The Effect of Mark-to-Market Accounting for Financial Assets and Liabilities on Financial Reporting Transparency and Information Asymmetry in Banks

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Abstract

We hypothesize and report robust evidence that mark-to-market (MTM) accounting for banks' securities suffers from a hitherto undocumented detrimental effect: it reduces financial reporting transparency and creates information asymmetry in the market for banks' shares. We observe this effect for securities that SFAS 115 classifies as "trading" securities requiring MTM treatment, and also for other financial assets and liabilities when firms exercise their option under SFAS 159 to use MTM reporting. Securities classified under accounting rules as "available-for-sale" or as "held-to-maturity" are not expected to and do not exhibit this effect.

We propose three principal reasons that MTM accounting for securities creates information asymmetry: under MTM it is costly for uninformed investors to determine the extent to which securities gains and losses are due to shocks to expected returns (which reverse in earnings over time) or shocks to expected cash flows (which do not), and they thus are at an informational disadvantage in separating the surprise and expected components of earnings in subsequent quarters; managers can manipulate MTM gains and losses for trading securities by influencing traded prices in less than perfect liquid markets; and MTM accounting reduces the ability of bank managers to convey private information by issuing voluntary earnings forecasts.

We document that bank shares are quoted at approximately one-fifth wider bid-ask spreads if the bank invests in trading securities, controlling for other bank characteristics. The spreads are a statistically and economically significant function of the relative size of the trading securities investment. We also show that banks with higher investments in trading assets have lower analyst following, release fewer management earnings forecasts, and have stock prices that reflect information that arrives in a less timely fashion. We use the passage of SFAS 115, which mandated the use of MTM for trading assets, as a shock to MTM rules and document a significant increase in information asymmetry for banks with trading assets after the passage of this standard. Finally, we find that firms exercising their option under SFAS 159 to adopt MTM accounting for other financial assets and liabilities (other than trading securities) experience an increase in spreads compared to firms that did not opt for MTM reporting.

1. Introduction

We hypothesize and report robust evidence that mark-to-market (MTM) accounting for banks' securities suffers from a hitherto undocumented detrimental effect: it reduces financial reporting transparency and creates information asymmetry in the market for banks' shares. We observe this effect for securities that SFAS 115 classifies as "trading" securities requiring MTM treatment, and also for other financial assets and liabilities when firms exercise their option under SFAS 159 to use MTM reporting. Other securities classified under accounting rules as "available-for-sale" or as "held-to-maturity" are not expected to and do not exhibit this effect.

Statement of Financial Accounting Standard (SFAS) 115 defines trading securities as (FASB, 1993, ¶12a):

> Securities that are bought and held principally for the purpose of selling them in the near term (thus held for only a short period of time) shall be classified as trading securities. Trading generally reflects active and frequent buying and selling, and trading securities are generally used with the objective of generating profits on short-term differences in price.

Under this standard, only securities classified as "trading" have MTM gains and losses both reflected on balance sheets and included in current-period earnings. Subsequently, SFAS 159 (FASB, 2007) gave firms the option to elect this treatment for any individual financial asset or liability.

We propose three principal reasons that MTM accounting for securities reduces financial reporting transparency and creates information asymmetry. First, under MTM it is costly for investors to determine the extent to which securities gains and losses are due to shocks to expected returns (which reverse in earnings over time) or shocks to expected cash flows (which do not), or both. Uninformed investors consequently are at an informational disadvantage in forming expectations of future earnings and thus in separating the surprise and expected

components of actual earnings in subsequent quarters. Second, managers can manipulate MTM gains and losses on trading securities by influencing traded prices in less than perfect liquid markets. Third, MTM accounting reduces the ability of bank managers to credibly convey private information by issuing voluntary earnings forecasts.

We document that bank shares are quoted at approximately one-fifth wider bid-ask spreads if the bank invests in trading securities, controlling for other bank characteristics. The spreads are a statistically and economically significant function of the relative size of the trading securities portfolio. We also show that banks with larger investments in trading assets have lower analyst following, release fewer management earnings forecasts, and have stock prices that reflect information that arrives in a less timely fashion. The results are robust to using alternative measures of the quantity of trading securities and to controls for firm-specific characteristics. The results also remain after including bank-fixed effects, which suggests they are not due to differences across banks in time-invariant characteristics.

As predicted, similar results are not observed for banks' investments that are not classified as "trading securities" under SFAS 115. These constitute: securities classified as "available-for-sale," which are reported at fair values on balance sheets but whose fair value gains and losses generally are not incorporated in earnings until they are sold; securities classified as "held-to-maturity," which are reported at historical cost, not market value; and loans, which are not affected by SFAS 115. These results are consistent with mark to market accounting reducing the transparency of banks' financial reports by the channel of incorporating gains and losses in quarterly earnings, consistent with our hypothesis.

While these results show that trading securities are associated with greater financial opacity for bank stocks, opacity could be due to unobservable characteristics of the underlying

securities or to imperfect controls for bank characteristics, rather than due to marking securities to market *per se*. To tease out the relative importance of these alternative explanations, we exploit the introduction of MTM accounting for trading securities by SFAS 115 in 1993 as a "quasi-natural" experiment. This allows a more valid inference about causality running from MTM accounting to opacity, using a difference-in-difference specification. We find that the passage of SFAS 115 resulted in a pronounced increase in bid-ask spreads for banks with holdings of trading securities compared to those without trading securities. Moreover, this increase in spreads is not observed for other types of investment securities. These results are consistent with mark to market accounting reducing the transparency of banks' financial reports.

We also take advantage of the introduction of the "fair value option" in SFAS 159 (FASB, 2007) as a shock to MTM accounting. Effective in 2008, SFAS 159 allowed firms to choose individual financial assets and liabilities to be reported at fair value, with unrealized gains and losses included in earnings for the period. Using a difference-in-difference specification, we find a significant increase in spreads for banks that opted to report financial assets and liabilities at fair values compared to those that did not. Additional tests verify that the above inferences are robust to controlling for possible confounding effects of the recent financial crisis.

The relation between trading securities and information asymmetry would not be predicted by focussing only on the accounting rules for investment securities, without considering the impact of financial information on investors or the incentives of managers preparing it. A focus on accounting rules alone would suggest that, relative to other classes of securities, those classified as trading securities should attract the most accurate "fair value" measurements among all security classes, because they almost invariably are valued using the most reliable methods in the GAAP hierarchy ("level 1" under SFAS 157). For example, even

Benston (2008, p. 104, emphasis added), in an otherwise highly critical review of fair value accounting rules, concludes that "fair values *other than those taken from quoted prices (level 1)* could be readily manipulated by opportunistic and overoptimistic managers."

The results also would seem surprising to those schooled in the belief that market prices provide investors with sufficient information. However, the picture changes after considering the effect of mark-to-market accounting on investors seeking to separate reported earnings into expected versus news components, or the effect of management incentives on their trading in illiquid markets.

MTM accounting for banks' trading securities portfolios was substantially criticized in the aftermath of the so-called Global Financial Crisis. Many bankers, politicians, regulators, press commentators and economists went so far as to blame this previously obscure method of accounting for exaggerating the crisis, or even causing it. As a consequence, accounting standard setters were forced to reduce the range of securities to which MTM accounting applies. Our results have no direct implication for this issue, though it is feasible that the effect we document on financial reporting transparency and information asymmetry could have adversely affected the market for banks' shares and investor sentiment during the crisis. While our results might seem to imply the desirability of reporting the decomposition of MTM gains and losses into shocks to expected cash flows and to expected returns, we caution that the decomposition depends on subjective expectations and is inherently unauditable.

Our hypotheses address an effect of incorporating MTM gains and losses in earnings. They have little to say about either disclosing gains and losses outside of the income statement or marking securities to market on bank balance sheets. As hypothesized, we find no evidence that available-for-sale (AFS) securities affect financial transparency, even though these assets also

are shown on the balance sheet at fair values. A crucial difference between AFS and trading securities lies in the fact that unrealized fair value gains and losses on AFS securities are not incorporated in current earnings, and hence do not give rise to the same earnings-based interpretation problems and incentive effects. Similarly, the results do not imply that accounting standard setters should abandon mark to market accounting for trading securities in favour of historical cost, but they do point to a detrimental effect of the governing accounting standards that does not appear to have been taken into account by regulators or standard setters.

The rest of the paper is organized as follows. Section 2 outlines the history of MTM for investment securities, which has been substantially influenced by banking crises, and describes the currently prevailing accounting rules. Section 3 develops our hypotheses and summarises related literature, section 4 defines the variables we use and describes their measurement, section 5 describes the sample and data, section 6 outlines the results, and section 7 presents conclusions.

2. Mark to Market Accounting: History and Current Rules

The history of mark-to-market accounting for securities holdings is very much a history of banking crises and the political and regulatory reaction to them. This section describes the major events. We later exploit these changes to improve identification.

2.1 MTM prior to 1938

Bank supervisors required a variant of MTM for all securities until after the Great Depression, when it was dropped in favour of cost-based reporting. In the aftermath of the downturn, MTM accounting was alleged to have marked bank assets down to the point where the banks could not maintain legal minimum capital adequacy ratios without curtailing loans and thereby contracting business and household spending. In a letter dated November 1, 1990 to the

Securities and Exchange Commission Chairman, then Federal Reserve Chairman Alan Greenspan stated[1]:

> "… prior to 1938, banking organizations were required for supervisory purposes to use market value accounting for their investment securities portfolios. Serious concerns on the part of the U.S. Treasury and the bank regulators over how this affected the banks' financial performance and investment decisions led the agencies to abandon in that year the use of this accounting concept for supervisory purposes."

A similar scenario was replayed seventy years later.

2.2 Lower-of-cost-or-market method until 1993

For public financial reporting purposes, the required method of accounting until 1993 was lower-of-cost-or-market (LCM). Under this method, securities were recorded on balance sheets at cost, and the cost basis was revised to incorporate losses but not gains. Losses were to be incorporated in current-period earnings, though the diligence with which this was done in practice subsequently came into question.

2.3 SFAS 115 reintroduces "fair value" (MTM) accounting for many securities.

After the savings and loans crisis of the 1980s, it was the LCM method's turn to come under pressure from regulatory bodies. The Financial Accounting Standards Board (FASB, the current U.S. accounting standard-setting body) identified the Office of the Comptroller of the Currency, the Federal Home Loan Bank Board, the Securities and Exchange Commission and the American Institute of Certified Public Accountants as proposing a change to market pricing.[2] Proponents of mark-to-market accounting argued that historical-cost based financial statements obscured underlying economic changes. Inadequate loss recognition practices allowed troubled financial institutions to operate without supervisory intervention, and also managers to undertake

[1] http://economyblog.ncpa.org/wp-content/plugins/uploads/Greenspan%20letter%20to%20SEC%20November%201990.pdf. See also: United States Securities and Exchange Commission (2008).
[2] Financial Accounting Standards Board (1993, ¶30-36).

excessive risk in the hope of recovering financial strength. The major CPA firms joined the call for greater use of market values in regulatory accounting for financial institutions and in public financial reporting for firms generally.

Against this, some commentators expressed concerns about the reliability of fair value numbers and the possibility of management manipulation. Banks also questioned the relevance of short term fair value gains and losses in cases such as default-free debt securities that are intended to be held to maturity, but not held with the intent of sale.

In response to these pressures, FASB (1993) issued SFAS 115, effective for fiscal periods commencing after December 15, 1993 (i.e., primarily affecting financial statements commencing with first quarter 1994). The fundamental provisions of this standard remain in effect today, though it has been amended over time in ways that are not central to our analysis. SFAS 115 requires firms to classify their investment securities into three categories – trading, available-for-sale and held-to-maturity – and gives different roles to securities' fair values in each category.

- Securities that are purchased principally for the purpose of sale in the near term are classified as *trading securities* and are reported on balance sheets at fair value (defined below), with both realized and unrealized gains and losses in fair value included in earnings in the period in which they arise. This asset class includes investments in bonds, notes, equities, derivatives and securitized loans, but does not include unsecuritized loans. The standard does not distinguish between changes in fair value that arise from shocks to expected future cash flows, shocks to expected returns (discount rates), or both.

- Debt securities that the firm has a positive intent as well as an ability to hold to maturity are classified as *held-to-maturity securities* and are reported on balance sheets at amortized historical cost. Gains and losses in their market values do not affect earnings, except for losses due to "other than temporary impairments" (FASB, 1993, ¶16), which we interpret as arising from increased default risk and hence reduced expected cash flows. In contrast, the price effects of increases in expected returns, for example due to market-wide increases in interest rates, reverse over time (given expected future cash flows) and hence are "temporary." The standard specifically excludes subsequent recoveries in fair value from being included in current earnings.

- All securities not classified as either held-to-maturity securities or trading securities are classified as *available-for-sale securities* and are reported on balance sheets at fair value, but with unrealized gains and losses excluded from earnings until the securities are sold or mature. They also are subject to the "other than temporary impairment" rules, so losses due to increased default risk (but not to increases in expected returns) are included in current earnings, and any subsequent recoveries are not.

Thus, accounting earnings incorporates the effect of current-period shocks to expected returns only in the case of trading securities. Given expected future cash flows, the effect on earnings of a shock to expected returns reverses over the investment interval. In Section 3 below, we conjecture that this creates uncertainty about expected future earnings, and corresponding ambiguity as to whether subsequent earnings from trading security investments arise from the realization of prior shocks to expected returns (and hence are not "news") or from subsequent-period shocks to either expected cash flows or to expected returns (and hence are "news"). Available-for-sale and held-to-maturity securities do not give rise to the same ambiguity, because under SFAS 115 there is no earnings effect of a shock to their expected returns.

Trading asset accounts can form a significant part of banks' balance sheets. For example, Citibank had $394 billion in trading asset accounts at the end of 2006. This accounted for over 20% of the bank's total assets and over three times the total of Tier 1 and Tier 2 capital. Its trading assets were approximately equally split between investments in (i) debt securities (ii) equity securities (iii) government securities and (iv) derivatives and securitized loans.

Because our hypotheses address the equity market effects of MTM accounting, we scale banks' security investments relative to their market value of equity, not total assets. [3] The difference is important because banks are relatively high levered. For banks in our sample with trading securities, their trading securities average 16.3% of book value of shareholders' equity.

2.4 SFAS 157 clarifies the definition and measurement of "fair value"

[3] Security investments are also scaled by market value of equity for consistency with prior studies, including Erel, Nadauld and Stulz (2011) and Flannery et al. (2004). Results are robust to scaling by total assets.

The SFAS 115 definition of "fair value" appears to operate under the premise that the mere existence of quotations in a recognized national market implies unlimited market liquidity (FASB, 1993 ¶3a):

> The fair value of an equity security is readily determinable if sales prices or bid-and-asked quotations are currently available on a securities exchange registered with the Securities and Exchange Commission (SEC) or in the over-the-counter market, provided that those prices or quotations for the over-the-counter market are publicly reported by the National Association of Securities Dealers Automated Quotations systems or by Pink Sheets LLC.

Provided dealer quotes or recent transactions prices are available, SFAS 115 equates them with the fair value for unlimited quantities of the security on firms' balance sheets.

In response to mounting dissatisfaction with variation in applying fair value accounting in practice, FASB issued SFAS 157 in 2006, effective for fiscal years commencing after November 15, 2007. SFAS 157 seeks to clarify the definition and measurement of fair value. The standard defines fair value (FASB, 2006, preamble) as follows:

> The definition of fair value retains the exchange price notion in earlier definitions of fair value. This Statement clarifies that the exchange price is the price in an orderly transaction between market participants to sell the asset or transfer the liability in the market in which the reporting entity would transact for the asset or liability, that is, the principal or most advantageous market for the asset or liability. The transaction to sell the asset or transfer the liability is a hypothetical transaction ….

The standard also provides a three-level hierarchy of measurement methods that is based on the reliability of the valuation, and is correlated with security liquidity:

- Level 1 fair values are where there exist (FASB, 2006 ¶24) "quoted prices … in active markets for identical assets or liabilities. … An active market for the asset or liability is a market in which transactions for the asset or liability occur with sufficient frequency and volume to provide pricing information on an ongoing basis. A quoted price in an active market provides the most reliable evidence of fair value."

- Level 2 fair values occur for illiquid securities for which a price in an actively traded market is not available, but other reliable price data can be used to infer a fair value (for example, pricing a convertible security based on traded prices of the underlying stock and traded options).
- Level 3 securities are those with no relevant price data from liquid markets, so their fair values are unobservable to auditors and are based on management expectations (for example, using present values of expected future cash flows).

The implicit assumption in the case of level 1 fair valuation is the existence of unlimited market liquidity. SFAS 157 actually states (FASB, 2006 ¶27):

> If the reporting entity holds a position in a single financial instrument (including a block) and the instrument is traded in an active market, the fair value of the position shall be measured within Level 1 as the product of the quoted price for the individual instrument times the quantity held. The quoted price shall not be adjusted because of the size of the position relative to trading volume (blockage factor). The use of a blockage factor is prohibited, even if a market's normal daily trading volume is not sufficient to absorb the quantity held and placing orders to sell the position in a single transaction might affect the quoted price.

Securities classified as "trading" almost invariably attract Level 1 valuation, the highest in the GAAP hierarchy.

2.5 SFAS 159 introduces the "fair value option" for many financial assets and liabilities

FASB issued SFAS 159 in 2007, effective for fiscal years commencing after November 15, 2007, giving firms an irrevocable option to use MTM accounting for a range of financial securities, including their own debt. The option is exercisable on a security by security basis, but one exercised it cannot be reversed. FASB's objective was stated as follows (FASB, 2007 ¶1):

> This Statement is expected to expand the use of fair value measurement, which is consistent with the Board's long-term measurement objectives for accounting for financial instruments.

3. Hypothesis development and related literature

We propose three principal reasons that MTM accounting for trading securities reduces financial reporting transparency and creates information asymmetry. First, uninformed investors are at an informational disadvantage in determining the extent to which securities gains and losses are due to shocks to expected returns (which reverse in earnings over time) or shocks to expected cash flows (which do not), or both. They therefore expect to trade at an informational disadvantage in forming earnings expectations and consequently in separating the surprise and expected components of earnings in subsequent quarters. Second, managers can manipulate MTM gains and losses by influencing traded prices in less than perfect liquid markets. Third, MTM accounting for trading securities reduces the propensity of bank managers to convey private information by issuing voluntary earnings forecasts. We discuss each in turn.

3.1 Uncertain implications of MTM gains and losses

The effect on future earnings of current-period and past fair value gains and losses depends on whether they were due to shocks to the securities' expected returns (discount rates), or shocks to their expected cash flows (Campbell and Shiller, 1988), or both. Consider a decline in price which, under mark-to-market accounting, triggers a loss charged against current period earnings and a downward revaluation of the security on the bank's balance sheet. If the price decline was caused by an increase in expected returns, holding expected cash flow constant, it is expected to reverse in earnings over time, as the increased expected return is realized. On the other hand, if the price decline was caused by a decrease in expected future cash flow, holding expected return constant, it is not expected to reverse in earnings over time.

Let $p_{t(}z_{t)}$ be the price of a security with maturity *T*, as follows:

$$p_t(z_t) = \sum_{j=1}^{T} c_{t+j}(z_t).r_{t+j}(z_t)$$

where z_t is the information set at time t, $c_{t+j}(z_t)$ is the expectation at time t of cash payoffs from the security at time $t+j$, $r_{t+j}(z_t) = [1+\rho_{t+j}(z_t)]^{-1}$ and ρ_{t+j} is the expected return on the security over the interval (t, $t+j$). The effect on price of a perturbation dz_t to the information set is:

$$dp_t / dz_t = \sum_{j=1}^{T} [(dc_{t+j} / dz_t).r_{t+j} + (dr_{t+j} / dz_t).c_{t+j}]$$

where dc_{t+j} is the shock at time t to the expected cash payoff from the security at time $t+j$ and dr_{t+j} is the inverse of the shock at time t to expected return over the interval (t, $t+j$). Change in price dp_t clearly is not fully informative about the shock to expected cash flow at any horizon $t+j$ or about the shock to expected return over any interval (t, $t+j$). The information problem for investors arises because the two types of shock have different implications for future earnings: a shock to expected return is expected to reverse in earnings over time, and a shock to expected cash flow is not.

Because separate cash flow and expected return shocks are not observable to uninformed investors at the individual security or portfolio level, marking securities to market creates uncertainty about a bank's expected future earnings. This in turn becomes a source of uncertainty for the bank's investors as to whether future earnings-related information is a "surprise," including information that becomes available during the quarter (which the evidence indicates is the majority) and information released at the earnings announcement itself. By definition, informed investors are at a relative advantage in ameliorating MTM-induced uncertainty about future earnings. Verrecchia (1982) and Diamond (1985) demonstrate that opacity can stimulate private information acquisition. We conjecture that individual shareholders are more likely to be uninformed because they encounter higher cost and, due to lower scale, have lower benefit in acquiring information to distinguish shocks to expected returns from shocks to expected cash

flows. Consequently, individual investors are less able to evaluate the implications of past MTM gains and losses for future earnings than are bank managers and institutional investors, including hedge funds and mutual funds (Maffett, 2011). Conversely, informed investors are at a relative advantage in ameliorating MTM-induced uncertainty about future earnings and are able to profitably trade on this advantage against uninformed investors. A simple one-security two-period example of this effect is provided in the Appendix.

Because informed investors are at a relative advantage in assessing the implications of MTM gains and losses for expected future earnings, they can profitably trade on this advantage against uninformed investors. We therefore predict that, other things equal, banks' investments in trading securities are associated with widening of their bid-ask spreads. The effect on spreads is expected to increase in the bank's investment in and earnings from trading securities.

The effects are expected to be economically substantial. For an individual security with maturity T, identifying the $2T$ separate shocks to cash flows and expected returns is a potentially large computational task, particularly for complex securities. Complexity is increased by correlation between cash flow and expected return shocks (Campbell, 1991; Kothari, Lewellen and Warner, 2006). Complexity is further increased by correlation of shocks across the term structure, and while investors' horizons in practice might be limited by the relative scarcity of long-term information, in principle the calculation for an individual security involves a covariance matrix with $4T^2$elements. Complexity is even further increased by correlation of shocks across securities. Computational complexity suggests the possibility of substantial informational advantages for investors with privileged information, higher computational ability and/or lower computational costs.

We believe this effect is largely confined to securities classified as trading. Held-to-maturity securities are recorded at cost, and are not normally marked to market. They are subject to the "other than temporary impairment" rules, so losses due to reduced expected cash flows are included in current earnings, but losses due to increases in expected returns are not. Subsequent recoveries in price are explicitly ignored. Consequently, the earnings reversal effects that occur for trading securities do not occur for held-to-maturity securities. Available-for-sale securities also do not give rise to the same ambiguity, because under SFAS 115 there is no earnings effect of a shock to their expected returns: it is recorded in what is termed Other Comprehensive Income. They are subject to the same "other than temporary impairment" rules as held-to-maturity securities. Earnings reversal effects therefore are unlikely to occur for available-for-sale securities.

We are aware of no discussion of this issue in the literature. The closest is the following general observation in Cochrane (2011, p. 1088):

> "Perhaps banks' complaint that low asset prices represent "illiquidity" or "temporarily depressed valuations" rather than insolvency—a lesser chance of making future interest and principal repayments—make some sense. Perhaps capital requirements do not have to respond immediately to such events. Perhaps "hold to maturity" accounting is not as silly as it sounds.
>
> "I am not arguing that mark-to-market accounting is bad, or that fudging the numbers is a good idea. The point is only that what you *do* with a mark-to-market number might be quite different in a world driven by discount-rate variation than in a world driven by cashflow variation. The mark-to-market value is no longer a sufficient statistic. A loss of value coincident with a rise in expected return has different implications than a loss of value with a decline in expected return. Decisions need to incorporate more information, not less."

In contrast, the so-called "golden age" of accounting literature viewed price as sufficient information for the decisions of investors and other parties (e.g., Chambers, 1966). This literature was founded on an economic model that preceded the economics of costly contracting and

institutional structure, and that (paradoxically) gave no role to information about the implications of current MTM gains and losses for future expected earnings.

3.2 Manipulating fair values in a securities market with limited liquidity

Banks hold trading securities primarily to address unexpected liquidity demands from depositors and borrowers, or to provide inventory for market making in those securities (Erel, Nadauld and Stulz, 2011). Both involve providing liquidity services. Indeed, Fama (1985) argues that limited liquidity is an economic premise of banking: in efficient markets with unlimited liquidity, banks would pay market returns on their financing and earn market returns on their investments, and would not be able to cover their costs of doing business.

We earlier noted that SFAS 157 pays scant attention to market depth. Even Level 1 fair values only require (FASB, 2006 ¶24) "a market in which transactions for the asset or liability occur with sufficient frequency and volume to provide pricing information on an ongoing basis." What is more, the accounting standard (FASB, 2006 ¶27): explicitly directs fair values to be set without regard for the size of the bank's position in a security relative to market depth: "The quoted price shall not be adjusted because of the size of the position relative to trading volume … even if a market's normal daily trading volume is not sufficient to absorb the quantity held and placing orders to sell the position in a single transaction might affect the quoted price." FASB's approach to "fair value" appears to equate the existence of market quotations with unlimited liquidity.[4]

Heaton et al. (2010) and Milbradt (2009) propose that managers can manipulate fair values of trading assets, and hence the gains and losses incorporated in earnings, by selectively trading in illiquid markets. They argue that in less liquid markets, such as the over-the-counter markets, managers can selectively trade in a security to influence quarter-ending traded and/or

[4] Which led Ball (2006, p.13) to muse: "Fair value accounting has not yet been tested by a major financial crisis."

quoted prices and manipulate marking-to-market in their accounts. This argument implies that the potential to manipulate prices and quotations exists even for Level 1 fair values.

There is evidence of period-end price manipulation in several contexts, as manifested in increases in trading volume, widening of spreads and subsequent price reversals, though there are alternative explanations such as portfolio rebalancing, program trading and option expiration. Carhart et al. (2002) report evidence that manipulation occurs primarily in the last half hour before the daily close and is more intense at quarter-ends. Approximately 80% of mutual funds outperform the S&P 500 on the last trading day of the year, and more than 60% under-perform the next day. Gallagher et al. (2009) report that mutual fund managers purchase illiquid stocks in which they already hold overweight positions on the last day of the quarter. In a study that cleverly excludes alternative explanations to manipulation, Comerton-Forde and Putniņš (2011) investigate SEC prosecutions for closing price manipulation by firm managers, substantial shareholders, mutual fund managers and brokers. They report that closing price manipulation is associated with substantial abnormal day-end returns and subsequent reversals, as well as increased trading volume and wider spreads.

We therefore hypothesize that mark-to-market accounting provides a potential for managers to influence reported balance sheet valuations and gains and losses incorporated in earnings, by trading at quarter-end in markets with less than perfect liquidity. In addition, mark-to-market accounting could encourage managers to over-invest in trading assets, where the accounting rules allow greater earnings manipulation opportunities. Managerial manipulation through selective investment and selective trading of securities makes financial statements less transparent. It creates uncertainty about balance sheet valuations and earnings from trading securities. It provides a second source of potential information asymmetry between informed and

uninformed investors, and an additional reason for our prediction that, other things equal, banks' investments in trading securities are associated with widening of their bid-ask spreads.

An equivalent prediction is not made for securities classified other than as trading. One reason is that trading in held-to-maturity and available-for-sale securities would risk the securities being classified as trading. A second reason is substantially reduced incentives to manipulate, because quarter-to-quarter gains and losses on held-to-maturity and available-for-sale securities generally are not included in earnings, the only exception being "other than temporary impairment" losses.

3.3 Effect of fair value accounting on management forecasting and security analysts

We also propose that MTM accounting for trading securities reduces the ability of bank managers to credibly convey private information to uninformed investors by issuing voluntary earnings for several reasons. First, managers are expected to have imperfect information about the decomposition of MTM gains and losses into shocks to expected cash flows and expected returns, reducing the precision of their private information about future earnings. Second, future MTM gains and losses are difficult to forecast, which reduces the effectiveness of reported earnings in confirming the accuracy and credibility of forecasts. The latter hypothesis builds on Ball (2001), Ball and Shivakumar (2008) and Ball, Jayaraman and Shivakumar (2011), who argue that an important role of audited accounting reports is to complement voluntary disclosures of forward-looking information, such as management forecasts, by committing to report actual outcomes more accurately and thereby enhancing disclosure credibility. The argument is that managers can more credibly commit to issuing truthful forecasts (and other forward-looking disclosures of private information) when the disclosures subsequently will be confirmed more accurately in reported earnings. MTM returns on security investments due to price changes after

the forecast date introduce variability into the actual earnings outcome, which in turn masks whether the outcome confirms the forecast. The benefits of forecasts then are reduced because they convey less credible private information, so managers engage in less forecasting.

3.4. Why not use alternative earnings variables?

It might be argued that uninformed investors could simply focus on earnings exclusive of earnings on securities. However this would only exacerbate their informational disadvantage relative to informed investors, because it would involve them forming no expectations about the earnings on banks' securities portfolios, which are substantial relative to banks' market values.[5] Informed investors then would be at an even greater advantage in assessing the value of the firm.

A related argument is that managers could forecast earnings exclusive of earnings on securities. The credibility of such forecasts then could be established by committing to independent audit of the reported outcome for this redefined earnings variable. However, in practice, banks do not seem to adopt this approach and it is unclear why this is not done. One possibility is that this too would exacerbate the informational disadvantage of uninformed investors, particularly relative to managers but also to institutional traders. Another possibility is that declining to predict securities income would provide an adverse signal of managerial ability.

A third possible argument involves available-for-sale securities. Under SFAS 115, unrealized price changes on these securities are not included in bottom-line earnings in banks' income statements, but are reported in a separate financial statement as a component of what is labelled "Comprehensive Income." It is not clear why investors (both informed and uninformed) and managers do not focus on an earnings variable inclusive of unrealized gains and losses on

[5] For bank-years with investments in trading securities, Table 1 below reports they average 16.3% of the market value of bank equity. Further, these are end-of-quarter balances and do not consider the within-period trading activity in these securities.

available-for-sale securities.[6] If this was standard practice, we would predict information asymmetry as a function of the level of investment in these securities as well, but it is not standard practice and we do not observe a relation between asymmetry and available-for-sale securities. It is not even clear why the accounting rules make this distinction.

3.5. Related literature

To the best of our knowledge, this is the first study to provide direct evidence of the effect of MTM accounting on information asymmetry. Barth (1994) studies the "value relevance" to shareholders of MTM accounting, and reports pre-SFAS 115 evidence that fair values of investment securities provide significant incremental explanatory power over historical costs for banks' share prices and returns. Barth, Landsman and Wahlen (1995) document that pre-SFAS 115 MTM reporting increases the volatility of bank's earnings. Bernard, Merton and Palepu (1995) evaluate the effect of marking-to-market on regulatory capital in Danish banks, and report evidence of earnings management generally but not in order to avoid regulatory capital constraints. They caution against generalizing the results outside the Danish regulatory framework. Morgan (1998) documents that banks and insurance companies face greater credit-rating disparity than other firms and attributes the difference to the specialised nature of banks' underlying assets. Specifically, he attributes the greater rating disparities of banks to them lending to opaque firms and to their ability to change trading positions, which make it difficult for outsiders to assess riskiness. However, from a sample of banks that straddles the passage of SFAS 115, Flannery, Kwan and Nimalendran (2004) conclude that banks' assets are not

[6] We could not directly investigate whether unrealized gains and losses on available-for-sale securities are considered for managerial compensation because the precise definitions of earnings in compensation contracts are not publicly disclosed. We adopting the approach from prior studies (e.g., Dechow et al. (1994) and Gaver and Gaver (1998)) of regressing managerial compensation on profit before trading income, trading income and unrealized income from available-for-sale securities. The coefficients on profit before trading income and on trading income are significant, but the coefficient on unrealized income from available-for-sale securities is not, suggesting that compensation is not a function of unrealized gains and losses from available-for-sale securities.

unusually opaque and that bank stocks, if anything, had lower bid-ask spreads, return volatility and analyst forecast errors than comparable non-bank firms. None of these papers address the relation between marking investment securities to market and information asymmetry.

4. Definition and measurement of variables

The following two sub-sections describe the measures of information asymmetry and investment securities. Sub-sections 4.3 and 4.4 present the control variables and regression specifications.

4.1. Bid-ask spread (SPREAD)

We use the relative bid-ask spread (*SPREAD*) to measure information asymmetry between informed and uninformed traders. The relation between information asymmetry and the bid-ask spread was first discussed in Bagehot (1971). Bagehot's intuition subsequently was modelled by Copeland and Galai (1983), Kyle (1985) and Glosten and Milgrom (1985). We define *SPREAD* as the quarterly average of the difference between the closing ask and the closing bid quotes scaled by the average of the ask and the bid, expressed in percentage terms. These are obtained from monthly data. Specifically,

$$SPREAD_{i,t,q} = \frac{1}{M_{i,t,q}} \sum_{1}^{M_{i,t,q}} \frac{(ASK_i - BID_i)}{(ASK_i + BID_i)/2} * 100$$

where $M_{i,t,q}$ is the number of months in quarter q of year t for bank i for which closing monthly bids (BID_i) and closing monthly asks (ASK_i) are available.

4.2. TRADING, AFS and HTM securities

The importance to shareholders of banks' investments in securities is measured using both balance sheet and income statement variables. The balance sheet variable for trading

securities (*TRADING*) is the ratio of the balance sheet value of trading assets (data item 3545) to market value of equity.[7] Similarly, available-for-sale securities (*AFS*) and held-to-maturity securities (*HTM*) are measured as the ratio of the balance sheet values of these securities (1773 and 1754) to the market value of equity. We also study an indicator variable *TRADEDUM* that takes the value 1 if the bank carries any trading securities on its balance sheet as of the end of the quarter and 0 otherwise.

From the income statement we measure the importance of trading income to shareholders (*TRADING_INC*) as the ratio of trading income (A220) to average trading assets (as defined above). Similarly, realized income on *AFS* securities (*AFS_REAL_INC*) is the ratio of realized gains and losses on *AFS* securities (3196) to average *AFS* securities, and unrealized income on *AFS* securities (*AFS_UNREAL_INC*) is the quarterly change in the balance of unrealized holding gains/losses on *AFS* securities (8434) divided by average *AFS* securities.[8] All balance sheet and income statement items are measured as of the beginning of the quarter.

4.3. Control variables

Other characteristics of the composition of banks' balance sheets are associated with information asymmetry (Morgan, 2002; Flannery et al., 2004). We control for *LOANS* defined as total loans and leases (2122) and loan loss allowance (*LLA*) defined as allowance for loan and lease losses (3123), both scaled by market value of equity. Following Fahlenbrach and Stulz (2011), we also control for capital strength using the Tier 1 capital ratio (*TIERONE*), measured as the ratio of Tier 1 capital (8274) to total assets (2170).[9]

[7] The Federal Reserve datasets (described below) prefix "BHCK" for all bank holding company financial data, "RCFD" for balance sheet data for commercial banks and "RIAD" for income statement data for commercial banks.
[8] All income statement items in the regulatory filings are adjusted to reflect the fact that they are reported on a cumulative basis.
[9] We do not control for both Tier 1 capital and the tangible equity ratio as in Fahlenbrach and Stulz (2011) because they are highly correlated in our sample (>0.83).Our results are robust to including the tangible equity ratio instead. Our results are also robust to defining this ratio based on Compustat data, as in Fahlenbrach and Stulz (2011).

Firm and market characteristics such as bank size and stock liquidity are important determinants of bid-ask spreads (Stoll, 2000). We control for size using the end of quarter log of market value of equity (*LNMVE*) and for stock liquidity using turnover (*TURN*) measured as the log of the total number of shares traded during the quarter divided by total shares outstanding, using data obtained from the monthly CRSP file. [10] We control for stock return volatility (*RETVOL*) measured as the standard deviation of daily returns over the quarter, for the inverse of the end-of-quarter closing stock price (*PRCINV*), for mean differences in spreads between commercial banks and bank holding companies using an indicator variable (*BHC*), and year fixed effects due to the decreasing trend in bid-ask spreads over time (Chordia et al., 2008). All balance sheet variables are measured as of the start of the current quarter.

4.4. Regression specifications:

Three variations of the basic specification are estimated. The first uses the indicator variable *TRADEDUM* to capture the presence of trading securities while the second employs the continuous variable *TRADING*. The third variation estimates the latter model within the sub-set of banks with trading assets (*TRADEDUM* =1). Standard errors are clustered two-way: by bank and by year-quarter. These regressions models are:

$$SPREAD_{i,t,q} = \alpha_0 + \alpha_1 TRADEDUM_{i,t,q-1} + \alpha_2 AFS_{i,t,q-1} + \alpha_3 HTM_{i,t,q-1} + \alpha_4 LOANS_{i,t,q-1} + \alpha_5 LLA_{i,t,q-1} + \alpha_6 TIERONE_{i,t,q-1} + \alpha_7 LNMVE_{i,t,q} + \alpha_8 TURN_{i,t,q} + \alpha_9 RETVOL_{i,t,q} + \alpha_{10} PRCINV_{i,t,q} + \alpha_{11} BHC_i + \sum YEAR + \varepsilon_{i,t,q} \quad (1)$$

[10] One could argue that controlling for stock liquidity is inappropriate as differences in trading volume are a manifestation of information asymmetry in a world with discretionary liquidity traders (Admati and Pfleiderer, 1988). While our results are robust to excluding turnover, we control for it for two reasons. First, we are interested in the adverse selection component of the spread, and including trading volume allows us to capture (albeit imperfectly) the inventory component of the spread (see Jayaraman (2008) for a similar design). Second, we are interested in the composition of trading between informed and uninformed investors. To the extent our results are driven purely by volume, controlling for turnover should attenuate the effect of trading assets on spreads.

$$SPREAD_{i,t,q} = \alpha_0 + \alpha_1 TRADING_{i,t,q-1} + \alpha_2 AFS_{i,t,q-1} + \alpha_3 HTM_{i,t,q-1} + \alpha_4 LOANS_{i,t,q-1}$$
$$+ \alpha_5 LLA_{i,t,q-1} + \alpha_6 TIERONE_{i,t,q-1} + \alpha_7 LNMVE_{i,t,q} + \alpha_8 TURN_{i,t,q} \quad (2)$$
$$+ \alpha_9 RETVOL_{i,t,q} + \alpha_{10} PRCINV_{i,t,q} + \alpha_{11} BHC_i + \sum YEAR + \varepsilon_{i,t,q}$$

The primary hypothesis, that fair-valued trading securities place uninformed investors at an informational disadvantage, predicts a positive coefficient α_1. We also expect insignificant coefficients α_2 and α_3 for available-for-sale (*AFS*) and held-to-maturity securities (*HTM*).

5. Data and Sample Descriptive Statistics

Data are from two primary sources. Data on bid-ask spreads and other microstructure variables are from CRSP. Financial statement data for bank holding companies are from the Federal Reserve's Consolidated Financial Statements for Bank Holding Companies (FRY-9C) while those for commercial banks are from the Federal Reserve's Report of Condition and Income ("Call reports").[11] The sample period commences in 1996, because the classification of investment securities into *AFS* and *HTM* is available only pursuant to the passage of SFAS 115.[12] The final sample with non-missing data for all variables covers the period 1996:Q1 to 2010:Q4 and comprises 24,753 bank-quarter observations for 907 unique banks.[13]

[11] Form FRY-9C is filed quarterly by large BHCs (the cutoff for "large" was $150 million prior to 2006 and $500 million thereafter). If the top-tier of a multi-tiered holding company is exempted from filing, the lower tier files. BHCs below the cutoff file a different form FRY-SP, semi-annually. Our data are collected from FRY-9Cs, so 98.24% of the data are from consolidated financials for the top-tier. Only 1.23% comprises lower-tiered BHCs where the top-tier was exempted from filing. There are 13 firm-quarter observations where the top and lower tiers both filed FRY-9Cs. There are 28 observations where a commercial bank in our sample is part of a bank holding company that also is in our sample. The results are robust to deleting the lower-tier observations.

[12] Although FAS 115 was issued in 1993, we start the sample in 1996 because a FASB amnesty in 1995 allowed banks to conduct a one-time reclassification of *HTM* securities (Hodder et al., 2002). The results are robust to including data from 1994 and 1995.

[13] In addition to matching bank regulatory entity codes with CRSP using PERMCOs available through the New York Fed link (http://www.newyorkfed.org/research/banking_research/datasets.html), we also match based on

Panel A of Table 1 presents descriptive statistics for the overall sample and for the sub-samples of bank-quarters with and without trading assets on the balance sheet. For the 17% of bank-quarters with trading assets, these assets average 16.3% of the bank's market value.[14] *AFS* and *HTM* securities for the median bank amount to 119% and 3.6% of market value respectively, and these proportions do not vary substantially between banks with and without trading assets. Loans dominate the asset portfolios of the sample banks, which lend approximately $6.53 for every $1 of market value of shareholders' equity. There is some evidence that loans are more prevalent on the balance sheets of banks without trading assets.

Banks with trading assets are substantially larger, with an average market value of equity of approximately $9 billion compared with $412 million for those without trading assets. Similarly, sample banks trade at an average of $23.5 per share, with trading asset banks averaging $34.5 and those without averaging $21.3. The mean Tier 1 capital ratio *TIERONE* of banks with and without trading assets is 8.0% and 9.0%.

The average bid-ask spread for the overall sample is 2.08% of price, while the median is 1.30%. Bank-quarters with trading assets have lower spreads (mean and median of 0.96% and 0.44% respectively) than those without (2.32% and 1.58%). Banks with trading assets also exhibit greater stock turnover but only slightly lower stock return volatility than those without. We recommend caution in interpreting these differences. Bank characteristics, and in particular bank size, also vary between banks with trading and non-trading investments, and larger stocks generally exhibit smaller spreads, smaller turnover and greater liquidity.

CUSIPs from the SNL database. This increases our sample by around 10%. All results are robust to using only the PERMCO-matched sample. We do not use the SNL database because we found inconsistencies in their reporting of trading assets. In particular, when any bank restates its financials for a particular year, SNL populates the trading assets field to "NA," whether or not these assets were restated. As a result, the frequency of "NA" trading assets was much larger in the SNL database than for the same banks in the FRY-9C database. When we raised this with SNL using Bank of America as a specific example, they rectified this specific instance. However, we have not received any confirmation that similar fixes would be applied for other banks.

[14] Around 8% of commercial banks in our sample hold trading assets.

Panel B presents a breakdown of the sample into bank holding companies (*BHC*) versus commercial banks. *BHC*s constitute the majority of our sample with 96% representation and commercial banks constitute the remaining 4%. These institution types are time-invariant in our sample. Panel C breaks the sample down by the exchange on which these banks are listed. Approximately 82% of the banks are listed on Nasdaq, followed by 13% on NYSE and the remainder on AMEX.

6. Results

6.1. Preliminary evidence

Figure 1 presents evidence of the association between bid-ask spreads and the three categories of investment securities considered separately. The figure plots the median value of *SPREAD* (orthogonalized with respect to bank-level determinants) as a function of the proportion invested in each category. For *AFS* securities, the observations are sorted into equally sized quintiles. For *TRADING* and *HTM* securities, the first group denotes banks with no investment in that security category, and then the observations with positive amounts invested are sorted into equally sized quartiles.

Panel A of Figure 1 shows that *SPREAD* increases monotonically in the five *TRADING* groups.[15] In contrast, Panel B and Panel C indicate no distinct patterns in spreads as a function of *AFS* and *HTM* securities, respectively. While consistent with our primary hypothesis that trading securities are associated with increased information asymmetry, these preliminary results for individual security categories are without controls for amounts invested in the other two categories. However, the values of the spreads are orthogonalized to the bank characteristics.

[15] As the y-axis plots the residuals from the projection of spreads on bank-level determinants, the lowest group has negative values.

6.2. Multivariate evidence for spreads

The primary test of whether trading securities are associated with increased information asymmetry is provided by estimating the relation between the relative amount invested by banks in trading securities and their bid-ask spreads. Table 2 presents the results from estimating the multivariate regression equations (1) and (2) where *SPREAD* is the dependent variable. Columns (1) and (2) are based on the entire sample while column (3) is based on the sub-sample of banks with trading securities. Regressions have year fixed effects and robust standard errors are estimating clustering by bank and by quarter. The three samples reveal results consistent with our hypotheses.

The coefficient on the indicator variable *TRADEDUM* for the full sample in column (1) is positive (coefficient = 0.388) and statistically significant (*t*-statistic = 4.06). Given the sample mean *SPREAD* of 2.08 and the fact that 17.1% of the sample comprises banks with trading securities, the coefficient of 0.388 on *TRADEDUM* implies that banks that invest in trading securities experience spreads that are approximately one-fifth higher on average than those of banks that do not, holding other categories of investment securities and bank characteristics constant.[16] The association between spreads and treasury securities appears statistically and economically significant.[17]

The 0.965 coefficient on the continuous variable *TRADING* in column (2) is statistically significant (*t*-statistic = 4.42). It implies a 1% increase in trading securities as a percent of equity (the mean is 16.3%) is associated with an approximately 1% average increase in spread as a percent of price (compared with the mean of approximately 2%).

[16] More precisely, 19.3%, calculated as 0.388/[2.08-0.171*x*0.388].
[17] Results are robust to mitigating the effect of outliers by using log spreads or estimating robust regressions.

For the smaller subsample of bank-quarters with holdings of trading securities reported in column (3), the estimated coefficient 0.511 for *TRADING* is smaller but remains significant statistically (*t*=2.88). It implies that a 1% increase in trading securities as a percent of equity is associated with an approximately 1% average increase in spread as a percent of price, compared with the mean for this sub-sample of approximately 1%.

Further, consistent with our hypothesis and the univariate evidence, we are unable to detect a significant association between *SPREAD* and either *AFS* securities, *HTM* securities or *LOANS*. Gains and losses on *AFS* are not incorporated in earnings until they actually are sold, and *HTM* securities and *LOANS* are not marked to market. These results are consistent with mark to market accounting reducing the transparency of banks' financial reports by the channel of incorporating gains and losses in quarterly earnings.

The coefficients on the microstructure controls generally are consistent with prior studies, in that spreads are lower for the larger, more liquid and less volatile banks.[18] Finally, the negative and significant coefficient on *BHC* suggests that after controlling for other factors, *BHC*s are associated with lower spreads than commercial banks.

The general picture that emerges is that, consistent with our hypotheses, trading assets are associated with higher information asymmetry in the market for bank shares, but this does not appear to extend to the other categories of investment securities, i.e., *AFS* and *HTM*.[19]

In the following sections, we explore how the presence of trading securities affects other informational characteristics of the bank. In particular, we explore market reactions to earnings

[18] One exception is the insignificant coefficient on *LOANS*. Relative to prior studies finding a positive coefficient, our specification includes a richer set of microstructure controls and our standard errors are two-way clustered.

[19] As one would expect, trading liabilities also are associated with spreads, but the 0.65 correlation with trading assets makes it problematic to estimate separate effects. When we regress trading liabilities on trading assets and include the orthogonal component in the regression, the coefficients on trading assets and (residual) trading liabilities both are positive and significant in the whole sample. Trading liabilities remains positive but becomes insignificant in the sub-sample with trading assets. These results are robust to including bank fixed effects.

announcements (both stock price and trading volume), analyst following, intra-period timeliness, and management forecasts.

6.3. Stock price and trading volume reactions around quarterly earnings announcements

We next examine the association between trading securities and the stock price and trading volume reactions to quarterly earnings announcements. Price reaction (*ABSCAR*) is measured as the absolute value of the cumulative return in excess of the value-weighted market return over days -1 to +1 relative to the quarterly earnings announcement date (day 0), standardized by the standard deviation of excess returns in the non-announcement period (defined as days -45 to -10). Similarly, abnormal trading volume (*ABVOL*) is average log turnover (share volume divided by shares outstanding) during the announcement-period days -1 to +1, minus the average log turnover in the non-announcement period, standardized by the standard deviation of log turnover in the non-announcement period. We regresses *ABSCAR* and *ABVOL* on *TRADEDUM* and the other controls (excluding *TURN* and *RETVOL*).[20] The regressions also control for analyst following (*ANALYST*) using an indicator variable, and the *ABVOL* specification also controls for announcement period bid-ask spreads (*ANNSPREAD*).

Results are presented in columns (1) and (2) of Table 3. The 0.066 estimated coefficient on *TRADEDUM* is insignificant in the *ABSCAR* regression, indicating that we are unable to find reliable evidence of an association between stock price reactions to earnings announcements and the presence of trading securities. In the *ABVOL* regression, the estimated coefficient on *TRADEDUM* is positive and marginally significant (at the 10% level), indicating that abnormal trading volume around earnings announcements is 6.2% higher for banks with trading assets. This is weak evidence that trading assets do not influence the average traders' beliefs around earnings announcements but increase traders' idiosyncratic reactions. The evidence is weakly

[20] When we replace *TRADEDUM* with the continuous variable *TRADING*, we obtain qualitatively similar results.

consistent with trading assets increasing information asymmetry at banks' earnings announcements by "allowing certain traders to make judgments about a firm's performance that are superior to the judgments of other traders" (Kim and Verrecchia 1994, p.41).[21]

6.4. Analyst following

There are two countervailing views on the effect of trading securities on analyst following. On one hand, analysts are less likely to follow banks whose earnings are not easily predictable (Lang and Lundholm, 1996), as is the case with banks with trading assets. On the other hand, these banks are likely to draw in greater analyst following, because other things equal the marginal benefit of information acquisition is greater in firms with greater information asymmetry (Grossman and Stiglitz, 1980). Thus, the overall association between the presence of trading securities and analyst following is an empirical question.

We estimate a probit model because approximately 83% of the bank-quarters have no analyst following. We define *ANALYST* as an indicator variable that takes the value 1 if the bank in followed by one or more analysts in a given quarter, and regress it on *TRADEDUM* and controls.[22] Consistent with the effect of earnings predictability dominating the effect of the demand for information acquisition, we report a negative and significant (t = -3.59) coefficient on *TRADEDUM* in column (3) of Table 3, indicating that analysts are less likely to follow banks with trading securities. The estimated probability of being followed by one or more analysts is 2.5% lower for banks with trading securities. [23]

[21] The relation between trading assets and spreads at earnings announcements is qualitatively identical to that reported in Table 2 for spreads throughout the quarter. Consequently, in a regression of *abnormal* spreads at earnings announcements (relative to the average spread in the non-earnings announcement period of days -45 to -10) on trading assets, the coefficient is no longer statistically significant. This is consistent with the conclusion of Ball and Shivakumar (2008) and Ball, Jayaraman and Shivakumar (2011) that most earnings-related information is reflected in prices well before earnings announcements.

[22] Our results are robust to replacing *TRADEDUM* with *TRADING* in the entire sample.

[23] In comparison, a one standard deviation increase in firm size (which has one of the highest marginal effects in the regression) increases the probability of analyst following by 6.3%.

6.5. Intra-period Timeliness (IPT)

Next, we examine how the presence of trading securities influences the speed with which public information is reflected in stock prices. We use the Butler, Kraft and Weiss (2007) measure of intra-period timeliness (*IPT*), which captures how early in the year the bank's earnings announcements are anticipated and impounded in its stock price. A bank's *IPT* measure is calculated as the sum over *m* (m= 1 to 11) of the ratio of the buy-and-hold stock return from month 1 through month m (BH_m) to the buy-and-hold return over the year from month 1 through 12 (BH_{12}), plus 0.5. This measure is designed to capture the timeliness with which all of the annual information related to that bank (proxied by returns) arrives during the year. More timely banks should have larger values of *IPT*. We study the decile rank of the bank's average *IPT* over all years.

Similar to the market reaction tests, we regress *IPT* on the trading securities indicator variable *TRADEDUM*, *AFS* securities, *HTM* securities, and controls.[24] Since *IPT* is an annual measure, we only retain the fourth quarter's financial data for this test. Results are presented in column(4) of Table 3. The coefficient on *TRADEDUM* is negative and significant (t = -2.49), indicating that banks with trading assets are associated with less timely incorporation of news into stock prices. The intra-period-timeliness of banks with trading securities is estimated as 5.3% lower than those without trading securities.

6.6. Management forecasts

Finally, we examine whether management forecasting propensity is influenced by the presence of trading securities. Here too there are opposing arguments under our hypotheses. On one hand, greater information asymmetry increases the demand for information from market

[24] Our inferences are similar when we replace *TRADEDUM* with *TRADING*, although the statistical significance falls slightly below conventional significance cutoffs.

participants, thereby increasing the benefits of issuing a forecast. On the other hand, the higher difficulty in forecasting earnings in these banks is likely to reduce the supply of management forecasts by making them less credible. This argument is based on the hypothesis in Ball (2001), Ball and Shivakumar (2008) and Ball, Jayaraman and Shivakumar (2011), that managers can more credibly commit to issuing truthful forecasts (and other forward-looking disclosures of private information) when the accuracy of the disclosures can be subsequently confirmed at earnings announcement date. Mark-to-market returns on security investments due to price changes after the forecast date introduce variability into the actual earnings outcome, which reduces its capacity to signal the management's ex-ante forecast accuracy. The benefits of forecasts then are reduced because they convey less credible private information, so managers engage in less forecasting.

We present these results in column (5) of Table 3. Similar to the tests on analyst following, we estimate a probit model of the likelihood of issuing a management forecast because 97% of our sample banks do not issue any forecast. Consistent with the supply effect dominating the demand effect, we find a negative and significant (t = -2.47) coefficient on *TRADEDUM*, consistent with banks with trading securities being 1.3% less likely to issue a management forecast than those without.[25] In comparison, a one standard deviation increase in firm size increases the likelihood of management forecasting by 3.7%.

The overall evidence from these informational characteristics reinforce those based on bid-ask spreads, and indicate that banks with trading assets are associated with greater opacity.

6.7. Robustness tests

In this section, we verify the robustness of the results to alternate empirical specifications.

[25] We continue to find a negative and significant coefficient using *TRADING* instead of *TRADEDUM*.

6.7.1. Including bank fixed effects.

One concern is that our specifications might omit cross-sectional differences in bank characteristics that are correlated with both information asymmetry and the presence of trading securities. The regression control variables ameliorate this concern, but nevertheless we examine the sensitivity of the results to including bank fixed effects that absorb all time-invariant differences across banks.[26] Bank fixed effects subsume the *BHC* indicator, which is dropped.

The opposing concern with including bank fixed effects in the *TRADEDUM* specification is that for most banks it is time invariant. Close to 74% of the sample banks never have trading assets and hence have *TRADEDUM*=0 throughout the sample period, and *TRADEDUM* would therefore be subsumed by the bank fixed effects. Approximately one third of the remaining banks have trading assets in every quarter and hence have *TRADEDUM*=1 throughout the period. We therefore are able to estimate the *TRADEDUM* specification with bank fixed effects for only approximately 17% of the total sample of bank-quarters, so the results should be interpreted cautiously.

Panel A of Table 4 shows that the coefficient on *TRADEDUM* in column (1) remains positive but weakly significant (at the 10% level) with the inclusion of bank fixed effects. The 0.458 coefficient on the continuous variable *TRADING* in column (2) remains positive and significant at the 1% level in the overall sample. Similar results are observed in column (3) for the *TRADING*>0 sub-sample.[27] Overall, the association between information asymmetry and trading securities is somewhat weakened but survives controlling for unobservable time-invariant differences among banks.

[26] The standard errors are clustered by year-quarter in these specifications.
[27] Although *HTM* is also significant, this result is fragile and not robust across sub-periods or to alternate scalars.

6.7.2. Income statement measures of trading assets.

We examine the robustness of our results to using income statement data to measure the importance to shareholders of the three security categories. In particular, we examine whether there is an association between bid-ask spreads and the variances of reported income from trading and other securities. The volatility of trading income (*TRADING_INC_VOL*) is calculated as the standard deviation of five quarterly observations of unrealized and realized gains/losses on trading assets scaled by total bank earnings.[28] Equivalent calculations estimate the volatility of realized *AFS* income (*AFS_REAL_INC_VOL*) and the volatility of unrealized *AFS* income (*AFS_UNREAL_INC_VOL*).

These results presented in Panel B of Table 4 are consistent with the balance sheet-based results. The estimated coefficient on *TRADING_INC_VOL* is positive and significant, irrespective of controlling for income from *AFS* securities. Further, the coefficients on *AFS_REAL_INC_VOL* and *AFS_UNREAL_INC_VOL* are insignificant, indicating that income from *AFS* securities is unrelated to information asymmetry.

6.7.3. Introduction of SFAS 133

In 1998, FASB introduced SFAS 133, which established accounting and reporting standards for derivative instruments and for hedging activities. To check whether the adoption of SFAS 133 had a significant effect on classification of trading securities in our sample of banks, we re-estimate Regressions (1) and (2) separately for the pre-SFAS 133 period (i.e., years 1996 to 2000) and the post-SFAS 133 periods (2001-2005). In untabulated analysis, we find a positive and significant coefficient on *TRADEDUM* and *TRADING* in each period and that the coefficients are not significantly different between the periods, suggesting that the results are unaffected by changes in classifying derivative/hedging instruments under SFAS 133.

[28] Our results are robust to using alternate scalars viz., total assets, total equity, *MVE*, and Tier 1 capital.

6.7.4. Glass–Steagall Act

The repeal of the Glass-Steagall Act in November 1999 eliminated the separation between investment banking and commercial banking in the U.S. and effectively allowed the same bank holding company to control both a commercial bank and an investment bank. To verify that our results are not affected by consequential changes in the asset structure of sample banks, we re-estimate Regressions (1) and (2) for the pre and post 1999 periods. Here too, we find a significant coefficient on *TRADEDUM* and *TRADING* in each of the periods and that the coefficients are not significantly different between the periods, suggesting that the abolition of Glass-Steagall Act did not have a noticeable effect on the results.

6.7.5. Changes in regulatory filing threshold

Effective March 2006, the Federal Reserve increased the asset-size threshold for filing Form FRY9-C from $150 million to $500 million, thereby changing the composition of our sample. We perform three robustness checks: testing for significant changes in results after the increase in the reporting threshold; excluding BHCs with assets below $500 million consistently throughout the sample period; and deleting 2005 and later years. In all cases the results remain robust economically and statistically.

6.7.6. Mitigating the effect of outliers

To verify that the results are not influenced by spread outliers, particularly during the financial crisis, we estimate two alternate regression specifications – a robust regression (assigning higher weights to better-behaved observations) and a rank regression (using spread ranks). The primary results reported in Table 2 remain - the coefficients on *TRADEDUM* and on *TRADING* remain positive and significant under both specifications. The results using income-

based variables also are robust, with the coefficient on *TRADING_INC_VOL* in Panel B of Table 4 remaining positive and significant under both specifications.

6.8. Difference-in-difference specification around the implementation of SFAS 115.

This subsection addresses the possibility that banks' holdings of trading securities are endogenously influenced by information asymmetry. For example, banks experiencing higher information asymmetry might increase their holdings of trading assets to bring the asymmetry closer to the mean. Alternatively, higher information asymmetry could be a property of trading assets *per se*, independent of mark-to-market accounting. We mitigate these concerns by examining changes in the association between information asymmetry and trading assets around the implementation of SFAS 115 in 1993, which provides a (relatively) clean exogenous shock. Before that date, the accounting rules valued trading securities at the lower of their cost or market value, but SFAS 115 mandated market value accounting for the first time. Thus, by examining changes in the association between spreads and trading securities around the implementation of SFAS 115, we are able to better identify the role of MTM accounting.

We examine the following difference-in-difference design:[29]

$$SPREAD_{i,q} = \alpha_0 + \alpha_1 TRADEDUM_{i,q-1} + \alpha_2 TRADEDUM * POST_{i,q-1} + \alpha_3 LOANS_{i,q-1} + \alpha_4 LLA_{i,q-1} + \alpha_5 TANGEQ_{i,q-1} + \alpha_6 LNMVE_{i,q} + \alpha_7 TURN_{i,q} + \alpha_8 RETVOL_{i,q} + \alpha_9 PRCINV_{i,q} + \alpha_{10} BHC_i + \sum_t \alpha_{11,t} YEAR_t + \varepsilon_{i,q} \quad (3)$$

POST is an indicator variable that takes the value of 1 for the five years after implementation of SFAS 115 (i.e., 1994 to 1998) and 0 for the five years before (i.e., 1988 to 1992). We omit the transition year 1993, and require at least one observation in each of the pre- and post-periods.

[29] *TIERONE* is available only from 1996, so we substitute the tangible equity ratio (*TANGEQ*), defined as total equity minus intangible assets divided by total tangible assets. Results are robust to using the continuous *TRADING* variable.

The coefficient on *TRADEDUM* indicates the association between spreads and trading assets in the pre-period, while *TRADEDUM*POST* indicates change in the association between the pre- and post-periods. The year fixed effects subsume any coefficient on *POST* and control for time trends, thus allowing a clean identification of the incremental effect of trading assets through the coefficient on *TRADEDUM*POST*. This coefficient can be interpreted as the incremental change in bid-ask spreads between the pre and post periods for banks with trading assets relative to those without. If MTM contributes to the opacity associated with trading assets, then the expected coefficient on *TRADEDUM*POST* is positive. On the other hand, if MTM improves the transparency of trading assets, the expected coefficient is negative. To check whether these results are unique to MTM for trading securities, in addition to including year fixed effects we interact *POST* with non-trading investment securities that are not marked to market (*INVSEC*).[30]

In Panel A of Table 5 we present two variants of equation (3), one with year fixed effects and the other with year and bank fixed effects. We cluster the former by bank and year-quarter and the latter by year-quarter. The coefficient on *TRADEDUM*POST* is positive and significant in both specifications, indicating that the association between bid-ask spreads and trading assets is stronger after SFAS 115 mandated MTM accounting. [31] The mean (unreported) spread for banks with trading assets in the pre-period is 3.20 per cent. The estimated 1.127 per cent increase after SFAS 115, after controlling for both bank and year fixed effects, is slightly more than one third. In contrast, the coefficient on *INVSEC*POST* is insignificant in both specifications, indicating there is no change in spreads as a function of banks' holdings of the other categories

[30] Prior to SFAS 115, firms were not required to separately report available-for-sale and held-to-maturity securities.
[31] When we exclude 1994 and 1995 from the post-SFAS 115 period, the coefficient on *TRADEDUM*POST* increases from 1.127 in the firm-fixed effects regression to 1.199 with a *t*-statistic of 8.06 and the coefficient on *INVSEC*POST* decreases from 0.039 to 0.026.

of investment securities, namely *AFS* and *HTM*. Thus, the effect of mandating MTM accounting is economically substantial and restricted to trading securities.[32]

The results in Panel A likely are diluted by the fact that banks frequently used mark-to-market accounting prior to it being mandated by SFAS 115, apparently encouraged by bank regulators (Comptroller of the Currency, 1990, pp. 23-24) and auditors (American Institute of Certified Public Accountants, 1990).[33] Nevertheless, Figure 2 shows that trading assets as a proportion of market value of equity significantly increased after SFAS 115, while at the same time the proportion of non-trading investment securities decreased. These changes are at least partly due to SFAS 115 tightening the definition of trading assets. To obtain better instrumentation we therefore compare changes in information asymmetry after SFAS 115 for banks (i) without trading assets at any stage, (ii) with trading assets that were entirely marked-to-market in the pre- and the post-periods and (iii) with trading assets that were not entirely marked-to-market in the pre-period. We hand-collect the 1991 10-Ks for all sample banks with trading assets in the pre-period and denote their use of mark-to-market accounting by the indicator variable *MTM*.[34] We then interact *TRADEDUM* with *MTM* as follows:

$$SPREAD_{i,q} = \alpha_0 + \alpha_1 MTM_i + \alpha_2 TRADEDUM_{i,q-1} + \alpha_3 MTM * TRADEDUM_{i,q-1} + \alpha_4 MTM * POST_{i,q-1} + \alpha_5 TRADEDUM * POST_{i,q-1} + \alpha_6 MTM * TRADEDUM * POSTi,q-1 + \alpha 7LOANSi,q-1 + \alpha 8LLAi,q-1 + \alpha 9TANGEQi,q-1 + \alpha 10LNMVEi, q + \alpha 11TURNi,q + \alpha 12RETVOLi,q + \alpha 13PRCINVi,q + \alpha 14BHCi + YEAR + \varepsilon i,q \quad (4)$$

[32] These results are robust to estimating the regressions over a 3-year window centred on the SFAS 115 adoption year, as well as to dropping firms that do not have trading assets in both the pre and the post SFAS 115 periods.

[33] In their 1991 annual reports, 67% of the sample banks state that trading assets are accounted for at market value, and 18% state that they use either lower of cost of market value or a mixture of market value and lower of cost or market value. The remaining 15% are ambiguous about their method.

[34] We choose 1991 because that is the earliest year for which the Global Access database provides 10Ks on CDs. When the accounting approach used by a bank is ambiguous, we treat them as not having employed MTM accounting in the pre-SFAS period to be conservative. Our results are unaffected by dropping those banks.

The coefficients of interest are those on *MTM*TRADEDUM*, *TRADEDUM*POST* and *MTM*TRADEDUM*POST*. As in Equation (3), we expect spreads to increase with the implementation of SFAS 115 for banks with trading assets generally, implying a positive coefficient on *TRADEDUM*POST*. For the subset of those banks that used fair values in the pre-SFAS 115 period, we expect both higher spreads in the pre-period (implying a positive coefficient on *MTM*TRADEDUM*) and a resulting attenuation of the post-SFAS 115 effect (implying a negative coefficient on *MTM*TRADEDUM*POST*).

Panel B of Table 5 presents results for five-year periods before and after the adoption of SFAS 115. The pre-SFAS classification of banks into MTM and non-MTM is based on their 1991 10-Ks, to reduce manual data collection, so as a test for classification error in the pre-SFAS data we also report results for shorter three-year periods pre-SFAS and post-SFAS. Further, to ensure that our results are not affected by banks changing their investment-asset structures between the pre and post periods, we drop firms that reported trading assets in only one of the periods, although the results are not sensitive to imposing this criterion.[35]

The coefficient on *MTM*TRADEDUM* is positive and significant in both specifications, indicating that trading assets are associated with higher spreads, even in the pre-period for banks using mark-to-market accounting. Further, the coefficient on *TRADEDUM*POST* is positive and highly significant, while that on *MTM*TRADEDUM*POST* is negative and significant in both specifications, consistent with our predictions. These results indicate that the change in spreads associated with trading securities around the adoption of SFAS 115 is positive and significant for banks that did not employ mark-to-market accounting in the pre-period, and that the change is significantly diminished for those that did.

[35] The results also are qualitatively unaffected by including bank fixed effects, using continuous values of *TRADIN*G and dropping the years 1994 and 1995.

Overall, we interpret the results in this subsection as evidence that mandating mark-to-market accounting for trading securities under SFAS 115 aggravated information asymmetry.

6.9. Effects of adoption of SFAS 159 on information asymmetry

Effective 2008, SFAS 159 gave firms the option to use mark-to-market accounting on a wide range of individual financial asset and liabilities. Once exercised, the option is irrevocable. Because the standard mandates including unrealized gains and losses on these assets and liabilities in current-period earnings, we expect its effects are akin to those for trading securities under SFAS 115. The option is exercisable on an individual-security basis, so imperfect information about the extent to which a particular bank has exercised its option is an additional source of information asymmetry. Furthermore, the notion that a firm can book gains from an increase in its own credit risk has proven to be counter-intuitive to many investors.[36] We therefore predict that spreads increase for banks that elect their "fair value option."

To test this prediction, we examine changes in spreads for banks around the adoption of SFAS 159. This test could suffer from banks self-selecting the fair value option. [37] In particular, SFAS 159 gave firms the further option of adopting its provisions before 2008, which Chang, Liu and Ryan (2011) conclude was exercised for opportunistic reasons.[38] To minimize self-selection effects we therefore exclude early adopters. Following Song (2008), we first identify fair value adopters based on whether a bank reported gains/losses under SFAS 159 as of the first quarter of 2008, which is the first period for which this data field is populated in FRY-9C.[39] We

[36] J. P. Morgan Cazenove (2012) investigated 24 banks that exercised the fair value option for 10% or more of their total non-derivative liabilities, and found that only 5 clearly disclosed earnings excluding own-credit gains. They cite a letter to the *Financial Times* by the CFO of Barclays Bank that the accounting method "is widely viewed by the market as one that misrepresents actual business profitability, makes results difficult to explain to investors and is unhelpful for an industry that wants to rebuild confidence through transparency in financial reporting."
[37] Self-selection issue is a lesser concern in our analysis of SFAS 115, which was mandatory.
[38] See also Henry (2008), Song (2008) and Guthrie et al. (2011).
[39] The screen is whether or not either BHCKF551 (net gains/losses recognized in earnings on assets under FVO) or BHCKF553 (net gains/losses recognized in earnings on liabilities under FVO) is non-missing and non-zero.

next identify and exclude early adopters defined as those with non-missing values for "net change in in value of financial instruments under a FVO" (data item BHCKF229) before 2008. [40]

The sample for this analysis comprises of 341 banks, of which 37 banks exercised the Fair Value Option under SFAS 159 for the first time in 2008:Q1 and 304 banks (excluding 10 early adopters) that did not. We define an indicator *FVO* that takes the value of 1 for adopters and 0 for non-adopters. We define another indicator *POST* to denote the pre- and post-SFAS 159 periods (years 2005-2007 and 2008-2010, respectively). The coefficient on the interaction term *FVO*POST* denotes the incremental effect of SFAS 159 on the spreads of adopters relative to non-adopters. The results of this difference-in-difference specification are presented in Table 6.

Panel A of Table 6 presents descriptive statistics of spreads around the event period. The advent of SFAS 159 coincides with the recent financial crisis, so the post-period bid-ask spreads are significantly larger. The median spread in the post-period is 0.861% of price, more than double the 0.412% median in the pre-period. The mean spread is affected by outliers (the 99th percentile increase is 1192%) and more than trebles. To mitigate the effect of outliers we estimate the regressions using the log of the spread.[41, 42]

Panel B presents results. The first two specifications investigate three years around SFAS 159 adoption: Model (1) is a two-way clustered OLS regression while Model (2) uses fixed effects. Consistent with our hypothesis, the coefficient on *FVO*POST* is positive and significant in both specifications, indicating that banks that exercise the fair value option experience larger

[40] We are unable to use the earnings-based fields as because they are populated only from 2008:Q1 onwards. Using this screen to identify regular adopters, we find results that are similar to those tabulated.
[41] The results are robust to other techniques such as using the ranks of spreads and estimating a robust regression.
[42] Although we include the inverse of the stock price as a control variable in all the specifications, we perform additional sensitivity tests to verify that our results are not confounded by declining stock prices during the crisis period. First, we compare the cumulative stock returns (in excess of value weighted market returns) from 2008 to 2010 of SFAS 159 adopters and non-adopters. SFAS 159 adopters experience mean (median) returns of -45% (-44%) compared to -39% (-40%) for non-adopters. These differences are not statistically significant. Second, we estimate rank regressions using the bid-ask spread scaled by the average stock price in the pre-adoption period and find slightly stronger results.

increases in spreads, compared to those that do not. Because spreads are logged, the coefficient of 0.100 on *FVO*POST* in Model (2) implies an incremental increase of 10.5% in spreads for FVO adopters relative to non-adopters. To alleviate any direct effect of the financial crisis on spreads (which are scaled by price), the second two specifications compare 2010 with 2006, omitting the intermediate years. The coefficient on *FVO*POST* remains positive and significant, and increases in economic significance. Overall, these results are consistent with our hypothesis that exercising the SFAS 159 fair value option increased information asymmetry.

7. Conclusions

For several reasons we hypothesize that mark-to-market accounting for banks' securities that are classified as "trading" securities suffers from a hitherto unreported detrimental effect: it reduces financial reporting transparency and creates information asymmetry in the market for banks' shares. Securities classified under accounting rules as "available for sale" or as "held to maturity" are not expected to and do not exhibit this effect.

We document that bank shares are quoted at statistically and economically significantly wider bid-ask spreads as a function of banks' trading securities holdings. Banks with higher investments in trading assets also have lower analyst following, release fewer management earnings forecasts, and have stock prices that reflect information that arrives in a less timely fashion. The results are robust to alternative research designs.

As predicted, similar results are not observed for banks' investments that are not classified as "trading securities" under SFAS 115. These constitute: securities classified as "available for sale," which are marked to market on balance sheets but whose MTM gains and

losses generally are not incorporated in earnings until they are sold; securities classified as “held to maturity,” which are not marked to market; and loans, which are not affected by SFAS 115.

To obtain better identification, we exploit the introduction of MTM accounting by SFAS 115, and show that it increased bid-ask spreads for banks with trading securities, but not for those without trading securities. We also exploit the passage of SFAS 159, which provided firms with the option to report financial assets and liabilities at fair value, as an additional shock to MTM accounting and find increases in opacity for adopters relative to non-adopters. Overall, the results are consistent with mark to market accounting reducing the transparency of banks' financial reports by the channel of incorporating gains and losses in quarterly earnings, consistent with our hypothesis.

The relation between trading securities and information asymmetry would not be predicted by focussing only on the accounting rules for investment securities, without considering the impact of financial information on investors or the incentives of managers preparing it. A focus on accounting rules alone would suggest that, relative to other classes of securities, those classified as trading securities should attract the most accurate “fair value” measurements among all security classes, because they almost invariably are valued using the most reliable methods in the GAAP hierarchy (“level 1” under SFAS 157). The results also would seem surprising to those schooled in the belief that market prices provide sufficient information for investor decisions. However, the picture changes after considering the effect of fair value accounting on investors seeking to separate reported earnings into expected versus news components, or the effect of management incentives on their trading in illiquid markets.

We caution that our hypotheses and evidence do not imply that MTM accounting for trading securities should be abandoned: they simply address a hitherto unsuspected adverse

effect of the method. Nor do they have address the effects of disclosing gains and losses outside of the income statement, or of marking securities to market on bank balance sheets. In regard to the latter, we hypothesize and report evidence that available-for-sale (AFS) securities, which are marked to market on balance sheets but without incorporating unrealized gains and losses in earnings, do not give rise to the same effects as trading securities. Nor do our results have any direct implication for the controversial role of MTM accounting in the so-called Global Financial Crisis, though it is feasible that the effect we document on financial reporting transparency and information asymmetry could have adversely affected the market for banks' shares and investor sentiment during the crisis. Nevertheless, we believe our results suggest a re-thinking of the belief classical accounting theorists that market prices provide sufficient information for investor decisions.

Appendix

Decomposing MTM Gains and Losses: A Simple Two-period Example

At t= 0 a bank buys a 2-period zero-coupon bond for $82.645 with a single expected cash flow at t=2 of $100 and an expected return in both periods of 10% (i.e., assume for simplicity a flat term structure). At t=1 the bond is selling at $83.333 and is marked to market at that price. In the absence of any shocks, its expected price would have been $90.909 = $82.645 + 10% expected return, so there has been a negative shock of $7.576 during period 1.

The uninformed investor does not know whether the shock is to expected return or to expected cash flow, or both. Assume for simplicity they are mutually exclusive explanations (i.e., the two sources of shocks are uncorrelated). The alternative interpretations then are: (1) an increase in expected return to 20%, holding expected t=2 cash flow constant at $100; and (2) a decrease in expected t=2 cash flow to $91.667, holding expected return constant at 10%.

This generates a source of uncertainty about future earnings for the uninformed investor. If (1) is the correct interpretation of the MTM amount at t=1, then the expected earnings from the security at t=2 is +$16.667, a 20% return on $83.333. However, if (2) is the correct interpretation of the MTM amount at t=1, then the expected earnings from the security at t=2 is +$8.333, a 10% return on $83.333. Consequently, uninformed investors establish less precise earnings expectations, and trade at an informational advantage.

Suppose the investment is liquidated at t=2 for $100. If (1) is the correct interpretation of the MTM amount at t=1, then there is no shock at t=2 because $100 gives a 20% return on $83.333. However, if (2) is the correct interpretation of the MTM amount at t=1, then there is a positive shock of +$8.333 at t=2 because the expected liquidating cash flow was $91.667. Uninformed investors do not know whether the amount included in t=2 earnings is a surprise or not. They would need to know the decomposition of the prior period MTM gains and losses (i.e., into cash flow shock versus expected return shock) to figure that out.

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Table 1: Descriptive statistics

The sample comprises of quarterly data for U.S. bank holding companies and commercial banks for the period 1996:Q1 to 2010:Q4. Data for bank holding companies are obtained from the Federal Reserve's Consolidated Financial Statements for Bank Holding Companies (FRY-9C) and those for commercial banks from Federal Reserve's Report of Condition and Income ("Call reports"). *TRADING* indicates the proportion of trading securities to market value of equity as of the beginning of the quarter. *SPREAD* denotes the average monthly relative bid-ask spread over the quarter, expressed in percentage terms. *TRADEDUM* is an indicator variable that denotes the presence of trading securities. *AFS* and *HTM* indicate the proportion of available-for-sale and held-to-maturity securities as of the beginning of the quarter respectively. *LOANS* denotes the proportion of loans to market value of equity as of the start of the quarter. *LLA* represents loan loss allowance scaled by market value of equity as of the start of the quarter. *MVE* denotes the average daily market value of equity (in millions) over the quarter. *TIERONE* is the ratio of Tier 1 capital to total assets. *TURN* denotes the log of turnover, defined as the ratio of shares traded to shares outstanding. *RETVOL* denotes stock return volatility during the quarter based on daily stock returns. *PRICE* denotes the average closing stock price during the quarter.

Panel A: Main variables

	Entire sample		***TRADING*>0**		***TRADING*=0**	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
SPREAD	2.084	1.301	0.958	0.443	2.316***	1.578***
TRADEDUM	0.171	0.000	–	–	–	–
TRADING	0.028	0.000	0.163	0.023	–	–
AFS	1.637	1.187	1.611	1.098	1.643	1.204***
HTM	0.309	0.036	0.288	0.030	0.313**	0.038
LOANS	6.532	4.532	6.082	3.896	6.625***	4.663***
LLA	0.116	0.059	0.123	0.057	0.114	0.060***
MVE	1,919.801	147.542	9,234.586	1,729.805	412.149***	115.933***
TIERONE	0.088	0.084	0.080	0.077	0.090***	0.086***
TURN	0.053	0.029	0.102	0.063	0.043***	0.024***
RETVOL	0.025	0.020	0.024	0.019	0.025***	0.021***
PRICE	23.546	20.697	34.525	31.359	21.283***	19.470***

Panel B: Composition of sample by institution type

	Obs.	% of total
Bank holding companies	23,719	95.82%
Commercial banks	1,034	4.18%
Total	**24,753**	**100.00%**

Panel C: Composition of sample by listed exchange

	Obs.	% of total
Amex	1,356	5.48%
Nasdaq	20,266	81.87%
NYSE	3,131	12.65%
Total	**24,753**	**100.00%**

Table 2: Association between trading securities and bid-ask spreads

The dependent variable is the percentage relative bid-ask spread (*SPREAD*) during the quarter. *TRADEDUM* is an indicator variable denoting the presence of trading securities. *TRADING* represents the ratio of trading securities to market value of equity as of the start of the quarter. *AFS* and *HTM* denote the proportion of *AFS* securities and *HTM* securities to market value of equity respectively. *LOANS* denotes the proportion of loans to market value of equity. *LLA* denotes loan loss allowance as a proportion of market value of equity. *TIERONE* is the ratio of Tier 1 capital to total assets. *LNMVE* denotes the log of market value of equity in millions. *TURN* denotes the log of turnover and is defined as the ratio of total shares traded to total shares outstanding. *RETVOL* denotes stock return volatility during the quarter based on daily stock returns. *PRCINV* denotes the inverse of the average stock price during the quarter. *BHC* is an indicator variable that denotes bank holding companies. All balance sheet variables are defined as of the start of the quarter while the market microstructure variables viz., *SPREAD*, *LNMVE*, *TURN*, *RETVOL* and *PRCINV* are defined as of the current quarter. The first two sets of results are from regressions using the entire sample, while the last set is from regressions using only bank-quarters where *TRADING*>0. All specifications include year fixed effects and robust standard errors clustered two-way: by bank and year-quarter.

	Entire sample (1)		Entire sample (2)		*TRADING>0* (3)	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	5.827	16.89	5.775	16.77	3.667	8.44
TRADEDUM	0.388	4.06				
TRADING			0.965	4.42	0.511	2.88
AFS	0.010	0.47	0.016	0.71	0.056	1.28
HTM	0.036	0.81	0.043	1.00	0.036	0.50
LOANS	0.005	0.47	0.002	0.18	-0.002	-0.19
LLA	-0.398	-1.44	-0.341	-1.18	-0.676	-1.84
TIERONE	-0.843	-0.79	-0.902	-0.84	1.041	0.53
LNMVE	-0.507	-12.32	-0.481	-12.41	-0.209	-6.58
TURN	-7.394	-9.83	-7.708	-9.99	-3.854	-4.16
RETVOL	58.084	11.25	57.974	11.18	30.171	4.41
PRCINV	-0.506	-1.16	-0.467	-1.04	2.736	2.56
BHC	-0.543	-2.77	-0.566	-2.88	-0.975	-4.81
Year effects	Yes		Yes		Yes	
Adj. R^2	0.53		0.53		0.46	
Obs.	24,753		24,753		4,230	

Table 3: Association between trading securities and other informational characteristics

ABSCAR and *ABVOL* denote the absolute value of abnormal returns and abnormal trading volume around quarterly earnings announcements (i.e., days -1, 0 and +1 relative to the quarterly earnings announcement date). *ANALYST* is an indicator variable that denotes whether or not the bank is covered by financial analysts during the quarter. *IPT* indicates the annual intra-period-timeliness measure of Butler et al. (2007). *MGTFORE* is an indicator variable that denotes whether or not a management forecast was issued during the quarter. *TRADEDUM* is an indicator variable denoting the presence of trading securities. *AFS, HTM, LOANS* and *LLA* denote the proportion of *AFS* securities, *HTM* securities, loans and loan loss allowance as a proportion of market value of equity. *TIERONE* is the ratio of Tier 1 capital to total assets. *LNMVE* denotes the log of market value of equity in millions. *TURN* denotes log of the ratio of total shares traded to total shares outstanding. *RETVOL* denotes stock return volatility during the quarter based on daily stock returns. *PRCINV* denotes the inverse of the average stock price during the quarter. *BHC* is an indicator variable that denotes bank holding companies. *ANNSPREAD* denotes the bid-ask spread around the earnings announcement date. All balance sheet variables are defined as of the start of the quarter while *SPREAD*, *LNMVE*, *TURN*, *RETVOL* and *PRCINV* are defined as of the current quarter. All specifications include year fixed effects and robust standard errors clustered two-way: by bank and year-quarter.

	(1) *ABSCAR*		(2) *ABLNTO*		(3) *ANALYST*		(4) *IPT*		(5) *MGTFORE*	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	0.540	2.95	-0.344	-2.93	-1.625	-2.74	5.513	10.31	-4.225	-9.87
TRADEDUM	0.066	1.03	0.062	1.72	-0.103	-3.59	-0.266	-2.49	-0.211	-2.47
AFS	0.002	0.15	0.004	0.72	-0.002	-0.51	0.078	1.62	0.004	0.12
HTM	0.077	2.74	0.036	2.56	-0.020	-1.24	0.016	0.20	0.031	0.58
LOANS	0.019	3.33	0.014	3.11	0.002	0.51	-0.043	-3.06	0.011	0.49
LLA	0.010	0.06	-0.131	-1.44	0.020	0.16	0.165	0.45	-0.464	-0.52
TIERONE	-0.411	-0.56	-0.578	-1.46	0.079	0.13	-2.701	-1.31	-2.861	-1.76
LNMVE	0.204	9.19	0.110	7.12	0.130	6.95	-0.044	-0.86	0.258	10.21
MB	-0.064	-0.16	0.055	0.22	-0.661	-1.64	0.485	0.64	-0.162	-0.34
RETVOL	-11.457	-4.77	-1.940	-1.61	2.694	0.43	20.065	4.32	10.996	3.33
BHC	-0.134	-1.33	-0.071	-1.41	0.219	2.91	0.085	0.39	0.591	2.28
ANALYST	-0.059	-0.65	0.094	1.59	–	–	–	–	–	–
ANNSPREAD	–	–	-1.543	-2.84	–	–	–	–	–	–
Year effects	Yes		Yes		Yes		Yes		Yes	
Adj. R^2	0.08		0.09		0.02		0.06		0.13	
Obs.	23,069		22,652		24,753		5,510		21,955	

Table 4: Robustness tests:

Panel A: Including bank-fixed effects

The dependent variable is the percentage relative bid-ask spread. *TRADEDUM* is an indicator variable denoting the presence of trading securities. *TRADING*, *AFS* and *HTM* denote the proportion of trading, *AFS* and *HTM* securities to market value of equity respectively. *LOANS* denotes the proportion of loans to market value of equity. *LLA* denotes loan loss allowance as a proportion of market value of equity. *TIERONE* is the ratio of Tier 1 capital to total assets. *LNMVE* denotes the log of market value of equity in millions. *TURN* denotes log of turnover and is defined as the ratio of total shares traded to total shares outstanding. *RETVOL* denotes stock return volatility during the quarter based on daily stock returns. *PRCINV* denotes the inverse of the average stock price during the quarter. *BHC* is an indicator variable that denotes bank holding companies. All balance sheet variables are defined as of the start of the quarter while *SPREAD*, *LNMVE*, *TURN*, *RETVOL* and *PRCINV* are defined as of the current quarter. The first two sets of results are from regressions using the entire sample, while the last set is from regressions using only bank-quarters where *TRADING*>0. All specifications include year fixed effects, bank fixed effects and robust standard errors clustered by year-quarter.

	Entire sample (1)		Entire sample (2)		*TRADING>0* (3)	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	5.855	19.09	5.847	18.99	2.480	7.44
TRADEDUM	0.100	1.86				
TRADING			0.458	3.09	0.392	2.85
AFS	0.013	0.77	0.016	0.91	0.062	3.03
HTM	0.119	3.93	0.120	3.93	0.097	2.37
LOANS	-0.002	-0.28	-0.004	-0.72	0.002	0.27
LLA	-0.284	-1.34	-0.245	-1.18	-0.611	-2.58
TIERONE	-1.904	-2.32	-1.962	-2.36	3.424	1.74
LNMVE	-0.526	-9.18	-0.521	-9.09	-0.224	-3.97
TURN	-6.264	-10.86	-6.450	-10.56	-3.002	-4.55
RETVOL	46.506	12.54	46.560	12.47	23.288	4.35
PRCINV	0.192	0.65	0.224	0.73	2.753	4.21
BHC	–	–	–	–	–	–
Year effects	Yes		Yes		Yes	
Bank effects	Yes		Yes		Yes	
Adj. R^2	0.65		0.65		0.66	
Obs.	24,753		24,753		4,230	

Panel B: Using income statement variables

The dependent variable is the percentage relative bid-ask spread. *TRADING_INC_VOL* is defined as the standard deviation of three (or five where available) observations of realized and unrealized gains/losses on trading assets scaled by net income. *AFS_REAL_INC_VOL* denotes volatility of realized gains/losses on *AFS* securities while *AFS_UNREAL_INC_VOL* is defined as the volatility of unrealized gains/losses on AFS securities. Each of these has been scaled by net income. *LOANS* denotes the proportion of loans to market value of equity. *LLA* denotes loan loss allowance as a proportion of market value of equity. *TIERONE* is the ratio of Tier 1 capital to total assets. *LNMVE* denotes the log of market value of equity in millions. *TURN* denotes log of turnover and is defined as the ratio of total shares traded to total shares outstanding. *RETVOL* denotes stock return volatility during the quarter based on daily stock returns. *PRCINV* denotes the inverse of the average stock price during the quarter. *BHC* is an indicator variable that denotes bank holding companies. All balance sheet variables are defined as of the start of the quarter while *SPREAD*, *LNMVE*, *TURN*, *RETVOL* and *PRCINV* are defined as of the current quarter. All specifications include year fixed effects and robust standard errors clustered two-way: by bank and year-quarter.

	(1)		(2)	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	3.454	9.93	3.486	10.06
TRADING_INC_VOL	0.088	2.71	0.111	2.50
AFS_REAL_INC_VOL			-0.010	-0.29
AFS_UNREAL_INC_VOL			-0.013	-0.77
LOANS	0.009	0.73	0.009	0.75
LLA	-0.587	-1.73	-0.576	-1.70
TIERONE	-0.037	-0.02	-0.114	-0.06
LNMVE	-0.192	-6.18	-0.194	-6.17
TURN	-3.169	-3.89	-3.193	-3.92
RETVOL	25.212	3.80	25.400	3.79
PRCINV	2.301	2.68	2.188	2.47
BHC	-0.752	-4.13	-0.756	-4.20
Year effects	Yes		Yes	
Adj. R^2	0.43		0.43	
Obs.	3,712		3,707	

Table 5: Event-study analysis of bid-ask spread around implementation of SFAS 115

This panel comprises data for 1988 to 1998, which covers five years before and after the implementation of SFAS 115 in 1993, excluding the implementation year. Only firms with at least one observation in each of the pre- and post-SFAS periods are included. The dependent variable is percentage relative bid-ask spread. *POST* denotes the post SFAS 115 period. *TRADEDUM* is an indicator variable denoting the presence of trading securities. *INVSEC* denotes investment securities (other than trading assets) scaled by market value of equity, computed as disclosed in the pre-period and as the sum of *AFS* and *HTM* securities in the post-period. *LOANS* and *LLA* denote loans and loan loss allowance as a proportion of market value of equity. *TANGEQ* indicates the tangible equity ratio. *LNMVE* denotes the log of market value of equity in millions. *TURN* denotes log of turnover defined as the ratio of total shares traded to total shares outstanding. *RETVOL* denotes stock return volatility during the quarter based on daily stock returns. *PRCINV* denotes the inverse of the average stock price during the quarter. *BHC* is an indicator variable that denotes bank holding companies. All balance sheet variables are defined as of the start of the quarter while *SPREAD*, *LNMVE*, *TURN*, *RETVOL* and *PRCINV* are defined as of the current quarter. The first set of specifications (1) includes year fixed effects while the second (2) includes year and bank fixed effects.

	TRADING securities				*INVSEC* securities			
	(1)		(2)		(3)		(4)	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	4.446	6.42	4.060	8.48	3.688	5.31	3.293	6.20
TRADEDUM	-0.230	-1.20	-0.605	-5.68				
*TRADEDUM*POST*	1.340	5.25	1.127	7.76				
INVSEC					-0.040	-0.71	-0.028	-0.73
*INVSEC*POST*					0.070	0.94	0.039	0.78
LOANS	-0.053	-2.19	-0.031	-2.81	-0.038	-1.51	-0.022	-1.72
LLA	0.111	0.20	-0.521	-2.14	-0.068	-0.12	-0.639	-2.57
TANGEQ	-5.238	-1.58	-0.110	-0.06	-5.001	-1.42	1.800	0.96
LNMVE	-0.663	-7.70	-0.649	-6.31	-0.522	-6.86	-0.556	-5.16
TURN	-26.340	-15.36	-20.458	-19.19	-25.836	-15.40	-20.438	-19.83
RETVOL	196.379	20.01	171.780	22.29	199.704	20.61	173.993	22.64
PRCINV	0.879	0.48	6.297	3.82	0.802	0.43	6.425	3.89
BHC	-0.174	-0.66	–	–	-0.214	-0.80	–	–
Year effects	Yes		Yes		Yes		Yes	
Bank effects	No		Yes		No		Yes	
Adj. R^2	0.81		0.87		0.80		0.86	
Obs.	10,117		10,117		10,117		10,117	

Panel B: Difference-in-difference-in-difference (DDD) around implementation of SFAS 115

This panel comprises data for 1988 to 1998, which covers five years before and after the implementation of SFAS 115 in 1993, excluding the implementation year. Firms with trading assets in only the pre or only the post period are dropped. The dependent variable is percentage relative bid-ask spread. *MTM* denotes banks that report trading securities using fair values in the pre-SFAS 115 period. *POST* denotes the post SFAS 115 period. *TRADEDUM* is an indicator variable denoting the presence of trading securities. *LOANS* and *LLA* denote loans and loan loss allowance as a proportion of market value of equity. *TANGEQ* indicates the tangible equity ratio. *LNMVE* denotes the log of market value of equity in millions. *TURN* denotes log of turnover defined as the ratio of total shares traded to total shares outstanding. *RETVOL* denotes stock return volatility during the quarter based on daily stock returns. *PRCINV* denotes the inverse of the average stock price during the quarter. *BHC* is an indicator variable that denotes bank holding companies. All balance sheet variables are defined as of the start of the quarter while *SPREAD*, *LNMVE*, *TURN*, *RETVOL* and *PRCINV* are defined as of the current quarter. The regression includes year fixed effects and robust standard errors clustered two-way: by bank and by year-quarter.

	5-year pre- and post-SFAS115 windows		3-year pre- and post-SFAS115 windows	
	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	5.294	6.86	6.457	5.85
MTM	-0.567	-1.80	-0.387	-1.01
TRADEDUM	-0.715	-2.69	-0.802	-2.42
*MTM*TRADEDUM*	1.260	3.63	1.165	2.80
*MTM*POST*	1.861	4.80	1.902	4.14
*TRADEDUM*POST*	1.816	4.67	2.097	4.71
*MTM*TRADEDUM*POST*	-1.915	-4.21	-1.872	-3.69
LOANS	-0.053	-1.93	-0.062	-1.96
LLA	0.091	0.15	-0.008	-0.01
TANGEQ	-8.569	-2.36	-11.714	-2.49
LNMVE	-0.792	-7.51	-0.903	-6.09
TURN	-26.108	-14.52	-27.419	-12.96
RETVOL	192.003	17.44	201.792	15.78
PRCINV	0.711	0.34	-0.493	-0.23
BHC	0.070	0.25	0.123	0.35
Year effects	Yes		Yes	
Bank effects	No		No	
Adj. R^2	0.81		0.81	
Obs.	8,476		5,608	

Table 6: Effect of SFAS 159 (Fair Value Option) on bid-ask spreads

The sample is 37 Bank Holding Companies (BHCs) that elected the fair value option under SFAS 159 in 2008:Q1, and 304 banks that did not elect. Early adopters are deleted from the sample. The pre-period consists of the years 2005-2007 while the post-period consists of years 2008-2010. 2008:Q1 has been deleted from the sample. Only banks that existed in both periods are included. *SPREAD* denotes the percentage relative-bid ask spread.

Panel A: Descriptive statistics

	Pre-period			**Post-period**		
	Obs.	**Mean**	**Median**	**Obs.**	**Mean**	**Median**
SPREAD	3,816	0.772	0.412	3,425	2.419	0.861
Firm-specific *ΔSPREAD* (*N* = 341)			P1: -37% Mean: 212% Median: 124% P99: 1192%			

Panel B: Multivariate evidence

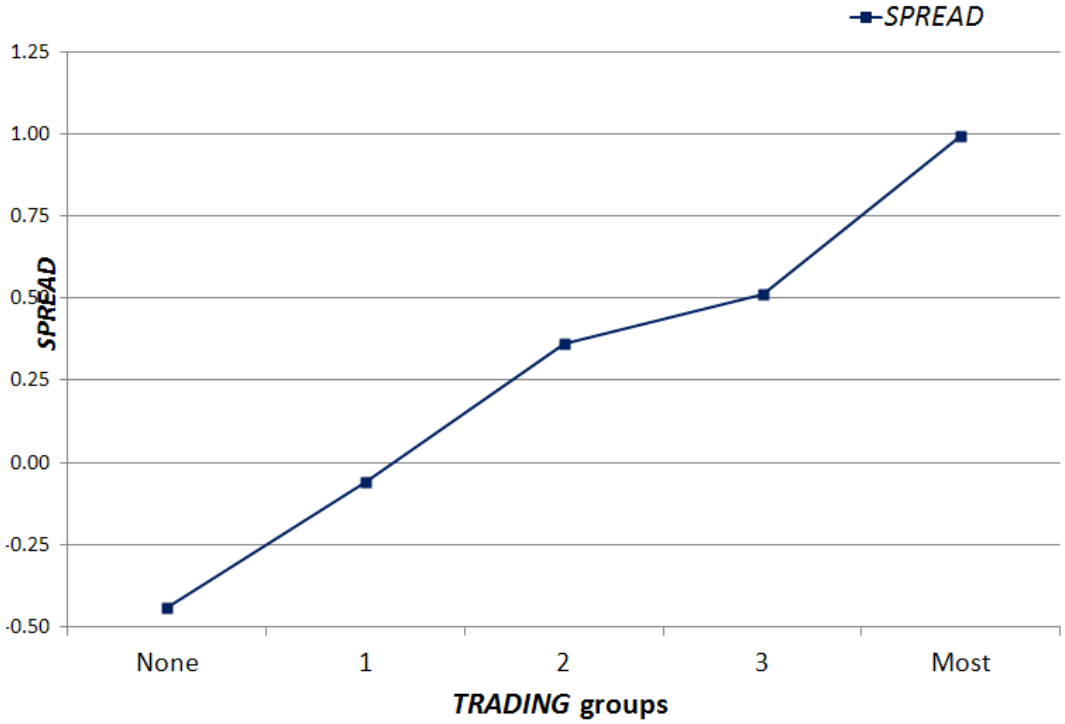
This panel comprises data for BHCs for the period 2005 to 2010 (excluding 2008:Q1), which covers three years before and after the implementation of SFAS 159 in 2008. Models (1) and (2) are estimated for the entire period from 2005-2010 while Models (3) and (4) compare the years 2006 and 2010. Banks without data in either the pre or the post period are dropped. The dependent variable is percentage relative bid-ask spread. *FVO* is an indicator variable that takes the value 1 for banks that adopted the Fair Value Option under SFAS 159. Non-adopters take the value of 0. Early adopters are deleted from the sample. *POST* denotes the post SFAS 159 period. *LOANS* and *LLA* denote loans and loan loss allowance as a proportion of market value of equity. *TANGEQ* indicates the tangible equity ratio. *LNMVE* denotes the log of market value of equity in millions. *TURN* denotes log of turnover defined as the ratio of total shares traded to total shares outstanding. *RETVOL* denotes stock return volatility during the quarter based on daily stock returns. *PRCINV* denotes the inverse of the average stock price during the quarter. All balance sheet variables are defined as of the start of the quarter while *SPREAD*, *LNMVE*, *TURN*, *RETVOL* and *PRCINV* are defined as of the current quarter. Models (1) and (2) include year fixed effects and robust standard errors clustered two-way: by bank and by year-quarter. Models (3) and (4) include year and bank fixed effects and robust standard errors clustered by year-quarter.

	3 years around adoption				2006 vs. 2010			
	(1)		(2)		(3)		(4)	
	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat	Coeff.	*t*-stat
Intercept	-2.043	-8.28	-2.191	-7.86	-2.076	-9.15	-1.800	-5.37
FVO	0.310	2.90	–	–	0.248	2.80	–	–
*FVO*POST*	0.209	2.41	0.100	2.18	0.303	2.99	0.174	2.50
LOANS	0.007	1.98	0.002	1.14	0.006	1.93	-0.001	-0.37
LLA	-0.097	-1.53	-0.039	-0.80	-0.188	-2.59	-0.034	-0.38
TANGEQ	1.198	0.92	1.187	1.15	0.209	0.16	2.480	1.53
LNMVE	-0.606	-16.78	-0.580	-11.88	-0.630	-19.36	-0.717	-11.64
TURN	-1.880	-4.90	-0.798	-3.76	-1.598	-2.55	-0.473	-1.60
RETVOL	8.965	4.97	8.158	5.30	9.692	3.92	7.137	3.05
PRCINV	-0.326	-1.91	0.092	0.85	0.027	0.27	0.215	2.23
Year effects	Yes		Yes		Yes		Yes	
Bank effects	No		Yes		No		Yes	
Adj. R^2	0.73		0.85		0.77		0.87	
Obs.	7,241		7,241		2,442		2,442	

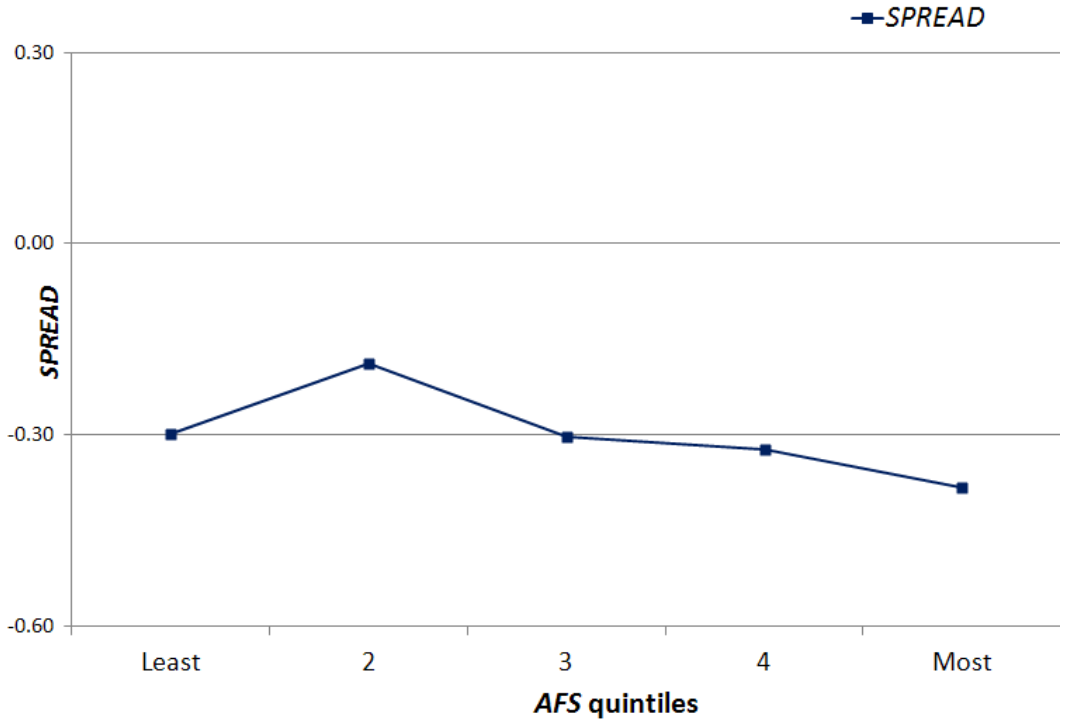
Fig. 1: Association between *SPREAD* and investment securities

This figure presents trends in *SPREAD* across groups of trading securities (*TRADING*) in Panel A, AFS securities (*AFS*) in Panel B and HTM securities (*HTM*) in Panel C. *TRADING*, *AFS* and *HTM* are each scaled by lagged market value of equity.

Panel A: *SPREAD* across groups of trading securities (*TRADING*)



Panel B: *SPREAD* across quintiles of AFS securities (*AFS*)



Panel C: *SPREAD* across groups of HTM securities (*HTM*)

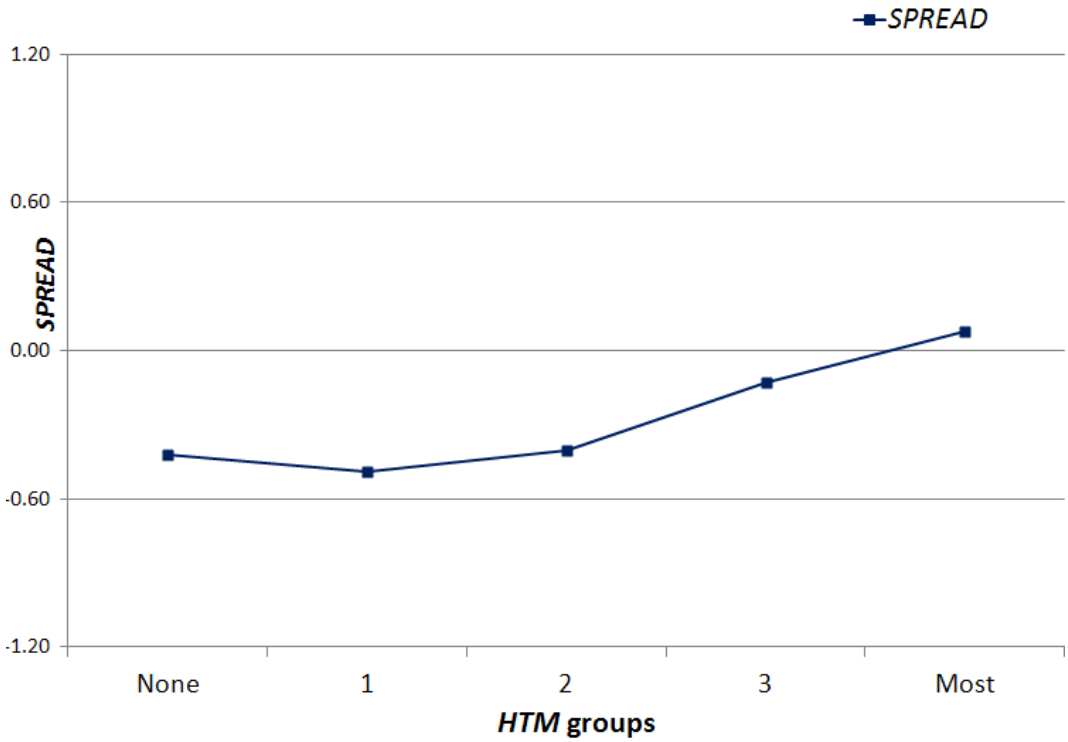
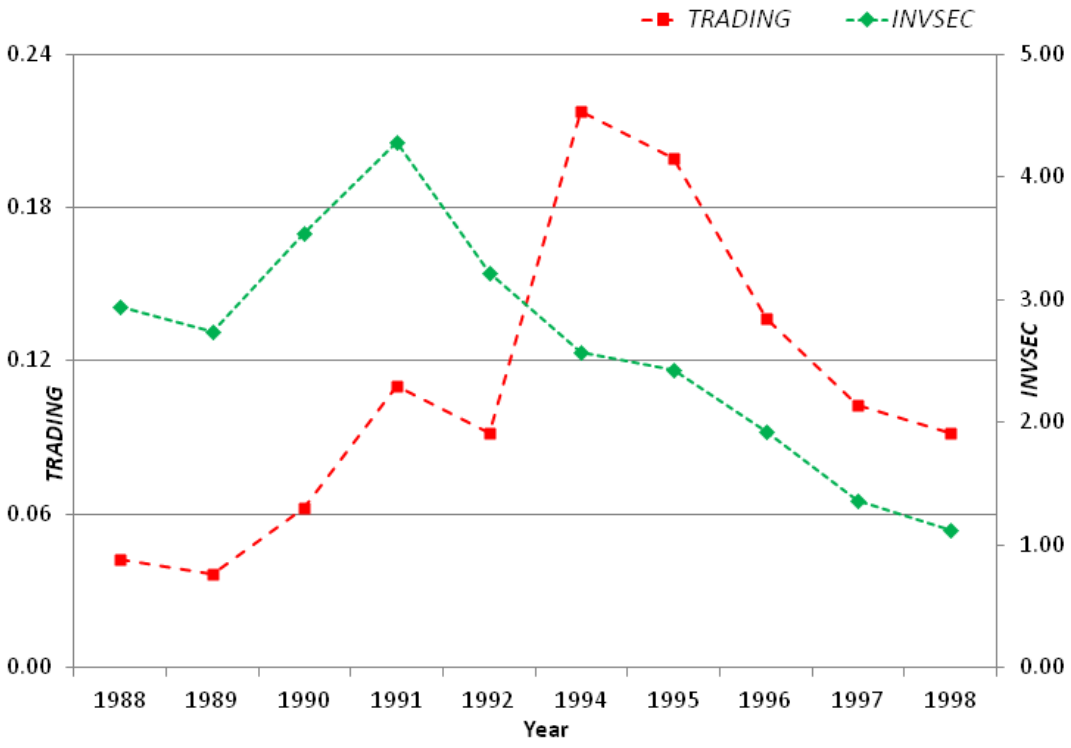


Figure 2: Trends in trading securities

The figure presents trends in *TRADING* and *INVSEC*, defined as the proportion of trading and non-trading investment securities to lagged market value of equity respectively. Panel A presents statistics for banks that applied mark-to-market accounting for all trading securities in the pre-SFAS 115 period, while Panel B presents the statistics for all other banks in the sample.

Panel A: *MTM* users



Panel B: *MTM* non-users