

The Disclosure Role of Earnings^{*}

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Abstract

Managers have incentives to voluntarily disclose good news early and delay bad news disclosure, and we propose that earnings announcements offset these asymmetric incentives by assuming a proportionately greater role in the disclosure of bad news. We find that when news measured by quarterly market-adjusted returns is negative, the proportion of news disclosed during quarterly earnings announcements is significantly greater than the proportion when the news is positive. In our cross-sectional tests we find that, consistent with our prediction, earnings announcements disclose a greater proportion of bad news among firms that are likely to suffer from greater information asymmetry between managers and external stakeholders. Finally, we find that there is a significant increase in earnings' differential role in disclosing bad news after the passage of the Sarbanes Oxley Act.

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1. Introduction

In this paper, we examine the role of earnings as a disclosure medium.¹ Managers have incentives to voluntarily disclose good news early and delay bad news disclosure, and we propose that earnings offset these asymmetric incentives by assuming a proportionately greater role in the disclosure of bad news. Specifically, we hypothesize that earnings announcements are a more salient source of negative information (or bad news) reaching the market in a fiscal period than they are of positive information (or good news). Our paper highlights earnings' role in addressing the adverse selection problem in disclosure that arises in the presence of information asymmetry between managers and external stakeholders.

Managers' asymmetric incentives to disclose privately received good news, and conceal privately received bad news to the extent possible are well-discussed in the literature, and permeate all forms of disclosure (Lang and Lundholm 2000, Noe 1999, Miller 2002, Kothari, Shu and Wysocki 2008, Sletten 2008). However, earnings announcements play a role distinct from all other disclosure forms. They involve the release of mandated financial statement information, the only form of disclosure scrutinized by external auditors. Auditors' reputations are tied to their ability to understand managers' asymmetric incentives and identify possibly adverse circumstances affecting the firm.

Even in the absence of formal audits, for example in the first three quarters, earnings announcements still represent a natural threshold in time when managers can disclose bad news in the same fiscal period that it is received in. The eventual advent of auditors in the fourth quarter is likely to limit the ability of managers to defer recognition of bad news beyond earnings announcements even in the first three quarters. Further, managers' flexibility to defer bad news disclosure indefinitely is also curtailed by the preparation of financial statements according to

¹ Throughout the paper, we use the term disclosure to mean the release of non-redundant information

GAAP, which require the faithful disclosure of privately received news, subject to verifiability requirements. We expect that verification requirements for the recognition of privately received bad news are less strict than for privately received good news.²

Managers' asymmetric disclosure incentives imply that there is more privately received bad news than good news remaining to be disclosed at the end of the period. We propose that together with a greater focus in mandated financial statements on identifying adverse information, these asymmetric incentives imply that earnings announcements are a relatively more important source of bad news reaching the market in a fiscal period than good news.

The influence of managers' asymmetric incentives on the disclosure of good and bad news is likely to be affected by factors such as the increased monitoring of managers by sophisticated investors, or the threat of lawsuits alleging wrongful/delayed disclosure. Consequently, in high-information-asymmetry environments when such alternate mechanisms are less robust, we expect earnings' differential role in releasing bad news relative to good news to be even more pronounced. We incorporate the role of the information environment into our analysis and investigate whether it generates cross-sectional variation in earnings' differential disclosure role. For example, when a firm's value is comprised more of unverifiable growth options than assets-in-place (i.e., firms with low book-to-market ratios), we expect the information asymmetry between managers and investors to be more severe, and earnings' differential disclosure role to be more pronounced. Similarly, we expect to observe less differential disclosure of bad news by earnings in situations where investors are more sophisticated (firms with high institutional ownership), or when information environments are richer (firms with high size and/or analyst following).

² Note that this is related to but distinct from Basu's (1997) evidence that accounting imposes asymmetric verification standards with respect to *publicly available* news. Basu's evidence does not inform on earnings as a disclosure medium.

The above cross-sectional factors influence the extent to which adverse information reaches the market prior to earnings announcements. We next investigate time-series factors that influence managers' ability to defer bad news disclosures beyond the earnings announcements – namely the passage of the Sarbanes Oxley Act (SOX) in the third quarter of 2002. SOX required that managers certify the veracity of their financial statements, both annual and quarterly. It also coincided with a heightened awareness of the reputation and litigation costs borne by auditors and managers in relation to the firm's financial statements, as well as increased scrutiny of financial reporting practices by regulators. Consequently, we hypothesize that managers' incentives and/or ability to defer disclosures of privately received bad news beyond earnings announcements is more constrained after SOX.

In our empirical analysis, we use returns-based measures to capture both news disclosed by earnings during a quarter and total news reaching the market in that quarter. We first compute market-adjusted earnings announcement returns (*EARs*) measured over a seven-day window that extends from 3 days prior to the announcement to 3 days after the announcement. Market-adjusted quarterly returns (*RETs*) are measured starting after 3 days beyond the previous quarter's earnings announcement to 3 days after the current quarter's earnings announcement are used to measure the total information disclosed to the market during a quarter.

In a regression of *EAR* on *RET*, the coefficient on *RET* captures the proportion of quarterly returns concentrated around the quarterly earnings announcements (QEAs). Using a piecewise linear regression framework, we predict that the coefficient of *EAR* on *RET* is significantly more positive when the quarterly returns are negative, relative to when they are positive. Our regression resembles Basu's (1997) specification to measure asymmetric timeliness of earnings, with the important difference that the dependent variable is not price-scaled

earnings, but returns surrounding the quarterly earnings announcements. The use of earnings announcement returns reflects our interest in the relative importance of earnings announcements as a disclosure medium, in contrast to Basu (1997) who is primarily interested in the extent to which earnings reflects publicly available news.

Our results are consistent with our predictions. When news measured by quarterly returns is negative, the proportion of news disclosed during QEAs is significantly greater than the proportion when the news is positive. We observe that the proportion of quarterly returns concentrated around QEAs is 13.91% when the returns are positive, and around 7.5 percent points greater, that is, 21.41% when the returns are negative.

In our cross-sectional tests we find that, consistent with our prediction, earnings' differential disclosure of bad news is more pronounced when a greater proportion of firm value is comprised of growth opportunities, measured using the book-to-market ratio. Further, among firms with smaller size, lower analyst following, and lower institutional ownership, the differential disclosure of bad news around QEAs relative to good news is magnified.

Further tests reveal that after the passage of SOX, there is a significant increase in earnings differential disclosure role. The proportion of bad news released around QEAs is around 6.74 percent points higher than that of goods news in the pre-SOX period. In the post-SOX period, this incremental proportion increases to 12.41%.

Our paper contributes by highlighting earnings' role in addressing the adverse selection problem in disclosure that arises in high-information asymmetry environments. Specifically, when the problems arising out of managers' asymmetric incentives to disclose good news early and delay bad news disclosure are more severe, quarterly earnings announcements (QEAs) assume a proportionately greater role in the disclosure of bad news. We do not assert that QEAs

as “information events” are a more important source of bad news than other information events during non-QEA periods in the quarter. Rather, our comparison is between the relative importance of QEAs as a source of bad news versus a source of good news. Managers’ asymmetric incentives imply that information events in the non-QEA period in which managers disclose positive news are, on average, more likely than those in which they disclose negative news. If the net news privately observed by managers over the fiscal period is negative, and QEAs successfully induce managers to release privately received news remaining undisclosed at the end of the period, we expect to observe that a higher proportion of negative news reaching the market is concentrated around QEAs. On the other hand, when the net news privately observed by managers over the fiscal period is positive, we expect that a lower proportion of the news is concentrated around the QEAs, because of managers’ incentives to disclose good news promptly. Our findings confirm our predictions and suggest that earnings contributes to attenuating the adverse selection problem in managerial disclosures, regardless of how the absolute magnitude of the information released around QEAs compares to other information events in the non-QEA period.

The rest of our paper is organized as follows. In Section 2, we develop our hypotheses. Section 3 describes our data, presents descriptive statistics and discusses our empirical design. Our results are presented in Section 4, and Section 5 concludes.

2. Hypothesis Development

2.1 Earnings Differential Disclosure Role

A number of studies suggest that managers have differential incentives with respect to the timely disclosure of good and bad news.³ When managers privately observe good news, they will be timely in making the news publicly available. On the other hand, managers will tend to delay the public disclosure of privately received bad news to the extent possible. The timely release of favorable news about the firm is likely to have a positive influence on managers' compensation and human capital. However, when managers receive bad news, they have incentives to delay the disclosure of the news, in the hope that the currently adverse information is offset by subsequent favorable information.

While there are limits to the extent that managers can delay bad news disclosure, for example, because of litigation risk (Skinner 1994), these limits are unlikely to completely offset the asymmetric disclosure incentives of managers. The survey evidence in Graham, Harvey and Rajgopal (2005) indicates that managers delay bad news disclosures in the hope that the firm's situation improves before the required information release.

Asymmetric disclosure incentives affect all forms of disclosure by the firm, including earnings announcements. However, earnings announcements are distinct from all other disclosure forms in a number of ways. First, earnings are a product of mandated financial statements, in which managers are expected to faithfully report the information about firm performance they observe privately in a given period, subject to verifiability requirements. The possibility of violating mandated norms for recognition while preparing financial statements is

³ See Lang and Lundholm (2000), Noe (1999), Miller (2002), Kothari, Shu and Wysocki (2008), Sletten (2008), among others.

likely to restrict managers' propensity to defer disclosure of privately received bad news beyond the earnings announcement.

Second, mandated financial statements are prepared according to GAAP, which traditionally has required the imposition of less strict verification standards to recognize bad news as losses than good news as gains. A number of studies starting with Basu (1997) have provided evidence suggesting that asymmetric verification standards are applied with respect to the recognition of public news (see for example, Ball, Kothari and Robin 2000, LaFond and Roychowdhury 2008 and LaFond and Watts 2008). We expect that verification standards applied by accountants for the recognition of *privately received* bad news are also likely to be less strict than those for *privately received* good news, with the result that earnings announcements will be timelier in disclosing privately received bad news.

Third, even if managers have incentives to defer recognition of contemporaneously received bad news beyond the current earnings announcement, auditor scrutiny is likely to restrict further deferral. Auditors function as external agents with a fiduciary responsibility to uncover adverse information, even when managers are reluctant to share that information. Auditors' reputational capital and expected litigation costs are tied to their ability to understand managers' asymmetric incentives and fulfill their fiduciary responsibility. Consequently, we hypothesize that earnings announcements represent a natural threshold in time when managers are compelled to release privately received bad news publicly.

In summary, when the overall information reaching the market in a given fiscal period is positive, we expect a lower proportion of it to be concentrated around earnings announcements, since managers seek ways to release their privately observed good news as early as possible. Conversely, when the overall information reaching the market in a given fiscal period is

negative, we expect a higher proportion of it to be concentrated around earnings announcements. Therefore, our first hypothesis is as follows:

H1: Earnings are a more salient source of overall information reaching the markets in a fiscal period in which the information is negative.

2.2 Cross-Sectional Variation

We propose that earnings' role as a more salient source of bad news essentially serves to alleviate the adverse selection problem in disclosure that arises in high-information asymmetry environments. When the problems arising out of managers' asymmetric incentives to disclose good news early and delay bad news disclosure are more severe, earnings are expected to assume a proportionately greater role in the disclosure of bad news.

The information asymmetry between managers and shareholder is likely to be more severe when the operating environment of the firm implies that a firm's equity value is comprised of substantial growth opportunities. These growth options tend to be unverifiable by their very nature and are generally associated with managers possessing superior knowledge about the firm's performance and health than other market participants (Smith and Watts 1992). In such situations, their incentives to release good news early and delay bad news disclosure are exacerbated by the greater information asymmetry between them and other stakeholders. We hypothesize that as a firm's value consists of more growth options, an increasingly larger greater proportion of the bad news concerning a firm's performance/health is likely to be released around earnings announcements, relative to good news. We proxy for growth options using the book-to-market ratio (*BTM*), or the ratio of book value of equity to market value of equity. The lower the *BTM* ratio, the more a firm's equity value is comprised of growth options.

H2: The greater concentration of bad news in a fiscal period around earnings announcements, relative to good news, is even more pronounced for firms with higher growth options.

Our next hypothesis concerns the general information environment of the firm. Certain firm types are associated with a large number of investors and/or other market participants tracking the firms' operations, investments, etc. For such firms, for example those with larger size or analyst following, efforts by market participants at uncovering information regarding the firm make the revelation of bad news prior to the earnings announcements dates more likely. Further, we expect that when investors are more sophisticated, they are likely to understand the adverse selection problem in managers' disclosures better. This is likely to make them more demanding of timely disclosures of bad news by management. Additionally, sophisticated investors such as institutions tend to be the price-setters in the market and this makes managers more responsive to their information demands.⁴ In general, we expect firms with higher size, analyst following and institutional ownership to have richer information environments, generating more bad news revelations prior to the earnings announcements. Thus, we have the following hypothesis:

H3: The greater concentration of bad news in a fiscal period around earnings announcements, relative to good news, is even more pronounced for firms with poorer information environments.

⁴ Note that factors such as size that capture the overall information environment of the firm are also likely to be positively associated with the litigation risk facing managers (Field, Shu and Lowry 2005). However, to the extent that litigation risk ameliorates the adverse selection problem in disclosure by compelling managers to disclose bad news early, we consider it a component of the overall information environment of the firm.

2.3 Pre- and Post- SOX

Managers' ability to defer bad news disclosures beyond the earnings announcements affects the relative importance of earnings as a source of bad news. This ability is limited by the requirement that managers faithfully disclose their private information about firm performance in mandated financial statements, subject to verifiability requirements. The Sarbanes Oxley Act (hereafter SOX) effective the third quarter of 2002 made managers' responsibility more explicit by requiring that managers essentially certify the veracity of their financial statements, both annual and quarterly. Further, the post-SOX period signified a heightened awareness of the reputation and litigation costs borne by auditors and managers after the accounting scandals involving Enron, Worldcom and others. We expect that SOX made both managers and auditors more cautious and provided them with greater impetus to uncover adverse information. We thus hypothesize that the greater importance of earnings as a source of bad news relative to good news is more pronounced after SOX. Hence, our hypothesis is as follows:

H4: After the Sarbanes Oxley Act (SOX), there is an increase in the concentration of bad news around earnings announcements relative to good news.

Note that the fourth-quarter financial statements were already subject to scrutiny by external auditors prior to SOX. While financial statements for the first three fiscal quarters are subjected to auditor review post-2000, there is no formal audit requirement for them. The eventual fourth-quarter auditor scrutiny is likely to constrain managers' flexibility in delaying bad news disclosures even in the first three quarters. Nevertheless, given the lack of a concurrent formal audit, we expect the certification by CEOs and the potentially increased alertness of

auditors in the post-SOX period to make a more pronounced difference in the first three fiscal quarters of the year.

3. Data, Descriptive Statistics and Empirical Design

3.1 Data

To construct our sample, we begin with all firm-quarters in COMPUSTAT with sufficient data to calculate market value of equity (MVE), book values and leverage. We also require data on quarterly returns and earnings announcement returns from CRSP. Analyst following and institutional ownership are obtained from I/B/E/S and Thomson Financial respectively, and are set equal to zero when not available. Since coverage in these databases starts in 1980, we restrict our sample to 108 quarters from 1980 to 2006.

Earnings announcement returns (EAR_t) are defined as the market-adjusted buy-and-hold returns over the seven days from day -3 to day +3, where day 0 is the quarterly earnings announcement (hereafter QEA). Quarterly returns (RET_t) are defined as the market-adjusted buy-and-hold returns starting after three days beyond the earnings announcement of quarter $t-1$ and ending three days after the announcement of quarter t .⁵ All variables are winsorized at the 1% level to address the issue of outliers. For comparability across quarters, we require that firms have data available in all four quarters in a fiscal year to be included in our sample. Our final sample consists of 387,101 firm-quarters, with 14,767 individual firms.

⁵ We require at least three days with trading to compute EAR , and at least twenty five days with trading to compute RET .

3.2 Descriptive Statistics on Key Variables

Table 1 presents the pooled means, medians, standard deviations and skewness for key variables in our sample. Mean market-adjusted earnings announcement returns (*EAR*) are around 0.26% over the seven-day window, and are larger than the mean non-announcement window returns (*NEAR*) which are around 0.19%. Mean market-adjusted quarterly returns (*RET*) in our sample are around 0.43%. We define *DR* as an indicator variable set equal to one if $RET < 0$, and equal to zero otherwise. Mean *DR* shows that 53% of quarterly returns are negative across all firm-quarters.

The average sample firm's market value of equity (*MVE*) is around \$1.3 billion, but the median is much lower, at \$147 million. Panel A also reports descriptive statistics for the number of analysts following a firm (*NUM_AN*, mean~5.6) and the percentage of outstanding shares owned by institutions (*INST_OWN*, mean~32%). To measure growth opportunities, we use the ratio of book value of equity to market value of equity or book-to-market ratio (*BTM*). The lower the *BTM*, the lower is the proportion of equity value comprised of recognized assets, and the higher is the relative importance of growth opportunities. The average *BTM* for the sample is 0.68, indicating that a significant proportion of a firm's equity value on average is composed of growth options. We measure financial leverage using ratio of total debt, both long-term and short-term, to total assets (*LEV*). Mean *LEV* for the sample is around 23%.

Following Field, Lowry and Shu (2005) we define *HITECH* as a binary indicator variable that is set equal to one if the firm belongs to the following four-digit SIC industry codes: 2833–2836 (drugs and pharmaceuticals), 3570–3577 (computer and office equipments), 3600–3674 (electrical equipment and electronics), 7371–7379 (software services) or 8731–8734 (R&D

services). As the mean value of *HITECH* shows, 19% of our observations belong to technology-intensive industries.

Table 1, Panel B reports Pearson correlation coefficients below the diagonal and Spearman correlations above. The three variables we use to proxy for the information environment of the firm - *SIZE* (logarithm of *MVE*), *NUM_AN* and *INST_OWN* - are highly positively correlated, with all pair-wise Spearman correlation coefficients above 0.60.

3.3 Descriptive Statistics on Return Ratios

As a first step to understanding patterns in quarterly and earnings announcements returns, we compute the proportion of total quarterly news released around earnings announcements when the total quarterly news is positive versus negative. In particular, we estimate ratios of market-adjusted earnings announcement returns (*EARs*) to market-adjusted quarterly returns (*RET*), separately for firm-quarters with positive and negative quarterly returns. We refer to the ratios with negative and positive quarterly returns as bad news ratios (*BNR*) and good news ratios (*GNR*) respectively.

Every quarter, we estimate the mean and median of the firm-specific *BNR* and *GNR* and then compute the average of each across the 108 quarters in Table 2. The average *BNR* (0.1632) is significantly greater than the average *GNR* (0.1522), when the median ratios are considered for every quarter.⁶ However, the average *BNR* (0.1374) is significantly lower than the average *GNR* (0.1808), when the mean ratios are considered for every quarter. Thus, the median ratios suggest that the proportion of news concentrated around QEAs is greater when the news is negative. However, the mean ratios provide contradictory evidence.

⁶ The t-statistics for the differences between *BNR* and *GNR*, which are provided entirely for descriptive purposes, assume independence between the positive news and negative news samples, and should clearly be interpreted with caution.

To get a sense of how the ratios vary with the magnitude of quarterly returns, we divide firm-quarters with positive and negative market-adjusted quarterly returns (RET) into 3 groups each based on the magnitude of RET . For the group of firm-quarters with quarterly returns not exceeding 30% in magnitude, the mean good news ratios are significantly larger than the corresponding bad news ratios while median good news ratios are smaller than corresponding bad news ratios, though not significantly so. For each of the other intervals involving larger return magnitudes (groups with quarterly return magnitudes of 30%-60% and greater than 60%), both the the mean and median bad news ratios are significantly greater than the corresponding mean and median good news ratios. However, the samples in which median and mean ratios provide confirming evidence contain a fewer percentage of total observations. Overall, the descriptive statistics in Table 2 do not allow for a consistent interpretation of the proportion of news concentrated around QEAs when the news is bad versus when it is good. In our formal tests described below we use regression analyses that exploit the covariance between EAR and RET and facilitate better inferences under a scenario where the two can have different signs.

3.4 Empirical Design

We use the following regression to measure whether the proportion of overall quarterly returns released around earnings announcement dates is greater when the overall quarterly returns are negative:

$$EAR_t = k + \eta * DR_t + \beta * RET_t + \gamma * RET_t * DR_t + \varepsilon_t. \quad (1)$$

In the equation (1), DR_t is an indicator variable set equal to one if $RET_t < 0$ and equal to zero otherwise. β captures the proportion of overall quarterly returns that is concentrated around

QEAs when overall quarterly returns are positive.⁷ γ captures the incremental concentration of returns around earnings announcements when overall quarterly returns are negative. Our primary hypothesis (H1) predicts that γ is significantly positive. Note that our regression is similar to the framework used by Basu (1997) with one important difference. Our dependent variable is the return around earnings announcements, and not earnings scaled by beginning-of-period price as in Basu (1997). This reflects our interest specifically in the mean information released around earnings announcements, rather than the information released through other channels prior to the announcement but captured in reported earnings.⁸

4. Regression Analysis: Results

4.1 Basic Results on Earnings' Differential Disclosure Role

Table 3 Panel A reports the results of estimating the regression (1) over the entire sample of 387,101 firm-quarters. The regression is estimated in the cross-section every fiscal quarter and Table 3 reports the time series means of the coefficients and associated t-statistics across the 108 quarters (following the Fama-Macbeth procedure). As can be seen, the coefficient on RET indicates that when overall quarterly returns are positive, approximately 13.9% of the news is released in the seven-day window around earnings announcements. More importantly, consistent with H1, the coefficient on $RET*DR$ (7.5%) is positive and statistically significant at the 1% level, indicating that a significantly larger proportion of news is disclosed around earnings announcements dates when the overall returns are negative. The actual proportion of news

⁷ To see this, consider the simple hypothetical case that earnings announcement returns constitute 10% of overall quarterly returns when returns are positive. The coefficient of EAR on RET in the positive return sample would be $cov[EAR,RET]/var[RET] = 0.10*var[RET]/var[RET]$, or 0.10.

⁸ Ball and Shivakumar (2008) use R^2 to capture the proportion of annual returns explained by the four QEAs. Note that in our case, we are interested the differential proportion of news concentrated around QEAs depending on whether the news is negative versus positive. The piecewise linear regression avoids problems in interpreting R^2 differences across two separate samples.

disclosed at the earnings announcements for firms experiencing negative quarterly returns is given by the sum of the coefficients on RET and $RET*DR$, and is approximately 21.4%.

Table 3 also reports that results of estimating regression (1) separately over the first three quarters (Panel B) and for the fourth quarter (Panel C). As Panel B demonstrates, 14.82% of positive quarterly returns in the first three fiscal quarters are concentrated around earnings announcements dates. Consistent with H1, the corresponding proportion for negative quarterly returns is higher by 7.90 percent points, at 22.72%.

Table 3 Panel C shows that for the fourth fiscal quarter, the coefficient on RET is 11.21%. The coefficient on $RET*DR$ at 6.29%, is statistically significant at the 1% level and indicates that the proportion of overall bad news concentrated around QEAs is around 17.49%. For both positive and negative quarterly returns, the proportions concentrated around QEAs in the fourth fiscal quarter appear lower than in the first three fiscal quarters. This suggests that in the fourth quarter, there is more pre-emption of both kinds of news – positive and negative - by disclosures and other events prior to earnings announcements. The occurrence of formal annual audits in the fourth quarter is likely to amplify the demand for information about firm performance in that quarter. However, both private efforts at gathering information by market participants and voluntary disclosures by managers are likely to be higher in the fourth quarter, diminishing the role of earnings as a disclosure medium, even for bad news.⁹

4.2 Cross-Sectional Analysis

We test the cross-sectional variation in earning's more pronounced role is disclosing bad news relative to good news using the following regression:

⁹ For example, Baginski and Hassell (1990) report that not only do managers issue more forecasts during the fourth quarter, but also that fourth-quarter management forecasts are more influential in generating revisions in analyst estimates of future earnings, relative to other quarters.

$$\begin{aligned}
EAR_t = & \rho_0 + \rho_1 * RBTM_{t-1} + \rho_2 * INFO_{t-1} + \rho_3 * HITECH_{t-1} + \rho_4 * RLEV_{t-1} + \\
& \sigma_0 * DR_t + \sigma_2 * RBTM_{t-1} * DR_t + \sigma_1 * INFO_{t-1} * DR_t + \sigma_3 * HITECH_{t-1} * DR_t + \sigma_4 * RLEV_{t-1} * DR_t + \\
& \mu_0 * RET_t + \mu_1 * RBTM_{t-1} * RET_t + \mu_2 * INFO_{t-1} * RET_t + \\
& \mu_3 * HITECH_{t-1} * RET_t + \mu_4 * RLEV_{t-1} * RET_t + \\
& \lambda_0 * RET_t * DR_t + \lambda_1 * RBTM_{t-1} * RET_t * DR_t + \lambda_2 * INFO_{t-1} * RET_t * DR_t + \\
& \lambda_3 * HITECH_{t-1} * RET_t * DR_t + \lambda_4 * RLEV_{t-1} * RET_t * DR_t + \varepsilon_t.
\end{aligned} \tag{2}$$

In the above regression, *BTM* is decile rank of the book-to-market ratio, or the ratio of the book-value of equity to market value of equity. It is used as a proxy for the extent of a firm's value that is comprised of growth options. *INFO* represents the richness of the firm's information environment. We use three separate empirical proxies for *INFO*, namely the decile ranks of the logarithm of the equity value (*RSIZE*), analyst following (*RNUM_AN*) and institutional ownership (*RINST_OWN*). Note that size, analyst following and institutional ownership conceptually capture the same underlying factor and empirically are highly positively correlated with one another (Table 1 Panel B). Therefore, we do not include them simultaneously in the same regression. Rather, we use a principal components analysis to capture the common variation between the three variables and use it as a composite measure of the information environment, *COMP_INFO*. Specifically, *COMP_INFO* is extracted from a principal components analysis of the logarithm of the market value of equity, the logarithm of one plus the number of analysts and the percentage institutional ownership of the firm. The decile rank of the common factor *RCOMP_INFO* is subsequently used in the regression analysis.

Note that in regression (2), λ_0 represents the incremental concentration of overall negative quarterly returns around earnings announcements dates relative to positive returns. λ_1 and λ_2 capture variation in λ_0 with *BTM* and the respective *INFO* variable (*RSIZE*, *RNUM_AN* or *RINST_OWN*). We also include two control variables that potentially affect earnings' differential role in releasing bad news: membership in a high-technology industry (*HITECH*) and decile

ranks of financial leverage (*RLEV*). Field, Lowry and Shu (2005) argue that firms in high-technology industries experience greater litigation risk, which can lead to firms releasing adverse information via voluntary disclosure prior to QEAs. On the other hand, there is likely to be substantial information asymmetry between managers and external stakeholders in technology-intensive industries because of their more complex operations and growth opportunities. This implies greater delays in voluntary disclosures of bad news and a more important role for earnings in disclosing bad news. Thus the relation between λ_0 and *HITECH* is ambiguous.

The financial leverage of a company (*RLEV*) is correlated with the extent to which firm value is comprised of growth options versus assets-in-place, yet is likely to have an independent effect on λ_0 . The sign of the relation between λ_0 and *RLEV* is ambiguous. The presence of high leverage can be associated with release of privately received bad information earlier than earnings announcements to manage litigation risk. On the other hand, the use of accounting numbers in debt contracts implies greater monitoring of reported earnings by debt-holders and therefore, an enhanced role for earnings in releasing adverse information.

Table 4 presents the results of estimating regression (2) using the Fama-Macbeth procedure, for both the full sample (Panel A) and then separately, for the first three fiscal quarters (Panel B) and the fourth fiscal quarter (Panel C). In Panel A, in the first, second and third columns, *INFO* is set equal to *RSIZE*, *RNUM_AN*, and *RINST_OWN* respectively, and in the fourth, it is set equal to the composite measure *RCOMP_INFO*. The results reveal that *RBTM* is consistently negatively associated with earnings' role in conveying a greater proportion of bad news relative to good news within a fiscal period. The coefficient on *RBTM*RET*DR* is negative and statistically significant at the 1% level in all four columns of Panel A. Thus, when firm value is comprised more of growth options than assets-in-place that is, they have lower *BTM*, a greater

proportion of bad news reaching the market in a fiscal period is concentrated around earnings announcements relative to good news (H2).

Additionally, we find that all our proxies for the information environment – namely, size analyst following, institutional ownership and our composite index *COMP_INFO*, are negatively associated with earnings' differential role in releasing bad news. Focusing on *COMP_INFO*, for example, the final column reports that the coefficient on *RCOMP_INFO*RET*DR* is negative (-0.0045), and statistically significant at the 1% level. Thus, earnings' assumes a disproportionately large role in releasing bad news relative to good news when the firm's information environment is poorer (H3).

Turning to the control variables, the coefficients on *LEV*RET*DR* and *HITECH*RET*DR* are statistically insignificant in all specifications. In other words, for firms with high leverage or in high-technology industries, there is no evidence that bad news is any less concentrated around earnings announcement dates.

Panels B and C of Table 4 present the results of estimating regression (2) separately for the first three fiscal quarters, and the fourth fiscal quarter. A comparison between corresponding columns across the two Panels reveals that the association of earnings' more pronounced role in releasing bad news relative to good news with both the book-to-market ratio and the *INFO* variables are negative and statistically significant, irrespective of the fiscal quarter. Overall, our evidence suggests that earnings address the adverse selection problem in disclosure by assuming a greater role in releasing bad news in environments that involve high information asymmetry.

4.3 Earnings' Differential Disclosure Role Pre- and Post- SOX

In this section we test variation in the proportion of overall information conveyed by earnings with the passage of the Sarbanes Oxley Act (SOX). Fiscal quarters which in calendar time occur prior to the third quarter of 2002 are classified as pre-SOX, while the remaining quarters are classified as post-SOX.¹⁰

Table 5, Panel A presents the results for the overall sample. The results show that prior to SOX, earnings announcements released around 13.79% of good news during the quarter, while they released 20.53%, or 6.74 percent points more of bad news. Post-SOX, there is a marginal and statistically insignificant increase in the proportion of good news released during earnings announcements (which is around 14.46% post-SOX). However, post-SOX, the extent to which the proportion of bad news released during earnings announcement exceeds that of good news increases significantly, to 12.41 percent points. In other words, after SOX, we find that around 26.87% of overall negative news is concentrated around earnings announcement dates. Thus, our results provide evidence that in the post SOX period, there is a significant increase in the differential role of QEAs in disclosing bad news (H4). In further analysis, we find that the post-SOX increase in earnings' differential disclosure of bad news relative to good news is not simply reflective of a secular trend through time. This analysis is presented in Appendix A.¹¹

Table 5 Panels B and C present results separately for the first three fiscal quarters and the fourth fiscal quarter respectively. Panel B shows that for the first three fiscal quarters, earnings announcements released around 14.73% of overall good news in the pre-SOX period, while they

¹⁰ While the partition in time is based on calendar quarters, the regressions are estimated using fiscal quarters. Due to firms with non-December fiscal year-ends, the sum of the fiscal quarters across the pre-SOX and post-SOX periods (112), exceeds the number of fiscal quarters in our total sample (108).

¹¹ Briefly, in considering equal-length periods partitioned on calendar time, we find that the twenty fiscal quarters following SOX show a discontinuous rise in the incremental proportion of bad news concentrated around QEAs. Please see Appendix A for further details.

released 21.68%, or 6.95 percent points more of bad news. Post-SOX, there is essentially no change in the proportion of good news released during earnings announcements (which is around 14.79% post-SOX). However, the extent to which the proportion of bad news released during earnings announcement exceeds that of good news increases significantly post-SOX, to 14.03 percent points. Thus, our results confirm our hypothesis that in the first three fiscal quarters in the post SOX period, there is a significant increase in the proportion of bad news disclosed around earnings, versus the proportion of good news.

The results are more ambiguous for the fourth quarter. Pre-SOX, the proportion of bad news released around QEAs is around 17.09%, relative to 10.98% for good news. Post-SOX, the point estimate of the differential proportion of bad news released around QEAs rises marginally, to 7.52 percent points. However, we do not find statistical significance for this point estimate.¹²

In summary, our results confirm our hypothesis (H4) that in the post-SOX period, there is a significant increase in the proportion of bad news disclosed around QEAs, versus the proportion of good news. As expected, the increase is particularly pronounced for the first three fiscal quarters of the year.

4.4 Additional tests - Analysis of Return Volatilities

Beaver (1968) uses volatility in earnings announcement returns as a measure of information content of earnings. In addition to our regression results presented in Table 3, we investigate the volatility of earnings announcement returns relative to the volatility of non-earnings announcement period returns within a fiscal period. Our primary hypothesis implies that when quarterly returns are overall negative, more information is conveyed around quarterly

¹² One possible reason for the lack of significance is the relatively small number of fourth fiscal quarters in the post-SOX period (5) in our Fama-Macbeth regressions.

earnings announcements (QEAs) relative to non-earnings announcement dates. Hence, the volatility of earnings announcement returns is expected to be larger relative to that of non-earnings announcement period returns when the overall quarterly return is negative, than when it is positive.

Table 6 Panel A presents our results for the full sample of 387,101 firm-quarters, using standard deviation of returns to measure volatility. *STD_EAR_NEG* represents the quarterly standard deviation of earnings announcement returns when overall quarterly returns are negative. *STD_EAR_POS* is defined similarly for firm-quarters in which overall quarterly returns are positive. *STD_NEAR_NEG* and *STD_NEAR_POS* represent similar volatility measures for non-earnings-announcement-period returns when the overall quarterly returns are negative and positive respectively. The key measure is the ratio of the standard deviation of quarterly earnings-announcement returns to that of non-earnings-announcement returns. Therefore, we compute the ratio of *STD_EAR_NEG* to *STD_NEAR_NEG* every quarter and report the mean across the 108 quarters in Table 6 as *STDRATIO_NEG*. *STDRATIO_POS* is defined analogously.

As Table 6 shows, the mean standard deviation of quarterly earnings announcement returns is 8.76% when quarterly returns are negative, and 8.89% when quarterly returns are positive. More importantly, as Table 6 reports, the average of the quarterly difference between *STDRATIO_NEG* (70.10%) and *STDRATIO_POS* (53.27%) across the 108 quarters is positive and statistically significant at the 1% level. Thus, using the relative volatility of QEA returns to non-QEA returns as a measure of the relative informativeness of QEAs, we find that relative QEA informativeness is larger when overall information reaching the market is negative, consistent with H1.

A possible concern in the above analysis is that negative quarterly returns cannot exceed 100% in magnitude.¹³ This can have a mechanical effect on the standard deviation of returns in the negative-news versus positive-news samples, particularly since non-earnings announcement returns are highly correlated with overall quarterly returns (Table 1 Column 2). To address this issue, we repeat our analysis in Column 1 by restricting our sample to the 384,988 firm-quarters with *RET* not exceeding 100% in magnitude. As Column 2 of Table 6 demonstrates, *STDRATIO_NEG* (70.10%) exceeds *STD_EAR_POS* (54.98%) in the restricted sample as well. The difference between the two, at 15 percent points, is statistically significant at the 5% level.

5. Conclusion

We investigate the role of earnings and in particular, the role of quarterly earnings announcements (QEAs) as a disclosure medium that addresses the adverse selection problem between managers and external stakeholders. We begin by highlighting the unique features of earnings and earnings announcements. Quarterly earnings announcements represent a natural threshold in time at which managers can choose to disclose all the information that they have privately received regarding the firm's performance and/or financial health within a quarter. Given managers' asymmetric incentives to disclose good news earlier in the quarter and delay bad news disclosure, we expect that there is more bad news remaining to be disclosed at the QEAs at the end of the fiscal period.

We hypothesize that managers' ability to defer bad news disclosures beyond the QEAs is, in general, limited. Earnings are the product of mandated financial statements in which managers are expected to disclose all the information they have received about firm performance in a given

¹³ Strictly speaking, *RET* can assume values below -100%, since it denotes market-adjusted returns. In practice, there is no *RET* observation below -100%.

period, subject to verifiability requirements. We expect that the generally accepted accounting principles used to prepare financial statements impose less strict verification requirements to recognize privately received bad news as losses than privately received good news as gains. Further, financial statements numbers are scrutinized by external auditors whose reputational capital is dependent on their ability to extract possibly adverse information that managers have incentives to conceal. Consequently, we predict that earnings announcements are a relatively more important source of bad news reaching the market within a fiscal period than good news.

In our empirical analysis, we use returns-based measures to capture both news disclosed by QEAs and total news reaching the market in the corresponding quarter. Using a piecewise linear regression framework, we predict that the coefficient of market-adjusted earnings announcement returns (*EARs*) on market-adjusted quarterly returns (*RET*) is significantly more positive when the quarterly returns are negative, relative to when they are positive. Our results are consistent with our predictions.

Our cross-sectional tests provide evidence that earnings' differential disclosure of bad news is negatively associated with book-to-market, size, analyst following and institutional ownership. Thus, earnings assume a proportionately greater role in disclosing bad news when the firm's unverifiable growth options and/or poorer information environments generate greater information asymmetry between managers and shareholders. Further tests reveal that after the passage of SOX, there is a significant increase in differential proportion of bad news concentrated around QEAs relative to good news and this increase is more pronounced in the first three quarters.

Our results are significant in the light of studies such as McNichols (1988), who investigates the means and skewness of earnings announcements returns (*EAR*) versus returns

during comparable windows in non-announcements periods (*NEAR_CW*). She finds some evidence that *EARs* are positively skewed, but less so than *NEAR_CW*. Note that this is not sufficient to conclude whether earnings announcements are proportionately a more important source of bad news than good news, particularly since she also reports that mean *EARs* are generally more positive than mean *NEAR_CWs*.

While Beaver (1968) provided evidence on the information content of earnings announcements, subsequent studies have questioned the relative importance of earnings announcements as a source of information. In a recent study, Ball and Shivakumar (2008) argue that relative to other sources, earnings announcements play a smaller role as a source of information. We focus not on the absolute amount of information released during earnings announcements, but on their role in concentrating primarily on the release of bad news relative to good news. Our results indicate that in certain cases, for example, in the first three fiscal quarters after the passage of SOX, the proportion of bad news concentrated around QEAs can exceed that of good news by up to 14 percent points. The findings further suggest that the eventual release of bad news at the earnings announcements can also provide managers incentives to release bad news earlier in the quarter in some cases, such as when litigation risk is high.

The results in this paper are relevant in the context of several studies that document the greater significance of earnings as a source of information for smaller firms (Atiase 1985, 1987, Bamber 1987). We suggest that earnings' enhanced importance for smaller firms arises primarily as a result of its greater role in the disclosure of bad news in high-information-asymmetry environments.

Overall, our study highlights the role of earnings announcements in attenuating the adverse selection problem in managerial disclosures. The evidence in this paper indicates that

earnings announcements play a positive disclosure role regardless of the magnitude of information they release relative to other “information events” in non-announcement periods.

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Appendix A - Time Trend in the Asymmetric Association between Quarterly Returns and Earnings Announcement Returns

Appendix A presents the results of quarterly Fama-Macbeth regressions with firm-quarters split along calendar time. The first sub-period, 2002Q3 to 2006Q4, encompasses the quarters occurring after the Sarbanes Oxley Act (SOX). This period includes 18 calendar quarters (which corresponds to 20 fiscal quarters due to firms with non-December year-ends). Each of the five subsequent quarters includes 20 fiscal quarters. The final period includes the residual 12 fiscal quarters. The appendix reports results of estimating the following regression over the different time periods:

$$EAR_t = k + \eta * DR_t + \beta * RET_t + \gamma * RET_t * DR_t + \varepsilon_t.$$

Earnings announcement returns (EAR_t) are defined as the market-adjusted buy-and-hold returns over the seven days from day -3 to day +3, where day 0 is the quarterly earnings announcement. Quarterly returns (RET_t) are defined as the market-adjusted buy-and-hold returns starting after 3 days beyond the earnings announcement of quarter $t-1$ and ending 3 days after the announcement of quarter t . DR_t is an indicator variable set equal to one if $RET_t < 0$ and equal to zero otherwise. The coefficient on $RET * DR$ captures earnings' differential role in disclosing bad news relative to good news.

The regression is estimated for every fiscal quarter using the Fama-Macbeth approach. The results demonstrate that in sub-periods prior to SOX, the mean coefficient on $RET * DR$ ranges between 0.0569 and 0.0855, with the exception of the sub-period 1982Q3-1986Q2, in which it dips to 0.0260. There is no clear pattern in the coefficient on $RET * DR$ through time, and the coefficient is higher in the post-SOX period relative to all other sub-periods in the sample.

| | | <i>Intercept</i> | <i>DR</i> | <i>RET</i> | <i>RET*DR</i> | <i>R Squared</i> | <i>RETBAD</i> |
|-------------------|---------|------------------|----------------|---------------|---------------|------------------|---------------|
| 2002Q3- 2006Q4 | Mean | 0.0114 *** | -0.0054 *** | 0.1446 *** | 0.1241 *** | 0.2086 | 0.2687 *** |
| | T-stat. | 5.18 | -3.96 | 9.19 | 3.58 | | 38.47 |
| 1998Q3- 2002Q2 | Mean | 0.0102 * | 0.0093 | 0.1670 *** | 0.0580 | 0.1513 | 0.2249 *** |
| | T-stat. | 1.80 | 1.65 | 4.09 | 1.52 | | 32.21 |
| 1994Q3- 1998Q2 | Mean | 0.0094 *** | 0.0042 ** | 0.1482 *** | 0.0855 *** | 0.1781 | 0.2337 *** |
| | T-stat. | 5.82 | 2.23 | 10.82 | 5.93 | | 33.46 |
| 1990Q3- 1994Q2 | Mean | 0.0101 *** | 0.0015 | 0.1517 *** | 0.0683 *** | 0.1619 | 0.2200 *** |
| | T-stat. | 7.36 | 0.94 | 14.88 | 11.65 | | 31.50 |
| 1986Q3- 1990Q2 | Mean | 0.0079 *** | 0.0004 | 0.1366 *** | 0.0784 *** | 0.1655 | 0.2150 *** |
| | T-stat. | 4.46 | 0.21 | 14.53 | 5.51 | | 30.78 |
| 1982Q3- 1986Q2 | Mean | 0.0024 * | 0.0000 | 0.1334 *** | 0.0260 | 0.1494 | 0.1594 *** |
| | T-stat. | 1.91 | -0.01 | 12.11 | 1.17 | | 22.82 |
| 1980Q1- 1982Q2 | Mean | 0.0024 | 0.0028 *** | 0.1489 *** | 0.0569 *** | 0.1569 | 0.2058 *** |
| | T-stat. | 1.19 | 2.95 | 12.34 | 3.45 | | 29.47 |

***, **, * represent statistical significance at a minimum 0.01, 0.05, and 0.10 level respectively.

Table 1 – Descriptive Statistics and Correlations

Panel A of the table presents descriptive statistics for the pooled sample of 387,101 firm quarters over the 108 quarters from 1980-2006. Panel B of the table presents Pearson (below the diagonal) and Spearman (above the diagonal) correlations. Significance levels are presented in italics below the correlation coefficients. *RET* represents quarterly market-adjusted returns beginning after 3 days beyond the quarterly earnings announcement for the previous quarter and ending 3 days after the final earnings announcement for the current quarter, *EAR* are the cumulative market-adjusted returns on trading days -3 to +3 relative to the quarterly earnings announcement, *NEAR* represents the cumulative market-adjusted non-earnings announcement period returns (spanning all trading days included in *RET* except for the trading days included in *EAR*), *DR* is an indicator variable equal to 1 if *RET* is negative, and 0 otherwise, *MVE* is the beginning-of-quarter market value of equity, *NUM_AN* is the of beginning-of-period number of analysts following the firm, *INST_OWN* is the beginning-of-period institutional ownership, *BTM* is the beginning-of-period book-to-market ratio (book value of equity to market value of equity), *LEV* is the beginning-of-period leverage measured using ratio of total debt, both long-term and short-term, to total assets, and *HITECH* is a binary indicator variable that is set equal to one if the firm belongs to the following four-digit SIC industry codes: 2833–2836, 3570–3577, 3600–3674, 7371–7379 or 8731–8734.

Panel A - Descriptive Statistics

| Variable | Mean | Median | Standard Deviation | Skewness |
|-------------------------|----------|--------|--------------------|----------|
| <i>EAR (%)</i> | 0.26 | -0.17 | 10.02 | 0.59 |
| <i>NEAR (%)</i> | 0.19 | -1.27 | 23.44 | 2.58 |
| <i>RET (%)</i> | 0.43 | -1.19 | 25.51 | 2.45 |
| <i>DR</i> | 0.53 | 1.00 | 0.50 | -0.12 |
| <i>MVE (\$ million)</i> | 1,303.44 | 147.31 | 4,672.84 | 7.85 |
| <i>NUM_AN</i> | 5.62 | 2.00 | 7.90 | 2.05 |
| <i>INST_OWN</i> | 0.32 | 0.27 | 0.26 | 0.61 |
| <i>BTM</i> | 0.68 | 0.56 | 0.57 | 2.11 |
| <i>LEV</i> | 0.23 | 0.20 | 0.20 | 0.90 |
| <i>HITECH</i> | 0.19 | 0.00 | 0.39 | 1.58 |

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

| | <i>EAR</i> | <i>NEAR</i> | <i>RET</i> | <i>DR</i> | <i>SIZE</i> | <i>NUM_AN</i> | <i>INST_OWN</i> | <i>BTM</i> | <i>LEV</i> | <i>HITECH</i> |
|-----------------|----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|-----------------|----------------|
| <i>EAR</i> | 1.0000 | -0.0202 | 0.3619 | -0.2987 | 0.0265 | 0.0240 | 0.0353 | 0.0250 | 0.0078 | -0.0273 |
| | | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 |
| <i>NEAR</i> | -0.0273 | 1.0000 | 0.88564 | -0.75369 | 0.0373 | 0.01724 | 0.03679 | 0.05927 | -0.01013 | -0.0290 |
| | <.0001 | | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 |
| <i>RET</i> | 0.3601 | 0.9085 | 1.0000 | -0.8645 | 0.0328 | 0.0168 | 0.0381 | 0.0674 | -0.0056 | -0.0350 |
| | <.0001 | <.0001 | | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | 0.0005 | <.0001 |
| <i>DR</i> | -0.2782 | -0.6084 | -0.6741 | 1.0000 | -0.0321 | -0.0182 | -0.0370 | -0.0463 | 0.0060 | 0.0239 |
| | <.0001 | <.0001 | <.0001 | | <.0001 | <.0001 | <.0001 | <.0001 | 0.0002 | <.0001 |
| <i>SIZE</i> | -0.0102 | -0.0162 | -0.0211 | -0.0315 | 1.0000 | 0.6881 | 0.6537 | -0.3391 | 0.0383 | -0.0495 |
| | <.0001 | <.0001 | <.0001 | <.0001 | | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 |
| <i>NUM_AN</i> | 0.0029 | -0.0055 | -0.0050 | -0.0217 | 0.6807 | 1.0000 | 0.6403 | -0.2201 | 0.0274 | 0.0185 |
| | 0.0733 | 0.0006 | 0.0020 | <.0001 | <.0001 | | <.0001 | <.0001 | <.0001 | <.0001 |
| <i>INST_OWN</i> | 0.0124 | -0.0001 | 0.0024 | -0.0379 | 0.6221 | 0.5059 | 1.0000 | -0.1641 | -0.0002 | 0.0009 |
| | <.0001 | 0.9459 | 0.1352 | <.0001 | <.0001 | <.0001 | | <.0001 | 0.8898 | 0.5632 |
| <i>BTM</i> | 0.0286 | 0.0543 | 0.0618 | -0.0422 | -0.3420 | -0.1623 | -0.1753 | 1.0000 | 0.0865 | -0.1948 |
| | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | | <.0001 | <.0001 |
| <i>LEV</i> | 0.0026 | -0.0186 | -0.0146 | 0.0098 | 0.0153 | 0.0204 | -0.0082 | 0.0174 | 1.0000 | -0.2551 |
| | 0.1021 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | | <.0001 |
| <i>HITECH</i> | -0.0109 | 0.0118 | 0.0067 | 0.0239 | -0.0443 | 0.0083 | 0.0010 | -0.1443 | -0.2242 | 1.0000 |
| | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | <.0001 | 0.5424 | <.0001 | <.0001 | |

Table 2 – Return Ratios

Table 2 presents return ratios - the ratio of earnings announcements (*EAR*) to total quarterly returns (*RET*). *GNR* ratios are computed as *EAR* divided by *RET* when *RET* is positive, while *BNR* ratios are computed as *EAR* divided by *RET* when *RET* is negative. Both *RET* and *EAR* are defined in notes to Table 1. Table 2 reports mean and median BNR and GNR ratios and the difference between these ratios along with the appropriate two-sided T-statistic computed using Fama-Macbeth procedure. The statistics are reported for the full sample and separately for 3 groups of firm-quarters where groups are based on the absolute value of *RET*. ***, **, * represent statistical significance at a minimum 0.01, 0.05, and 0.1 level respectively.

| Variable | Full Sample | | | Absolute Value of RET between 0-30% | | | Absolute Value of RET between 30-60% | | | Absolute Value of RET above 60% | | | | | | |
|-----------------------------|-------------|----------------|------------|--|------|----------------|---|--------------|--------|------------------------------------|------------|--------------|----|---------------|------------|-------------|
| | N | Mean | T-stat | N | Mean | T-stat | N | Mean | T-stat | N | Mean | T-stat | | | | |
| Mean BNR | 108 | 0.1374 | *** | 15.28 | 108 | 0.0935 | *** | 6.85 | 107 | 0.1942 | *** | 31.02 | 22 | 0.1808 | *** | 13.97 |
| Mean GNR | 108 | 0.1808 | *** | 22.36 | 108 | 0.2455 | *** | 17.10 | 108 | 0.1625 | *** | 42.26 | 78 | 0.1403 | *** | 22.13 |
| <i>Difference (BNR-GNR)</i> | | -0.0435 | *** | -7.03 | | -0.1520 | *** | -7.67 | | 0.0317 | *** | 4.33 | | 0.0405 | *** | 2.94 |
| Median BNR | 108 | 0.1632 | *** | 35.65 | 108 | 0.1635 | *** | 27.11 | 107 | 0.2115 | *** | 32.21 | 22 | 0.2229 | *** | 13.91 |
| Median GNR | 108 | 0.1522 | *** | 38.27 | 108 | 0.1563 | *** | 29.97 | 108 | 0.1323 | *** | 32.96 | 78 | 0.1223 | *** | 14.85 |
| <i>Difference (BNR-GNR)</i> | | 0.0110 | *** | 4.09 | | 0.0072 | 0.90 | | | 0.0792 | *** | 10.31 | | 0.1006 | *** | 5.69 |

Table 3 - The Differential Association between Earnings Announcement Returns and Quarterly Returns

The table presents the results of quarterly Fama-Macbeth regressions for all quarters (Panel A), the first three fiscal quarters (Panel B), and only the fourth quarter (Panel C) over the 387,101 firm-quarters between 1980 and 2006. The dependent variable is *EAR* computed as the cumulative market-adjusted returns on trading days -3 to +3 relative to the quarterly earnings announcement. *RET* represents quarterly market-adjusted returns beginning after 3 days beyond the quarterly earnings announcement for the previous quarter and ending 3 days after the final earnings announcement for the current quarter, *DR* is an indicator variable equal to 1 if *RET* is negative, and 0 otherwise. ***, **, * represent statistical significance at a minimum 0.01, 0.05, and 0.10 level respectively.

Panel A - All Quarters

| | Mean | T-stat. |
|----------------------------|------------|---------|
| <i>Intercept</i> | 0.0079 *** | 11.15 |
| <i>DR</i> | 0.0004 | 0.65 |
| <i>RET</i> | 0.1391 *** | 30.85 |
| <i>RET*DR</i> | 0.0750 *** | 11.75 |
| <i>N of quarters</i> | 108 | |
| <i>R Squared</i> | 0.1617 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.2141 *** | 30.66 |

Panel B – First Three Quarters

| | Mean | T-stat. |
|----------------------------|------------|---------|
| <i>Intercept</i> | 0.0075 *** | 9.27 |
| <i>DR</i> | 0.0007 | 0.96 |
| <i>RET</i> | 0.1482 *** | 31.69 |
| <i>RET*DR</i> | 0.0790 *** | 11.11 |
| <i>N of quarters</i> | 81 | |
| <i>R Squared</i> | 0.1716 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.2272 *** | 28.33 |

Panel C – Fourth Quarter

| | Mean | T-stat. |
|----------------------------|-------------|----------------|
| <i>Intercept</i> | 0.0092 *** | 6.23 |
| <i>DR</i> | -0.0004 | -0.27 |
| <i>RET</i> | 0.1121 *** | 11.46 |
| <i>RET*DR</i> | 0.0629 *** | 4.49 |
| <i>N of quarters</i> | 27 | |
| <i>R Squared</i> | 0.1320 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.1749 *** | 32.17 |

Table 4 – Cross-Sectional Variation in the Differential Disclosure Role of Earnings

The table presents the results of quarterly Fama-Macbeth regressions for all fiscal quarters (Panel A), the first three fiscal quarters (Panel B), and only the fourth fiscal quarter (Panel C). The dependent variable is *EAR* computed as the cumulative market-adjusted returns on trading days -3 to +3 relative to the quarterly earnings announcement. *RSIZE* is the decile rank of the logarithm of the beginning of-period market value of equity, *RNUM_AN* is the decile rank of the of beginning-of-period number of analysts following the firm, *RINST_OWN* is the decile rank of the beginning-of-period institutional ownership, and *RCOMP_INFO* is the decile rank of the factor derived from a principal components analysis of the logarithm of the market value of equity, logarithm of one plus the number of analysts and percentage institutional ownership. All other variables are defined in the notes to Table 1. ***, **, * represent statistical significance at a minimum 0.01, 0.05, and 0.1 level respectively.

Panel A - All Quarters

| Variable | INFO=RSIZE | | INFO=RNUM_AN | | INFO=RINST_OWN | | INFO=RCOMP_INFO | |
|----------------------|-------------|---------|--------------|---------|----------------|---------|-----------------|---------|
| | Mean | T-stat. | Mean | T-stat. | Mean | T-stat. | Mean | T-stat. |
| <i>Intercept</i> | 0.0141 *** | 8.86 | 0.0091 *** | 8.09 | 0.0088 *** | 7.02 | 0.0111 *** | 8.11 |
| <i>RBTM</i> | -0.0005 *** | -3.30 | -0.0002 | -1.44 | -0.0002 | -1.08 | -0.0003 ** | -2.08 |
| <i>INFO</i> | -0.0009 *** | -4.68 | -0.0003 * | -1.93 | -0.0002 | -1.21 | -0.0005 *** | -3.21 |
| <i>RLEV</i> | 0.0000 | -0.31 | 0.0000 | -0.31 | -0.0001 | -0.68 | -0.0001 | -0.50 |
| <i>LITIND</i> | 0.0030 ** | 2.29 | 0.0036 *** | 2.72 | 0.0040 *** | 3.04 | 0.0035 *** | 2.69 |
| <i>DR</i> | 0.0011 | 0.58 | 0.0008 | 0.56 | 0.0025 | 1.43 | 0.0020 | 1.12 |
| <i>RBTM*DR</i> | -0.0001 | -0.74 | -0.0002 | -0.83 | -0.0002 | -1.10 | -0.0002 | -0.95 |
| <i>INFO*DR</i> | -0.0002 | -0.90 | -0.0002 | -1.13 | -0.0003 * | -1.73 | -0.0003 | -1.43 |
| <i>RLEV*DR</i> | 0.0006 *** | 3.00 | 0.0006 *** | 3.14 | 0.0006 *** | 3.01 | 0.0006 *** | 3.03 |
| <i>LITIND*DR</i> | -0.0039 *** | -2.63 | -0.0036 ** | -2.42 | -0.0040 *** | -2.71 | -0.0039 *** | -2.63 |
| <i>RET</i> | 0.1161 *** | 13.44 | 0.1194 *** | 17.92 | 0.1130 *** | 15.99 | 0.1160 *** | 15.29 |
| <i>RBTM*RET</i> | 0.0052 *** | 6.32 | 0.0049 *** | 6.24 | 0.0047 *** | 6.06 | 0.0051 *** | 6.34 |
| <i>INFO*RET</i> | 0.0011 | 1.22 | 0.0016 * | 1.94 | 0.0030 *** | 3.73 | 0.0019 ** | 2.49 |
| <i>RLEV*RET</i> | -0.0003 | -0.46 | -0.0004 | -0.57 | -0.0003 | -0.36 | -0.0004 | -0.57 |
| <i>LITIND*RET</i> | -0.0098 * | -1.84 | -0.0111 ** | -2.10 | -0.0120 ** | -2.36 | -0.0109 ** | -2.12 |
| <i>RET*DR</i> | 0.1423 *** | 13.50 | 0.1160 *** | 12.78 | 0.1245 *** | 12.99 | 0.1336 *** | 13.62 |
| <i>RBTM*RET*DR</i> | -0.0062 *** | -5.03 | -0.0046 *** | -3.72 | -0.0043 *** | -3.48 | -0.0053 *** | -4.31 |
| <i>INFO*RET*DR</i> | -0.0063 *** | -4.92 | -0.0043 *** | -4.31 | -0.0046 *** | -4.31 | -0.0057 *** | -5.06 |
| <i>RLEV*RET*DR</i> | 0.0008 | 0.84 | 0.0011 | 1.11 | 0.0007 | 0.72 | 0.0008 | 0.83 |
| <i>HITECH*RET*DR</i> | 0.0021 | 0.22 | 0.0081 | 0.84 | 0.0081 | 0.87 | 0.0058 | 0.61 |
| <i>N of quarters</i> | 108 | | 108 | | 108 | | 108 | |
| <i>R Squared</i> | 0.1887 | | 0.1872 | | 0.1878 | | 0.1885 | |

Panel B – First Three Quarters

| Variable | INFO=RSIZE | | INFO=RNUM_AN | | INFO=RINST_OWN | | INFO=RCOMP_INFO | |
|----------------------|-------------|---------|--------------|---------|----------------|---------|-----------------|---------|
| | Mean | T-stat. | Mean | T-stat. | Mean | T-stat. | Mean | T-stat. |
| <i>Intercept</i> | 0.0136 *** | 7.36 | 0.0084 *** | 6.58 | 0.0081 *** | 5.67 | 0.0106 *** | 6.79 |
| <i>RBTM</i> | -0.0006 *** | -3.36 | -0.0003 * | -1.77 | -0.0002 | -1.46 | -0.0004 ** | -2.37 |
| <i>INFO</i> | -0.0009 *** | -4.33 | -0.0002 | -1.30 | -0.0002 | -0.92 | -0.0005 *** | -2.91 |
| <i>RLEV</i> | 0.0000 | 0.20 | 0.0000 | 0.10 | 0.0000 | -0.29 | 0.0000 | -0.09 |
| <i>LITIND</i> | 0.0046 *** | 3.03 | 0.0053 *** | 3.49 | 0.0056 *** | 3.69 | 0.0052 *** | 3.40 |
| <i>DR</i> | -0.0013 | -0.67 | -0.0004 | -0.22 | 0.0012 | 0.61 | -0.0003 | -0.15 |
| <i>RBTM*DR</i> | 0.0001 | 0.23 | 0.0000 | -0.05 | -0.0001 | -0.43 | 0.0000 | -0.01 |
| <i>INFO*DR</i> | 0.0002 | 0.78 | 0.0000 | -0.22 | -0.0001 | -0.52 | 0.0001 | 0.43 |
| <i>RLEV*DR</i> | 0.0006 ** | 2.35 | 0.0006 ** | 2.50 | 0.0006 ** | 2.50 | 0.0006 ** | 2.43 |
| <i>LITIND*DR</i> | -0.0036 ** | -2.09 | -0.0037 ** | -2.13 | -0.0040 ** | -2.35 | -0.0037 ** | -2.19 |
| <i>RET</i> | 0.1307 *** | 14.07 | 0.1310 *** | 18.38 | 0.1248 *** | 16.15 | 0.1294 *** | 15.77 |
| <i>RBTM*RET</i> | 0.0050 *** | 5.42 | 0.0050 *** | 5.66 | 0.0047 *** | 5.80 | 0.0050 *** | 5.78 |
| <i>INFO*RET</i> | 0.0005 | 0.44 | 0.0012 | 1.29 | 0.0029 *** | 2.86 | 0.0015 | 1.60 |
| <i>RLEV*RET</i> | -0.0007 | -0.96 | -0.0007 | -0.93 | -0.0005 | -0.65 | -0.0007 | -0.94 |
| <i>LITIND*RET</i> | -0.0131 ** | -2.05 | -0.0143 ** | -2.23 | -0.0149 ** | -2.41 | -0.0143 ** | -2.29 |
| <i>RET*DR</i> | 0.1349 *** | 11.38 | 0.1108 *** | 10.79 | 0.1200 *** | 11.53 | 0.1267 *** | 11.54 |
| <i>RBTM*RET*DR</i> | -0.0057 *** | -4.08 | -0.0042 *** | -3.04 | -0.0039 *** | -2.93 | -0.0048 *** | -3.56 |
| <i>INFO*RET*DR</i> | -0.0057 *** | -3.72 | -0.0041 *** | -3.33 | -0.0045 *** | -3.39 | -0.0052 *** | -3.72 |
| <i>RLEV*RET*DR</i> | 0.0017 | 1.54 | 0.0019 * | 1.68 | 0.0014 | 1.29 | 0.0016 | 1.41 |
| <i>HITECH*RET*DR</i> | 0.0113 | 1.00 | 0.0173 | 1.50 | 0.0163 | 1.49 | 0.0150 | 1.34 |
| <i>N of quarters</i> | 81 | | 81 | | 81 | | 81 | |
| <i>R Squared</i> | 0.1983 | | 0.1966 | | 0.1973 | | 0.1980 | |

Panel C – Fourth Quarter

| Variable | INFO=RSIZE | | INFO=RNUM_AN | | INFO=RINST_OWN | | INFO=RCOMP_INFO | |
|----------------------|-------------|---------|--------------|---------|----------------|---------|-----------------|---------|
| | Mean | T-stat. | Mean | T-stat. | Mean | T-stat. | Mean | T-stat. |
| <i>Intercept</i> | 0.0158 *** | 4.91 | 0.0111 *** | 4.76 | 0.0109 *** | 4.16 | 0.0128 *** | 4.39 |
| <i>RBTM</i> | -0.0003 | -0.84 | 0.0000 | 0.07 | 0.0001 | 0.20 | -0.0001 | -0.21 |
| <i>INFO</i> | -0.0009 * | -1.97 | -0.0004 | -1.53 | -0.0003 | -0.81 | -0.0006 | -1.43 |
| <i>RLEV</i> | -0.0003 | -0.86 | -0.0002 | -0.75 | -0.0002 | -0.85 | -0.0002 | -0.79 |
| <i>LITIND</i> | -0.0019 | -0.83 | -0.0016 | -0.66 | -0.0009 | -0.38 | -0.0014 | -0.60 |
| <i>DR</i> | 0.0082 ** | 2.07 | 0.0044 | 1.34 | 0.0063 * | 1.85 | 0.0089 ** | 2.45 |
| <i>RBTM*DR</i> | -0.0007 * | -1.77 | -0.0006 | -1.48 | -0.0005 | -1.39 | -0.0007 * | -1.80 |
| <i>INFO*DR</i> | -0.0012 ** | -2.58 | -0.0007 * | -1.83 | -0.0009 *** | -2.70 | -0.0014 *** | -3.47 |
| <i>RLEV*DR</i> | 0.0007 * | 1.97 | 0.0007 * | 1.98 | 0.0006 * | 1.71 | 0.0007 * | 1.88 |
| <i>LITIND*DR</i> | -0.0047 | -1.63 | -0.0033 | -1.13 | -0.0038 | -1.33 | -0.0042 | -1.45 |
| <i>RET</i> | 0.0722 *** | 3.96 | 0.0847 *** | 5.99 | 0.0777 *** | 5.40 | 0.0757 *** | 4.87 |
| <i>RBTM*RET</i> | 0.0056 *** | 3.20 | 0.0046 *** | 2.69 | 0.0047 ** | 2.40 | 0.0053 *** | 2.76 |
| <i>INFO*RET</i> | 0.0031 * | 1.69 | 0.0025 * | 1.80 | 0.0033 ** | 3.02 | 0.0033 ** | 2.35 |
| <i>RLEV*RET</i> | 0.0009 | 0.62 | 0.0005 | 0.27 | 0.0005 | 0.27 | 0.0005 | 0.32 |
| <i>LITIND*RET</i> | 0.0003 | 0.03 | -0.0016 | -0.18 | -0.0034 | -0.40 | -0.0009 | -0.10 |
| <i>RET*DR</i> | 0.1645 *** | 7.32 | 0.1314 *** | 6.84 | 0.1379 *** | 6.16 | 0.1543 *** | 7.28 |
| <i>RBTM*RET*DR</i> | -0.0077 *** | -2.94 | -0.0057 ** | -2.12 | -0.0056 * | -1.87 | -0.0068 ** | -2.41 |
| <i>INFO*RET*DR</i> | -0.0080 *** | -3.59 | -0.0051 *** | -3.09 | -0.0050 *** | -3.04 | -0.0074 *** | -4.15 |
| <i>RLEV*RET*DR</i> | -0.0019 | -1.01 | -0.0014 | -0.68 | -0.0015 | -0.71 | -0.0015 | -0.72 |
| <i>HITECH*RET*DR</i> | -0.0254 | -1.51 | -0.0193 | -1.14 | -0.0168 | -1.00 | -0.0219 | -1.31 |
| <i>N of quarters</i> | 27 | | 27 | | 27 | | 27 | |
| <i>R Squared</i> | 0.1599 | | 0.1591 | | 0.1592 | | 0.1601 | |

Table 5 – Post SOX (Sarbanes and Oxley Act) Changes in the Differential Association between Earnings Announcement Returns and Quarterly Returns

The table presents the results of quarterly Fama-Macbeth regressions for all fiscal quarters (Panel A), the first three first fiscal quarters (Panel B), and for the fourth fiscal quarter (Panel C) before and after SOX in calendar time. Quarters after SOX are defined as quarters after the third calendar quarter of 2002 in calendar time. The dependent variable is *EAR* - the cumulative market-adjusted returns on trading days -3 to +3 relative to the quarterly earnings announcement. All other variables are as defined in Table 1. ***, **, * represent statistical significance at a minimum 0.01, 0.05, and 0.1 level respectively.

Panel A – All Quarters

| PRE SOX | | |
|--|-------------|----------------|
| | Mean | T-stat. |
| <i>Intercept</i> | 0.0076 *** | 9.40 |
| <i>DR</i> | 0.0015 *** | 2.18 |
| <i>RET</i> | 0.1379 *** | 31.54 |
| <i>RET*DR</i> | 0.0674 *** | 12.29 |
| <i>N of quarters</i> | 92 | |
| <i>R Squared</i> | 0.1542 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.2053 *** | 46.11 |
| POST SOX | | |
| | Mean | T-stat. |
| <i>Intercept</i> | 0.0114 *** | 5.18 |
| <i>DR</i> | -0.0054 *** | -3.96 |
| <i>RET</i> | 0.1446 *** | 9.19 |
| <i>RET*DR</i> | 0.1241 *** | 3.58 |
| <i>N of quarters</i> | 20 | |
| <i>R Squared</i> | 0.2086 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.2687 *** | 7.71 |
| | Mean | T-stat. |
| <i>Change in RET*DR Post SOX relative to Pre SOX</i> | 0.0567 *** | 2.86 |
| <i>Change in RETBAD Post SOX relative to Pre SOX</i> | 0.0634 *** | 4.13 |

Panel B – First Three Quarters

| PRE SOX | | |
|---|-------------------|----------------|
| | Mean | T-stat. |
| <i>Intercept</i> | 0.0071 *** | 7.84 |
| <i>DR</i> | 0.0015 ** | 2.01 |
| <i>RET</i> | 0.1473 *** | 31.47 |
| <i>RET*DR</i> | 0.0695 *** | 11.28 |
| <i>N of quarters</i> | 69 | |
| <i>R Squared</i> | 0.1639 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.2168 *** | 49.69 |
| POST SOX | | |
| | Mean | T-stat. |
| <i>Intercept</i> | 0.0126 *** | 4.61 |
| <i>DR</i> | -0.0053 *** | -3.30 |
| <i>RET</i> | 0.1479 *** | 8.95 |
| <i>RET*DR</i> | 0.1403 *** | 3.32 |
| <i>N of quarters</i> | 15 | |
| <i>R Squared</i> | 0.2220 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.2882 *** | 8.71 |
| | Mean | T-stat. |
| <i>Change in RET*DR Post SOX relative to Pre SOX</i> | 0.0708 *** | 3.03 |
| <i>Change in RETBAD Post SOX relative to Pre SOX</i> | 0.0715 *** | 4.02 |

Panel C – Fourth Quarter

| PRE SOX | | |
|--|-------------|----------------|
| | Mean | T-stat. |
| <i>Intercept</i> | 0.0090 *** | 5.18 |
| <i>DR</i> | 0.0016 | 0.95 |
| <i>RET</i> | 0.1098 *** | 13.57 |
| <i>RET*DR</i> | 0.0611 *** | 5.11 |
| <i>N of quarters</i> | 23 | |
| <i>R Squared</i> | 0.1253 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.1709 *** | 19.13 |
| POST SOX | | |
| | Mean | T-stat. |
| <i>Intercept</i> | 0.0077 *** | 2.63 |
| <i>DR</i> | -0.0057 ** | -1.98 |
| <i>RET</i> | 0.1347 *** | 3.18 |
| <i>RET*DR</i> | 0.0752 | 1.33 |
| <i>N of quarters</i> | 5 | |
| <i>R Squared</i> | 0.1681 | |
| <i>RETBAD (RET+RET*DR)</i> | 0.2100 *** | 10.90 |
| | Mean | T-stat. |
| <i>Change in RET*DR Post SOX relative to Pre SOX</i> | 0.0141 | 0.40 |
| <i>Change in RETBAD Post SOX relative to Pre SOX</i> | 0.0391 * | 1.85 |

Table 6 – Return Volatility Analysis

The table presents the results of our volatility analysis for the full sample of 387,101 firm-quarters, and for the restricted sample of 384,988 firm-quarters, using standard deviation of returns to measure volatility. *STD_EAR_NEG* represents the mean across 108 quarters of the quarterly standard deviation of earnings announcement returns when overall quarterly returns are negative. *STD_EAR_POS* is defined similarly for firm-quarters in which overall quarterly returns are positive. *DIFF_STD_EAR* is the average difference across the 108 quarters between *STD_EAR_NEG* and *STD_EAR_POS*. *STD_NEAR_NEG* and *STD_NEAR_POS* represent similar measures for non-earnings announcement period returns when the overall quarterly returns are negative and positive respectively. The table also presents results with *STD_RATIO*, or the mean ratio of the standard deviation of quarterly earnings-announcement returns to that of non-earnings-announcement returns across the 108 quarters. Thus *STDRATIO_NEG* is defined as the mean ratio of *STD_EAR_NEG* to *STD_NEAR_NEG*. *STDRATIO_POS* is defined analogously. *DIFF_STDRATIO* is the average difference across the 108 quarters between *STDRATIO_NEG* and *STDRATIO_POS*.

| | Column 1: Unrestricted Sample | | | Column 2: Restricted sample, ABS(RET)<100% | | |
|----------------------|--|----------------|--------|--|----------------|--------|
| Variable | Mean | T-stat. | | Mean | T-stat. | |
| <i>STD_EAR_NEG</i> | 0.0876 | *** | 40.36 | 0.0876 | *** | 40.36 |
| <i>STD_EAR_POS</i> | 0.0889 | *** | 44.34 | 0.0877 | *** | 48.77 |
| <i>STD_NEAR_NEG</i> | 0.1251 | *** | 44.86 | 0.1251 | *** | 44.86 |
| <i>STD_NEAR_POS</i> | 0.1783 | *** | 19.28 | 0.1622 | *** | 41.65 |
| <i>STDRATIO_NEG</i> | 0.7010 | *** | 107.41 | 0.7010 | *** | 107.41 |
| <i>STDRATIO_POS</i> | 0.5327 | *** | 59.65 | 0.5498 | *** | 78.86 |
| <i>DIFF_STDRATIO</i> | 0.1683 | *** | 18.70 | 0.1512 | *** | 22.10 |
| <i>N of quarters</i> | 108 | | | 108 | | |