value of net cash flows from investing activities in 2006.

(Cash – Curr Liab) 06 = the difference between cash and current liabilities in 2006.

Leverage 06 = long term debt scaled by total assets, in the 2006.

Market to Book 06 = market value of equity scaled book value of equity for 2006.

Free Cash Flow 08 = cash flows from operations less capital expenditures and cash dividends scaled by total assets for 2008.

Avg Prob Top E 07-09 = average propensity to outperform its peers from 2007-2009 as measured by the sum of annual probabilities that the firm was above the median of the change in net income for all positive changes.

Avg Prob Bottom E 07-09 = average propensity to underperform its peers from 2007-2009 as measured by the sum of annual probabilities that the firm was below the median of the change in net income for all negative changes.

Average Special Items 07-09 = average value of annual special items reported from 2007-2009.

Table 7
Spearman Correlation of OTTI and Special Items

	OTTI=1	\$OTTI	Total S.I.	PPE W-off	GW W-off	Sale Assets	Mergers	Settle	Restruct	Debt Ext.	IPR&D	Other S.I.	Net Income
\$OTTI	(0.992) <.0001												
Total S.I.	(0.158) <.0001	0.171 <.0001											
PPE W-off	(0.017) 0.672	0.018 0.663	0.214 <.0001										
GW W-off	(0.234) <.0001	0.246 <.0001	0.365 <.0001	0.217 <.0001									
Sale Assets	(0.064) 0.111	0.062 0.125	0.274 <.0001	0.075 0.063	0.024 0.548								
Mergers	(0.117) 0.004	0.134 0.001	0.205 <.0001	0.047 0.239	0.038 0.341	(0.019) 0.631							
Settle	0.005 0.896	0.002 0.962	0.332 <.0001	(0.030) 0.460	(0.011) 0.787	0.023 0.572	0.009 0.820						
Restruct	(0.090) 0.025	0.098 0.015	0.675 <.0001	0.054 0.183	0.174 <.0001	(0.004) 0.925	0.112 0.005	0.208 <.0001					
Debt Ext.	0.091 0.024	(0.095) 0.018	0.035 0.390	(0.040) 0.325	(0.037) 0.363	0.021 0.605	0.131 0.001	(0.022) 0.578	(0.022) 0.589				
IPR&D	(0.067) 0.098	0.077 0.055	0.093 0.022	0.097 0.016	0.087 0.030	(0.031) 0.442	0.247 <.0001	0.034 0.392	0.005 0.896	(0.003) 0.947			
Other S.I.	(0.082) 0.043	0.086 0.032	0.327 <.0001	(0.013) 0.753	(0.004) 0.921	(0.044) 0.277	0.089 0.027	0.089 0.027	0.107 0.008	0.013 0.746	0.099 0.014		
Net Income	(0.122) 0.002	0.109 0.007	0.009 0.816	0.091 0.024	0.218 <.0001	0.161 <.0001	(0.046) 0.252	(0.088) 0.028	(0.057) 0.160	(0.127) 0.002	(0.012) 0.769	(0.063) 0.119	
NI<0	0.192 <.0001	(0.190) <.0001	(0.185) <.0001	(0.087) 0.032	(0.338) <.0001	(0.084) 0.038	0.021 0.599	0.010 0.799	(0.131) 0.001	0.116 0.004	(0.000) 0.991	(0.047) 0.239	(0.643) <.0001

Table 8
Analysts Coverage, Expectations and Surprises for OTTI Firms which Took from One to Three OTTI

	Before OTTI			Between 1st and 3rd OTTI			After OTTI			<i>Pr>F</i>	<i>Pr> Z </i>
	N	Mean	Median	N	Mean	Median	N	Mean	Median		
Coverage	291	8	8	77	9	8	130	9	8	<i>0.352</i>	<i>0.661</i>
Mean Estimate	291	0.50	0.47	77	0.49	0.36	130	0.42	0.38	<i>0.241</i>	<i>0.050</i>
Median Estimate	291	0.50	0.47	77	0.49	0.37	130	0.42	0.38	<i>0.199</i>	<i>0.053</i>
St.Dev. Of Estimates	280	0.06	0.03	76	0.07	0.04	126	0.05	0.03	<i>0.632</i>	<i>0.012</i>
Actual EPS	291	0.46	0.45	77	0.57	0.48	130	0.49	0.42	<i>0.390</i>	<i>0.892</i>
Error1 (against Mean)	291	-0.040	0.010	77	0.083	0.020	130	0.074	0.030	<i>0.002</i>	<i>0.016</i>
Error2 (against Med)	291	-0.044	0.010	77	0.083	0.030	130	0.075	0.030	<i>0.003</i>	<i>0.008</i>
Miss1 (against Mean)	291	37%	0%	77	36%	0%	130	26%	0%	<i>0.093</i>	<i>0.093</i>
Miss2 (against Med)	291	38%	0%	77	35%	0%	130	23%	0%	<i>0.008</i>	<i>0.008</i>
Sales of Invst (CF)	291	195	0	77	594	5	130	121	0	<i><.0001</i>	<i>0.002</i>
Purchases of Invst (CF)	291	222	0	77	557	0	130	136	0	<i>0.001</i>	<i>0.005</i>

Correlations between between SIV and :

Error1	0.118	0.044	0.056	0.628	0.081	0.360
Error2	0.104	0.077	0.079	0.494	0.059	0.507
Miss1	-0.071	0.228	-0.001	0.996	-0.046	0.600
Miss2	-0.028	0.631	-0.094	0.416	-0.036	0.683

Variable Definition:

- Coverage = number of analysts covering the firm during the period (this and other I/B/E/S variables from the last consensus file before the earnings announcement)
- Mean Estimate = mean estimate forecast of earnings per share across all analysts covering the firm for the period.
- Median Estimate = median estimate forecast of earnings per share across all analysts covering the firm for the period.
- St. Dev. Of Estimates = standard deviation of the estimate of earnings per share across all analysts covering the firm.
- Actual EPS = reported earnings per share for the period.
- Error1 = forecast error, measured as the difference between the actual earnings per share for the period and the mean earnings per share forecast.
- Error2 = forecast error, measured as the difference between the actual earnings per share for the period and the median earnings per share forecast.
- Miss1 = 1 if the company's actual earnings per share for the period is less than the mean earnings per share forecast, and 0 otherwise.
- Miss2 = 1 if the company's actual earnings per share for the period is less than the median earnings per share forecast, and 0 otherwise.
- Sales of Invst = amount of investments sold during the period, where the amount is taken from the statement of cash flows.
- Purchases of Invst = amount of investments purchased during the period, where the amount is taken from the statement of cash flows.