Asymmetric Timely Loss Recognition and Insider Trading Profitability*

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Abstract:

We provide evidence that the profitability of corporate insiders' trading decreases in the degree of asymmetric timely loss recognition (TLR) of their firms' financial reporting. Consistent with TLR reducing insiders' information advantages over outside shareholders about future *negative* news about the firm, we find that the reduced insider trading profitability is mainly driven by: (a) stock sales, as opposed to purchases; (b) the price change component of trading, as opposed to its volume; and (c) insiders' non-routine trades, as opposed to less information-driven routine trades. Although CEOs/CFOs are more likely to influence TLR, the effect is more pronounced for non-CEO/CFO insiders, inconsistent with reverse causality. Our findings suggest that TLR reduces managers' abilities to extract rents from investors via insider trading, thus upholding the integrity of capital markets.

Key words: *Asymmetric timely loss recognition, accounting conservatism, insider trading*
Data availability: *The data are publically available from the sources identified in the paper*

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1. Introduction

Healthy and well-functioning capital markets are important to society, as they provide the opportunities to individual investors to share in the benefits of prospering corporations. However, investors' confidence in the integrity of capital markets will be damaged if corporate insiders knowingly trade on material information unavailable to others. In addition to enforcing securities laws and strengthening ethics and governance, transparency through timely financial disclosure can effectively limit corporate insiders' information advantage and thereby reduce their potential wealth transfer from outside shareholders. This study examines whether and how one particular aspect of financial reporting, namely, the asymmetric timeliness of loss over gain recognition (hereafter "timely loss recognition" or TLR for brevity) affects insider trading profitability.

TLR refers to the incremental timeliness with which accounting earnings recognize losses *relative to* recognizing gains, due to a higher verifiability threshold for gain recognition than for loss recognition (Basu 1997; Watts 2003a, b). As TLR results in lower recognized earnings when good news (economic gains) and bad news (economic losses) arrive, it is commonly used as a measure of conditional conservatism in accounting (Ryan 2006; Khan and Watts 2009).[1] Prior research has documented many benefits of conditional conservatism, such as increased debt contracting efficiency (e.g., Beatty, Weber, and Yu 2008; Zhang 2008; Tan 2012) and investment efficiency (Francis and Martin 2010; Kravet 2014) as well as decreased cost of equity capital (Garcia, Osma, and Penalva 2011) due to reduced information asymmetry between corporate managers and external investors (LaFond and Watts 2008). Much of this literature focuses on how accounting conservatism mitigates the agency problem of adverse selection at the firm level. In contrast, we investigate moral hazard, another form of agency problem, of top corporate managers as manifested in insider trading.

[1] In this paper, we use the terms "timely loss recognition" (TLR) and "accounting conservatism" interchangeably.

Managers' ability to trade profitably stems from their superior information over outside shareholders (e.g., Skaife, Veenman, and Wangerin 2013). Such information include prospective major corporate events such as mergers and changes in management teams (Karpoff and Lee 1991; Seyhun and Bradley 1997) to prospective earnings information (Ke, Huddart, and Petroni 2003; Piotroski and Roulstone 2005). Because illegal insider trading is deemed to compromise the integrity and fair functioning of the capital markets, it remains a high priority area in the Securities Exchange Commission (SEC)'s enforcement program. In recent years, the SEC has taken actions against hundreds of alleged insider traders. Despite regulators' efforts, insiders may still benefit from their information advantage over shareholders via legal or undetected illegal trading.[2] Therefore, the most natural solution to insider trading is to reduce the information advantage possessed by insiders over outside shareholders.

In this paper, we argue that, by accelerating the recognition of bad news into accounting earnings, timely loss recognition (TLR) helps achieve this goal. Thus, we expect the profitability of insider trading to decrease with TLR. Following Skaife et al. (2013), we define insider trading profitability as the capital gains following insider share purchases plus any capital losses avoided by insider share sales, cumulated over a future period (e.g., one year). Moreover, unlike the finding that TLR reduces information asymmetry reduction in prior studies (e.g., LaFond and Watts 2008), we expect the effect of TLR on insider trading profitability to be primarily attributable to insiders' sales rather than purchases of their firms' stock. TLR only reduces insiders' information advantage only about bad news, not good news, limiting potential losses they may avoid by selling stocks prior to the revelation of bad news. The null hypothesis is also conceivable that TLR has *no* effect on insider trading profitability, because stock prices typically

[2] Under the SEC rule 10b5, it is an illegal trading if the insider executes the trade while in possession of *material* nonpublic information. However, insiders can trade legally on *immaterial* private information.

incorporate information faster than accounting earnings (e.g., Ball and Brown 1968). In spite of diminished information content of earnings reports over time, recent research suggests a confirmation role of earnings for information that is already partially incorporated in stock prices (e.g., Ball, Jayaraman, and Shivakumar 2012). Thus, whether TLR can sufficiently improve stock price efficiency to reduce insider trading profits is an empirical question.

We test these predictions using two complementary approaches to measuring timely loss recognition. In both approaches, we measure insider trading profitability as the (unrealized) capital gains after insider purchases and the capital losses avoided by insider sales, following Skaife et al. (2013). The first approach is based on a modified Basu (1997) model of timely loss recognition, which regresses current annual earnings on returns and allows the coefficient on returns to change with the sign of returns. We interact our measure of insider trading profitability in the next year with the Basu interaction term, following Francis and Martin (2010). Using a sample of 16,003 firm-years (3,554 unique firms) in the U.S. over the years 2004-2011, we find a significantly negative coefficient on the interaction between insider trading profitability and the Basu measure of timely loss recognition, even after controlling for other factors shown to affect timely loss recognition in financial reporting such as firm size, leverage, market-to-book ratio, and litigation risks.

To further investigate the mechanisms through which timely loss recognition restrains insiders' abilities to trade profitably on their superior information, we analyze the direction of insider trading (buy versus sell) as well as the two components of trading profits (price change versus volume). Consistent with our prediction that timely loss recognition accelerates only the release of bad news, but not of good news, we find that only insiders' profitability from their share sells is significantly negatively associated with timely loss recognition, but not their share

purchases.[3] Moreover, only the price change component of their trades is significantly negatively associated with timely loss recognition, but not their trading volumes. This finding is consistent with price being more efficient with respect to future bad news and is inconsistent with insiders' trading affecting the timely loss recognition measure. Again, the significant effect of price change is observed only from insiders' share sells, not from their purchases.

Next, because insiders make choices over both their trading activities and their firms' financial reporting, the negative association we document between timely loss recognition and insider trading profitability might be endogenous. We mitigate this concern by analyzing the types of insiders (CEO/CFOs versus non-CEO/CFOs) and the types of insider trades (routine trades versus non-routine trades). Prior research suggests that CEO/CFOs have significant discretion over their firms' financial reporting (e.g., Jiang, Petroni, and Wang 2010; Feng, Ge, Luo, and Shevlin 2011). However, we find no significant results that CEO/CFO insiders' trading profitability to be significantly related to timely loss recognition, inconsistent with the alternative story of reverse-causality that CEO/CFOs could manipulate their firms' timely loss recognition to boost their own trading profitability. In contrast, we find that non-CEO/CFOs' trading profitability is significantly negatively associated with timely loss recognition. To the extent that these insiders have less control over their firms' financial reporting, this result lends further support to the interpretation that it is the non-discretionary component of timely loss recognition of financial reporting that reduces insider trading profitability. Moreover, our results are mainly driven by insider trades executed out of their regular trading periods, consistent with recent evidence that only those non-routine insider trades are informative of firms' future performance

[3] This does *not* contradict prior finding that insider purchases are more profitable (e.g., Jeng, Metrick, and Zeckhauser 2003).

(e.g., Cohen et al. 2012). Our finding suggests that timelier loss recognition reduces such private information imbedded in insiders' non-routine trades.

Finally, we repeat the above analysis using our second approach to measuring timely loss recognition at the firm-year level with *C_Score*, which is developed by Khan and Watts (2009) and is used in prior research in similar settings (e.g., Jayaraman 2012). *C_Score* specifies the Basu measure of timely loss recognition as a linear function of firm size, market-to-book ratio, and leverage. Using *C_Score*, we find similar results that are consistent with our prediction that insider trading profitability is negatively associated with timely loss recognition, after we control for factors associated with insider trading, the three determinants of *C_Score*, and firms' buy-and-hold abnormal returns prior to insider trading (Piotroski and Roulstone, 2005).[4] This result is also robust to using a change (first-difference) specification and Granger causality tests. We continue to find that timely loss recognition decreases the profitability of non-CEO/CFOs' non-routine trades and the effect is significant only when insiders are net sellers of their firms' shares.

Our study mainly contributes to two streams of literature. The first examines the benefits of accounting conservatism in areas such as earnings quality (Penman and Zhang 2002; Kim and Kross 2005), cost of equity capital (Garcia et al. 2011), debt contracting efficiency (Beatty et al. 2008; Zhang 2008), corporate investment efficiency (Francis and Martin 2010; Kravet 2014), post earnings announcement drift (Narayanamoorthy 2006), and voluntary disclosures (Hui, Matsunaga, and Morse 2009). Our study advances this literature by documenting another important benefit of timely loss recognition to shareholders *but not* to managers, i.e., reducing the wealth transferred from shareholders to managers through insider trading, an agency problem in a moral hazard form that has received scant attention in this literature. Our findings suggest that, although TLR does not seem to discourage managers from insider tradings (i.e., no effect on

[4] Note that the significant effect of TLR is *incremental* to the effect of information asymmetry which we control for.

insider trading volume), the moral hazard damage from insider tradings can still be substantially reduced by TLR (i.e., a negative effect on insider trading profitability).

Our study also contributes to the literature on insider trading. Prior studies have examined the effect of financial information on insider trading profitability (Beneish and Vargus 2002, Frankel and Li 2004, Skaife et al. 2013).[5] We provide evidence that insider trading profitability also significantly relates to another important attribute of accounting earnings – conditional conservatism as reflected in asymmetric timely loss recognition. Moreover, our decomposition of insider trading profitability reveals that, while the price component decreases significantly in conditional conservatism the volume component does not, consistent with TLR resulting in more efficient stock prices. This also highlights that the two channels, i.e., the price and the volume components of insider trading profitability, may not always work at the same time.

The next section summarizes related literatures and develops our hypotheses regarding the relation between accounting conservatism and the profitability of insider trading. In Section 3, we describe our sample and research design. Section 4 presents and discusses empirical results. Section 5 concludes the paper.

2. Hypothesis development

The separation between ownership and control creates information asymmetry. Corporate managers engaging in day-to-day operations possess superior information regarding their firms relative to outside shareholders (Jensen and Merkeling 1976). One form of moral hazard arising from this information asymmetry is that self-interested managers extract rents from outside shareholders by taking advantage of their superior information and purchasing (selling) shares

[5] While Frankel and Li (2004) and Skaife et al. (2013) examine insider trading profitability, they do not specifically focus on properties of earnings, unlike our study. Although Beneish and Vargus (2002) focus on earnings properties, accrual-based earnings management in particular, they examine only the intensity, not the profitability, of insider trading, unlike our study in which both components are examined.

before good news (bad news) is released to the capital market (Baiman and Verrecchia, 1996). Consistent with this, several studies have documented that insider trading profits are related to various types of undisclosed corporate news, such as seasoned equity offering and bankruptcy petition filings (Karpoff and Lee, 1991; Seyhun and Bradley, 1997). Thanks to continuous efforts by regulators to discipline violators, insiders have become less likely to trade on undisclosed material events. However, more recent studies show that insiders seem to utilize more subtle information aggregated in earnings to increase the profitability of their trading (Ke et al., 2003; Piotroski and Roulstone, 2005). This implies that one way to mitigate insiders' rent extraction through informed trading is to enhance the timeliness of reporting and thereby reduce managers' information advantages.

Basu (1997) provides the first empirical evidence that accounting earnings recognize bad news faster than good news. He develops a measure for accounting conservatism based on asymmetric timely loss recognition (TLR). Watts (2003a, b) attributes TLR to the higher verifiability of good news recognition than for bad news recognition. LaFond and Watts (2008) document that TLR reduces information asymmetry and mitigates adverse selection problem, resulting in lower cost of debt and cost of equity (Zhang, 2008; Beatty et al., 2008; Garcia et al., 2011). Prior research also finds that TLR is associated with more efficient investment decisions (e.g., Francis and Martin 2010; Kravet 2014). However, even when the firm maximizes its value through efficient financing and investing decisions, shareholder (i.e., the principal) interests can still fall prey to rent extraction by managers (i.e., the agent). Insider trading embodies a severe form of moral hazard, as managers reap personal benefits from their superior information over outside investors, transferring wealth from shareholders to themselves (e.g., Skaife et al., 2013). By reducing managers' information advantage, we predict that TLR is negatively associated with

the profitability of insider trading. This leads to our main hypothesis, stated in the alternative form below:

H1: *Ceteris paribus*, managers at firms with more timely loss recognition earn lower insider trading profits.

We note that it is also conceivable the null hypothesis holds for H1, i.e., TLR has *no* effect on insider trading profitability. TLR is a property of earnings reports, which are released to investors periodically relatively infrequently (i.e., quarterly). For TLR to reduce insider trading profits, a significant portion of managers' information advantage must come from their private information about upcoming earnings that has not yet been reflected in the stock prices. However, since Ball and Brown (1968), it is well documented that most earnings information is assimilated into stock prices prior to the earnings announcement (i.e., prices lead earnings). Thus, whether TLR has a significant effect on insider trading profitability is an empirical question.

Moreover, because timely loss recognition (TLR) specifically requires bad news to be recognized faster than good news, it most effectively reduces managers' information advantage regarding forthcoming bad news. Figure 1 illustrates this mechanism. Assume that managers have some private information in year *t* about a potential loss in year *t+1*. Without timely loss recognition, this loss will be recognized only when it materialize in year *t+1*, hence reflected in X_{t+1}. Therefore, prior to the release of X_{t+1}, managers could sell their shares before investors learn of the forthcoming bad news.[6] The potential capital losses avoided by insiders are part of our measure of insider trading profits. As a firm's financial reporting exhibits more timely loss recognition, more of the losses would be accelerated into recognition in year *t*, hence reflected in X_t. As investors learn more about future losses, managers' information advantage is diminished

[6] Although it is possible that investors might learn of the loss during the course of year *t+1*, confirming it through earnings can still be important given the confirmation role of earnings (Ball and Brown 1968; Ball, Jayaraman, and Shivakumar 2012).

or even eliminated, reducing their trading profitability during year *t+1*. In contrast to accelerated bad news, good news is not accelerated by timely loss recognition. In fact, TLR imposes a higher verifiability threshold for good news recognition. Hence, insiders' ability to purchase shares before the market learns the good news is unlikely to be hindered by timely loss recognition. Taken together, we expect that the effect predicted in H1 is primarily concentrated in cases where managers are net sellers of their firms' shares rather than net purchasers.

H2: *Ceteris paribus*, the negative association between timely loss recognition and insider trading profitability is more pronounced for insider sales than for insider purchases.

3. Research Design and Sample Selection

The empirical measurement of timely loss recognition is difficult and has been subject to recent debate (e.g., Patatoukas and Thomas 2011, 2015; Ball, Kothari, and Nikolaev 2013a, b). For this reason, we use two complementary approaches to investigating the relation between timely loss recognition and insider trading profitability. Both approaches have been used in prior research in settings similar to ours. The first approach follows Francis and Martin (2010), who use a modified Basu (1997) model to examine the association between acquisition profitability and timely loss recognition. We modify their model for our setting by replacing acquisition profitability with insiders' trading profitability. This approach has the advantage of not requiring a firm-year measure of timely loss recognition. The second approach follows Skaife et al. (2013), who examine the relation between insiders' trading profitability and the effectiveness of internal control over financial reporting. To adapt their model to our research question, we need a firm-year measure of timely loss recognition as an additional independent variable. We follow the procedures developed by Khan and Watts (2009) to calculate *C_Score*, which is used in many prior studies as a firm-year measure of timely loss recognition (e.g., Jayaraman, 2012). Below

we first describe our measurement of insider trading profitability, which is central to our research question and essential in both approaches. We then detail each regression model and describe our sample.

3.1. Measurement of insider trading profitability

Following Skaife et al. (2013), we measure insider trading profits as the capital gains after insider purchases and the capital losses avoided by insider sales. We construct our firm-year measures of insider trading profitability to capture three determinants identified in the prior literature: (a) the difference between the prevailing share price and its value based on insiders' private information, (b) the number of shares traded, and (c) the frequency of insider trading (Huddart, Ke, and Shi 2007; Huddart and Ke 2007). Moreover, we define component (a) as the price component of insider trading profitability, whereas components (b) and (c) are combined as the volume (or quantity) component, which we separately examine in further analyses.

Our empirical measure of insider trading profitability closely follows the procedures described in Skaife et al. (2013). First, for each trading day with insider trades, we aggregate all trades at the firm-day level. Duplicate firm-days are removed. Then, using daily stock returns data from CRSP, we compute one-year buy-and-hold size-adjusted abnormal returns to infer the differences between insiders' private valuations and market prices at the time of insider trades.[7] Then we multiply the abnormal return with the dollar value of shares traded by insiders to determine the profitability of their trades. For share purchases, the product reflects the potential gains to the insider if the shares were bought and held for one year. For share sales, we use the absolute value of the product to determine the amount of losses that the insider managed to avoid

[7] Securities and Exchange Act of 1934 Section 16(b) aims to eliminate insiders' short-term trading opportunities by allowing shareholders to recoup the profits earned by an insider from purchasing and selling (or vice versa) within six months. Thus, the prior literature on insider trading typically examine trading windows over one year or longer (Lakonishok and Lee, 2001; Ke et al., 2003). Following Skaife et al. (2013), we check the robustness of our results to the use of alternative return measurement windows of 6, 12, 18, or 24 months and find similar results.

through insider sales. Finally, we aggregate individual transactions to arrive at a firm-year level measure:

$$PROFIT(\%)_{it} = \frac{\sum_{j=1}^{n} ABRET_{itj} * VALUE\_BOUGHT_{itj} - ABRET_{itj} * VALUE\_SOLD_{itj}}{MV_{it-1}} \quad (1)$$

where $ABRET_{itj}$ is the buy-and-hold size-adjusted abnormal return computed over the one-year period starting one day after the transaction day j in year t for firm i, $VALUE\_BOUGHT_{itj}$ ($VALUE\_SOLD_{itj}$) is the total dollar value of shares bought (sold) by all insiders on day j, n is the number of firm-days with insider trading activity during firm-year it, and MV_{it-1} is the market value of equity at the end of fiscal year $t-1$. The value of the right-hand side of *Eq. (1)* is multiplied by 100 to denote *Profit* as a percentage of market value at the beginning of the year t.[8] Finally, following prior literature, we set *Profit* equal to zero when no insider trades are reported for a given firm-year because insiders' choices not to trade their companies' stocks also reflect their private information (Frankel and Li, 2004; Huddart and Ke, 2007; Skaife et al., 2013).

3.2. Modified Basu (1997) Model of Timely Loss Recognition

Following prior literature, we use Basu (1997) model to measure a firm's timely loss recognition in financial reporting. Basu (1997) defines timely loss recognition (or conditional conservatism) as the extent to which earnings reflect contemporaneous bad news faster than contemporaneous good news. Specifically, assuming that the market is (semi-strong form) efficient and that stock returns capture (public) economic news, Basu (1997) estimates the cross sectional regression specified as follows:

$$X_i = \beta_1 + \beta_2 D_i + \beta_3 R_i + \beta_4 DR_i + \varepsilon_i \quad (2)$$

[8] Consistent with prior literature, we scale insider trading profits by beginning prices to mitigate confounding effects of firm size (e.g., Skaife et al., 2013). Yet we obtain qualitatively similar results when we use the beginning-of-year total assets as a deflator or when we use the unscaled dollar magnitude of insider trading profitability.

where *i* is firm index, *X* is annual earnings scaled by the beginning-of-year market value of equity, *R* is twelve-month stock returns used to measure economic news over the twelve-month period beginning nine months before the fiscal year end, *D* is a dummy variable set equal to one when $R < 0$ and equal to zero otherwise, and ε is the residual. The timeliness measure for good news is captured by β_3, whereas the incremental timeliness for bad news over good news is captured by β_4, which is used to measure timely loss recognition. The total timeliness of bad news is captured by $\beta_3 + \beta_4$.

Following Francis and Martin, we expand the baseline Basu (1997) model in Eq. (2) by including insider trading profitability (*Profit*) along with additional firm-level controls in the following regression model. Because we predict timely loss recognition to influence insider trading profits in the subsequent period, *Profit* is measured one year after *X*.

$$\begin{aligned} X_{i,t-1} = {} & \beta_1 + \beta_2 D_{i,t-1} + \beta_3 R_{i,t-1} + \beta_4 D_{i,t-1} * R_{i,t-1} + \beta_5 Profit_{i,t} + \beta_6 Profit_{i,t} * D_{i,t-1} + \beta_7 Profit_{i,t} * R_{i,t-1} \\ & + \beta_8 Profit_{i,t} * D_{i,t-1} * R_{i,t-1} + \beta_9 Leverage_{i,t-1} + \beta_{10} Leverage_{i,t-1} * D_{i,t-1} + \beta_{11} Leverage_{i,t-1} * R_{i,t-1} \\ & + \beta_{12} Leverage_{i,t-1} * D_{i,t-1} * R_{i,t-1} + \beta_{13} Log(assets)_{i,t-1} + \beta_{14} Log(assets)_{i,t-1} * D_{i,t-1} + \beta_{15} Log(assets)_{i,t-1} * R_{i,t-1} \\ & + \beta_{16} Log(assets)_{i,t-1} * R_{i,t-1} * D_{i,t-1} + \beta_{17} MB_{i,t-1} + \beta_{18} MB_{i,t-1} * D_{i,t-1} + \beta_{19} MB_{i,t-1} * R_{i,t-1} + \beta_{20} MB_{i,t-1} * D_{i,t-1} * R_{i,t-1} \\ & + \beta_{21} LIT_{i,t-1} + \beta_{22} LIT_{i,t-1} * D_{i,t-1} + \beta_{23} LIT_{i,t-1} * R_{i,t-1} + \beta_{24} LIT_{i,t-1} * D_{i,t-1} * R_{i,t-1} + \varepsilon_{i,t} \end{aligned} \quad (3)$$

where all variables are defined the same as in the baseline Basu (1997) model, with these additional new variables: the profitability of insider trading (*Profit*), leverage (*Leverage*), firm size (*Log* (*assets*)), market to book ratio (*MB*), and litigation risk (*LIT*). *Profit* is our variable of interest and is measured as described in the previous section. The other four are control variables that prior research shows to be associated with timely loss recognition (e.g., Basu 1997; LaFond and Roychowdhury 2008; LaFond and Watts 2008; Khan and Watts 2009). *Leverage* is book value of debt (DLC+DLTT) over book value of total assets (AT); *Log*(*assets*) is the natural logarithm of total assets (AT); *MB* is market value of equity (PRCC_F * CSHO) scaled by book

value of equity (CEQ). *LIT* is an indicator for firms in high litigation risk industries (following Gong et al. 2011) and 0 otherwise. All variable definitions are listed in Appendix A.

The advantage of using the modified Basu (1997) model is that it does not require a firm-year measure of timely loss recognition, but rather identifies timely loss recognition through variations in firms' financial reporting process over time. Therefore, we use modified Basu model as the main research specification in our study.

3.3. C-Score as Timely Loss Recognition Measure and Skaife et al. (2013) Model

The modified Basu (1997) model focuses on timely loss recognition and includes controls for it, whereas our second model follows Skaife et al. (2013), which focuses on insider trading profitability and uses a pooled panel regression with insider trading profitability (*Profit*) directly as the dependent variable. An advantage of Skaife et al.'s (2013) model is that it avoids complex interactive terms and allows us to control for factors that likely influence insider trading profits. This is difficult to achieve with Basu (1997) model because each variable must be interacted with stock returns (*R*), the dummy variable for bad news (*D*), and the interaction of the two (*DR*).

To apply Skaife et al.'s (2013) panel regression model to our setting, we need a firm-year measure of timely loss recognition.[9] Extending the baseline Basu (1997) model, Khan and Watts (2009) specify that both the timeliness of good news (referred to as the *G_Score*) and the incremental timeliness of bad news (referred to as *C_Score*) are linear functions of firm-specific characteristics, namely, firm size (*Size*), market-to-book ratio (*M/B*) and financial leverage (*Lev*):

$$G\_Score = \beta_3 = \mu_0 + \mu_1 Size_i + \mu_2 M/B_i + \mu_3 Lev_i \quad (4)$$

$$C\_Score = \beta_4 = \lambda_0 + \lambda_1 Size_i + \lambda_2 M/B_i + \lambda_3 Lev_i \quad (5)$$

[9] Although both of our approaches to measuring timely loss recognition (TLR) are based on annual earnings, it does not necessarily imply that insiders' information advantage is mitigated only by TLR of annual earnings, because the quarterly financial reporting system under the integral accounting method allows TLR to be manifested, to less extent, in quarterly earnings reports. In untabulated tests, we repeat our analyses using quarterly measures (e.g., insider trading profits in each quarter, quarterly earnings, and quarterly returns) and find qualitatively similar results.

Empirical estimators μ_i and λ_i , i=1-3, are the same across different firms but change by year because they are obtained from annual cross-sectional regressions. Eqn. (4) and (5) are then substituted into regression Eq. (2), to obtain Eq. (6) below. *G_Score* is the firm-year measure of good news timeliness. *C_Score* is the firm-year measure of conditional conservatism, which captures incremental timeliness of bad news recognition. Therefore, the total timeliness of bad news recognition is the sum of *G_Score* and *C_Score*, both of which vary across firms (because of different firm characteristics) and vary across years (because of different μ_i and λ_i). Following Khan and Watts (2009), we use the following Eq. (6) to estimate *G_Score* and *C_Score*. Appendix B elaborates the details of the estimation.

$$X_i = \beta_1 + \beta_2 D_i + R_i(\mu_0 + \mu_1 Size_i + \mu_2 M/B_i + \mu_3 Lev_i) + D_i R_i(\lambda_0 + \lambda_1 Size_i + \lambda_2 M/B_i + \lambda_3 Lev_i) + (\delta_1 Size_i + \delta_2 M/B_i + \delta_3 Lev_i + \delta_4 D_i Size_i + \delta_5 D_i M/B_i + \delta_6 D_i Lev_i) + \varepsilon_i \quad (6)$$

After calculating *C_Score* and *G_Score*, following Khan and Watts (2009), we include them as independent variables in Skaife et al. (2013) model, which also controls for various factors that likely affect insider trading profits. Specifically, we estimate the following model:

$$Profit = \beta_0 + \beta_1 C\_Score + \beta_2 G\_Score + \beta_3 InsiderTradingDeter + \varepsilon_i \quad (7)$$

In this model, we follow Skaife et al. (2013) to control for the following factors that are likely to affect inside trading profitability (indicated as *InsiderTradingDeter* in the above equation). First, we control for firm size measured with the market value of equity at the beginning of the year (*MV*) because both insider trading activity and profitability are shown in the literature to be correlated with firm size (Seyhun 1986; Lakonishok and Lee 2001). Next, we control for firms' growth option with the book-to-market ratio at the beginning of the year (*BTM*) as prior studies find insider trades to be contrarians (Rozeff and Zaman, 1998; Piotroski and Roulstone, 2005). To further mitigate this concern, we control for the buy-and-hold abnormal

returns over the one-year period ending one day before the first insider transaction (*BHARPRE*), following Skaife et al. (2013).

Importantly, to identify the *incremental* effect of timely loss recognition *beyond* other sources of information asymmetry that might also affect insider trading profitability, we control for a set of variables used in the literature to capture the extent of information asymmetry. First, we control for analyst following (*NUMEST*) and return volatility (*RETVOL*), following Frankel and Li (2004). Next, we control for the informativeness of financial statements (*FSINFORM*) measured as the adjusted R^2 from a firm-specific time-series regression of share price on book value and earnings per share, using quarterly data as we follow Skaife et al. (2013).[10] We also control for the level of research and development expenses (*RND*). Furthermore, we include institutional ownership (*INST*) and firm age (*AGE*) as additional controls for information asymmetry. Finally, we follow Huddart and Ke (2007) and control for the absolute magnitude of return reaction to earnings announcement (*MAG_AR*). All variables are defined in Appendix A.

3.4. Sample description

Because we use two distinct approaches, we construct two samples. To enhance the comparability of results across both approaches, we restrict our sample period to 2004-2011, during which all control variables can be collected in Skaife et al.'s (2013) model.[11] Table 1 Panel A reports our sample selection procedure. We start with all firm-year observations available on Compustat during 2004–2011 (n=82,784), representing 14,185 unique firms. Next, we delete firm-year observations without available data items from Compustat (23,215

[10] We follow Skaife et al. (2013) to measure financial statement informativeness (*FSINFORM*) using quarterly data over a 20-quarter period ending in the fourth quarter of fiscal year *t*, requiring a minimum of eight available quarters.
[11] Our sample starts in 2004 because the effectiveness of internal control over financial reporting (*ICFR*), which is the key variable shown in Skaife et al. (2013) to affect insider trading profitability, is available only from 2004. Following Skaife et al. (2013), we use Audit Analytics as our data source for *ICFR* effectiveness because of its comprehensive coverage of SEC registrants.

observations) and insider trading data from Thomson Reuters (16,004 observations). Finally, we eliminate 27,562 firm-year observations without complete matched data from CRSP, resulting in a sample of 16,003 firm-year observations consisting of 3,554 unique firms.

To compute insider trading profitability, our main variable, we collect insider trading data from Thomson Reuters' Insiders Data Feed and collect open market purchases and sales by officers, including C-Suite executives (CEOs and CFOs) and other officers such as Chief Operating Officer (COO) and Chief Investment Officer (CIO). Compared with other corporate insiders such as non-officer board members, these officers are more likely to acquire information advantage if their firms' financial reporting is less conservative or more opaque in general. Therefore, we focus on officers as the insiders in this study. We then exclude insider transactions with insufficient data to compute profitability due to missing price or shares traded. Finally, we retain only transactions that we are able to match with CRSP.

Table 1 Panel B presents summary statistics on insider trading activities as reported in Table 1 of SEC Form 4. Consistent with prior research, insider sales are more prevalent and material than insider purchases (Lakonishok and Lee 2001; Brochet 2010). We identify insider purchases in 2,270 firm-years with a median dollar amount traded of $70,544 (0.04% of the opening market value), whereas we identify insider sales in 8,269 firm-years with a median dollar amount traded equal to $2,315,833 (0.15% of the opening market value).

3.5. Summary statistics

Table 2 presents summary statistics for our main variables. Panel A reports the details of our measurement of insider trading profitability (*Profit*). The median profit is zero and the mean is 0.058%, which is greater than the third quartile of 0.019%, suggesting that the profitability of insider trading is right-skewed. Consistent with insiders' possessing superior information, the

ratio of positive to negative profitability is 1.33. To provide perspectives on the economic magnitude of insider trading profits, we also report statistics on the unscaled dollar-amount profitability measure (*Profitability*). The mean annual trading profit for insiders is $590,816 in our sample. The $0 median profit is driven by firm-years where no insider trading takes place. We keep these observations in our main analyses because insiders' non-trade could also be driven by information (e.g., Huddart et al. 2007, Skaife et al. 2013). Our inferences, however, are qualitatively the same if we exclude these observations.

Panel B presents the summary statistics for the variables used in Basu (1997) model while Panel C reports the descriptive statistics for the control variables used in Skaife et al. (2013) model. These statistics are largely consistent with prior studies (e.g., Basu 1997, Khan and Watts 2009, Skaife et al. 2013). Panel D reports the calculated *C_Score* and *G_Score* following the procedure developed by Khan and Watts (2009). *C_Score* (*G_Score*) has a mean of 0.186 (-0.002) and a median of 0.135 (-0.002), suggesting little skewness in the distributions of *C_Score* and *G_Score*. Moreover, even the lower quartile of *C_Score* is positive, suggesting that timely loss recognition is prevalent across most firms. Finally, Panel E presents the descriptive statistics of the variables we use to estimate *C_Score* and *G_Score*. These statistics are similar to those reported in Khan and Watts (2009). Appendix B reports the results from estimating Khan and Watt's (2009) model to derive our *C_Score* and *G_Score*.

Table 3 presents pair-wise correlation coefficients between variables used in Basu (1997) model (Panel A) and in Skaife et al. (2013) model (Panel B). Pearson (Spearman) correlations are reported above (below) the diagonal. Consistent with our main hypothesis, we find a negative correlation between insider trading profit (*Profit*) and the firm-year measure of timely loss recognition (*C_Score*) in Panel B (Pearson ρ = -0.035, Spearman ρ = -0.006), suggesting that

insider trading profitability decreases in the degrees of timely loss recognition exhibited from a firm's financial reporting. Many control variables are significantly correlated with *Profit* in the expected direction. Untabulated tests of variance inflation factors (VIF) suggest no significant concern of multi-collinearity.

4. Empirical results

4.1. Main Results from Modified Basu (1997) Model

Table 4 presents the results from testing H1 using the modified Basu (1997) model as specified in Eq. (3). In Column (1), we start with the baseline Basu model specified in Eq. (2). The coefficient on the interaction term, *DR*, is 0.10 and significantly positive at the 0.01 level (t-stat = 5.70), consistent with prior findings that accounting earnings accelerate the recognition of losses relative to gains (Basu 1997).[12] The total timeliness of loss recognition is 0.06 (sum of -0.04 and 0.10). An F-test rejects the null hypothesis (untabulated F=11.42, p<0.001) that the sum equals zero, suggesting that firms on average recognize losses on a timelier basis than gains. These results are consistent with prior studies (e.g., Francis and Martin 2010).

In Column (2), we report the results of Eq. (3) without firm-level control variables. Similar to Column (1), the coefficient on the interaction term (*DR*) is positive and significant at the 0.01 level (t-stat=5.67). Moreover, the three-way interaction term, *Profit*DR*, is negative and significant at the 0.01 level (t-stat= -3.42), suggesting that insider trading profits are negatively correlated with the Basu coefficient of timely loss recognition. The sum of β_7 and β_8 is -0.016

[12] Surprisingly, the coefficient on *R* is negative, partially driven by the fact that earnings are increasingly associated more with lagged returns than contemporaneous earnings (Ryan and Zarowin 2003). This negative coefficient on *R* in such regressions has also been confirmed in prior studies (e.g., Francis and Martin 2010, Patatoukas and Thomas 2011, Lawrence et al. 2013).

and significantly negative (p = 0.02), suggesting that the insider trading profitability decreases in the extent of timely loss recognition.[13]

In Column (3), we report the results of Eq. (3) with firm-level control variables. The three-way interaction term (*Profit*DR*), our main focus in the model, remains significantly negative at the 0.05 level (t-stat = -2.16). The sum of β_7 and β_8, however, becomes insignificant (p=0.21). Thus, after controlling for firm-level controls, insider trading profitability appears to decrease in the *incremental*, but *not total*, timeliness of loss recognition. We assess the economic magnitude of the impact of timely loss recognition on insider trading profitability using a bootstrapping method to obtain a distribution of the Basu coefficient (β_3) in Eq. (2). Following Francis and Martin (2010), we estimate Eq. (2) 500 times from randomly selected samples (with replacement) with the size of the samples equal to 10% of the full sample. The estimated distribution of the Basu coefficient has a mean of 0.106, a median of 0.104, and a standard deviation of 0.022. Thus, a one standard deviation increase in the Basu coefficient leads to a decrease in the insider trading profitability by a magnitude of 0.0169 based on the results of model (3) in Table 4 (0.022/0.01[3]/100), which is a 29% decrease from the mean insider trading profitability of 0.058 in Panel B of Table 2.[14]

As mentioned earlier, the Basu model for asymmetric timely loss recognition has been recently debated (e.g., Patatoukas and Thomas 2011, 2015; Ball, Kothari, and Nikolaev 2013a, b). To ensure that our findings are not driven by any particular specification, we conduct robustness

[13] In untabulated analysis, we also estimate our model (with control variables) using Ball and Shivakumar's (2006) accrual-based measure of conditional conservatism and obtain similar results. Specifically, the interaction term of insider trading profits with the incremental timeliness of accruals for recognizing negative cash flows is negative and marginally significant (t-stat = -1.78 and -1.63 for Dechow-Dichev Model and Jones Model, respectively).

[14] Because we calculate insider trading profitability as cumulative future returns, the time-series correlations in stock returns may cause a mechanical relation between TLR and insider trading profitability. To evaluate this alternative explanation, we replace insider trading profitability with returns from "pseudo-"insider trading dates by adding or subtracting 90 days from actual insider trading dates. Inconsistent with the alternative explanation, our result turns insignificant (p>0.10) in the full sample as well as in separate samples of insider buys and insider sells.

tests in untabulated analyses. First, we add firm fixed effects to the model as specified in Eq. (3) to mitigate the effect of unobservable heterogeneity, as proposed by Ball et al. (2013a) and used by several recent studies (Dhaliwal, Huang, Khurana, and Pereira 2014; Erkens, Subramanyam, and Zhang 2014). Our variable of interest (*Profit*DR*) remains significantly negative at the 0.05 level (t-stat = -2.39). Next, we follow Kravet (2014) and additionally control for lagged stock prices. Again, *Profit*DR* remains significantly negative at the 0.10 level (t-stat = -1.87). Third, we follow Banker, Basu, Byzalov, and Chen (2015) to also control for negative changes in sales because cost stickiness may contribute to the observed asymmetric timely loss recognition. As before, *Profit*DR* stays significantly negative at the 0.05 level (t-stat = -2.37). Overall, the results in Table 4 are robust to various alternative specifications and are consistent with our H1, which predicts insider trading profitability to decrease with timely loss recognition.

4.2. Mechanisms through which Timely Loss Recognition Reduces Insider Trading Profits

The negative association between insider trading profitability and timely loss recognition in financial reporting documented in Table 4 is consistent with Watts's (2003a, b) argument that timely loss recognition reduces information asymmetry, thus reducing managers' information advantage over outside shareholders. LaFond and Watts (2008) provide empirical evidence that supports the "information role" of timely loss recognition in the context of managers' incentives and ability to manipulate accounting numbers. In our setting of insider trading, we expect timely loss recognition to be particularly pertinent to reducing information asymmetry regarding upcoming bad news. By accelerating the recognition of bad news through lower verifiability threshold (Watts 2003a, b), timely loss recognition reduces managers' information advantage over bad news, thus reducing the profitability of their trades when they are net sellers of their

firms' shares. Therefore, through analyzing the direction of insiders' trades, we can infer the mechanism through which timely loss recognition restrains insider trading profitability.

Table 5 Panel A presents the results from estimating Eq. (3) *conditional on* the direction of insider trades using two methods. In Columns (1) and (2), we refine our measure of insider trading profitability (*Profit*) based on the direction of insider trades. Specifically, in Column (1) (Column (2)), *Profit* is calculated as the profits earned only from insider buy (insider sell) of their firms' shares, and is set to zero if there is no insider buy (insider sell) during the year. Consistent with H2, we find a significant negative coefficient on the three-way interaction term (*Profit*DR*) for insider sells in Column (2) at the 0.05 level (t-stat= -2.32). Yet, this coefficient is insignificant at the conventional levels for insider purchases in Column (1) (t-stat= 0.00).[15] These findings suggest that, timely loss recognition effectively reduces managers' advantageous information of bad news, thus resulting in less profitable insider sells. However, timely loss recognition is unlikely to reduce managers' superior knowledge of good news, hence having no effect on the profits that insiders earn from share purchases.

We find similar results in Columns (3) and (4) of Table 5 Panel A, in which we partition our sample based on the net transactions of all insiders in each firm-year.[16] Consistent with insiders' needs to diversify their wealth, the "Net Sell" sample in Column (4) is much larger than the "Net Buy" sample in Column (3) (13,535 firm-years vs. 2,359 firm-years). *Profit* in Columns (3) and (4) are calculated based on both insider sells and purchases, as in Table 4. Again, we find that when insiders are net sellers of their firms' shares (Column (4)), the coefficient on the three-way interaction term (*Profit*DR*) is significantly negative (t-stat= -1.99), suggesting that timely

[15] It is important to note that these findings do *not* contradict prior findings that insider purchases are usually more profitable than insider sells (e.g., Jeng, Metrick, and Zeckhauser 2003), because we focus on the association between timely loss recognition and insider trading profitability, rather than the level of insider trading profitability *per se*.
[16] For this analysis, we exclude firm-years where net insider trade is zero. However, our results remain qualitatively the same if retain these observations and include them in either "Net Buy" or "Net Sell" sample.

loss recognition reducing managers' information advantage of upcoming bad news. However, when insiders are net buyers of their firms' shares (Column (3)), the coefficient on the three-way interaction term (*Profit*DR*) is insignificant (t-stat= -0.82), suggesting no significant effect of timely loss recognition on the profitability of insiders' purchases. Overall, Table 5 Panel A presents evidence for H2 that timely loss recognition mainly reduces the profitability of insiders' sells rather than purchases of shares, as timely loss recognition reduces managers' information advantages of bad news, but not good news.

Focusing on insider sells, Table 5 Panel B further investigates the mechanism through which timely loss recognition reduces insider sell profitability. Insiders' trading profitability could decrease because of less trading and/or because of less profit earned from each dollar of shares traded. Hence, to further pinpoint the specific mechanism, we decompose insider trading profitability into price and volume components.[17] The volume component is calculated as the dollar amount of all insiders' trades, whereas the price component captures the average price changes per dollar traded by insiders and is calculated by dividing the dollar amount of insider trading profit by the dollar amount of insider trading volume.[18] Similar to Table 5 Panel A, in Columns (1) and (2) of Table 5 Panel B, both the price and volume components are calculated only using insider sells, but the analysis is conducted using the full sample. In Columns (3) and (4), the analysis is conducted using the net seller sample, but the price and volume components are calculated using all insiders' trades (both purchases and sells).

In Columns (1) and (3) only, we find significantly negative coefficients on the three-way interaction term for the price component of insider trading profitability (*Profit*DR*) (t-stats

[17] Note that these two components are expected to be related. Rational investors would increase trading volume only if they expect profit per unit of trade to be positive.
[18] We measure trading volume in dollar amount to avoid the effect of stock prices, but our results are qualitatively the same if we measure trading volume with the number of shares traded by insiders.

= -2.01 and -2.24), but insignificant in Columns (2) and (4) for insider trading volumes (t-stats = 0.62 and -0.08). These findings are consistent with timely loss recognition reducing information asymmetry (Watts 2003a, b; LaFond and Watts 2008), thereby reducing managers' information advantage about upcoming bad news. Because of accelerated recognition of bad news in earnings, prices likely incorporate bad news faster and thus reduce the potential profits that could be earned by insiders. The insignificant results on insider trading volume suggests that insiders do not appear to change their trading behavior with timely loss recognition of their financial reporting, which mitigates the concern of reverse causality that managers' insider trading may influence how quickly stock prices incorporate private information.[19] Thus, the specific mechanism through which timely loss recognition restrains insider trading profits seems to be accelerated reporting of bad news, thus making stock prices more efficient with regard to the upcoming bad news that managers might be privy to.

4.3. Types of Insiders and Types of Insider Trades

The effect of timely loss recognition on reducing the profitability from insider trading, more specifically insider sells, is confounded by the fact that insiders might also influence their firms' financial reporting. To the extent that timely loss recognition in financial reporting is partially discretionary (e.g., Lawrence, Sloan, and Sun 2013), managers might want to reduce the level of TLR in order to extract more rent in the form of insider trading profits. To evaluate this alternative explanation, we examine insider trading profitability by insider types. Prior studies suggest that CEOs and CFOs have significantly more discretion over their firms' financial reporting than do other insiders (e.g., Jiang et al. 2010, Feng et al. 2011). Under the alternative

[19] We choose to focus on insider sells in Table 5 Panel B because we find that only insider sells are significantly associated with timely loss recognition in Table 5 Panel A. In untabulated analysis, we also decompose the profit of insider purchases into price and volume components and we find that neither component is significantly associated with timely loss recognition.

explanation, we would expect significant results only from CEO/CFO trading, but not from other insiders' trading. In contrast, if timely loss recognition causally *reduces* insiders' trading profits, then even non-CEO/CFO insiders with less influence on their firms' financial reporting would also trade less profitably in their firms as timely loss recognition reduces information asymmetry and enhances price efficiency.

Table 6 Panel A presents the results of this analysis. We calculate insider trading profits (*Profit*) using insider trades only by CEO/CFOs in Column (1), and using trades only by non-CEO/CFOs in Column (2). We remove an observation if no trades by that type of insiders occur during the year. As Table 6 shows, the coefficient on the three-way interaction term (*Profit*DR*) is negative and significant at the 0.01 level in Column (2) for non-CEO/CFOs (t-stat= -2.83), but insignificant at conventional levels in Column (1) for CEO/CFOs (t-stat= -0.93). Hence, it seems unlikely that the negative association between timely loss recognition and insider trading profit is due to CEO/CFOs manipulating their financial reporting, given that their own trading profit does not vary significantly with timely loss recognition.[20] In contrast, timely loss recognition seems to reduce the information advantage of those non-CEO/CFO insiders, who have less control over their firms' financial reporting, resulting in lower trading profitability.

Next, we further explore the effect of timely loss recognition on insiders' trading profitability conditional on the type of insider trades. Cohen, Malloy, and Pomorski (2012) document that certain trades by insiders occur on a predictable and identifiable basis (henceforth "routine" trades) and that these routine trades are *not* informative about firms' future performance. In contrast, insider trades occurring outside those predictable patterns (henceforth "non-routine" trades) are more informative of firms' future performance. In our setting, the

[20] The insignificant results for CEO/CFOs may be due to the fact that they are subject to greater scrutiny by regulators and therefore face higher costs from illegal insider trading.

effect of timely loss recognition reduces insider trading profitability through reducing managers' information advantage. Hence, we expect that only those information-based trades such as the "non-routine" trades are likely to be associated with timely loss recognition.

Table 6 Panel B presents the results from this analysis. Columns (1) and (2) (Columns (3) and (4)) separate trades by CEO/CFOs (non-CEO/CFOs) into routine and non-routine trades. In each column, the insider trading profitability variable (*Profit*) is measured from the specified type of trades made by the specified type of insiders. We remove an observation if a particular type of trades does not occur during the year.[21] We follow Cohen et al. (2012) to classify routine versus non-routine trades.[22] In Columns (1) and (2), we find insignificant coefficients on the three-way interaction term (*Profit*DR*) (t-stats= -0.45 and -0.66), suggesting that timely loss recognition is insignificantly associated with both types of trades by CEO/CFOs. This result echoes that in Table 6 Panel A when we do not separate the types of insider trades. Recall that Table 6 Panel A finds a significant association between timely loss recognition and profits from non-CEO/CFOs' trades. In Table 6 Panel B Columns (3) and (4), when we separate these trades into routine and non-routine trades, we find that the significant association is concentrated only in non-routine trades (t-stat= -2.80), consistent with these trades being driven by insiders' superior information, which is mitigated by timely loss recognition. In contrast, because routine trades are mostly not information driven (Cohen et al. 2012), timely loss recognition is not significantly associated with profits from these trades, even for non-CEO/CFO insiders (t-stat = -0.16).[23]

[21] We also lose many observations due to the data requirement to identify whether an insider's trade is routine or not. However, our inferences are qualitatively the same if we set *Profit* to zero for trades that we cannot identify.
[22] The identification strategy of routine trades developed by Cohen et al. (2012) essentially is based on analyzing insiders' past trading history and searching for consistent patterns in the timing of trades.
[23] Note that an insignificant association between insider trading profits with timely loss recognition does not mean that such insider trading is unprofitable. In untabulated analysis, we find that both CEO/CFO and non-CEO/CFO insiders' trading is profitable on average, but the latter is significantly higher than the former.

In summary, the results in Table 6 show that the negative association between timely loss recognition and insider trading profits varies by the type of insiders and the type of insider trades. Specifically, we find that only the profitability of non-routine trades by non-CEO/CFO insiders is significantly associated with timely loss recognition, consistent with timely loss recognition reducing potential information advantage that insiders may use to extract rent from shareholders.

4.4. Results from Skaife et al. (2013) Model

In this section, we examine the association between timely loss recognition and insider trading profitability using the alternative approach by estimating Skaife et al.'s (2013) model with an added independent variable —timely loss recognition measured as *C_Score* following the procedures by Khan and Watts (2009), as we described in Section 3.3. Table 1 Panel A shows that the requirement of additional variables used in Skaife et al.'s (2013) model to control for other determinants of insider trading profitability reduces the sample by 1,699 firm-year observations, resulting in a slightly smaller sample of 14,304 firm-years for 3,554 unique firms.

4.4.1. Main Results on the Relation between Timely Loss Recognition and Insider Trading

Table 7 Panel A presents the main results from estimating the Skaife et al.'s (2013) model in which we regress insider trading profits (*Profit*) on contemporaneous *C_Score* and *G_Score* with control variables as specified in Eq. (7). All continuous variables are winsorized at the 1st and 99th percentiles. We adjust standard errors for heteroskedasticity and cluster them at the firm-level (Petersen, 2009). In addition, we include year and industry fixed effects in the regression. Our hypothesis H1 predicts the coefficient on *C_Score* to be negative as we expect insider trading profitability to be negatively associated with timely loss recognition. Column (1) reports the results from the level specification. Consistent with H1, *C_Score* is significantly

negative at the 0.01 level (t-stat = -2.72).[24] In terms of economic magnitude, one standard deviation increase in timely loss recognition measured with *C_Score* is associated with a decrease in insider trading profitability by 0.0145%, about 25% of the sample mean of 0.058%. *G_Score* is not significant at conventional levels (t-stat = 1.30), suggesting that the timeliness of good news recognition is insignificantly related to insider trading profitability. Among the control variables, we find the profitability of insider trading to be lower for larger firms (*ln(MV)*) and for firms with higher book-to-market ratios (*BTM*) (t-stats = -3.26 and -3.96) but higher for firms with higher past returns (*BHARPRE*) (t-stat = 3.83), similar to the results from Skaife et al. (2013).[25] Overall, the adjusted R^2 is 1.73%, comparable to that reported in prior studies (e.g., Huddart and Ke 2007; Skaife et al. 2013).

Because both insider trading profitability and timely loss recognition are sticky over time, a mechanical association might exist between *Profit* and *C_Score* if firms with timelier loss recognition also self-select into restricting insiders from profitable trades of their firms' stocks. To mitigate such concern, we conduct two additional tests. First, in Column (2) of Table 7 Panel A, we re-estimate Eq. (7) with a change specification by taking first differences of the dependent variable and all independent variables, which reduces the sample size to 14,304 firm-year observations. In the change model, we continue to find a negative association between timely loss recognition and insider trading profitability as the coefficient on the change in *C_Score* is significantly negative at the 0.05 level (t-stat = -2.01).[26] Change in *G_Score* remains insignificant

[24] Results are qualitatively the same if we use the rank instead of the continuous *C_Score* (untabulated t-stat = -3.89). Our results also remain unchanged if we additionally control for litigation and managerial ownership.
[25] Although material weakness of internal control (*MWIC*) is insignificant in our model, it becomes statistically significant and positive when we exclude *C_Score* and *G_Score* from our model. This suggests that at least part of the explanatory power of *MWIC* of insider trading profitability is driven by timely loss recognition.
[26] In untabulated tests, we find that insider trading profitability is significantly associated with lagged *C_Score* (t-stat = -2.27) but insignificantly associated with leading *C_Score* (t-stat = -0.70), which again is consistent with timelier loss recognition reducing insider trading profitability, rather than the reverse causality.

(t-stat = 0.15), suggesting that changes in the timeliness of good news recognition do not explain changes in insider trading profitability. Results on other control variables are similar to the level estimation results, except that changes in financial statement informativeness (*FSINFORM*) and changes in the magnitude of stock reaction to earnings announcement (*MAG_AR*) are positively associated with changes in insider trading profitability (t-stats = 2.63 and 2.07).

Our second approach to ascertaining causality is the Granger causality test, proposed by Granger (1969) and popularized by Sims (1972). In our setting, to establish that timely loss recognition "Granger causes" less profitable insider trading, we need to document a significant effect of lagged *C_Score* on leading insider trading profits *in the presence of* lagged value of insider trading profits through F-tests. Because we are not sure of the exact lead-lag structure, we use both single-lag and two-lag structures, following Cheng and Subramanyam (2008). Table 7 Panel B presents the results. For both lead-lag structures, the F-tests reject the null of no Granger causality between timely loss recognition and insider trading profits. Moreover, the significantly negative coefficients on the lagged values of *C_Score* are consistent with our prediction that insiders' trading profitability decreases in timely loss recognition causally ($p< 0.01$).

In summary, the results in Table 7 Panels A and B provide confirming evidence on a negative association between insider trading profitability and timely loss recognition, both in levels and in changes. This is consistent with timely loss recognition reducing information asymmetry between managers and shareholders, thus reducing the opportunities for managers to extract rent from shareholders through profitable insider trading. Such causal inferences are further supported by our Granger causality tests.

4.4.2. Cross-Sectional Variations

Using the Skaife et al.'s (2013) model, we revisit the cross sectional variations that we examined earlier with the Basu (1997) model. Table 7 Panel C presents results from subsamples where the net trades made by all insiders are "net buy" versus "net sell". Consistent with insiders having diversification needs and the tendency to sell shares more often than to purchase them, the sample size for "Net Sell" is 10,179, much larger than 2,271 for the "Net Buy" Sample. Consistent with the previous results, we only find significantly negative coefficient on *C_Score* in the "net sell" sample (t-stat = -2.40) but not in the "net buy" sample (t-stat = -1.15), which lends support to our H2 that timely loss recognition reduces the opportunity for insiders to sell shares before price drops.

One possible reason that we find a negative association between timely loss recognition and insider sell profitability, but not insider buy profitability, could be due to the difference in the sample sizes, which increases with the testing power. To mitigate this concern, we randomly select 2,271 observations from the "Net Sell" sample and re-estimate our model. The results are reported in the last column of Table 7 Panel C. As before, we continue to find a significantly negative coefficient on *C_Score* at the 0.05 level in this sample (t-stat = -2.39), thus mitigating the concern that the significant results for "Net Sell" sample is driven by a larger sample size.

Table 7 Panel D reports the results from estimating Skaife et al.'s (2013) model conditional on the types of insiders (CEO/CFOs vs. non-CEO/CFOs) and the types of insider trades (routine vs. non-routine). The classifications follow our previous analysis with the Basu (1997) model. Similar to our previous findings, we find that timely loss recognition, as measured by *C_Score*, is negatively associated with only with non-routine trades by non-CEO/CFO insiders at the 0.05 level (t-stat = -1.96) and by CEO/CFO insiders at the 0.1 level (t-stat = -1.83),

consistent with these non-routine trades are based on managers' superior information that is reduced by timelier loss recognition. In contrast, timely loss recognition is insignificantly associated with routine trades by either CEO/CFO or non-CEO/CFO insiders (t-stats = -1.60 and -0.80), consistent with these routine trades being uninformative (Cohen et al. 2012).

In summary, similar to our results from estimating the Basu (1997) model, using the Skaife et al. (2013) model with a firm-year measure of timely loss recognition derived from Khan and Watts (2009), we find that timely loss recognition is negatively associated with insider trading profits. Moreover, this negative association is driven mainly by non-routine trades by non-CEO/CFO insiders.

5. Conclusion

Insider trading compromises the integrity of capital markets and thereby adversely affects individual investors' ability to share in the growth of corporations. In this study, we investigate whether and how asymmetric timely loss recognition (TLR), a common measure of conditional accounting conservatism, reduces a firm's insider trading profitability. We predict and find insiders at firms with higher TLR trade less profitably; therefore, less wealth is transferred from shareholders to managers who likely possess better information. Moreover, this negative association is driven by insider sells rather than by insider purchases of their firms' shares, consistent with TLR reducing managers' information advantage about bad news but not good news (Watts 2003a, b). Furthermore, we find that only the price change component, not the volume component, of insider trading is negatively associated with TLR, consistent with TLR improving price efficiency and reducing insiders' opportunities to sell shares before price declines (LaFond and Watts 2008). Finally we find that TLR mainly reduces profits from non-CEO/CFO insiders' non-routine trades, consistent with non-routine trades being information-

driven (Cohen et al. 2012) and inconsistent with the reverse causality that CEO/CFO insiders' influence their firms' financial reporting to reap higher personal benefits.

Our evidence adds to the extensive literature documenting the benefits of accounting conservatism (e.g., Watts, 2003a, b; Zhang, 2008; Francis and Martin, 2010; Garcia et al., 2011). Our findings shed light on a particular mechanism through which a financial reporting property (i.e., timely loss recognition) can mitigate the agency problem of moral hazard by reducing insiders' rent extraction through informed tradings. Our paper also contributes to the insider trading literature by showing that insiders' information advantage may have distinct impacts on the price change and the volume components of insiders' trading activities.

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Appendix A: Variable Definitions

Variable	Definition
Profit	Aggregate profitability of officer trades during the firm-year measured as a percentage of market value at the beginning of the fiscal year.
Extended Basu (1997) Model	
X	Earnings (Compustat data item IB), scaled by market value of equity (MV) at the end of fiscal year
R	12-month compound returns beginning nine months prior to fiscal year end
D	Dummy variable equal to 1 when R < 0 and 0 otherwise
Leverage	Book value of debt (DLC + DLTT) over book value of total assets (AT)
Log(assets)	Natural logarithm of total assets (AT)
MB	Market value of equity (PRCC_F * CSHO) scaled by book value of equity (CEQ)
LIT	Dummy variable coded 1 if the firms belong to high risk industry (Gong, Li, and Wang 2011) and 0 otherwise.
Extended Skaife et al. (2013) Model	
C_Score	Estimation the incremental timeliness of bad news at the firm-year level. (Khan and Watts, 2009)
G_Score	Estimation the timeliness with which accounting reflects good news at the firm-year level. (Khan and Watts, 2009)
MWIC	An indicator variable for ineffective internal control equal to one if firm reports a material weakness in ICFR, zero otherwise.
MV	Market capitalization at fiscal year-end calculated as the product of end-of-year stock price (Compustat Fundamentals Annual table, data item PRCC_F) and number of shares outstanding (CSHO).
BTM	Book-to-market ratio calculated as the ratio of book value of equity (CEQ) to market value of equity (MV) at fiscal year-end.
BHARPRE	Buy-and-hold abnormal returns over the one-year period ending one day before the first insider transaction by an officer during the fiscal year, calculated as the CRSP raw buy-and-hold return minus the average buy-and-hold return for equally sized firms using the NYSE/AMEX/NASDAQ size deciles, set to 0 for firm-years with no officer trading activity.
NUMEST	Analyst following that is equal to the number of earnings forecasts (I/B/E/S) outstanding before the annual earnings announcement, and set to 0 when missing.
FSINFORM	Financial statement informativeness computed as the adjusted R^2 from firm-specific time-series regression of price per share (PRCCQ) on book value per share (CEQQ/CHOQ) and earnings per share (IBQ/CHOQ) using quarterly data from Compustat Fundamentals Quarterly table for the 20-quarter period ending with the fourth quarter of fiscal year t (minimum of 8 quarterly observations required). Per share amounts and numbers of shares outstanding are adjusted for stock splits using ADJEX adjustment factor.
RND	An indicator variable equals to 1 if company reports non-zero R&D expenditures (XRD), 0 otherwise.
INST	Institutional ownership calculated as the percentage of common shares outstanding owned by institutional

	shareholders (Thomson Reuters)
AGE	Firm age measured by the number of years the company has stock price data on CRSP
RETVOL	The standard deviation of daily stock returns (CRSP) during the fiscal year.
MAG_AR	The median of absolute market reactions to prior quarterly earnings announcements, where market reaction is measured as the cumulative abnormal return from two days before to the day of the earnings announcement (Huddart and Ke, 2007); the median is measured over the (maximum) five year period ending the fiscal quarter before the end of fiscal year t.

Appendix B: Khan and Watts (2009) Model to Estimate *C_Score*

Dependent Variable: Earnings (*X*) **Test:**	**Pred. sign**	**Coeff.**	**t-stat.**
Intercept		-0.038	-2.345
D		-0.014	-0.407
Ret	+	-0.024	-1.038
*Ret*Size*	+	0.010	2.274
*Ret*M/B*	-	0.000	0.148
*Ret*Lev*	-	-0.126	-2.506
*D*Ret*	+	0.126	2.232
*D*Ret*Size*	-	-0.035	-5.240
*D*Ret*M/B*	+	-0.019	-2.451
*D*Ret*Lev*	+	0.641	4.680
Size		0.013	5.085
M/B		0.000	-0.295
Lev		-0.017	-1.442
*D*Size*		0.004	1.402
*D*M/B*		-0.002	-0.880
*D*Lev*		-0.018	-0.525
Adj.R^2.		0.101	

This table reports mean coefficients from annual cross-sectional (Fama-Macbeth) regressions of earnings on the variables listed, our sample has totally 36,511 firm-year observations from 2004 to 2011. *Ret* is 12-month stock returns used to measure economic news over the 12-month beginning 9 months before the fiscal year end, *D* is a dummy variable set equal to 1 when $R < 0$ and equal to 0 otherwise. Other variables are defined in Appendix A. Adj. R^2 is the average of the adjusted R^2.

Table 1

Sample Selection and Summary Statistics on Insider Trading

Panel A: Sample selection

Description	Firm-years	Firms
Firm-years on Compustat 2004-2011	82,784	14,185
Less: missing data items on financial control variables on Compustat	(23,215)	(4,441)
missing data items on insider trading	(16,004)	(3,897)
missing data items on CRSP	(27,562)	(2,293)
Final sample for Basu (1997) Model	16,003	3,554
Less: missing data items for control variables for insider trading profitability	(1,699)	(0)
Final sample of Skaife et al. (2013) Model	14,304	3,554

Panel B: Summary statistics on all insider trades

Description	N	Mean	Median
Value traded			
Net purchases	2,270	$749,901	$70,544
Net sales	8,269	$9,969,636	$2,315,833
Value traded as percentage of opening market value			
Open market purchases	2,270	0.05%	0.04%
Open market sales	8,269	0.46%	0.15%

This table presents the sample selection procedures and summary statistics on insider trading activities. The firm-year sample consists of NYSE, AMEX, and NASDAQ firms with available data on Audit Analytics, Compustat, and CRSP. We match Audit Analytics firm-years with Compustat using the CIK identifier. The resulting firm-year sample is then matched with CRSP using the CRSP/Compustat merged file. Finally, based on CUSIP identifiers, we match firm-years with all insider transactions occurring during the same fiscal year. Companies with no change in CUSIP are matched by CRSP's header CUSIP. For companies that have a changing CUSIP over time, we use CRSP's historical eight-digit identifier (NCUSIP). We use Audit Analytics to identify ineffective internal control, which is disclosed in the audit report accompanying the firm's 10-K filing. Insider trades are the open market purchases and sales of shares as reported by officers on Table 1 of SEC Form 4, acquired from the Thomson Reuters insider filling database. Open market share purchases exclude share purchases through stock option exercises. Years 2004-2011 are fiscal years according to Compustat.

Table 2
Summary Statistics for Insider Trading Profitability and Explanatory Variables

Panel A: Insider trading profitability (n=16,003)

	Mean	St.dev.	Q1	Median	Q3	#Pos/#Neg
Profit	0.058	0.549	-0.003	0.000	0.019	1.333
Profitability($)	590,816	9,739,856	-9,080	0.000	161,927	1.333
Price	0.684	41.435	-0.202	0.062	0.378	1.333
Volume	5,841,713	25,408,841	0.000	363,100	3,550,803	N/A
Buy Profit%	-0.001	0.666	0.000	0.000	0.000	1.183
Sell Profit%	0.241	1.193	0.000	0.000	0.508	1.324
CEO/CFO Profit%	0.063	1.780	0.000	0.000	0.003	1.376
Non CEO/CFO Profit%	0.066	1.824	-0.0004	0.000	0.007	1.325

Panel B: Determinants of Basu (1997) coefficient (n=16,003)

	Mean	St.dev.	Q1	Median	Q3
Profit	0.058	0.549	-0.003	0.000	0.019
Earnings	0.030	0.169	0.000	0.004	0.018
Returns	0.113	0.487	-0.128	0.108	0.333
Leverage	0.564	0.273	0.357	0.556	0.765
Log(assets)	6.950	2.080	5.535	6.922	8.261
MB	3.357	48.304	1.224	1.901	3.071
LIT	0.233	0.423	0.000	0.000	0.000

Panel C: Determinants of insider trading profitability (n=14,304)

	Mean	St.dev.	Q1	Median	Q3
ln(MV)	6.64	1.97	5.22	6.56	7.92
BTM	0.62	0.51	0.32	0.50	0.76
BHARPRE	0.05	0.39	-0.10	0.00	0.13
ln(NUMEST)	1.17	1.09	1.00	1.10	2.08
FSINFORM	0.45	0.24	0.25	0.65	0.65
RND	0.51	0.50	0.00	1.00	1.00
INST	0.61	0.56	0.25	0.50	0.79
AGE	11.46	1.46	8.00	10.00	12.00
RETVOL	0.03	0.02	0.02	0.03	0.04
MAG_AR	0.01	0.13	-0.02	0.00	0.04

Panel D: C_Score and G_Score (n = 36,511 from year 2004 to 2011)

	Mean	St.dev.	Q1	Median	Q3
C_Score	0.186	0.23	0.04	0.135	0.28
G_Score	-0.002	0.09	-0.05	-0.002	0.03

Panel E: Determinants of C_Score and G_Score (n = 36,511 from year 2004 to 2011)

	Mean	St.dev.	Q1	Median	Q3
Earnings	0.05	0.66	0.00	0.05	0.07
Returns	0.20	0.85	-0.19	0.01	0.32
Size	6.85	2.17	5.41	6.86	8.23
M/B	3.36	4.45	1.15	1.84	3.00
Lev	0.58	0.33	0.36	0.56	0.79

This table presents summary statistics for insider trading profitability and the variables used in extended Basu (1997) model and extended Skaife et al. (2013) model. All variables are defined as in Appendix A. All continuous variables are winsorized to the 1st and 99th percentiles of their distributions..

Table 3
Pearson and Spearman Correlation Matrix

Panel A: Correlation matrix for variables used in Basu (1997) model (n=16,003)

		1	2	3	4	5	6	7
1	*Profit*		-0.012	-0.006	**-0.045**	**-0.048**	0.003	**0.023**
2	*Earnings*	**0.022**		**0.018**	0.004	**0.303**	0.002	**0.013**
3	*Returns*	**-0.057**	**0.132**		**-0.037**	-0.012	0.008	0.007
4	*Leverage*	**-0.014**	**0.015**	**-0.054**		**0.297**	0.007	**-0.176**
5	*Log(assets)*	**-0.007**	**0.611**	**0.019**	**0.437**		**-0.041**	**-0.151**
6	*MB*	**0.029**	**0.304**	**0.213**	**-0.167**	**0.013**		-0.003
7	*LIT*	**0.017**	**-0.093**	-0.007	**-0.241**	**-0.160**	**0.128**	

Panel B: Correlation matrix for variables used in Skaife et al.(2013) model (n=14,304)

		1	2	3	4	5	6	7
1	$Profit_t$		**-0.035**	**0.018**	**0.029**	**-0.059**	**-0.036**	**0.080**
2	C_Score_t	-0.006		**-0.569**	**-0.035**	**-0.241**	**0.040**	**-0.074**
3	G_Score_t	-0.000	**-0.643**		**0.043**	**0.176**	**-0.211**	**0.046**
4	$MWIC_t$	0.001	**-0.031**	**0.035**		**-0.126**	0.007	**-0.026**
5	$ln(MV_{t-1})$	-0.001	**-0.254**	**0.301**	**-0.131**		**-0.321**	-0.010
6	BTM_{t-1}	**-0.069**	**0.330**	**-0.149**	0.001	**-0.302**		**-0.032**
7	$BHARPRE_t$	**-0.051**	**-0.107**	**0.064**	**-0.036**	**0.060**	**-0.072**	
8	$ln(NUMEST_t)$	0.010	**-0.161**	**0.176**	**-0.111**	**0.613**	**-0.169**	**0.040**
9	$FSINFORM_t$	0.005	-0.010	0.009	-0.021	**0.068**	0.003	-0.001
10	RND_t	0.011	**-0.206**	**0.021**	**0.039**	0.006	**-0.222**	**0.048**
11	$INST_t$	**0.017**	**0.158**	**-0.198**	0.077	**-0.636**	**0.227**	**-0.04**
12	AGE_t	-0.005	**0.059**	**-0.078**	**-0.087**	**0.114**	0.010	**0.033**
13	$RETVOL_t$	**0.029**	**0.328**	**-0.579**	**0.065**	**-0.433**	**0.150**	**-0.057**
14	MAG_Ar_t	**0.021**	**-0.050**	**0.037**	**-0.020**	**0.079**	**-0.040**	**0.091**

	8	9	10	11	12	13	14
1	**-0.036**	0.002	**0.030**	**0.019**	**-0.019**	**0.022**	**0.051**
2	**-0.142**	-0.008	**-0.229**	**0.134**	0.014	**0.297**	**-0.047**
3	**0.103**	-0.009	**0.072**	**-0.101**	**-0.047**	**-0.516**	**0.032**
4	**-0.111**	**-0.021**	**0.039**	**0.078**	**-0.072**	**0.068**	-0.015
5	**0.602**	**0.066**	0.010	**-0.569**	**0.087**	**-0.401**	**0.039**
6	**-0.176**	-0.015	**-0.173**	**0.216**	0.009	**0.265**	**-0.044**
7	**0.018**	-0.008	**0.046**	**-0.027**	0.008	**-0.018**	**0.116**
8		-0.001	**0.072**	**-0.301**	**0.082**	**-0.234**	**0.064**
9	0.003		**-0.066**	**-0.029**	-0.012	**-0.041**	**0.017**
10	**0.072**	**-0.062**		**0.032**	**0.023**	**0.046**	**0.022**
11	**-0.267**	**-0.031**	**0.047**		**-0.064**	**0.212**	**-0.029**
12	**0.082**	0.003	**0.018**	**-0.088**		**-0.024**	**0.000**
13	**-0.242**	**-0.037**	**0.084**	**0.269**	**-0.020**		-0.033
14	**0.094**	0.013	0.014	**-0.042**	0.008	**-0.050**	

This table presents the Pearson (Spearman) correlations above (below) the diagonal. Panel A is based on a sample of 16,003 firm-year observations used in our modified Basu (1997) model. Panel B is based on a sample of 14,304 firm-year observations used in our modified Skaife et al. (2013) model. Sample selection is described in Table 1 and all variables are defined as in Appendix A. All continuous variables are winsorized to the 1st and 99th percentiles of their distributions. Bold text indicates statistical significance at the level of 0.05 or better.

Table 4
Modified Basu (1997) Model to Examine the Association between Insider Trading Profitability and Timely Loss Recognition

Dependent Variable: Earnings (X)

Tests:		**Pred.**	**Basu Model (1)**		**Extended Basu Model (2)**		**(3)**	
			Coeff.	**t-Stat**	**Coeff.**	**t-Stat**	**Coeff.**	**t-Stat**
β_1	*Intercept*	?	0.05	11.31***	0.05	11.27***	-0.13	-7.85***
β_2	*D*	+	-0.01	-3.26***	-0.01	-3.25***	0.00	-0.74
β_3	*R*	+	-0.04	-5.64***	-0.04	-5.62***	-0.01	-1.40
β_4	*D*R*	+	0.10	5.70***	0.10	5.67***	0.00	0.19
β_5	*Profit*	?			-0.01	-5.71***	-0.00	-2.60***
β_6	*Profit*D*	?			0.00	1.72*	0.00	0.90
β_7	*Profit*R*	?			0.01	3.75***	0.01	3.09***
β_8	***Profit*DR***	**-**			**-0.02**	**-3.42*** **	**-0.01**	**-2.16** **
β_9	*Leverage*	?					-0.10	-5.21***
β_{10}	*Leverage*D*	?					-0.07	-2.71***
β_{11}	*Leverage*R*	?					0.07	2.10**
β_{12}	*Leverage*DR*	+					-0.35	-5.31***
β_{13}	*Log(assets)*	?					0.03	8.88***
β_{14}	*Log(assets)*D*	?					0.01	1.87*
β_{15}	*Log(assets)*R*	?					-0.01	-2.10**
β_{16}	*Log(assets)*DR*	-					0.04	4.41***
β_{17}	*MB*	?					0.00	-0.51
β_{18}	*MB*D*	?					0.00	1.74*
β_{19}	*MB*R*	?					0.00	0.88
β_{20}	*MB*DR*	-					0.00	-0.22
β_{21}	*LIT*	?					0.01	0.92
β_{22}	*LIT*D*	?					0.00	0.43
β_{23}	*LIT*R*	-					0.01	0.90
β_{24}	*LIT*DR*	+					-0.02	-0.79

F-test: $\beta_7+\beta_8=0$		-0.016	p=0.02	-0.01	p=0.21
N	16,003	16,003		16,003	
Adj. R^2 (%)	12.08	12.87		15.03	

This table presents the results from Ordinary Least Squares (OLS) regressions extended from Basu (1997) model. The sample comprises 16,003 U.S. insiders trading data over period 2004-2011. The dependent variable *X* is earnings scaled by beginning-of-year market value of equity. *R* is 12-month compound returns beginning 9 months before the fiscal year end. Both *X* and *R* are measured for the fiscal year prior to insider trading. *D* is a dummy variable coded 1 if *R* is negative and 0 otherwise. *Profit* is the aggregate profitability of officer trades during the firm-year measured as a percentage of market value at the beginning of the fiscal year. *Leverage* is equal to book value of debt scaled by book value of total assets. *Log (assets)* is the logarithm of the firm's total assets at the beginning of the year. *MB* is the firm's market value divided by the book value of equity. *LIT* is litigation dummy, coded 1 if and only if the firm belongs to a high risk industry: Biotechnology (SIC 2833 to 2836), Computer Hardware (SIC 3570 to3577), Electronics (SIC 3600 to 3674), Retailing (SIC 5200 to 5961), and Computer Software (SIC 7371 to 7379)) (Gong et al. (2011). Timely loss recognition is measured with the incremental coefficient on negative stock returns (β_7). OLS regression is estimated with clustered standard errors at the firm level to derive p-values (Petersen, 2009). All continuous variables are winsorized to the 1st and 99th percentiles of their distributions. Standard errors are adjusted for heteroskedasticity and clustering at the firm-level. ***, **, and * reflect significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 5
Mechanisms through which Timely Loss Recognition Restrains Insider Trading Profits:
Analysis of the Direction and the Components of Insider Trades

Panel A: Directions of Insider Trades: Buy vs. Sell

Dependent variable: *Earnings* (X)

		Pred	(1)			(2)			(3)			(4)		
Tests:		.	**Buy Profitability**			**Sell Profitability**			**Net Buy Sample**			**Net Sell Sample**		
β_1	*Intercept*	?	-0.132	-7.89	***	-0.132	-7.89	***	-0.096	-4.28	***	-0.139	-7.69	***
β_2	*D*	+	-0.003	-0.68		-0.003	-0.68		-0.002	-0.40		-0.003	-0.57	
β_3	*R*	+	-0.013	-1.32		-0.013	-1.33		-0.017	-0.93		-0.013	-1.17	
β_4	*D*R*	+	0.002	0.11		0.002	0.13		0.024	1.06		0.001	0.06	
β_5	*Profit*	?	0.001	0.52		-0.001	-1.40		-0.001	-0.18		-0.004	-2.33	**
β_6	*Profit*D*	?	-0.001	-0.20		0.000	0.43		-0.006	-0.77		0.003	0.98	
β_7	*Profit*R*	?	-0.001	-0.47		0.001	1.60		0.000	0.05		0.008	3.07	***
β_8	***Profit*DR***	-	0.000	0.00		-0.003	-2.32	**	-0.018	-0.82		-0.011	-1.99	**
β_9	*Leverage*	?	-0.097	-5.22	***	-0.097	-5.21	***	-0.048	-4.55	***	-0.106	-4.89	***
β_{10}	*Leverage*D*	?	-0.072	-2.71	***	-0.073	-2.71	***	-0.035	-1.91	*	-0.076	-2.46	**
β_{11}	*Leverage*R*	?	0.066	2.10	**	0.066	2.10	**	0.020	2.83	***	0.076	2.00	**
β_{12}	*Leverage*DR*	+	-0.353	-5.31	***	-0.353	-5.32	***	-0.196	-3.28	***	-0.377	-4.98	***
β_{13}	*Log(assets)*	?	0.033	8.88	***	0.033	8.88	***	0.023	5.37	***	0.035	8.39	***
β_{14}	*Log(assets)*D*	?	0.006	1.87	*	0.006	1.88	*	0.000	-0.11		0.006	1.82	*
β_{15}	*Log(assets)*R*	?	-0.011	-2.10	**	-0.011	-2.10	**	-0.004	-3.22	***	-0.013	-2.02	**
β_{16}	*Log(assets)*DR*	-	0.040	4.42	***	0.040	4.42	***	0.008	0.70		0.045	4.36	***
β_{17}	*MB*	?	0.000	-0.51		0.000	-0.51		0.000	-0.14		0.000	-1.37	
β_{18}	*MB*D*	?	0.001	1.74	*	0.001	1.74	*	0.002	1.66	*	0.001	1.68	*
β_{19}	*MB*R*	?	0.001	0.88		0.001	0.88		0.000	0.21		0.002	2.06	**
β_{20}	*MB*DR*	-	0.000	-0.21		0.000	-0.22		0.002	0.58		-0.002	-1.03	
β_{21}	*LIT*	?	0.010	0.95		0.010	0.95		0.014	0.89		0.009	0.89	
β_{22}	*LIT*D*	?	0.002	0.38		0.002	0.39		-0.011	-0.59		0.005	0.67	
β_{23}	*LIT*R*	-	0.010	0.84		0.010	0.85		-0.007	-0.34		0.014	1.00	
β_{24}	*LIT*DR*	+	-0.017	-0.76		-0.017	-0.76		-0.019	-0.77		-0.015	-0.54	
	N		16,003			16,003			2,359			13,535		
	Adj. R^2 (%)		15.21			15.34			14.42			15.09		

Panel B: Components of Insiders' Trades: Price Change vs. Volume

Dependent variable: *Earnings* (X)		**Pred.**	**Sell Profitability**						**Net Sell Sample**					
Tests:			**(1) Price**			**(2) Volume**			**(3) Price**			**(4) Volume**		
β_1	*Intercept*	**?**	0.039	2.19	**	0.041	2.47	**	0.014	0.69		0.013	0.68	
β_2	*D*	+	-0.038	-2.31	**	-0.033	-2.04	**	-0.008	-0.43		-0.016	-0.93	
β_3	*R*	+	0.020	1.16		0.014	0.83		-0.004	-0.37		-0.003	-0.24	
β_4	*D*R*	+	0.144	2.32	**	0.158	2.49	**	0.210	3.70	***	0.223	4.09	***
β_5	*Profit*	**?**	-0.007	-1.12		0.000	0.15		-0.001	-0.93		0.000	-0.37	
β_6	*Profit*D*	**?**	-0.003	-0.35		0.000	-0.86		-0.005	-2.28	**	-0.001	-1.06	
β_7	*Profit*R*	**?**	0.016	1.00		0.000	-1.04		0.001	0.84		0.000	0.30	
$\boldsymbol{\beta_8}$	***Profit*DR***	**-**	-0.027	-2.01	**	0.001	0.62		-0.006	-2.24	**	0.000	-0.08	
β_9	*Leverage*	**?**	-0.071	-1.97	**	-0.074	-2.03	**	-0.123	-3.01	***	-0.122	-2.93	***
β_{10}	*Leverage*D*	**?**	0.017	0.38		0.019	0.43		0.006	0.13		0.001	0.02	
β_{11}	*Leverage*R*	**?**	-0.082	-2.72	***	-0.079	-2.54	**	-0.039	-2.31	**	-0.040	-2.17	**
β_{12}	*Leverage*DR*	+	0.535	3.77	***	0.531	3.75	***	0.217	2.70	***	0.222	2.74	***
β_{13}	*Log(assets)*	**?**	0.013	5.46	***	0.013	4.98	***	0.019	7.63	***	0.019	7.00	***
β_{14}	*Log(assets)*D*	**?**	0.001	0.37		0.000	0.11		0.001	0.24		0.002	0.54	
β_{15}	*Log(assets)*R*	**?**	-0.001	-0.24		-0.001	-0.20		0.005	1.97	**	0.005	1.82	*
β_{16}	*Log(assets)*DR*	-	-0.025	-2.33	**	-0.026	-2.28	**	0.000	-0.05		-0.003	-0.31	
β_{17}	*MB*	**?**	-0.001	-2.63	***	-0.001	-2.33	**	0.000	-0.86		0.000	-0.85	
β_{18}	*MB*D*	**?**	0.000	0.21		0.000	0.09		-0.001	-1.30		-0.001	-1.17	
β_{19}	*MB*R*	**?**	0.000	1.14		0.000	0.75		0.000	0.44		0.000	0.46	
β_{20}	*MB*DR*	-	-0.004	-1.48		-0.004	-1.45		-0.008	-2.94	***	-0.008	-2.95	***
β_{21}	*LIT*	**?**	-0.013	-1.19		-0.014	-1.21		-0.009	-0.95		-0.008	-0.90	
β_{22}	*LIT*D*	**?**	0.006	0.52		0.004	0.38		-0.011	-0.90		-0.013	-1.13	
β_{23}	*LIT*R*	-	0.006	0.54		0.007	0.58		-0.013	-1.66	*	-0.014	-1.70	*
β_{24}	*LIT*DR*	+	-0.045	-1.37		-0.047	-1.44		-0.127	-4.20	***	-0.133	-4.51	***
	N		16,003			16,003			13,535			13,535		
	Adj. R^2 (%)		11.55			11.12			12.05			11.84		

This table presents the results from Ordinary Least Squares (OLS) regressions extended from Basu (1997) model, separately for cases where managers are purchasers and where they are sellers of their firms' shares. Panel A shows that we divide the sample into purchase or sell, net purchase and net sell based on yearly insider trading. Also we delete the missing transaction to exclude the plausible explanation from missing values. Panel B compares the presents the results from Ordinary Least Squares (OLS) regressions with the dependent variable decomposed into

insider trading profitability price and volume components in sell and net sell samples. Volume component is based on the dollar amount of transaction. Price component is the average return on per dollar share traded by insiders, calculated from dividing the total insider trading profitability by the total dollar amount traded by insiders. All other variables are defined as in Appendix A. All continuous variables are winsorized to the 1st and 99th percentiles of their distributions. Standard errors are adjusted for heteroskedasticity and clustering at the firm-level. ***, **, and * reflect significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 6
Analysis of the Types of Insiders and the Types of Insider Trades

Panel A: Types of Insiders: CEO/CFOs vs. Non CEO/CFOs

			Types of Insiders					
Dependent variable:			**(1)**			**(2)**		
***Earnings* (X)**		**Pred.**	**CEO/CFOs**			**Non-CEO/CFOs**		
Tests:			Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.
β_1	*Intercept*	**?**	-0.014	-0.86		-0.029	-1.42	
β_2	*D*	+	-0.014	-0.48		-0.025	-0.66	
β_3	*R*	+	0.094	2.95	***	0.117	2.63	
β_4	*D*R*	+	-0.010	-0.09		-0.088	-0.63	
β_5	*Profit*	**?**	-0.002	-0.44		-0.009	-0.87	
β_6	*Profit*D*	**?**	-0.005	-0.73		-0.003	-0.26	
β_7	*Profit*R*	**?**	0.003	0.55		0.014	1.32	
β_8	***Profit*DR***	-	-0.009	-0.93		-0.032	-2.83	***
β_9	*Leverage*	**?**	-0.087	-4.37	***	-0.086	-3.44	***
β_{10}	*Leverage*D*	**?**	-0.026	-0.49		0.030	0.49	
β_{11}	*Leverage*R*	**?**	-0.145	-3.79	***	-0.157	-3.23	***
β_{12}	*Leverage*DR*	+	0.639	3.64	***	0.970	5.06	***
β_{13}	*Log(assets)*	**?**	0.017	8.89	***	0.018	6.83	***
β_{14}	*Log(assets)*D*	**?**	0.011	2.04	**	0.007	1.08	
β_{15}	*Log(assets)*R*	**?**	-0.010	-1.95	*	-0.014	-1.87	*
β_{16}	*Log(assets)*DR*	-	0.020	1.01		0.006	0.27	
β_{17}	*MB*	**?**	0.000	0.72		0.000	0.18	
β_{18}	*MB*D*	**?**	-0.002	-3.02	***	0.001	0.38	
β_{19}	*MB*R*	**?**	0.000	0.12		0.000	0.02	
β_{20}	*MB*DR*	-	-0.013	-2.98	***	-0.011	-1.32	
β_{21}	*LIT*	**?**	-0.033	-3.5	***	-0.043	-3.51	***
β_{22}	*LIT*D*	**?**	-0.069	-3.12	***	-0.073	-2.87	***
β_{23}	*LIT*R*	-	0.029	2.06	**	0.041	2.18	**
β_{24}	*LIT*DR*	+	-0.226	-3.29	***	-0.210	-2.97	***
	N		15,731			10,942		
	Adj. R^2 (%)		16.88			18.92		

Panel B: Types of Insider Trades: Routine Trades vs. Non-Routine Trades

Dependent variable: *Earnings* (X)		**Pred.**	**CEO/CFOs**						**Non-CEO/CFOs**					
Tests:			**(1) Routine**			**(2) Non-Routine**			**(3) Routine**			**(4) Non-Routine**		
			Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.
β_1	*Intercept*	**?**	-0.041	-1.03		0.030	0.86		-0.115	-1.22		0.013	0.42	
β_2	*D*	+	0.086	1.32		-0.069	-1.06		0.042	0.40		-0.069	-1.10	
β_3	*R*	+	0.315	2.12	**	0.008	0.13		0.472	1.50		0.054	0.81	
β_4	*D*R*	+	0.016	0.04		0.039	0.16		-0.240	-0.59		0.200	0.98	
β_5	*Profit*	**?**	0.004	2.43	**	-0.001	-0.09		-0.008	-1.31		0.002	0.96	
β_6	*Profit*D*	**?**	-0.013	-1.48		0.002	0.21		0.006	0.92		-0.016	-3.60	***
β_7	*Profit*R*	**?**	-0.005	-2.03	**	0.004	0.37		0.005	0.37		0.000	-0.10	
β_8	***Profit*DR***	**-**	-0.008	-0.45		-0.008	-0.66		-0.002	-0.16		-0.020	-2.80	***
β_9	*Leverage*	**?**	-0.010	-0.29		-0.184	-4.71	***	-0.054	-0.94		-0.018	-0.50	
β_{10}	*Leverage*D*	**?**	-0.173	-1.25		0.295	2.45	**	-0.019	-0.19		-0.150	-1.90	*
β_{11}	*Leverage*R*	**?**	-0.176	-2.05	**	0.010	0.24		-0.167	-2.17	**	-0.270	-3.00	***
β_{12}	*Leverage*DR*	+	0.625	1.92	*	1.117	2.52	**	0.878	2.07	**	0.516	2.19	**
β_{13}	*Log(assets)*	**?**	0.022	4.79	***	0.019	4.66	***	0.027	2.16	**	0.010	2.84	***
β_{14}	*Log(assets)*D*	**?**	-0.001	-0.04		0.001	0.08		-0.006	-0.34		0.025	2.46	**
β_{15}	*Log(assets)*R*	**?**	-0.051	-2.23	**	-0.002	-0.27		-0.062	-1.34		0.000	-0.00	
β_{16}	*Log(assets)*DR*	-	-0.003	-0.05		-0.015	-0.32		0.009	0.12		0.009	0.28	
β_{17}	*MB*	**?**	-0.001	-0.65		-0.001	-0.99		0.000	0.16		-0.002	-1.70	*
β_{18}	*MB*D*	**?**	0.008	0.92		-0.004	-0.82		0.007	1.84	*	0.006	2.02	**
β_{19}	*MB*R*	**?**	0.000	-0.08		-0.001	-0.72		0.002	0.41		0.009	2.17	**
β_{20}	*MB*DR*	-	0.013	0.48		-0.025	-1.31		0.018	1.18		-0.012	-0.90	
β_{21}	*LIT*	**?**	-0.041	-1.74	*	0.008	0.46		-0.016	-0.68		-0.024	-1.60	
β_{22}	*LIT*D*	**?**	0.029	0.70		-0.104	-2.89	***	-0.004	-0.12		-0.129	-3.00	***
β_{23}	*LIT*R*	-	0.047	1.36		0.009	0.36		0.044	1.03		0.030	1.02	
β_{24}	*LIT*DR*	+	0.038	0.21		-0.341	-2.81	***	-0.206	-1.23		-0.449	-3.60	***
	N		1,134			3,041			964			3,839		
	Adj. R^2 (%)		24.01			25.42			28.39			21.30		

This table presents the results from Ordinary Least Squares (OLS) regressions extended from Basu (1997) model, separated by the types of insiders (CEO/CFO vs. Non CEO/CFO) and the types of insider trades (routine vs. non-routine). Panel A presents the results by the types of insiders only, whereas Panel B presents the results both by types of insiders and by types of trades. All variables are defined as in Appendix A. All continuous variables are winsorized to the 1st and 99th percentiles of their distributions. Standard errors are adjusted for heteroskedasticity and clustering at the firm-level. ***, **, and * reflect significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 7
Skaife et al. (2013) Model of Insider Trading Profitability:
Firm-Year Analysis Using *C_Score* following Khan and Watts (2009)

Panel A: Main Results

Dependent variable: *Profit*	**(1) Level model**			**(2) Change Model**		
Test variable	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.
Tests:						
C_Score$_t$	**-0.05**	-2.72	***	**-0.06**	-2.01	**
G_Score$_t$	0.06	1.30		0.01	0.15	
Controls:						
MWIC$_t$	0.04	1.27		0.05	0.98	
ln(MV$_{t-1}$)	-0.02	-3.26	***	-0.05	-2.18	**
BTM$_{t-1}$	-0.05	-3.96	***	-0.06	-2.21	**
BHARPRE$_t$	0.10	3.83	***	0.08	2.92	***
ln(NUMEST$_t$)	-0.01	-0.59		0.01	0.10	
FSINFORM$_t$	0.02	1.10		0.15	2.63	***
RND$_t$	0.01	0.47		0.07	1.69	*
INST$_t$	-0.02	-1.33		-0.04	-1.30	
AGE$_t$	-0.03	-1.51		-0.01	-0.14	
RETVOL$_t$	0.53	1.40		0.21	0.39	
MAG_AR$_t$	0.18	2.64		0.26	2.07	**
INTERCEPT	0.28	3.45	***	0.00	-0.15	
YEAR FE	Included			Included		
INDUSTRY FE	Included			Included		
N	14,304			11,568		
Adj. R^2 (%)	1.73			1.71		

Panel B: Granger causality tests
Specification A: $Profit_{t+1} = g_1 * Profit_t + h_1 * C\_Score_t + e_1$
Specification B: $Profit_{t+1} = g_1 * Profit_t + g_2 * Profit_{t-1} + h_1 * C\_Score_t + h_2 * C\_Score_{t-1} + e_2$

Specification	**F-value**	**p-value**	**h_1 or $h_1 + h_2$**	**p-value**
A	38.70	< 0.01	-0.04	< 0.01
B	11.87	< 0.01	-0.03	< 0.01

Panel C: Direction of Trades

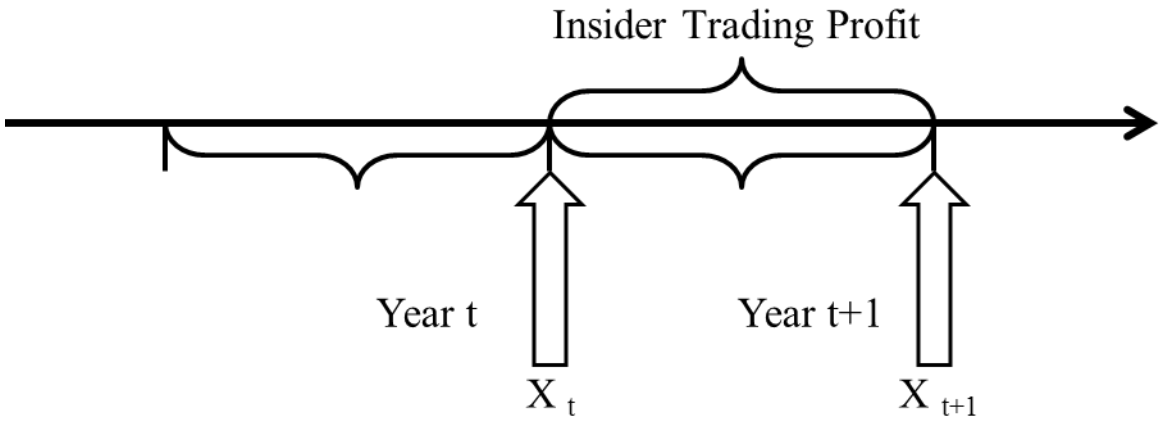
Dependent variable: *Profit*	**(1) Net Buy Sample**			**(2) Net Sell Sample**			**(3) Random Select Sample**		
Test Variable	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.
Tests:									
***C_Score**$_t$*	-0.05	-1.15		-0.06	-2.40	**	-0.14	-2.39	**
G_Score$_t$	-0.20	-1.41		0.14	2.36	**	0.07	0.52	
Controls:									
MWIC$_t$	-0.03	-0.78		0.07	1.39		0.01	0.10	
ln(MV$_{t-1}$)	0.01	0.89		-0.04	-3.42	***	-0.03	-2.65	***
BTM$_{t-1}$	0.00	0.18		-0.08	-4.17	***	-0.05	-0.97	
BHARPRE$_t$	0.00	0.05		0.11	3.44	***	0.16	2.09	**
ln(NUMEST$_t$)	-0.01	-0.76		-0.01	-0.62		-0.01	-1.03	
FSINFORM$_t$	-0.02	-0.58		0.03	1.42		0.03	0.63	
RND$_t$	-0.02	-0.82		0.01	0.83		-0.01	-0.22	
INST$_t$	0.03	1.74	*	-0.07	-2.18	**	-0.07	-2.01	**
AGE$_t$	-0.01	-0.46		-0.05	-1.48		0.02	0.19	
RETVOL$_t$	0.72	0.91		0.76	1.34		-0.35	-0.31	
MAG_AR$_t$	0.02	0.46		0.22	2.39	**	0.32	1.67	*
INTERCEPT	-0.06	-0.83		0.52	3.71	***	0.35	1.42	
YEAR FE	Included			Included			Included		
INDUSTRY FE	Included			Included			Included		
N	2,271			10,179			2,271		
Adj. R^2 (%)	1.56			2.72			3.77		

Panel D: Types of Insiders and Types of Insider Trades

Dep. variable: *Profit*	**CEO/CFOs**						**Non-CEO/CFOs**					
Tests:	**(1) Routine**			**(2) Non-Routine**			**(3) Routine**			**(4) Non-Routine**		
	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.
C_Score$_t$	**-0.28**	**-1.60**		**-0.12**	**-1.83**	*	**-0.07**	**-0.80**		**-0.05**	**-1.96**	**
G_Score$_t$	-0.25	-0.84		-0.06	-0.32		-0.01	-0.03		-0.04	-0.55	
Controls:												
MWIC$_t$	0.18	1.10		0.02	0.35		0.04	0.32		0.08	0.94	
ln(MV$_{t-1}$)	-0.08	-2.21	**	0.00	0.26		-0.02	-0.96		-0.04	-1.9	*
BTM$_{t-1}$	0.00	0.02		-0.01	-0.52		0.00	-0.85		0.00	-4.62	***
BHARPRE$_t$	0.20	2.05	**	0.04	1.25		0.13	1.55		0.05	1.77	*
ln(NUMEST$_t$)	-0.01	-0.27		-0.03	-2.17	**	-0.01	-0.52		0.00	-0.22	
FSINFORM$_t$	0.07	0.64		0.05	1.35		-0.04	-0.52		0.00	0.13	
RND$_t$	0.04	0.63		-0.01	-0.31		-0.04	-1.24		0.03	1.51	
INST$_t$	-0.01	-1.55		0.00	0.66		0.00	-0.77		-0.01	-1.34	
AGE$_t$	-0.06	-0.38		-0.04	-0.89		-0.09	-0.91		-0.06	-1.50	
RETVOL$_t$	-0.11	-0.05		0.73	0.67		2.01	1.68	*	0.30	0.51	
MAG_AR$_t$	4.53	1.50		1.30	1.73	*	4.33	2.42	**	0.44	0.48	
INTERCEPT	0.77	1.48		0.12	0.79		0.41	1.64		0.47	2.13	**
YEAR FE	Included			Included			Included			Included		
INDUSTRY FE	Included			Included			Included			Included		
N	1,085			2,784			1,300			5,435		
Adj. R^2 (%)	6.80			1.36			4.68			2.40		

This table presents the results from Ordinary Least Squares (OLS) regressions with *Profit* as the dependent variable. Panel A presents the main results using both level and change specifications. Panel B presents the Granger causality tests. F-tests suggest that lagged *C_Score* "Granger causes" statistically significantly lower insider trading profits in the presence of lagged insider trading profits. Panel C presents results based on subsamples where insider trades are "net buy" or "net sell" during the year. Panel D presents results based on the types of insiders (CEO/CFO vs. non-CEO/CFO) and types of insider trades (routine vs. non-routine). Sample selection is described in Table 1 and all variables are defined as in Appendix A. All continuous variables are winsorized to the 1st and 99th percentiles of their distributions. Standard errors are adjusted for heteroskedasticity and clustering at the firm-level. ***, **, and * reflect significance at the 0.01, 0.05, and 0.10 level, respectively.

Figure 1: Timeline for Insider Trading and Measurement of Asymmetric Timely Loss Recognition



This figure illustrates our measurement and the mechanism through which asymmetric timely loss recognition reduces insider trading profitability, especially for insider sells.