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Earnings quality, proprietary disclosure costs and managers' use of disclosure tone to signal future performance

Nam Tran

Melbourne Business School, University of Melbourne

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Earnings Quality, Proprietary Disclosure Costs and Managers' Use of Disclosure Tone to Signal Future Performance

Angela K. Davis
University of Oregon, Charles Lundquist College of Business

Nam D. Tran
Melbourne Business School

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ABSTRACT: In this study, we examine whether managers are more likely to use the tone of language in earnings press releases to signal future performance when earnings quality is low and when proprietary disclosure costs are high. Using various proxies for earnings quality and disclosure costs, we find that, firms with low earnings quality and firms with high proprietary disclosure costs exhibit a stronger association between the net optimistic tone of current earnings press releases and future earnings. We also find some evidence that the market reaction to net optimistic tone of earnings press releases is stronger for firms with low earnings quality and firms with high proprietary disclosure costs.

I. INTRODUCTION

Corporate financial disclosures come in both quantitative and qualitative forms and include both mandated reports and voluntary disclosures. While academic research has generally focused on quantitative disclosures, a growing set of studies has used textual analysis tools to examine various dimensions of qualitative corporate disclosures including the use of optimistic and pessimistic language, which is often referred to as "tone". The results of these studies are generally consistent with managers using tone (at least to some extent) to communicate information about future performance. More specifically, they provide evidence of a positive association between the tone of managers' language used in narrative disclosures and current and future firm profitability, as well as short window returns around the release of the related disclosures (e.g., Henry 2008; Demers and Vega 2011; Davis, Piger, and Sedor 2012). Other recent studies consider alternative determinants of disclosure tone and find that tone may not always signal future performance. For example, Davis, Ge, Matsumoto, and Zhang (2012) find that the tone of language in earnings conference calls also reflects a specific manager's style, and Huang, Teoh, Zhang (2011) suggest that managers may opportunistically use tone in earnings press releases to misinform investors. The purpose of this study is to contribute to our understanding of managers' use of tone in qualitative disclosures and how it varies depending on the quality of a firm's quantitative disclosures. Specifically, we examine whether firms with low earnings quality and firms that have high proprietary disclosure costs are more likely to use the tone of language in earnings press releases to communicate information about future performance.[1]

Empirical evidence indicates that, on average, both quantitative and qualitative disclosures contain signals about future performance, and that the market incorporates those

[1] The term earnings quality has been used to capture different attributes of earnings in the literature (Dechow, Ge, and Schrand 2010). In this study, earnings quality refers to the ability of current earnings to predict future earnings (i.e., earnings persistence).

signals in valuing a firm (e.g. Hoskin, Hughes, and Ricks 1986; Francis, Schipper, and Vincent 2002; and Davis et al. 2012). Relative to quantitative information, qualitative disclosures are generally less precise and less verifiable, which reduces the reliability of qualitative disclosures (Demers and Vega 2011). Therefore, managers who want to signal private information about future performance will prefer quantitative disclosures (e.g., earnings) to qualitative disclosures (e.g., disclosure tone), unless the cost of using quantitative disclosures to signal performance outweighs the benefits of incremental reliability.

Prior research suggests that the quality of earnings varies across firms depending on various factors, including innate firm characteristics, managerial ability and managerial incentives (see Dechow, Ge, and Schrand [2010] for a comprehensive review). We argue that when innate firm characteristics limit managers' ability to signal future performance via earnings and other quantitative disclosures, managers will increase their reliance on disclosure tone as an alternative means to signal expected future performance.[2] Further, standard Bayesian learning models suggest that the market would place more weight on the signal of future performance in disclosure tone as the signal in earnings becomes noisier (Holthausen and Verrecchia 1988; Kim and Verrecchia 1991; Dye and Shridhar 2004). This would provide managers with additional incentives to use disclosure tone as a means to signal future performance. Relative to earnings and other quantitative information, the nature of disclosure tone provides managers with more flexibility to communicate information about future performance. Thus, we predict that firms with low earnings quality are more likely to use the tone of language in earnings press releases to signal future performance than firms with high earnings quality.

[2] Our argument assumes that, on average, managers have incentives to disclose information about future performance and are limited in their ability to use quantitative disclosures as a means to communicate this information for reasons that are out of their control. However, we recognize that earnings management could also lead to low earnings quality. When managers intentionally report low quality earnings for opportunistic reasons, it is possible that they would also be opportunistic in their qualitative disclosures, including their use of disclosure tone. In this case, we would not expect disclosure tone to be more informative of future performance for firms with low earnings quality.

We argue that as disclosure tone is less verifiable and, it offers another advantage as an alternative means to signal future performance for firms that have a significant concern about proprietary disclosure costs. Although disclosures help reduce cost of capital, concerns about revealing proprietary information to competitors might discourage firms from disclosing information to the market (e.g., Verrecchia 1983, Hayes and Lundholm 1996). The lower level of precision and verifiability makes disclosure tone less reliable. But this would also reduce the probability that competitors will take advantage of proprietary information at the expense of the disclosing firms. Therefore, we predict that firms that are more concerned about proprietary disclosure costs are more likely to rely on disclosure tone to communicate information about future performance.

We test our predictions using a sample of over 17,000 quarterly earnings press releases published in PR Newswire between 1998 and 2003. Following Davis et al. (2012) and Demers and Vega (2011), we use wordlists developed by DICTION to classify words as optimistic and pessimistic and calculate the net optimistic tone of earnings press releases as the difference between the percentage of optimistic and pessimistic words included in a press release. We expect the association between our measure of net optimistic tone and future performance to be stronger for firms with low earnings quality and firms with high disclosure costs. Our measure of future performance is the average earnings over the four quarters ahead scaled by total assets at the beginning of the current quarter.

We use two measures of earnings quality. Our first measure of earnings quality is based on the magnitude of current earnings relative to lagged earnings. We assume that firms with extreme earnings changes have low earnings quality. “Extreme” earnings are less persistent and presumably more difficult for investors to interpret. In other words, extreme earnings are less predictive of future earnings and hence of low quality. In addition, for firms with extreme earnings, it might be difficult to manage earnings to signal future performance,

as the required amount of earnings management is likely too large to be implemented. Our second measure of earnings quality is based on the magnitude of discretionary accruals. Firms with extreme discretionary accruals likely have lower earnings quality because discretionary accruals involve managerial estimates, which are subject to errors. Also, firms with extreme discretionary accruals have less room to manage earnings to signal future performance.

To proxy for disclosure costs, we use firms' average gross profit and market-to-book ratio. Firms with high gross profit likely have more valuable proprietary information and hence have more to lose if such proprietary information is revealed to the public (Dedman and Lennox 2009). Therefore, we assume that firms with high gross profit have high proprietary disclosure costs. Firms with high market-to-book ratio likely have more valuable growth opportunities and hence have less incentive to reveal private information that might dissipate those opportunities (Bamber and Cheon 1998).

Consistent with prior studies, we find that, on average, both current earnings and net optimistic tone of earnings press releases are predictive of future earnings performance. Consistent with our predictions, we find that firms with low earnings quality (i.e., those with extreme earnings changes or extreme discretionary accruals) exhibit a stronger positive association between net optimistic tone of earnings press releases and future earnings performance. Also consistent with our predictions, we find that firms with high proprietary disclosure costs (i.e., those with high gross profit or high market-to-book ratio) have disclosure tone that is more predictive of future earnings performance.

We also examine the market reaction to disclosure tone in earnings press releases. Given that disclosure tone is more informative about future performance for firms with low earnings quality and firms with high disclosure costs, we expect that the market reaction to disclosure tone is stronger for those firms. Our findings are mixed. Specifically, we find that

the market reaction to disclosure tone is stronger for firms with extreme current earnings changes and firms with high gross profit, consistent with our predictions. However, we do not find evidence that the market reaction to disclosure tone is stronger for firms with extreme abnormal accruals and for firms with high market-to-book ratio.

Our study extends previous research on managers' voluntary disclosure strategies, specifically those related to qualitative disclosures. Consistent with prior studies (e.g., Schrand and Walther 2000 and Davis and Tama-Sweet 2012), our evidence suggests that managers are deliberate in the preparation of qualitative discussion in earnings press releases. However, whereas prior work has focused on whether qualitative disclosures provide information incremental to quantitative data on average, we examine and provide evidence on how managers adjust their use of qualitative disclosures to signal private information when their ability to signal private information using quantitative disclosures is limited (i.e., when earnings are less informative or when proprietary disclosure costs are high). Second, our study extends the literature that examines the link between disclosure costs and managers' financial reporting choices. A general result documented in prior studies is that firms with high proprietary disclosure costs are less willing to provide voluntary disclosures (Bamber and Cheon 1998, Harris 1998, Botosan and Stanford 2005). We provide evidence that when proprietary disclosure costs are high, firms might switch to an alternative form of disclosures, disclosure tone, that has a lower level of reliability.

The remainder of the paper is organized as follows. Section II discusses related prior literature and our empirical predictions. Section III describes the sample and explains key variables. Section IV presents models to test our predictions and empirical results. Section V summarizes and concludes.

II. PRIOR LITERATURE AND PREDICTIONS

Theoretical research suggests several reasons why disclosures reduce cost of capital. First, disclosures improve market liquidity, which in turn reduces cost of capital through lower transaction costs or higher demand for the firm's shares (Amihud and Mendelson 1986; Diamond and Verrecchia 1991). Second, disclosures reduce non-diversifiable estimation risk, which also reduces cost of capital as the risk premium required by investors would be lower (Barry and Brown 1985; Coles and Loewenstein 1988; Handa and Linn 1993; Coles, Loewenstein, and Suay 1995; Clarkson, Guedes, and Thompson 1996; Lambert, Leuz, and Verrecchia 2007). Finally, Lambert, Leuz, Verrecchia (2007) suggest that disclosures could affect firms' real decisions, which may affect the ratio of expected cash flows to non-diversifiable covariance risk in a way that reduces firms' cost of capital. Consistent with this body of theoretical work, empirical studies have generally documented a negative association between firms' disclosure quality and cost of capital (e.g., Botosan 1997; Francis, LaFond, Olsson, and Schipper 2004).

The ability of disclosures to reduce cost of capital provides incentives for managers to disclose private information to the market. Earnings press releases are presumably one of the most important opportunities for managers to disclose information that will influence market participants' perception about their firms' future performance. Earnings press releases can be viewed as a "package of information", which includes both quantitative disclosures (e.g., earnings) and qualitative disclosures (e.g., the tone of language used). While the ability of current earnings to predict future earnings has been thoroughly investigated in the literature, recent studies have examined and provided evidence that the tone of language used in earnings press releases (disclosure tone) can also predict firms' future performance (e.g., Demers and Vega 2011; Davis et al. 2012). Relative to earnings and other quantitative disclosures, disclosure tone is less precise and verifiable (Demers and Vega 2011). Standard

Bayesian learning models suggest that when multiple signals about performance exist, the market reaction to one signal increases in the quality of that signal relative to the quality of other existing signals (Holthausen and Verrecchia 1988; Kim and Verrecchia 1991; Dye and Shridhar 2004). Therefore, if both earnings and disclosure tone contain the same signal about future performance, the market would place more weight on earnings in valuing the firm.

However, due to GAAP constraints, managers may be limited in their ability to signal future performance via earnings and/or have relevant information that is difficult to quantify (e.g., managers' confidence of winning a pending lawsuit, managers' perception of risk factors facing the firm), which decreases the quality of earnings. Given managers' incentives to disclose information to reduce cost of capital, we expect managers to compensate for the low quality of earnings by increasing the use of disclosure tone as an alternative means to signal future performance. Our expectation is consistent with the evidence in Tasker (1998) that firms with less informative financial statements are more likely to provide additional voluntary disclosures via conference calls. We argue that the inherent flexibility of language provides managers with an opportunity to communicate information that is difficult to communicate via quantitative disclosures.

In addition, as the quality of earnings decreases, Bayesian learning models suggest that the market would place more weight on disclosure tone in assessing the firm's future performance. In this case, the marginal benefit of qualitative disclosures increases, providing managers with stronger incentives to use disclosure tone as an alternative means to communicate information to the market. Taken together, we predict that managers of firms with low earnings quality are more likely to use disclosure tone to signal future performance than managers of firms with high earnings quality.

Although disclosures help reduce cost of capital, when disclosures are costly, there exist equilibria in which not all information is disclosed even if the market is rational and

presumes that withheld information is unfavorable (e.g., Verrecchia 1983, Hayes and Lundholm 1996). While there are various costs associated with disclosing private information, the most compelling example are perhaps costs associated with revealing proprietary information, which might be used by competitors to the disadvantage of the disclosing firm (Verrecchia 2001, p. 141). We conjecture that because of its lower precision and verifiability, disclosure tone offers another advantage over quantitative disclosures in mitigating disclosure costs. As disclosure tone is less precise and verifiable, actions taken based on disclosure tone are subject to higher information risks. This reduces the probability that competitors will take advantage of proprietary information disclosed by a firm. Therefore, we expect that firms with high proprietary disclosure costs are more likely to rely on disclosure tone to signal future performance than firms with low disclosure costs. Taken together, we predict that:

> *H1a: Firms with low earnings quality are more likely to use disclosure tone to signal future performance.*
>
> *H1b: Firms with high proprietary disclosure costs are more likely to use disclosure tone to signal future performance.*

III. SAMPLE SELECTION AND VARIABLE DEFINITION

Sample Selection

We start by collecting quarterly earnings press releases published by PR Newswire between January 1, 1998 and December 31, 2003. We rely on PR Newswire's classification of press releases to identify earnings press releases. To increase our confidence that the sample includes only earnings press releases, we read all electronic files with a size of less than 2 kilobytes and eliminate those files containing conference call announcements or other

non-earnings related announcements.[3] We are able to collect 73,758 earnings press releases from PR Newswire. Relying on the ticker provided in the earnings press release as a firm identifier, we are able to successfully match 39,221 (approximately 53%) of these press releases to the CRSP/Compustat merged database. Primary reasons leading to unmatched press releases include firms' tickers changing across time and firms that are not covered by CRSP/Compustat (e.g., firms traded on the OTC market) issuing press releases on PR Newswire. We require data from Compustat, CRSP, I/B/E/S to test our predictions, which further reduces our sample size. Finally, we eliminate observations greater than five standard deviations from the mean for each of the accounting, financial-market, and language variables. Our final sample consists of 17,951-22,582 firm-quarters, depending on specific tests.

Measure of Net Optimistic Language

We employ computerized textual-analysis software to measure managers' use of optimistic and pessimistic tone in each of the quarterly earnings press releases in the sample. In particular, we use DICTION 5.0 (Hart 2000, 2001) to count optimism-increasing words (i.e., optimistic) and optimism-decreasing words (i.e., pessimistic) in the full text of each earnings press release. We then construct our disclosure tone measure, NETOPT, by calculating the difference between total number of optimistic words and total number of pessimistic words, scaled by total number of words in the corresponding earnings press release (numerical characters are excluded from the calculation). This NETOPT variable will be used in our tests.

[3] It is possible that larger electronic files are not earnings press releases. However, when we collect Compustat data, we require that firms have a report date that falls within 3 days of the press release date. Thus, any non-earnings related press releases that have been misclassified by PR Newswire would remain in our sample only if the press release date is within 3 days of the report date, which generally corresponds to the earnings announcement dates. This data restriction ensures that non-earnings related press releases are unlikely to be included in our final sample and thus, unlikely to influence our results.

Measures of Earnings Quality

Extreme Earnings Changes

Our first measure of earnings quality is based on the magnitude of firms' current earnings changes. Extreme earnings changes (exceptionally high or exceptionally low) are less persistent and hence less predictive of future performance (Frankel and Litov 2010). Moreover, for firms with extreme earnings changes, it is more difficult to use discretionary accruals as a means to signal future performance as the required amount of accruals adjustment is likely too large to be implemented. Therefore, we assume that firm-quarters with extreme earnings changes have low earnings quality. We calculate earnings changes as current earnings minus last quarter earnings. Earnings are scaled by total assets at the beginning of each quarter. For each firm-quarter, earnings change is defined as "extreme" if its absolute value exceeds one standard deviation of earnings calculated over the previous 12 quarters.

Extreme Discretionary Accruals

Our second proxy for earnings quality is based on the magnitude of discretionary accruals for the current quarter. Discretionary accruals are estimated cross-sectionally using the following model by two-digit industry and year.

$$ACC_{it} = \lambda_0 + \sum_{k=1}^{4} \lambda_k Q_{kit} + \lambda_5(\Delta SALE_{it} - \Delta AR_{it}) + \lambda_6 Net_PPE_{it} + \mu_{it} \qquad (1)$$

We require at least 20 observations for each industry-year in estimating model (1). ACC_{it} equals earnings before extraordinary items minus cash flows from operating activities of firm i for quarter t. Q_{kit} is a dummy variable equal to 1 for fiscal quarter k, 0 otherwise. $\Delta SALE_{it}$ is the change in sales of firm i from quarter t-1 to quarter t. ΔAR_{it} is the change in accounts receivable of firm i for quarter t. Net_PPE_{it} is net property, plant, equipment of firm

i at the end of quarter t. All variables, including the fiscal quarter dummies, are scaled by total assets at the beginning of quarter t. To mitigate the effects of outliers, ACC_{it} and $(\Delta SALE_{it} - \Delta AR_{it})$ are truncated at the 0.5^{th} and 99.5^{th} percentiles. Net_PPE_{it} and all quarter dummies are truncated at 0 and the 99.5^{th} percentile.

The residuals from estimating model (1) are discretionary accruals. We argue that extreme discretionary accruals (exceptionally high or exceptionally low) are an indicator of low earnings quality because discretionary accruals represent management's subjective estimates, which are subject to errors. Also, having extreme discretionary accruals indicates that the firm has less flexibility in managing earnings to signal future performance. For each fiscal year, firm-quarters with discretionary accruals above the 75^{th} percentile or below the 25^{th} percentile of discretionary accruals for all sample firm-quarters in that particular year are classified as having "extreme" discretionary accruals and hence having low earnings quality.

Measures of Proprietary Disclosure Costs

Measuring disclosure costs has always been a difficult task in the accounting literature. In this study, we use two proxies for disclosure costs: firms' gross profit and market-to-book ratio. Firms with high gross profit are likely to have more valuable proprietary information and hence are more concerned about disclosing such information to the market (Dedman and Lennox 2009). Therefore, we use firms' gross profit as a proxy for proprietary disclosure costs, with high gross profit implying high disclosure costs. Specifically, for each firm-quarter we calculate the average gross profit (sales minus cost of goods sold) using data over the previous 12 quarters. Following Dedman and Lennox (2009), gross profit is scaled by total assets at the beginning of each quarter.

Our second proxy for proprietary disclosure costs is firms' market-to-book ratio. Firms with high market-to-book ratio likely have valuable growth opportunities, which might

dissipate if information about those opportunities is revealed to their competitors. Thus, firms with high market-to-book ratio are expected to have high proprietary disclosure costs (Bamber and Cheon 1998). We calculate market-to-book ratio for each firm-quarter as the market value divided by the book value of the firm's equity at the end of the current quarter.

Other Accounting and Financial-Market Variables

Our measure of firms' future performance is the average earnings before extraordinary items calculated over the four quarters subsequent to the current quarter, scaled by total assets at the beginning of the current quarter.[4] To measure the market reaction to information in earnings press releases, our variable CAR is defined as the cumulative abnormal return (relative to the firm's size-decile portfolio) over the three-day window centered on the earnings press release date. Other control variables will be defined in conjunction with the empirical models presented in the next section.

IV. EMPIRICAL MODELS AND RESULTS

Summary Statistics

Table 1 presents summary statistics for variables used in this paper. Our sample consists of relatively large firms. Mean and median of revenue is $691 million and $132 million, respectively. Given this skewed distribution of revenue, we will use natural logarithm of revenue (LOGREV) as a control variable in our analyses. On average, firms in our sample have positive (as opposed to neutral) net optimistic tone of earnings press

[4] In untabulated tests, we find that net optimistic tone in earnings press releases is predictive of earnings for each of the four quarters following the current quarter.

releases.[5] During the sample period, our sample firms meet or beat analyst forecasts 71% of the time and report positive earnings 75% of the time.

Table 2 presents pairwise correlation coefficients between variables used in our empirical tests. All variables are statistically significantly correlated with each other at the 1-percent level, suggesting the importance of using multivariate analyses to test the association between disclosure tone and future performance. As expected, the market reaction to earnings announcement (CAR) is positively associated with both current and future earnings, with the magnitude of earnings surprise, and with the ability of firms to meet or beat earnings thresholds (analyst forecast and zero earnings). Consistent with prior studies, firms with more optimistic tone of earnings press releases (NETOPT) have higher future performance (FUTEARN) as well as higher announcement return (CAR). However, as the associations among all variables in table 2 are statistically significant, simply looking at pairwise correlations might not allow us to make meaningful conclusions.

Association Between Disclosure Tone and Future Earnings Conditional on Earnings Quality

We predict that firms with low earnings quality have disclosure tone that is more informative about future performance. We test this prediction using the following model, estimated separately for firms with high versus low earnings quality.

$$FUTEARN_{it} = \theta_0 + \theta_1 EARN_{it} + \theta_2 NETOPT_{it} + \theta_3 SDROA_{it} + \theta_4 LOGREV_{it} + \theta_5 SURP_{it} + \theta_6 BEAT_{it} + \theta_7 POSITIVE_NI_{it} + \sum_j \theta_{8j} ID_{ij} + \sum_k \theta_{9k} YEAR_{ik} + \eta_{it} \quad (2)$$

$EARN_{it}$ is earnings before extraordinary items for quarter t, scaled by total assets at the beginning of quarter t. $FUTEARN_{it}$ is the average earnings before extraordinary items over

[5] In untabulated tests, we find that firms with extreme earnings have *more* optimistic tone of earnings press releases while firms with extreme discretionary accruals have *less* optimistic tone of earnings press releases. Firms with high gross profit and firms with high market-to-book ratio both have *more* optimistic tone of earnings press releases.

the four quarters t+1 through t+4, scaled by total assets at the beginning of quarter t. $NETOPT_{it}$ is the net optimistic tone of firm i's earnings press release for quarter t. If our prediction is consistent with empirical data, we should observe that the coefficient on $NETOPT_{it}$ (i.e., θ_2) is positive and larger for firms with low earnings quality than for firms with high earnings quality.

We also include variables to control for other quantitative information that are likely predictive of future performance. $SDROA_{it}$ is the standard deviation of *ROA* calculated over the four quarters subsequent to the current quarter, which is included to control for risk. $LOGREV_{it}$ is the natural logarithm of total revenue for the current quarter. $SURP_{it}$ is the difference between actual I/B/E/S earnings and the I/B/E/S most recent consensus earnings forecast from the summary file, scaled by share price of the firm at the beginning of the current quarter. $BEAT_{it}$ is a dummy variable equal to 1 if $SURP_{it}$ is non-negative, 0 otherwise. $POSITIVE_NI_{it}$ is a dummy variable equal to 1 if $EARN_{it}$ is non-negative, 0 otherwise. ID_{ij} is an indicator variable taking the value 1 if firm *i* currently belongs to the j^{th} two-digit SIC industry, 0 otherwise. $YEAR_{ik}$ is an indicator variable taking the value 1 if the earnings press release of firm *i* was released in year *k*, 0 otherwise. ID_{ij} and $YEAR_{ik}$ are included in the model to capture any industry and year fixed effects.

Table 3 presents the regression results for model (2) separately for firms with low and high earnings quality. For each proxy of earnings quality (i.e., extreme earnings changes or extreme discretionary accruals), the first column presents the result for firms with low earnings quality while the second column presents the result for firms with high earnings quality. Consistent with the finding in Davis et al. (2012) that net optimistic tone in earnings press releases contains signal about future performance, we find that the coefficient on $NETOPT_{it}$ (θ_2) is positive and statistically significant at conventional levels. This result holds

for both firms with high and low earnings quality. Consistent with our prediction, the coefficient θ_2 is statistically significantly smaller for firms with high earnings quality. In terms of economic significance, the coefficient θ_2 for firms with low earnings quality is 2 to 3 times larger than that for firms with high earnings quality, depending on which proxy for earnings quality is used. Overall, the results suggest that managers' use of disclosure tone to signal future performance varies with earnings quality, firms with low earnings quality are more likely to use disclosure tone to signal future performance.

Consistent with firms in the second column (for each measure of earnings quality) having earnings that are of higher quality, the coefficient on $EARN_{it}$ (θ_1) is significantly greater for those firms. Turning to other control variables, firms with more volatile ROA have lower future performance while firms that beat analyst consensus forecasts have higher future performance. There are also statistically significant differences in the association between many control variables and future performance across firms with low versus high earnings quality.[6]

Association Between Disclosure Tone and Future Earnings Conditional on Disclosure Cost

We predict that firms with high disclosure costs have disclosure tone that is more predictive of future performance. We test this prediction using model (2) above, estimated separately for firms with high versus low proprietary disclosure costs. Table 4 presents the regression results. For each measure of disclosure, the first column presents the result for

[6] We also ran model (2) for subsamples of firm-quarters with high earnings changes (earnings change higher than one standard deviation of historical earnings) and high discretionary accruals (discretionary accruals higher than the 75th percentile), firm-quarters with medium earnings changes (absolute value of earnings change lower than one standard of historical earnings) and medium discretionary accruals (discretionary accruals between the 25th percentile and the 75th percentile, inclusive), and firm-quarters with low earnings changes (earnings change smaller than negative one standard deviation of historical earnings) and low discretionary accruals (discretionary accruals lower than the 25th percentile). The results shown in Figure 1A and 1B are consistent with our prediction. That is, firm-quarters with extreme earnings changes or extreme abnormal accruals (either exceptionally high or exceptionally low) have more informative disclosure tone than firm-quarters with medium earnings changes or medium discretionary accruals.

firms with high disclosure costs (i.e., those with gross profit or market-to-book ratio above the median) while the second column presents the result for firms with low disclosure costs (i.e., those with gross profit or market-to-book ratio below the median).

Consistent with our prediction, the coefficient θ_2 is positive and statistically significantly greater for firms with high disclosure costs. In terms of economic significance, the coefficient θ_2 for firms with high disclosure costs is 2 to 3 times larger than that for firms with low disclosure costs, depending on which proxy for disclosure costs is used. This result is consistent with managers of firms with high disclosure costs are more likely to use disclosure tone to signal future performance. It is important to note that firms with high disclosure costs do *not* have less informative earnings.[7]

Market Reaction to Disclosure Tone Conditional on Earnings Quality and Disclosure Costs

We expect the market reaction to the net optimistic tone of earnings press releases to be stronger for firms with low earnings quality for two reasons. First, as indicated in table 3, net optimistic tone of firms with low earnings quality is more informative about future performance than net optimistic tone of firms with high earnings quality. Second, as reported earnings become less informative (i.e., of lower quality), we would expect investors to place more weight on disclosure tone when responding to earnings press releases even if disclosure tone does not contain more information about future performance for firms with low earnings quality. For similar reasons, we expect the market reaction to disclosure tone to be stronger for firms with high disclosure costs relative to firms with low disclosure costs. To test our

[7] We also ran model (2) for subsamples of firm-quarters with high disclosure costs (those with gross profit or market-to-book ratio higher than the 75th percentile), firm-quarters with medium disclosure costs (those with gross profit or market-to-book ratio in between the 25th and 75th percentiles, inclusive), and firm-quarters with low disclosure costs (those with gross profit or market-to-book ratio below the 25th percentile). The results shown in Figure 1C and 1D are consistent with our prediction. That is, the informativeness of disclosure tone increases monotonically with the degree of disclosure costs.

predictions, we estimate the following regression separately for firms with high versus low earnings quality, and for firms with high versus low disclosure costs.

$$CAR_{it} = \delta_0 + \delta_1 SURP_{it} + \delta_2 NETOPT_CHANGE_{it} + \delta_3 BEAT_{it} + \delta_4 POSITIVE_NI_{it} + \sum_j \delta_{5j} ID_{ij} + \sum_k \delta_{6k} YEAR_{ik} + \tau_{it} \quad (3)$$

CAR_{it} is the cumulative abnormal return (relative to the firm's size-decile portfolio) over the three days centered on the earnings announcement date. $NETOPT_CHANGE_{it}$ is net optimistic tone of firms i's earnings press release for quarter t minus net optimistic tone of firm i's earnings press release for quarter t-1. This is our measure of unexpected disclosure tone. All other variables are defined as in model (2). If the market reaction to net optimistic tone of earnings press releases is stronger for firms with low earnings quality and firms with high disclosure costs, we should observe that the coefficient δ_2 is more positive for firms with low earnings quality and for firms with high disclosure costs.

Regression results for model (3) for firms with low versus high earnings quality are presented in table 5. For each measure of earnings quality, the first column presents the result for firms with low earnings quality (those with extreme earnings changes or extreme discretionary accruals) while the second column presents the result for firms with high earnings quality (those with medium earnings changes and those with medium discretionary accruals). Overall, the coefficient on $NETOPT_CHANGE_{it}$ (δ_2) is positive and statistically significant at conventional levels for both firms with low and high earnings quality. When extreme earnings changes are used as a proxy for earnings quality, the association between $NETOPT_CHANGE_{it}$ and CAR_{it} is statistically significantly lower for firms with high earnings quality, consistent with our prediction. In terms of economic significance, the coefficient on $NETOPT_CHANGE_{it}$ for firms with low earnings quality is 2.7 times larger than that for firms with high earnings quality. However, when extreme discretionary accruals

is used to proxy for earnings quality, the coefficient on $NETOPT_CHANGE_{it}$ is statistically indistinguishable for firms with low versus high earnings quality.

Regression results for model (3) for firms with low versus high disclosure costs are presented in table 6. For each measure of disclosure costs, the first column presents the result for firms with high disclosure costs (those with gross profit or market-to-book ratio higher than or equal to the median) while the second column presents the result for firms with low disclosure costs (those with gross profit or market-to-book ratio lower than the median). Overall, the coefficient on $NETOPT_CHANGE_{it}$ (δ_2) is positive and statistically significant at conventional levels for both firms with low and high disclosure costs. When average gross profit is used as a proxy for disclosure costs, the association between $NETOPT_CHANGE_{it}$ and CAR_{it} is statistically significantly greater for firms with high disclosure costs, consistent with our prediction. In terms of economic significance, the coefficient on $NETOPT_CHANGE_{it}$ for firms with high disclosure costs is 1.8 times larger than that for firms with low disclosure costs. However, when market-to-book ratio is used to proxy for disclosure costs, the coefficient on $NETOPT_CHANGE_{it}$ is statistically indistinguishable for firms with low versus high disclosure costs. Taken together, we find weak evidence that the market reaction to the tone of language in earnings press releases is stronger for firms that have low earnings quality and for firms that have high proprietary disclosure costs. Turning to other control variables, the market reacts favorably to firms that meet or beat analyst forecasts as well as firms that report non-negative earnings, also consistent with prior studies.

V. CONCLUSION

Earnings press releases provide managers with an important opportunity to disclose private information to the market. While earnings news is presumably the most important

piece of information in earnings press releases, a growing body of research has documented that the tone of language used in the corresponding discussion also contains relevant information about future performance (Demers and Vega 2011; Davis et al. 2012). Specifically, firms that exhibit more optimistic tone in the qualitative discussion included in their earnings press releases tend to have better future performance, as measured by both future returns on assets and stock returns in response to earnings announcements. However, other recent studies recognize that managers' tone in earnings press releases may not always reflect future performance for various reasons including managerial fixed effects and incentives to report opportunistically (e.g., Davis et al. 2012 and Huang et al. 2012). We extend this literature by examining how managers' use of disclosure tone to signal future performance varies with the quality of their firms' earnings and with the degree of proprietary disclosure costs.

We find that disclosure tone in earnings press releases is more strongly associated with future earnings for firms that have low earnings quality, as proxied for by extreme earnings changes and extreme discretionary accruals. We also find that firms with high proprietary disclosure costs have disclosure tone that is more predictive of future earnings. Overall, our evidence is consistent with managers using the tone of language in earnings press releases as an alternative means to signal information about future performance when the ability of quantitative disclosures to signal future performance is limited. Finally, we find some evidence that the market reaction to disclosure tone is stronger for firms with low earnings quality and firms with high disclosure costs, although the results are not consistent across different measures of earnings quality and disclosure costs.

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Appendix A: Variable Definition

Main Variables

Variable	Definition
CAR	Cumulative abnormal returns (relative to the firm's size-decile portfolio) over the three days centered on the earnings announcement date.
FUTEARN	Mean of earnings before extraordinary items over the four quarters subsequent to the current quarter, scaled by total assets at the beginning of the current quarter.
EARN	Earnings before extraordinary items scaled by total assets at the beginning of the current quarter.
NETOPT	Difference between the percentage of "optimism-increasing" words and the percentage of "optimism-decreasing" words in the earnings press release.
SDROA	Standard deviation of ROA over the four quarters subsequent to the current quarter.
REVENUE	Total revenue in million dollars.
LOGREV	Natural logarithm of sales for the current quarter.
SURP	Difference between actual I/B/E/S earnings for the current quarter and the most recent I/B/E/S consensus forecast from the summary file, scaled by stock price at the beginning of the current quarter.
BEAT	An indicator equal to 1 if SURP>=0, 0 otherwise.
POSITIVE_NI	An indicator equal to 1 if ROA>=0, 0 otherwise.

Partitioning Variables:

Earnings Change	Difference between current earnings and last quarter earnings, both scaled by lagged total assets. Earnings changes with absolute value greater than one standard deviation of historical earnings (calculated over the past 12 quarters) are classified as *extreme*.
Discretionary Accruals	Discretionary accruals are estimated cross-sectionally for each two-digit industry and year using a modified Jones model. For each year, discretionary accruals greater than the 75^{th} percentile or smaller than the 25^{th} percentile of discretionary accruals for all sample firm-quarters are classified as *extreme*.
Gross Profit	Sales minus cost of goods sold, scaled by lagged total assets.
Market-to-book ratio	Market value of equity divided by book value of equity at the end of the current quarter.

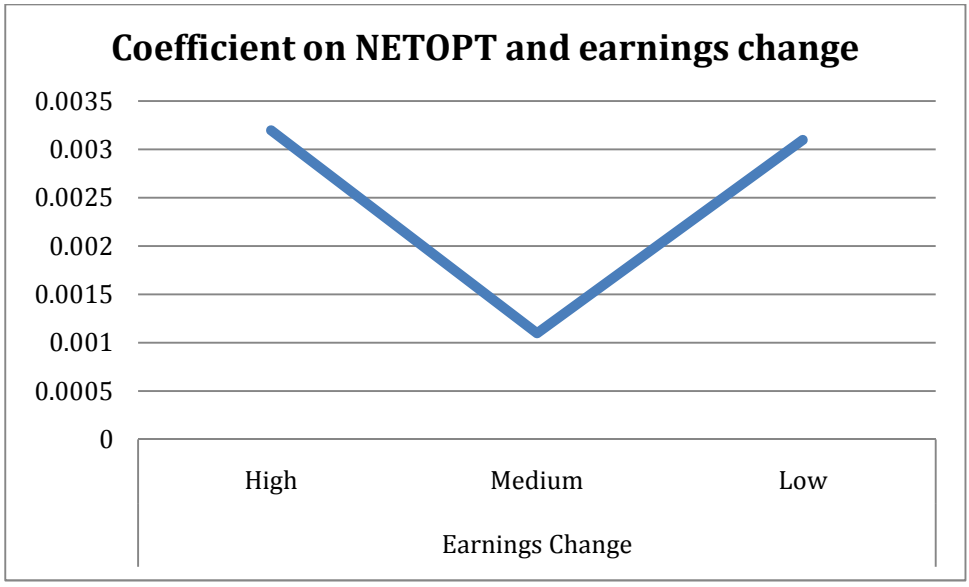


Figure 1A: This figure plots the coefficient θ_2 from model (2) for firm-quarters with different levels of earnings changes. High (Low) indicates firm-quarters with earnings changes greater than one standard deviation (smaller than negative one standard deviation) of earnings calculated over the past 12 quarters. Medium indicates the remaining sample firm-quarters. Quarter t is the quarter for which the earnings press release is issued. The sample includes 19,060 firm-quarters.

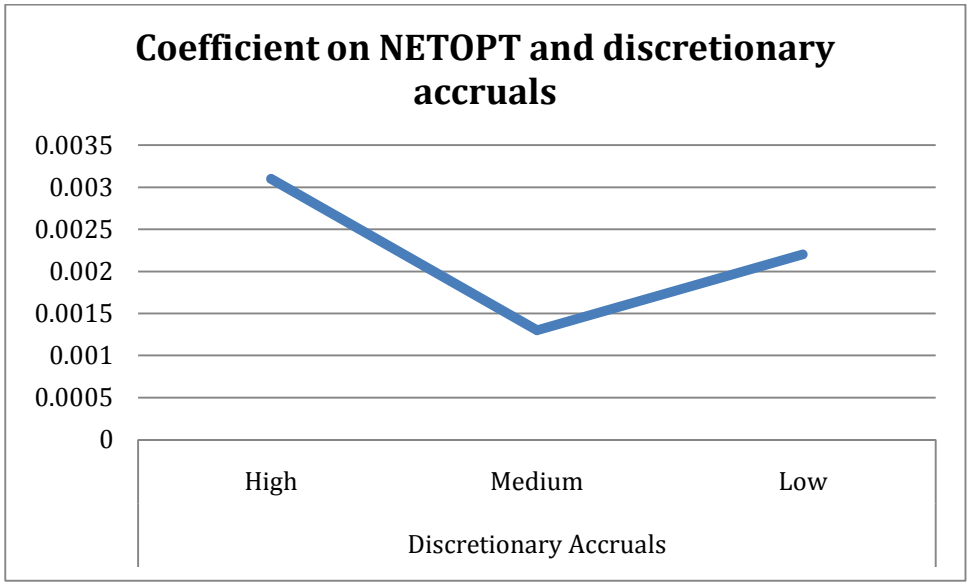


Figure 1B: This figure plots the coefficient θ_2 from model (2) for firm-quarters with different levels of discretionary accruals. High (Low) indicates firm-quarters with discretionary accruals greater than the 75th percentile (smaller than the 25th percentile) of discretionary accruals for all sample firm-quarters in the same fiscal year. Quarter t is the quarter for which the earnings press release is issued. The sample includes 18,036 firm-quarters.

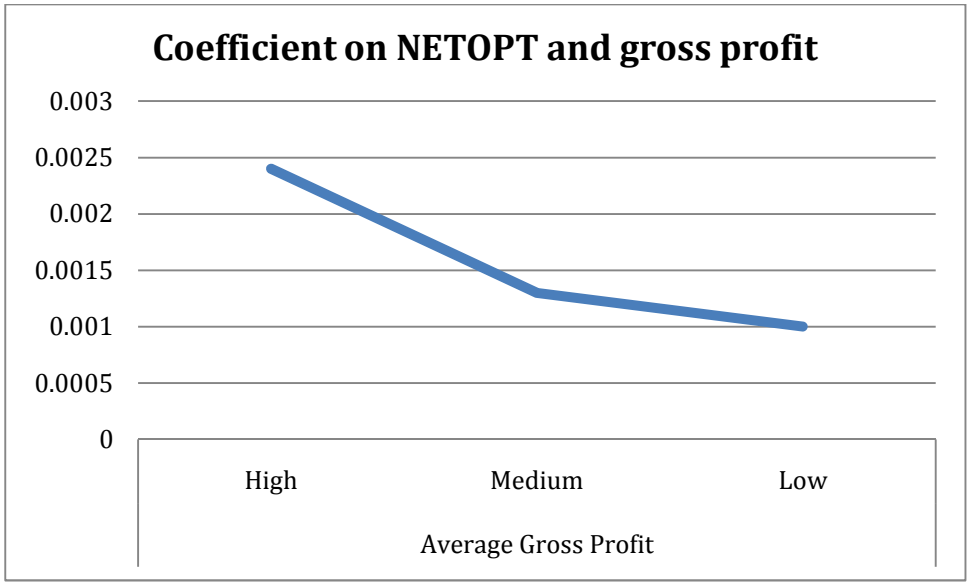


Figure 1C: This figure plots the coefficient θ_2 from model (2) for firm-quarters with different levels of average gross profit (calculated over the past 12 quarters). High, Medium, and Low indicate firm-quarters with average gross profit greater than the 75th percentile, between the 25th and 75th percentiles (inclusive), and smaller than the 25th percentile of average gross profit for all sample firm-quarters in the same fiscal year, respectively. Quarter t is the quarter for which the earnings press release is issued. The sample includes 17,951 firm-quarters.

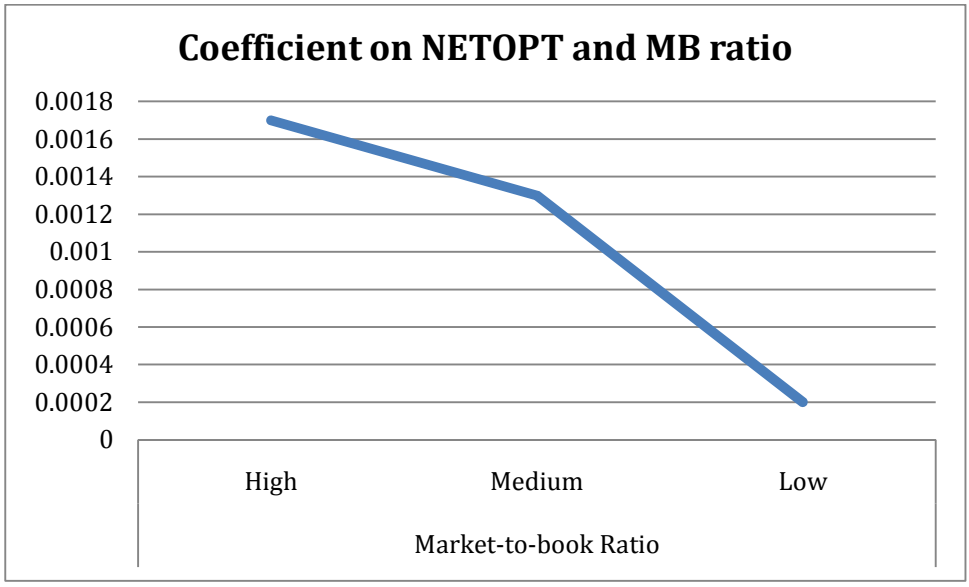


Figure 1D: This figure plots the coefficient θ_2 from model (2) for firm-quarters with different levels of market-to-book ratio. High, Medium, and Low indicate firm-quarters with market-to-book ratio greater than the 75th percentile, between the 25th and 75th percentiles (inclusive), and smaller than the 25th percentile of average gross profit for all sample firm-quarters in the same fiscal year, respectively. Quarter t is the quarter for which the earnings press release is issued. The sample includes 22,582 firm-quarters.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Median	Maximum	Minimum	Std. Dev.
CAR	22,582	0.005	0.003	0.490	-0.483	0.090
FUTEARN	22,582	0.003	0.007	0.236	-0.236	0.037
EARN	22,582	0.003	0.008	0.316	-0.322	0.041
NETOPT	22,582	0.820	0.740	4.250	-1.470	0.700
SDROA	22,582	0.015	0.007	0.254	0.000	0.022
REVENUE	22,582	691.270	132.158	66,903.060	0.009	2,279.213
SURP	22,582	-0.001	0.000	2.766	-3.657	0.049
BEAT	22,582	0.709	1.000	1.000	0.000	0.454
POSITIVE_NI	22,582	0.755	1.000	1.000	0.000	0.430

See Appendix A for variable definition.

Table 2: Pearson Correlation Coefficients

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	CAR	**1.00**								
(2)	FUTEARN	**0.10**	**1.00**							
(3)	EARN	**0.09**	**0.68**	**1.00**						
(4)	NETOPT	**0.04**	**0.16**	**0.16**	**1.00**					
(5)	SDROA	**-0.04**	**-0.47**	**-0.29**	**-0.10**	**1.00**				
(6)	LOGREV	**0.02**	**0.39**	**0.37**	**0.14**	**-0.28**	**1.00**			
(7)	SURP	**0.04**	**0.03**	**0.09**	**0.02**	**-0.05**	**0.02**	**1.00**		
(8)	BEAT	**0.17**	**0.16**	**0.18**	**0.10**	**-0.08**	**0.10**	**0.16**	**1.00**	
(9)	POSITIVE_NI	**0.08**	**0.54**	**0.66**	**0.20**	**-0.36**	**0.36**	**0.07**	**0.20**	**1.00**

Bold text indicates statistical significance at the 1-percent level or lower. See Appendix A for variable definition.

Table 3: Current Disclosure Tone and Future Earnings Conditional on Earnings Quality (Dependent variable: FUTEARN = average EARN over quarters t+1 to t+4)

	Earnings Change				Discretionary Accruals			
	Extreme	Normal	***Diff.***		Extreme	Normal	***Diff.***	
EARN	0.2231	0.6717	***-0.4486***	{a}	0.3357	0.8011	***-0.4654***	{a}
	(12.63)***	(29.07)***	***(15.43)***		(19.42)***	(37.70)***	***(16.99)***	
NETOPT	0.0033	0.0011	***0.0022***	{a}	0.0025	0.0013	***0.0012***	{b}
	(7.45)***	(4.09)***	***(4.37)***		(5.07)***	(4.10)***	***(2.07)***	
SDROA	-0.5136	-0.4191	***-0.0945***	{b}	-0.4658	-0.4416	***-0.0242***	
	(15.12)***	(18.05)***	***(2.30)***		(17.50)***	(15.41)***	***(0.62)***	
LOGREV	0.0019	0.0007	***0.0012***	{a}	0.0033	0.0005	***0.0028***	{a}
	(8.32)***	(5.48)***	***(4.57)***		(14.38)***	(3.42)***	***(10.48)***	
SURP	-0.0157	0.0234	***-0.0391***	{a}	-0.0167	-0.002	***-0.0147***	
	(2.40)**	(1.77)*	***(2.65)***		(2.10)**	(0.13)	***(0.84)***	
BEAT	0.0012	0.0014	***-0.0002***		0.0012	0.0002	***0.001***	
	(1.77)*	(3.61)***	***(0.25)***		(1.63)	(0.43)	***(1.11)***	
POSITIVE_NI	0.0062	0.0003	***0.0059***	{a}	0.0091	-0.002	***0.0111***	{a}
	(6.07)***	(0.31)	***(4.19)***		(8.13)***	(2.15)**	***(7.59)***	
Constant	0.0114	0.0134	***-0.002***		0.0067	0.0157	***-0.009***	{c}
	(1.73)*	(2.14)**	***(0.23)***		(1.31)	(3.50)***	***(1.34)***	
Observations	5967	13101			9019	9017		
R-squared	0.48	0.64			0.54	0.72		
Robust t statistics in parentheses								

* significant at 10%; ** significant at 5%; *** significant at 1% (two-tailed test)

{c} significant at 10%; {b} significant at 5%; {a} significant at 1% (one-tailed test)

For variable definition and sample partitioning criteria: See Appendix A

Table 4: Current Disclosure Tone and Future Earnings Conditional on Disclosure Cost (Dependent variable: FUTEARN = average EARN over quarters t+1 to t+4)

	Gross Profit				Market-to-Book Ratio			
	High	Low	***Diff.***		High	Low	***Diff.***	
EARN	0.3439	0.3685	***-0.0246***		0.5215	0.2612	***0.2603***	{a}
	(15.42)***	(14.86)***	***(0.74)***		(23.28)***	(16.42)***	***(9.47)***	
NETOPT	0.0024	0.0007	***0.0017***	{a}	0.0016	0.0007	***0.0009***	{b}
	(6.38)***	(2.44)**	***(3.79)***		(4.30)***	(2.76)***	***(1.96)***	
SDROA	-0.4595	-0.4661	***0.0066***		-0.4574	-0.5499	***0.0925***	{a}
	(18.02)***	(14.74)***	***(0.16)***		(15.64)***	(32.33)***	***(2.73)***	
LOGREV	0.0007	0.0017	***-0.001***	{a}	0.0019	0.0014	***0.0005***	{b}
	(3.58)***	(11.55)***	***(4.08)***		(10.40)***	(10.83)***	***(2.27)***	
SURP	-0.0101	-0.012	***0.0019***		-0.1367	-0.0069	***-0.1298***	{a}
	(0.37)	(1.97)**	***(0.07)***		(4.83)***	(1.34)	***(4.52)***	
BEAT	0.0035	0.001	***0.0025***	{a}	0.0015	0.0006	***0.0009***	
	(5.86)***	(2.47)**	***(3.36)***		(2.16)**	(1.62)	***(1.19)***	
POSITIVE_NI	0.0055	0.0047	***0.0008***		0.0067	0.0062	***0.0005***	
	(4.74)***	(5.11)***	***(0.49)***		(4.52)***	(9.68)***	***(0.30)***	
Constant	0.0193	0.0091	***0.0102***		0.0207	0.0092	***0.0115***	{c}
	(3.50)***	(0.76)	***(0.78)***		(2.69)***	(2.71)***	***(1.36)***	
Observations	9003	8948			11260	11322		
R-squared	0.5	0.61			0.6	0.62		
Robust t statistics in parentheses								

* significant at 10%; ** significant at 5%; *** significant at 1% (two-tailed test)

{c} significant at 10%; {b} significant at 5%; {a} significant at 1% (one-tailed test)

For variable definition and sample partitioning criteria: See Appendix A

Table 5: Market Reaction to Disclosure Tone Conditional on Earnings Quality (Dependent variable: $CAR_{[-1,+1]}$)

	Earnings Change				Discretionary Accruals			
	Extreme	Normal	***Diff.***		Extreme	Normal	***Diff.***	
SURP	0.0191	0.0242	***-0.0051***		0.0073	0.2031	***-0.1958***	{b}
	(0.60)	(0.45)	***(0.08)***		(0.28)	(2.49)**	***(2.29)***	
NETOPT_CHANGE	0.0114	0.0043	***0.0071***	{a}	0.0085	0.0082	***0.0003***	
	(5.43)***	(2.89)***	***(2.75)***		(4.11)***	(4.55)***	***(0.11)***	
BEAT	0.032	0.0315	***0.0005***		0.0319	0.0314	***0.0005***	
	(12.56)***	(17.74)***	***(0.16)***		(12.63)***	(14.35)***	***(0.16)***	
POSITIVE_NI	0.0158	0.007	***0.0088***	{b}	0.016	0.0092	***0.0068***	{b}
	(5.23)***	(2.90)***	***(2.25)***		(6.13)***	(3.54)***	***(1.83)***	
Constant	-0.0287	-0.0461	***0.0174***		-0.0539	-0.0472	***-0.0067***	
	(0.79)	(3.60)***	***(0.45)***		(3.21)***	(1.85)*	***(0.22)***	
Observations	5967	13101			9019	9017		
R-squared	0.06	0.04			0.04	0.05		
Robust t statistics in parentheses								

* significant at 10%; ** significant at 5%; *** significant at 1% (two-tailed test)

{c} significant at 10%; {b} significant at 5%; {a} significant at 1% (one-tailed test)

For variable definition and sample partitioning criteria: See Appendix A

Table 6: Market Reaction to Disclosure Tone Conditional on Disclosure Costs (Dependent variable: $CAR_{[-1,+1]}$)

	Gross Profit				Market-to-Book Ratio			
	High	Low	***Diff.***		High	Low	***Diff.***	
SURP	0.1358	0.0017	***0.1341***	{b}	0.0959	0.0169	***0.079***	{b}
	(2.63)***	(0.06)	***(2.32)***		(2.54)**	(0.62)	***(1.70)***	
NETOPT_CHANGE	0.0092	0.005	***0.0042***	{b}	0.0084	0.0062	***0.0022***	
	(4.94)***	(3.03)***	***(1.72)***		(5.07)***	(3.81)***	***(0.92)***	
BEAT	0.0392	0.0248	***0.0144***	{a}	0.0339	0.0297	***0.0042***	{c}
	(16.72)***	(13.83)***	***(4.87)***		(15.87)***	(16.31)***	***(1.48)***	
POSITIVE_NI	0.0076	0.0096	***-0.002***		0.0132	0.0124	***0.0008***	
	(2.57)**	(3.74)***	***(0.51)***		(4.92)***	(5.45)***	***(0.23)***	
Constant	-0.0343	-0.0738	***0.0395***		-0.048	-0.0495	***0.0015***	
	(2.33)**	(1.58)	***(0.81)***		(3.55)***	(2.51)**	***(0.06)***	
Observations	9003	8948			11260	11322		
R-squared	0.06	0.04			0.04	0.04		
Robust t statistics in parentheses								

* significant at 10%; ** significant at 5%; *** significant at 1% (two-tailed test)

{c} significant at 10%; {b} significant at 5%; {a} significant at 1% (one-tailed test)

For variable definition and sample partitioning criteria: See Appendix A