The Impact of Earnings Guidance Cessation on Information Asymmetry: Evidence from Transaction Data

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Abstract

We study the impact of quarterly earnings guidance cessation on information asymmetry using a large sample of firms during 2002-2011. There are two possibilities for the effect of earnings guidance cessation on information asymmetry. After guidance cessation, information asymmetry may increase because less information is provided to the market. Alternatively, information asymmetry may decrease because managers feel less pressure to manage reported earnings to meet guidance numbers. Our study shows guidance cessation significantly reduces information asymmetry for persistent guiders but not for occasional guiders. We find that the reductions in information asymmetry are driven, at least in part, by firms engaging in less earnings management after guidance cessation.

JEL Classification: G14, G38

Keywords: earnings guidance, information asymmetry, market microstructure

1. INTRODUCTION

Many firms, such as Coca-Cola, McDonald's, General Electric, and Pfizer, stopped providing quarterly earnings guidance in the past decade. Recent survey by the National Investors Relations Institute (NIRI) in 2009 reports that only around 60% (dropped from 78% in 2003) of the companies provided earnings guidance[1] Given this shift in firms' practice of issuing quarterly guidance, there is a growing interest in understanding the motivation of firms' decision to stop providing earnings guidance and more importantly the consequences of stopping quarterly guidance.

Several studies have examined the effect of earnings guidance or the decision to abandon the provision of guidance. The focus of most studies has been on investigating the changes in the information environment using analyst performance measures such as the number of analysts following, analyst forecast accuracy, and forecast dispersion (for example, Libby et al., 2006; Cotter et al., 2006; Houston et al., 2010).[2] However, previous literature has paid scant attention to the effect of guidance cessation on various transaction-based information asymmetry measures, such as spread, price impact, and the adverse selection component of spread. Although both analyst-based measures and trading-based measures are used to measure the firm's degree of information asymmetry, we should not expect that these two measures yield identical results. For example, Van Ness et al. (2001) find no significant relationship between the adverse selection component of the spread and analyst forecast errors. Also, Chung et al. (1995) and Van Ness et al. (2001) find evidence that firms with greater number of analyst following (which is typically

[1] The most recent NIRI survey, 2009 Forward-Looking Guidance Practices Survey Results, can be found at http://www.niri.org/media/News-Releases/News-Releases-Archive/NIRI-Releases-2009-Forward-Looking-Guidance-Practices-Survey-Results-2009May18.aspx.

[2] Libby et al. (2006) examine how guidance forms and guidance errors affect analyst forecasts. Cotter et al. (2006) investigate how analysts react to explicit earnings guidance and find that analysts quickly react to the guidance and subsequently revise their forecasts to a beatable target. Houston et. al (2010) find that guidance cessation results in a decrease in analyst coverage and increases in their earnings forecast errors and forecast dispersions.

interpreted as an environment for lower information asymmetry) has *higher* spread. Analyst-based measures of information asymmetry capture supply-side information production and therefore are more susceptible to self-selection and endogeneity problem.[3] Analyst measures also suffer from having low data frequency. On the other hand, transaction-based measures reflect the behavior of market participants and allow us to utilize high-frequency intraday data. Transaction-based information costs are important to the firm since firms having lower trading costs in terms of information asymmetry can enjoy lower costs of capital (Easley et al., 2002). In this study, we attempt to fill the gap in the literature by investigating from a market microstructure perspective, whether the degree of information asymmetry changes for firms which stop providing quarterly earnings guidance.

Using trading-based measures, we test two competing hypotheses on whether information asymmetry will increase or decrease after quarterly earnings guidance cessation. The first hypothesis, "*information transparency*" hypothesis, states that information asymmetry increases after earnings guidance cessation because less information is provided to the market. Corporate disclosure is shown to be related to information asymmetry between investors and managers (Glosten and Milgrom, 1985; Welker, 1995; Lang and Lundholm, 1996; Verrecchia, 2001; and Brown and Hillegeist, 2007). Supporters of the practice of earnings guidance often cite information transparency as a rationale for maintaining guidance, and studies using analyst-based information asymmetry measures provide results consistent with this hypothesis (Libby et al., 2006; Cheng et al., 2006; Houston et al., 2010; Chen et al., 2011). Therefore, according to the "*information transparency*" hypothesis, earnings guidance cessation will result in less information disclosures, and therefore will increase the degree of information asymmetry.

[3] Chung et al. (1995) argues that analysts are more likely to follow stocks with greater information asymmetry because those stocks bring greater profit potential for analysts.

The second hypothesis, "*numbers game*" hypothesis, argues that information asymmetry decreases after earnings guidance cessation. Anecdotal evidence suggests that the communication of earnings numbers has increasingly become a game between the management and stock market participants. Rather than delivering credible information, the management may use earnings guidance to adjust market expectations and thus influence the stock price. In the speech titled "*The numbers game*", former SEC chairman Arthur Levitt pointed out that earnings management was becoming a serious problem as CEOs struggled to meet or beat Wall Street expectations. He further commented, "*This process has evolved over the years into what can be characterized as a game among market participants -- a game that if not addressed soon will have adverse consequences.*"[4] Critics of earnings guidance practices also propose that firms providing guidance can be shortsighted and forego potentially attractive long term projects because of the pressure to manage earnings expectations on a quarterly basis.[5] When Coca-Cola stopped providing guidance, the company cited that providing earnings guidance had made its management focusing on short-term goals to meet its own publicly stated earnings targets.[6] These anecdotal evidences suggest that earnings guidance adds another layer of earnings target number (in addition to the analyst forecast) which the company is trying to meet or beat, and thus induce incentives to manage earnings. Several studies document a positive relationship between earnings management and information asymmetry (Dye, 1988; Trueman and Titman, 1988; and Richardson, 2000). Therefore, according to the "*numbers game*" hypothesis, when firms stop providing earnings guidance, information asymmetry between the management and stock market participants will decrease because of less earnings management behavior by managers.

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[4] The complete speech can be found at http://www.sec.gov/news/speech/speecharchive/1998/spch220.txt.

[5] One example is the report from the Aspen Institute, which can be found at http://www.aspeninstitute.org/sites/default/files/content/docs/bsp/EGInFocus.pdf

[6] Chief Executive of Coke, Douglas Daft states that "We believe that establishing short-term guidance prevents a more meaningful focus on the strategic initiatives that a company is taking to build its business and succeed over the long term," For details, see http://www.forbes.com/2002/12/13/cx_ml_1213coke.html.

In this study, we use various information asymmetry measures based on intraday transaction data, and examine changes around anticipated earnings releases and find that information asymmetry decreases significantly for persistent guiders who cease providing quarterly earnings guidance, whereas the decline in information asymmetry for occasional guiders is insignificant. These results are interesting because whereas studies using analyst-based measures show an increase in information asymmetry after guidance cessation (consistent with the "*information transparency*" hypothesis), we find that market microstructure measures of information asymmetry show a decrease in information asymmetry when persistent guiders cease guidance (thus supporting the "*numbers game*" hypothesis). Therefore, from a trading cost perspective, our study suggests that firms can lower information asymmetry for their securities, and therefore lower their cost of capital if they stop the practice of providing persistent quarterly earnings guidance.

We also provide an explanation for observing lower information asymmetry after guidance cessation by showing that firms manage earnings less aggressively after the cessation of guidance. Before guidance cessation, persistent guiders exhibit significantly higher level of earnings management compared to occasional guiders. But after guidance cessation, the difference between the two groups disappears. Our empirical results further show that the reductions in information asymmetry are positively related to the degree of earnings management before earnings guidance cessation for persistent guiders. These results are in agreement with the belief that reductions in information asymmetry are driven, at least in part, by earnings management practices before earnings guidance cessation. Therefore, our empirical results on earnings management provide further support for the "*numbers game*" hypothesis.

We perform various robustness checks and find results supporting the "*numbers game*" hypothesis. We test using the levels of information asymmetry in addition to the changes in abnormal information asymmetry and find that there are qualitatively similar reductions in the levels of information asymmetry after guidance cessation. We also examine the relationship between information asymmetry reduction and signed discretionary accruals. The results are similar to those reported using absolute discretionary accruals. Next, using a subset of persistent guiders who publicly announced guidance cessation, as listed in Houston et al. (2010), we obtain qualitatively similar results. Finally, we account for the possibility that information asymmetry and earnings management can be simultaneously determined, and show that we cannot reject the null hypothesis of no endogeneity between information asymmetry and earnings management. Overall, our robustness tests provide further support for the positive association between pre-cessation earnings management and reductions in information asymmetry.

This study is important since the findings are of significance to investors and traders who want to understand the implications of quarterly earnings guidance cessation on information asymmetry costs encountered when trading. This study differs from previous studies that use stock return and analyst data, and is, to our knowledge the first attempt to examine the changes in various transaction-based information asymmetry measures associated with firms' decisions to stop quarterly guidance. As our study shows that firms providing quarterly earnings guidance have the tendency to focus on short term results, this finding should be useful for regulators and policy makers in their search for better practice of information disclosure.

Our study is organized as follows. In Section 2, we develop our hypothesis and explain our research design. In Section 3, we describe the variables used to measure the degrees of information asymmetry and earnings management. In Section 4, we explain the data and show the descriptive statistics. In Section 5, we provide our main results of the study. We also conduct various robustness tests to support our argument. In Section 6, we provide the summary of the study.

2. Hypotheses Development and Research Design

A. Hypotheses Development

Prior research indicates that corporate disclosure is related to information asymmetry between managers and outside investors (Glosten and Milgrom, 1985; Lang and Lundholm, 1993; Welker, 1995; Lang and Lundholm, 1996; Verrecchia, 2001; and Brown and Hillegeist, 2007). As one of voluntary corporate disclosure, earnings guidance cessation can have conflicting effects on a firm's information environment.

On the one hand, managers' disclosure of value-relevant information to investors can reduce information asymmetry. Diamond and Verrecchia (1991) theoretically show that public disclosure of information to reduce information asymmetry can increase liquidity of the company's stock and in turn reduce the cost of capital. In this aspect, stopping quarterly guidance can result in an overall reduction in the amount of information which is released and available to analysts and investors, which in turn would lead to an increase in information asymmetry.[7] We refer to this as the "*information transparency*" hypothesis. Several studies using analyst-based measures find results consistent with this hypothesis. For example, Houston et al. (2010) find that once firms stop providing quarterly guidance, there is a decrease in the number of analysts following and in forecast accuracy, and an increase in the dispersion of forecasts. Their results suggest that the information environment deteriorates after stopping quarterly

[7] As for the possibility that guidance stoppers can increase other forms of disclosures to make up for the lack of guidance information, Houston et al. (2010) finds that firms which stopped giving earnings guidance show no increase in the number of disclosures.

guidance. However, whether the same relationship holds for trading-based measures of information asymmetry has yet to be tested.

On the other hand, the decision to stop providing earnings guidance can also have implications on firms' behavior. Specifically, managers who frequently issue earnings guidance can be a sign that the manager is managing its earnings. Athanasakou et al. (2011) point out in their analyses of UK firms that earnings guidance may serve as a tool in the game between the management and stock market participants over the communication of earnings numbers. There are two implications in this game. First, using earnings guidance, the management may guide analyst earnings forecasts to an attainable level. Second, the management may manage reported earnings to achieve its earnings forecast. Empirical evidence shows that managers make discretionary accounting choices to manage reported earnings around some pre-determined target (DeFond and Park, 1997). LaFond et al. (2007) find international evidence that discretionary earnings smoothing creates opacity and reduces liquidity. Therefore, earnings guidance can increase information asymmetry if managers either provide investors with lower guidance numbers instead of the true expected earnings, or manage reported earnings to meet their guidance numbers. Thus stopping earnings guidance may enhance the information environment in the trading of the underlying firm. We refer to this as the "*numbers game*" hypothesis. This hypothesis claims that there will be a decrease in information asymmetry after guidance cessation.

In summary, whether information asymmetry increases or decreases around the event of stopping earnings guidance is an issue that is amenable to empirical analysis. Although the determinant of and market reaction to guidance cessation have been studied, there has been no direct investigation of guidance cessation from a trading, or market microstructure perspective.

We conduct a detailed analysis of the liquidity and information asymmetry effects of stopping earnings guidance, and provide evidence on whether stopping quarterly earnings guidance leads to changes in earnings management behavior of the firm.

B. Persistent versus Occasional Guiders

Cheng et al. (2006) examine the relationship between R&D expense and the frequency of quarterly earnings guidance. They find that guidance frequency is negatively correlated with both R&D expense and long term earnings growth, and conclude that frequent guiders are more likely to suffer from managerial myopia. Since managing earnings is another manifestation of managerial myopia, the finding of Cheng et al. (2006) suggests that firms can have varying degrees of earnings management based on the frequency of earnings guidance. Therefore, we classify guidance cessation firms into two groups based on the number of quarters firms provide guidance prior to cessation. Firms which had at least three quarterly forecasts in the last four quarters preceding guidance cessation are classified as persistent guiders. Companies which provided two or fewer guidance in the year prior to guidance cessation are classified as occasional guiders. We conjecture that the degree of earnings management and the changes in information environment to be different between persistent guiders and occasional guiders.

C. Research Design

Two main aspects of the trading environment can influence our research design. First, trading costs may vary over time and across firms for reasons unrelated to guidance cessation. For example, technological improvements, tick changes, and regulatory actions are likely to create variations in trading costs over time and cross-sectionally (Bessembinder, 2003; and

Chiyachantana et al., 2004). Second, the impact of guidance cessation should be more pronounced surrounding earnings announcement periods. Kim and Verrecchia (1994) argue that market makers widen bid and ask spreads on public announcements to guard against information leakages and also to compensate for higher information asymmetry among traders. Lee et al. (1993) find empirical evidence of an increase in spreads on the days surrounding earnings announcement. Affleck-Graves et al. (2002) also show that firms with less predictable earnings experience significant increases in information asymmetry surrounding quarterly earnings announcements. Thus, any changes in the degree of information asymmetry should be more pronounced surrounding the earnings announcement periods.

Based on the reasons stated above, we first construct abnormal trading cost and various adverse selection cost measures by subtracting the non-announcement period value from the earnings announcement period value. We follow the approach of Houston et al. (2010) and use a stopping firm's past (non-announcement period) as its own control. In doing so, we are able to mitigate the concern that changes in information asymmetry may be related to the omitted control variables in forming a control group of non-guiders. Affleck-Graves et al. (2002) use a similar approach when investigating the relationship between earnings predictability and information asymmetry. Likewise, Eleswarapu et al. (2004), to study the impact of Regulation Fair Disclosure on information asymmetry, examine changes in abnormal adverse selection cost measures surrounding earnings announcement. These measures of abnormal trading cost and adverse selection cost not only minimize the cross-sectional variations and eliminate trading cost changes unrelated to asymmetric information changes, but also controls for the time trend in trading costs and general market conditions.

Next, to analyze the impact of guidance cessation on information asymmetry, we examine the changes in the abnormal information asymmetry between the pre-cessation period and post-cessation period. Specifically, we model the impact of guidance cessation under the timeline shown in Figure 1. In Figure 1, the event period q_0 refers to the quarter during which a firm provides its last quarterly earnings guidance. The quarter immediately before (after) the event period is defined as pre-event period q_{-1} (post-event period q_1). We use the following three equations to measure the changes in trading costs due to earnings guidance cessation.

$$\delta_{pre} = TC_{ann,pre} - TC_{non,pre} \quad (1)$$

$$\delta_{post} = TC_{ann,post} - TC_{non,post} \quad (2)$$

$$\delta_{G} = \delta_{post} - \delta_{pre} \quad (3)$$

where $TC_{ann,pre}$ ($TC_{ann,post}$) represents trading costs during earnings announcement periods in pre- (post-) event period. $TC_{non,pre}$ ($TC_{non,post}$) represents trading costs during non-announcement periods in pre- (post-) event period. δ_{pre} is the difference in trading costs between earnings announcement periods and non-announcement periods for the pre-event quarter, and δ_{post} is the difference in trading costs between earnings announcement and non-announcement periods for the post-event quarter. The difference in δ_{post} and δ_{pre} yields δ_{G}, which measures the difference in trading costs during announcement periods caused by the guidance cessation event. As we describe in the next section, we calculate trading costs using different measures of spreads and further examine the portion of trading costs arising from information asymmetry.

3. VARIABLE MEASUREMENT

A. Measures of Trading Costs and Information Asymmetry

Liquidity refers to the ease of converting an asset into cash with minimal price movement. Bid-ask spread measures the cost of a round-trip trade and is among the most common measures of liquidity. Lower bid-ask spreads are indications of higher liquidity and lower trading costs. We use several spread measures such as quoted spread, relative quoted spread, effective spread, and relative effective spread. These different measures of spreads are computed as follows:

i. Quoted spread = $A_{it} - B_{it}$

ii. Relative quoted spread = $(A_{it} - B_{it}) / M_{it}$

iii. Effective spread $= 2 \times | P_{it} - M_{it} |$

iv. Relative effective spread = $2 \times | P_{it} - M_{it} | / M_{it}$

where A_{it}, B_{it}, and P_{it} and M_{it} are the best ask or offer, the best bid, transaction price, and the midpoint of bid and ask prices, respectively, for firm *i* at time *t*. The quoted spread and relative quoted spread are time weighted while the effective and relative effective spreads are value weighted.

The information asymmetry portion of trading costs can be measured by models which decompose spreads into adverse selection component, or by changes in bid-ask spreads.[8] The adverse selection component compensates the market makers for the risk of trading against informed traders. Van Ness et al. (2001) examine five regression-based adverse selection models and conclude that the models created by Lin et al. (1995, hereafter LSB) and Glosten and Harris (1988, hereafter GH) produce relatively better estimates of adverse-selection cost. Thus, we use LSB and GH spread decomposition models to test whether there are any changes in adverse selection costs in the quarters surrounding quarterly earnings guidance cessation.

[8] Another popular model of estimating information asymmetry is based on Easley et al., (1996). In their model, the probability of information-based trading (PIN) for a given stock is estimated based on the actual order flow. In spite of many appealing features, the PIN measure does not exhibit significant cross-sectional variation over time (Easley et al., 2002). In addition, because PINs require a fairly lengthy estimation period, we believe the spread decompositions models are more appropriate in our analysis.

For the LSB model, we use the following regression equation:

$$\Delta \log M_{t+1} = \lambda Z_t + \varepsilon_{t+1}$$

where M_{t+1} is the quoted midpoint at time $t+1$. Z_t = logP_t - logM_t. P_t is the transaction price at time t. ε_t is the disturbance term. λ represents the adverse selection component and is the cross-sectional averages of estimates for each stock in our sample.

GH model is described as the following:

$$\Delta P_t = c_0 \Delta D_t + c_1 \Delta D_t Vol_t + \lambda_0 D_t + \lambda_1 D_t Vol_t + e_t$$

where D_t is a Lee-Ready indication variable that equals 1 for buy orders and -1 for sell orders at time t (Lee and Ready, 1991). P_t is the transaction price at time t. Vol_t is the volume traded at time t. e_t captures public information innovations and errors. The adverse selection component in this model is $2(\lambda_0 + \lambda_1 Vol_t)$, and inventory and order processing components are estimated as $2(c_0+c_1 Vol_t)$. We use the average transaction volume ($\overline{Vol}$) for stock i to obtain the adverse selection costs as a percentage of the bid-ask spread:

$$\frac{2(\lambda_0 + \lambda_1 \overline{Vol})}{2(c_0 + c_1 \overline{Vol}) + 2(\lambda_0 + \lambda_1 \overline{Vol})} \times 100$$

To supplement our adverse selection cost models, we also measure changes in information asymmetry by using changes in price impacts. Many studies (Huang and Stoll, 1996; and Eleswarapu et al., 2004) have adopted using percentage price impact to measure information asymmetry. We define price impact using the following equation:

Percentage Price Impact = $2 \times D_{it} \times (V_{i,t+30} - M_{it}) / M_{it}$

where M_{it} is the midpoint of bid and ask prices for firm i at time t. D_{it} is a Lee-Ready indication variable that equals 1 for buy orders and -1 for sell orders. $V_{i,t+30}$ is the post-trade quote midpoint of the stock 30 minutes after the trade. To control for the arrival of new information during t and

t+30, we weight the percentage price impact by the inverse number of trades during the period.

B. Measures of Earnings Management

Earnings management are often measured based on Jones (1991). In the Jones model, total accruals are regressed on a set of variables to control for the effect of changes in the firm's economic conditions on nondiscretionary accruals, thus letting the error term capture the unobservable extent of discretionary accruals. Inferences drawn from hypotheses related to earnings management hinge critically on accurately estimating discretionary accruals. After comparing several models of accruals management, Dechow et al. (1995) conclude that a "modified Jones model" provides the most power for detecting earnings management. Following many studies (Kothari et al., 2005; Davidson et al., 2007; Cornett et al., 2008; and Gong et al., 2008), we adopt the "modified Jones model" approach as our measures of earnings management.

We estimate discretionary accruals in two steps. First, we estimate normal or nondiscretionary accruals using the modified Jones model.

$$TACC_{it} = \alpha_0 (1/A_{i,t-1}) + \alpha_1 \Delta Sales_{it} + \alpha_2 PPE_{it} + \varepsilon_{it} \qquad (4)$$

where:

$TACC_{it}$ = total accruals for firm i in year t, calculated as $(\Delta ACT_{it} - \Delta CHE_{it} - \Delta LCT_{it} + \Delta DLC_{it} - DP_{it})/A_{i,t-1}$,[9]

ΔACT_{it} = change in current assets,

ΔCHE_{it} = change in cash and short-term investments,

ΔLCT_{it} = change in current liabilities,

ΔDLC_{it} = change in current portion of long-term debt,

[9] In addition to using balance sheet numbers, we also calculate TACC using cash flow numbers and find similar results.

DP_{it} = depreciation and amortization,

$A_{i,t-1}$ = total assets for firm *i* at the end of year *t-1*,

$\Delta Sales_{it}$ = change in sales for firm *i* in year *t* deflated by $A_{i,t-1}$,

PPE_{it} = property, plant and equipment for firm *i* in year *t* deflated by $A_{i,t-1}$.

Discretional accruals are estimated for each industry and year using equation (4) and the change in accounts receivable is subtracted from the change in sales based on the modified Jones model as shown below.

$$DACC_{it} = TACC_{it} - [\hat{\alpha}_0 (1/A_{i,t-1}) + \hat{\alpha}_1 (\Delta Sales_{it} - \Delta Rec_{it}) + \hat{\alpha}_2 PPE_{it}] \quad (5)$$

where parameters, $\hat{\alpha}_0$, $\hat{\alpha}_1$, and $\hat{\alpha}_2$ are estimated from equation (4). ΔRec_{it} denotes changes in net receivable for firm *i* in year *t* deflated by $A_{i,t-1}$. The reason equation (4) is not directly used for the discretionary accruals estimation is to capture the extent to which changes in sales are attributed to aggressive recognition of questionable sales. The subtraction of ΔRec_{it} reflects the "modification" of the Jones model.

Following Kothari et al. (2005), we use matching firms to control for the impact of financial performance on accruals. Specifically, we match sample firms in period *t*-1 based on industry classification (same first two-digit SIC codes) and return on assets (ROA). To obtain a performance-matched modified Jones model discretionary accrual for firm *i*, we subtract the discretionary accrual of the matching firm from that of the sample firm *i*.

To measure the magnitude of earnings management, we use the absolute value of discretionary accruals as suggested in the literature (Bergstresser and Philippon, 2006; Cohen, Dey, and Lys, 2008; and Cornett et al., 2008). Earnings management may lead to large values of discretionary accruals, either negative or positive. Since our hypotheses do not predict any specific direction of earnings management, we use the absolute value of discriminatory accruals to capture the degree of earnings management.[10]

4. DATA AND DESCRIPTIVE STATISTICS

A. Data

For all firms listed in the Company Issued Guidelines (hereafter CIG) database from 2002 to August, 2011 (the latest date available from the CIG dataset), we first identify a sample of guidance stoppers by requiring: 1) the firm is incorporated in the United States; 2) the last appearance of the firm in CIG is between 2002 and June 2010, inclusive[11]; 3) the sample firm is in CRSP, Compustat, IBES, and TAQ databases; 4) the earning announcement dates are not missing for the event period (the quarter during which a firm provides its last quarterly earnings guidance), three quarters leading to the event period, and the quarter after the event period; 5) the days between any adjacent announcement dates are not more than 150 days; 6) there are no stock splits and no changes in the ticker or listing exchange during the sample period. Table 1 provides detailed information of the sample construction process and shows the number of firms which survive after each selection procedure. The final number of firms from the CIG database which meets all of our selection criteria is 1,061.

Our sample construction method is similar to Houston et al. (2010). However, we differ from Houston (2010) in that their sample includes only persistent guiders since they require at least three quarterly forecasts in the last four quarters preceding guidance cessation. As our research question further addresses the effect of the guidance frequency, we also include

[10] An alternative view can be that earnings management is more likely to be one directional (that is, managing earnings either upward or downward in order to meet the target). In Section D2, we examine the robustness of our results using *signed* discretionary accruals.

[11] The reason for the cutoff point of June, 2010 is because in order for the firm to qualify as guidance cessation firm, we need to observe at least 1 year of non-guidance after providing guidance.

occasional guiders in our sample, which are defined as companies which provide two or fewer guidance in the year prior to guidance cessation.

The COMPUSTAT fiscal year end data before the last earnings guidance and CRSP database are used to calculate quarterly trading volume and size of the firms. The intraday data are obtained from TAQ. It includes prices of all trades and quotes which are time-stamped to the nearest second during the trading day. To eliminate possible data entry errors, we use criteria similar to those in Bessembinder (1999) and Eleswarapu et al. (2004). We use only the best bid or the best ask eligible quotes originated from primary listing exchange. We exclude all "after hours" trades, as well as the opening transaction prices. We further exclude all quotes with missing values, quotes with negative or zero spreads, quotes with quoted spreads greater than $5, quotes with change in the quote midpoint exceeding either 50% or $2, and quotes associated with trading halts and designated order imbalances. Finally, trades involving price changes of greater than 10% in absolute value and quotes involving bid or ask changes of greater than 10% in absolute value are also excluded from the sample.

B. Descriptive Statistics

Table 2 provides descriptive statistics on the guidance frequency prior to guidance cessation and the distribution of guidance stoppers by year, quarter, and listing exchange. Results show that, among the earnings guidance cessation firms, there are almost twice as many occasional guiders (695 firms that give one or two quarterly earnings guidelines in the year prior to guidance cessation) compared to persistent guiders (366 firms that provide at least three quarterly earnings guidelines in the year prior to guidance cessation). The number of firms which stop providing quarterly earnings guidance gradually declines from 195 in 2002 to 61 in 2009.

When we examine which quarter of the year the firm stops giving earnings guidance, we find that in almost 40% (420 firms) of the stoppage firms, companies stop giving guidance after they last provide guidance in the fourth fiscal quarter. This is consistent with the results of Houston et al. (2010), which show that firms tend to stop giving guidance at the turn of a new fiscal year. Also, there are more cases of guidance stopping firms listed in NYSE (623 firms) compared to those listed in Nasdaq (421 firms).

Table 3 reports descriptive statistics of firm characteristics during the event quarter q_0 for the overall sample and the subsample of occasional guiders and persistent guiders. Since the descriptive statistics among the overall sample, occasional guiders, and persistent guiders are qualitatively similar, we focus on the overall sample in the following discussions.[12] The market capitalization varies from $3.5 million to $374.6 billion with a mean value of $5.5 billion. The average daily price is approximately $22.10 while the average number of analysts covering the company is 7.3. On average, there are 1,382 trades per day. The quoted spread averages around 5.69 cents. The average effective spread is 4.76 cents, which is about one penny below the average quoted spread. The intraday return volatility varies from 0.012% to 3.93%, with a mean of 0.278%. Overall, our sample of guidance stoppers has similar characteristics to the group identified by Houston et al. (2010). For example, in their sample of 222 guidance stoppers, the number of analysts following shows an average of 7.5 and the mean firm size is $5.5 billion compared to our numbers of 7.3 analysts and $5.5 billion market cap, respectively.

5. EMPIRICAL RESULTS AND DISCUSSIONS

[12] We perform between-group t-test and Wilcoxon rank sum test for testing the difference between persistent guiders and occasional guiders. The results show no significant differences in firm characteristics and spread measures between the two groups for all the variables with the exception of relative spreads. Therefore, any difference in trading cost measures we observe between these two groups surrounding the event period is unlikely to have caused by differences in firm characteristics.

A. Univariate Analysis of Spreads and Information Asymmetry Measures

This section provides the results of the changes in trading costs surrounding quarterly earnings guidance cessation. As explained in our research design section, the abnormal trading cost is defined as the trading cost in earnings announcement periods less that of non-announcement periods. Panel A of Table 4 reports changes in trading costs using various measures of spread. We first examine abnormal spreads in both the pre-event quarter (δ_{pre}) and the post-event quarter (δ_{post}). The abnormal spread for the pre-event quarter, δ_{pre}, is positive, which indicates higher trading costs during earnings announcement period compared to non-announcement period. Similarly the abnormal spread for the post-event quarter, δ_{post}, is also positive except for the relative quoted spread measure. These results are consistent with previous literature which documents that the degree of information asymmetry increases during earnings announcement periods (Kim and Verrecchia, 1994; and Affleck-Graves et al., 2002) and that market makers increase spreads in the presence of higher adverse selection costs (Copeland and Galai, 1983; and Glosten and Milgrom, 1985).

Next, we examine the change in the abnormal spreads surrounding the guidance cessation event. For the overall sample, we observe a reduction in abnormal bid-ask spread δ_G, which indicates that trading cost declines after earnings guidance cessation. While the decrease in quoted spread is not statistically significant, the decreases in abnormal relative quoted spread, the abnormal effective spread, and the abnormal relative effective spread are all statistically significant. For example, the abnormal effective spread decreases by 0.333 cents after the firm stops providing earnings guidance.

To further examine the impact of earnings guidance cessation on liquidity, we categorize guiders into occasional guiders and persistent guiders. For persistent guiders, we observe a significant reduction in abnormal spreads as reflected in the negative and significant values of δ_G for all four spread measures. For example, the abnormal relative effective spread declines by 0.079 percent when firms stop providing guidance. Therefore, for persistent guiders, results are consistent with the "*numbers game*" hypothesis which predicts increase in liquidity or decrease in spreads after earnings guidance cessation. For occasional guiders, δ_G is negative but statistically insignificant.

Panel B of Table 4 reports the change in the measures of information asymmetry during quarters before and after the guidance cessation event. We use three different measures of information asymmetry reflected in trading costs: percentage price impact and adverse selection costs based on LSB and GH models. For the overall sample, we observe a reduction of information asymmetry following earnings guidance cessation. For example, the abnormal percentage price impact decreases by 0.017 percent while the abnormal adverse selection costs decline by 0.012 percent and 0.013 percent for LSB and GH models, respectively. The declines in both the price impact and the GH based measure are statistically significant at the 10 percent level, and the measure based on LSB is significant at the 1 percent level. Hence our testing of δ_G = 0, or no change in information asymmetry due to the guidance cessation event, is rejected for the overall sample. This result is also in line with our testing of changes in liquidity as shown in Panel A.

For persistent guiders, we observe a significant reduction in both abnormal price impact and abnormal adverse selection costs as reflected in the negative and significant values of δ_G. The percentage price impact declines by 0.028 percent. The abnormal adverse selection costs decrease by 0.017 percent and 0.027 percent for LSB and GH spread decomposition models, respectively. The information asymmetry reduction is statistically significant at the 5 percent level for all three measures. These results suggest that the information asymmetry during earnings announcement period is reduced after the firm's guidance cessation. Therefore, for persistent guiders, results are consistent with the "*numbers game*" hypothesis which predicts a decrease in information asymmetry after the earnings guidance cessation event. For occasional guiders, δ_G is negative but statistically insignificant, and the hypothesis of no change in adverse selection cost before and after the earnings guidance cessation cannot be rejected.

In summary, we find significant trading cost reduction following earnings guidance cessation, as observed by higher liquidity (measured using various spread measures) during the earnings announcement period once the firm stops giving earnings guidance. Since a more liquid security requires lower returns than a less liquid security does, stopping earnings guidance can result in lower trading costs and thus lowering the firm's cost of capital and increasing firm value. We further find that the source for enhanced liquidity is from the reduction in information asymmetry, as shown by the decreases in price impact and adverse selection costs of the spread following earnings guidance stoppage. When we further categorize ex-guiders into persistent and occasional guiders, the aforementioned results seem to be mainly driven by persistent guiders. For occasional guiders, trading cost reductions are also observed, but they are of smaller magnitude and statistically insignificant.

B. Multivariate Analysis of Information Asymmetry

As another way of testing the effect of earnings cessation on information asymmetry, we examine the change in the information asymmetry in a regression framework. Specifically, we use the following regression model.

$$\delta = TC_{ann,i} - TC_{non,i} = \beta_0 + \beta_1 POST + \beta_2 LNTRDVOL + \beta_3 LNMKTSZ + \beta_4 ANALFOLL + \varepsilon_i \quad (6)$$

In the regression model, δ measures the elevation in adverse selection cost during earnings announcement. $TC_{ann,i}$ and $TC_{non,i}$ are the average information asymmetry measures for security i over earnings announcement and non-announcement periods, respectively. *POST* is a dummy variable which equals 1 for earnings announcements made during the post-event quarter and 0 for announcements made during the pre-event quarter. The coefficient for *POST* dummy, β_1, measures the overall change in information asymmetry around earnings announcements that are related to the earnings cessation event. The hypothesis that adverse selection costs increase (decrease) after guidance cessation predicts a positive (negative) β_1.

Studies show that information asymmetry is also related to trading volume, firm size, and number of analysts following (Easley et al., 1996; Kim and Verrecchia, 1994; and Eleswarapu et al., 2004). Larger firms and stocks with greater trading volume and with more number of analysts following are associated with lower information asymmetry. Therefore, to control for these factors, we include in our right hand side variables the log of trading volume (*LNTRDVOL*), log of firm size (*LNMKTSZ*), and number of analysts following (*ANALFOLL*).

Table 5 shows the multivariate analysis results for the changes in information asymmetry surrounding earnings announcements. In Panel A, where we use percentage price impact as a proxy for information asymmetry, the coefficient for *POST* dummy, β_1, is negative but statistically insignificant. Using spread decomposition models in Panels B and C, the coefficient β_1 is -0.0099 and -0.0178 for models based on LSB and GH, respectively. These coefficients are statistically significant at the 5 percent level. Therefore, results show that the adverse selection cost component of the spread decreases after the earnings cessation event, implying that the information asymmetry declines after earnings cessation. This result is consistent with those of Table 4.

For persistent guiders, the coefficient for POST dummy β_1 is negative and statistically significant using all three measures of information asymmetry. Using percentage price impact as a proxy, the coefficient β_1 is -0.0263, statistically significant at the 5 percent level. Using adverse selection models, the coefficient is -0.0181 and -0.0282 for LSB and GH based models, respectively. All estimates point to a statistically significant decline in information asymmetry measures after quarterly earnings guidance cessation.

For occasional guiders, we also observe a decline in information asymmetry during the announcement period after guidance cessation. However, the reduction is not statistically significant. For example, adverse selection cost based on LSB model is reduced by 0.52 basis points with a t-statistic of -0.86. Therefore we cannot reject the hypothesis that there is no change in information asymmetry after earnings guidance cessation for occasional guiders.

In conclusion, our results show that information asymmetry is reduced after earnings guidance cessation. However, once we categorize guiders into groups of persistent guiders and occasional guiders, we find that the reduction in information asymmetry is significant only for persistent guiders. These results in Table 4 and 5 guide us to an interesting question: Are there any differences in the behavior between persistent and occasional guiders which lead to the discrepancy between the two groups in liquidity and information asymmetry after guidance cessation? We explore this issue in the following section.

C. Guider Types and Earnings Management

Studies show that firms missing the expected earnings are penalized by the market. For example, Bartov et al. (2002) and Skinner and Sloan (2002) show evidence that the market reacts strongly negative to firms missing the earnings target. Graham et al. (2005) provide evidence based on a survey result that managers perceive large penalties to missing earnings target.[13] In this regard, earnings guidance can be used as a way of preventing those penalties from missing earnings target. Cotter et al. (2006) show that when companies issue earnings guidance, they tend to guide analysts to earnings target that the firm can meet or beat. With respect to the frequency of guidance, Cheng et al. (2006) find that persistent guiders meet or beat analyst consensus more frequently compared to occasional guiders. These studies suggest that firms that guide regularly may perceive higher pressure to alter their reported performance through earnings management. Thus, we conjecture that the level of earnings management is higher for persistent guiders compared to that of occasional guiders. Furthermore, because there is a positive relationship between earnings management and information asymmetry (Dye, 1988; Trueman and Titman, 1988; and Richardson, 2000), the change in information asymmetry after guidance cessation may be explained by the firms' practice of earnings management.

Since we find reduction in information asymmetry following guidance cessation for persistent guiders, but not for occasional guiders, we will first explore whether there is any difference in the magnitude of earnings management for these two types of firms both before and after guidance cessation. If persistent guiders engage in more earnings management compared to occasional guiders before guidance cessation, we would expect the difference to become insignificant after guidance cessation. To test this, we include the guider type as a dummy variable in the following equation.

$$DACC = \alpha_0 + \alpha_1 Type + \alpha_2 LNMKTSZ + \alpha_3 Leverage + \alpha_4 CRP + \alpha_5 FRP + \varepsilon \quad (7)$$

where *DACC* is the absolute value of discretionary accruals defined as the difference between actual accruals and accruals predicted from the modified Jones model as a percent of total

[13] As an anecdotal evidence, General Electric (GE) chief Jeff Immelt was criticized by his predecessor, Jack Welch, on CNBC in April of 2008 as "has a credibility issue" after GE's recent earnings miss. The full content can be found at http://www.cnbc.com/id/24158810/Jack_Welch_GE_CEO_Immelt_Has_Credibility_Issue.

assets.[14] *Type* is a guider type dummy variable which takes the value of 0 for occasional guiders and 1 for persistent guiders. Four additional right hand side variables are the natural logarithm of firm size (*LNMKTSZ*), leverage based on the ratio of total liabilities to total assets (*Leverage*), current relative performance (*CRP*) measured as the current annual net income deflated by the beginning total assets, and future relative performance (*FRP*) which is defined as the next year's net income deflated by the beginning total assets. Prior research indicates that these four variables are important determinants of discretionary accruals (DeFond and Park, 1997; and Lobo and Zhou, 2001).

We run equation (7) separately for the fiscal year before and after guidance cessation. According to our conjecture, persistent guiders will have higher discretionary accruals than occasional guiders before guidance cessation. Therefore, we expect α_1 to be positive and significant for the fiscal year before guidance cessation, but insignificant for the fiscal year after guidance cessation.

Table 6 reports results for the discretionary accruals in years surrounding earnings cessation. For the fiscal year before guidance cessation, α_1 is positive and statistically significant at the 5 percent level. The result shows that compared to occasional guiders, persistent guiders tend to manage their earnings more aggressively during the period in which they routinely provide earnings guidance. For the fiscal year after guidance cessation fiscal year, α_1 is positive but statistically insignificant. This result shows that after guidance cessation, the difference in the level of earnings management between ex-persistent guiders and ex-occasional guiders becomes insignificant. The coefficients for the control variables are consistent with those reported in the literature (DeFond and Park, 1997). Leverage and current relative performance are negatively

[14] The use of *DACC* as the earnings management measure is explained in detail in Section 3.B.

related to discretionary accruals, and future relative performance is positively related to discretionary accruals.

Overall, results in Table 6 show that the decline in the magnitude of earnings management is higher for persistent guiders, which suggests that the higher level of earnings management during the pre-cessation period can be the cause of the information asymmetry reduction after guidance cessation. This leads us to a further analysis of the "*numbers game*" hypothesis by testing whether the change in information asymmetry due to guidance cessation is positively related to the extent of earnings management prior to guidance cessation. To model the relationship between changes in the degree of information asymmetry and the level of earnings management, we use the following equation:

$$\delta_{G} = \delta_{post} - \delta_{pre} = \gamma_0 + \gamma_1 DACC + \gamma_2 LNTRDVOL + \gamma_3 LNMKTSZ + \gamma_4 ANALFOLL + \varepsilon \qquad (8)$$

As discussed earlier, δ_{pre} is the difference in trading costs between earnings announcement periods and non-announcement periods for the pre-event quarter, and δ_{post} is the difference in trading costs between earnings announcement and non-announcement periods for the post-event quarter. The difference in δ_{post} and δ_{pre} yields δ_{G}, which measures the difference in trading costs caused by the guidance cessation event. We measure the level of earnings management using the absolute discretionary accruals (*DACC*) for the fiscal year before guidance cessation. If the absolute discretionary accruals (*DACC*) are larger before the earnings guidance cessation, we would expect a larger reduction in information asymmetry, implying a negative coefficient (γ_1) for *DACC*. The control variables are the same as those used in equation (6).

Table 7 reports the regression results of information asymmetry and discretionary accruals. For both the overall sample and occasional guiders, in Panel A, B, and C of Table 7, the coefficients for discretionary accruals, γ_1 , are all statistically insignificant. However, for persistent guiders, the coefficients for discretionary accruals are positive and statistically significant. In Panel A of Table 7, using percentage price impact as a measure of trading costs, the coefficient for discretionary accruals is negative and statistically significant at the 5 percent level. In Panels B and C of Table 7, using different measures of adverse selection costs as the dependent variable, the coefficients for discretionary accruals are negative and statistically significant at the 1 percent level. Therefore, results from Table 7 show that for persistent guiders, the higher the absolute *DACC*, the greater is the information asymmetry reduction after guidance cessation. This is in support of our "*numbers game*" hypothesis which states that the decrease in information asymmetry arising from guidance cessation is due to the firm engaging in earnings management before it stops providing guidance. The fact that we only observe this relationship for persistent guiders is possibly due to the notion that persistent guiders tend to be shortsighted and therefore may engage in more extensive earnings management to smooth earnings prior to guidance cessation (Cheng et al., 2006).

D. Robustness Checks

D1. Level of Information Asymmetry

Our research design followed that of Houston et al (2010) and first measured the *abnormal* information asymmetry cost measures between the non-announcement period and the announcement period. We then examined the change in the abnormal information asymmetry cost measures between the pre-cessation period and the post-cessation period. This method serves the purpose of minimizing the influence of cross-sectional variations unrelated to the guidance event. An alternative approach is to examine simply the changes in the *level* of information asymmetry between the entire pre-cessation period and the post-cessation period, as done in Chen et al. (2011). Therefore, as an additional check on our main findings, we use the level of information asymmetry as an alternative measure and test whether our results are robust to this measure.

We first investigate the level of information asymmetry during the pre- and post-cessation quarter. Our hypothesis is that there are significant reductions in information asymmetry for persistent guiders but not for occasional guiders. As seen from Panel A of Table 8, there are significant reductions in information asymmetry using all three measures for persistent guiders during the post-cessation quarter relative to the pre-cessation quarter. The percentage price impact is reduced by 0.0017 while the LSB based measure declines by 0.0113. For occasional guiders, only the GH measure delivers results which show significantly lower information asymmetry during the post-cessation quarter relative to the pre-cessation quarter. Therefore, the results using the level of information asymmetry for the entire pre-event and post-event quarter is consistent with our previous results which show that persistent guiders experience significant reductions in information asymmetry after quarterly earnings guidance cessation.

Next, we account for the fact that some days of the quarter coincide with earnings announcement periods while some days do not. As mentioned earlier, studies show that market markers perceive greater level of information asymmetry during earnings announcement period (Lee et al., 1993; Kim and Verrecchia, 1994; and Affleck-Graves et al., 2002). Therefore, we decompose the quarter into earnings announcement periods and non-announcement periods and examine the impact of guidance cessation on information asymmetry for each of these two periods. Announcement period is defined as days which span one day prior to earnings announcement to one day after the announcement. Non-announcement period starts from 2 days after the previous quarter's announcement and ends 2 days before the current quarter's announcement. Results in Panel A of Table 8 show that for the earnings announcement periods, persistent guiders exhibit a statistically significant decline after guidance cessation for all three measures of information asymmetry. The percentage price impact is reduced by 0.0271, LSB measure is reduced by 0.0270, and the GH based measure shows a reduction of 0.0543. These results confirm that information asymmetry is significantly lower after guidance cessation for persistent guiders. For occasional guiders, there are also some reductions in information asymmetry measures following guidance cessation, but these reductions are smaller in magnitude compared to persistent guiders. Also, the percentage price impact shows a statistically insignificant decline for occasional guiders. During the non-announcement period, the results are somewhat weaker. This result is consistent with our previous argument that the impact of guidance cessation should be more pronounced surrounding the earnings announcement periods.

Finally, to compare against the results in Table 4, we subtract the benchmark non-announcement period measures from announcement period measures. Results show a statistically significant reduction in information asymmetry for persistent guiders after guidance cessation. For occasional guiders, we also find some reduction in information asymmetry but smaller in magnitude and statistically insignificant. These results are consistent with our previous main findings that persistent guiders show significant decrease in information asymmetry once they stop providing earnings guidance.

D2. Information Asymmetry and Signed Discretionary Accruals

In our study, we used the absolute value of discriminatory accruals to capture the degree of earnings management because our hypotheses do not predict any specific direction of earnings management. Although the absolute discretionary accruals measure is widely used to proxy for earnings management activity (Bergstresser and Philippon, 2006; and Cornett et al., 2008), this measure can suffer from the concern that it only captures earnings smoothing behavior and does not reflect the direction of earnings management. To address this concern, we use another measure of earnings management, the signed discretionary accruals. Cohen, Dey, and Lys (2008), in investigating the degree of earnings management in the pre- and post-Sarbanes Oxley periods, examine both positive and negative discretionary accruals in addition to absolute discretionary accruals.

Therefore, in this subsection, we examine the relationship between the change in information asymmetry and the degree of earnings management behavior by using signed discretionary accruals as our measure of earnings management. The regression model follows equation (8) except for the use of signed discretionary accruals in place of absolute discretionary accruals. Results are presented in Panel B of Table 8. Results show that the coefficients for positive discretionary accruals are all negative and statistically significant for persistent guiders but statistically insignificant for occasional guiders. Using positive discretionary accruals, Cohen, Dey, and Lys (2008) find a positive relationship between the degree of earnings management and the percentage of compensation derived from option grants and other unexercised options and stock ownership. They argue that option-based compensation provides managers with incentives to manipulate earnings upwards. Our results which are consistent with the "*numbers game*" hypothesis suggest that earnings guidance can be another mechanism which gives executives the incentive to manage earnings upward in order to meet their earnings forecasts.

When we use the negative discretionary accruals as explanatory variable, the coefficients of negative discretionary accruals are positive, but mostly insignificant. It seems that managers are more likely to manage earnings upward and not downward in order to meet their earnings targets. In conclusion, the results using signed discretionary accruals provide further support for our "*numbers game*" hypothesis stating that the reduction in information asymmetry after guidance cessation is positively related to the firm's earnings management during its guidance periods.

D3. Sample Selection

Previous research on earnings guidance has used two different approaches in collecting samples: using the CIG database, or through searching Lexis-Nexis or Factiva to locate public announcements of guidance cessation.[15] Houston et al. (2010) start with CIG and refine the identification of stoppers through a news search. They list a subset of persistent guiders who publicly announced guidance cessation. To provide a robustness check for our results, we repeat our analysis using this subgroup of firms that made public announcements. We obtain qualitatively similar results.[16] For example, using price impact and adverse selection cost based on LSB model as proxies in equation (3), δ_G is -1.57% and -1.71%, respectively. For this subset of persistent guiders who made public announcements of guidance cessation, the decline in information asymmetry due to stopping the guidance is also positively related to the extent of earnings management prior to guidance cessation. Specifically, in the regression of information asymmetry (using price impact as the dependent variable) on discretionary accruals in equation (8), the coefficient for absolute discretionary accruals is -1.58 and statistically significant at the 10% level. Using adverse selection cost based on LSB model, the coefficient of absolute

[15] Anilowski et al. (2007) suggest that CIG database may not be complete whereas Cheng et al. (2006) note that CIG reports the same reported dates and earnings estimates as those found by Lexis-Nexis news searches.
[16] Table is not reported for brevity, but is available upon request.

discretionary accruals is -2.06 and statistically significant at the 5% level. These results support the *"numbers game"* hypothesis that higher the absolute discretionary accrual, the higher is the information asymmetry reduction after guidance cessation for persistent guiders.

D4. Endogeneity

Information asymmetry and earnings management can be simultaneously determined. For example, in equation (8), the right hand side variable *DACC* (absolute discretionary accruals) may be correlated with error terms. On one hand, firms engaging in earnings management can have higher information asymmetry between managers and investors. On the other hand, when a firm's information asymmetry is greater, firm can have more room to manage its earnings without being detected of earnings management. Therefore, the measures for information asymmetry and earnings management can potentially be endogenous. We use Hausman tests to examine this endogeneity bias. Specifically, we perform first stage regression of the *DACC* on size, leverage, current relative performance, future relative performance, trading volume, and the number of analysts following. We then calculate the residuals from this equation and include them as an additional regressor in the original estimation equation (8). When we run an ordinary least squares regression on this new equation and examine the statistical significance of the coefficient of the first stage residuals, we are unable to reject the null hypothesis that no endogeneity problem exists between information asymmetry and earnings management. [17] Therefore, our tests do not seem to suffer from the endogeneity problem.

6. CONCLUSION

We study a sample of 1,061 firms that stopped providing guidance during 2002-2011. Previous studies which assess the effect of earning guidance on analyst performance show that

[17] Table is not reported for brevity, but is available upon request.

earnings guidance generally improves the predictability of analyst forecast, suggesting that information asymmetry should increase after guidance cessation. Because the analyst-based measures capture the firm's information environment produced only from the supply side, concluding that the current trend of firms' decision to stop providing earnings guidance would hurt the information environment would be premature. In this study, we use high-frequency trade-based measures of information asymmetry, which capture the market participants' overall trading activity, and show that liquidity increases and information asymmetry declines significantly for persistent guiders following cessation of earnings guidance.

We further explore the possible sources of the improvement in liquidity and information environment associated with guidance cessation. Our explanation is that these improvements may be due to the fact that firms manage earnings less aggressively after they stop guidance. Without the need of providing guidance to the public on a quarterly basis, firms can have less motivation to engage in earnings management to meet or beat their own targets. To this end, our empirical results show that the decline in the magnitude of earnings management is higher for persistent guiders and that the information asymmetry reductions are positively related to the magnitude of discretionary accruals before earnings guidance cessation for persistent guiders. Therefore, our results are in agreement with the notion that reductions in information asymmetry are driven, at least in part, by change in earnings management practices for persistent guiders.

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Figure 1. Time Line of Event

The event period q_0 refers to the quarter during which a firm provides its last quarterly earnings guidance. The quarter immediately before (after) the event period is defined as pre-event (post-event) period.

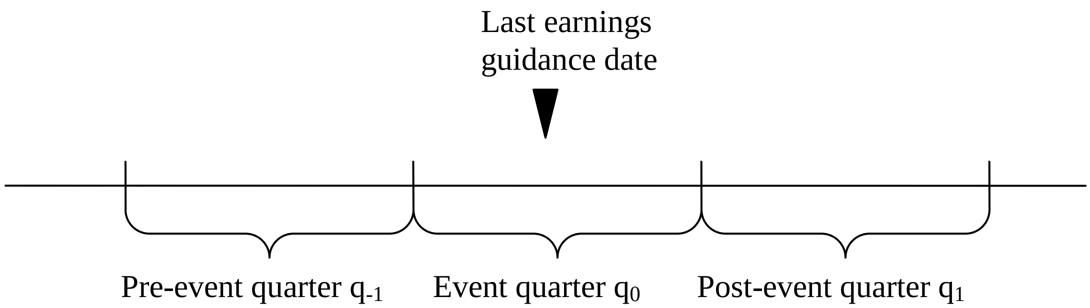

Table 1. Sample Construction

For all firms listed in the Company Issued Guidelines (hereafter CIG) database from 2002 to August 2011, we first identify a sample of guidance stoppers by requiring: 1) the firm is incorporated in the United States; 2) the last appearance of the firm in CIG is between 2002 and June 2010, inclusive; 3) the sample firm is in CRSP, Compustat, IBES, and TAQ databases; 4) Earning announcement dates are not missing for three quarters before the event period, the event period (the quarter during which the firm provides its last quarterly earnings guidance), and the post-event quarter; 5) the days between any adjacent announcement dates are not more than 150 days; 6) there are no stock splits, no changes in ticker, and no changes in the listing exchange during the sample period. The final number of firms from the CIG database which meets all of our selection criteria is 1,061.

Database	Procedures	Number of Firms
CIG	There are at least two management quarterly forecasts in the CIG database for a firm incorporated in the United States and the last appearance of the firm in CIG is between 2002 and June, 2010.	1,820
CRSP, Compustat, IBES	Exclude firms which are not in CRSP, Compustat, or IBES database.	194
Compustat, IBES	Exclude firms which have missing earnings announcement dates.	266
CRSP	Exclude firms with splits during the event period or changes in either listing exchange or ticker.	102
TAQ	Exclude firms which are not in TAQ database	197
	Final sample	1,061

Table 2. Breakdown of Sample Firms

This table shows the breakdown of sample firms. Panel A shows the categorization of sample firms into persistent guidance providers and occasional guidance providers based on the frequency of earnings guidance. The frequency of quarterly guidance refers to the number of guidance firms provided in the past year leading to the cessation of earnings guidance. If there is more than one earnings guidance in a given quarter, we count the number of guidance as one for that quarter. Panel B reports the distribution of sample firms by the year and quarter of guidance cessation and their listed stock exchange.

Panel A: Guidance frequency: Persistent versus occasional guiders

Frequency of earnings guidance	Number (Percentage) of firms	
Four quarterly guidance	181 (17.1%)	
Three quarterly guidance	185 (17.4%)	
Persistent Guidance Providers		366 (34.5%)
Two quarterly guidance	285 (26.9%)	
One quarterly guidance	410 (38.6%)	
Occasional Guidance Providers		695 (65.5%)
Total Number of Firms	1,061	

Panel B: Distribution of guidance cessation by year, quarter, and listing exchange

Calendar year	Number (Percentage) of firms	Fiscal quarter of last guidance provided	Number (Percentage) of firms	Listing exchange	Number (Percentage) of firms
2002	195 (18.4%)	First Quarter	228 (21.5%)	NYSE	623 (58.7%)
2003	192 (18.1%)	Second Quarter	197 (18.6%)	AMEX	17 (1.6%)
2004	167 (15.7%)	Third Quarter	216 (20.4%)	NASDAQ	421 (39.7%)
2005	131 (12.3%)	Fourth Quarter	420 (39.6%)		
2006	122 (11.5%)				
2007	86 (8.1%)				
2008	72 (6.8%)				
2009	61 (5.7%)				
2010*	35 (3.3%)				
Total Firms	1,061		1,061		1,061

*: The sample period ends in June, 2010.

Table 3. Sample Descriptive Statistics

This table reports descriptive statistics during the event quarter for the overall sample and the subsample of occasional guiders and persistent guiders. Market capitalization is reported for the fiscal year before earnings guidance cessation. Price is the average daily price during the event quarter and is computed from CRSP. Number of analysts is the average number of analysts following during the event quarter and is retrieved from IBES. Number of daily trades is the average number of daily trades during the event quarter and is computed from TAQ. Quoted spread is time weighted difference of ask and bid prices using primary exchange quotes. Relative quoted spread is quoted spread divided by the quote midpoint. Effective spread is value weighted difference of trade price and last quote midpoint. Relative effective spread is effective spread divided by the quote midpoint. Return volatility is intraday trade return volatility.

Variables	Overall Sample				Persistent Guiders				Occasional Guiders			
	Mean	Min.	Max.	St. dev.	Mean	Min.	Max.	St. dev.	Mean	Min.	Max.	St. dev.
Market cap. ($millions)	5,503.3	3.5	374,637.2	21,791.2	5,730.9	6.9	374,637.2	24,572.4	5,419.8	3.5	259,710.2	20,296.3
Price ($)	22.10	1.02	789.65	29.38	23.57	1.02	123.00	18.17	21.38	1.06	789.65	33.94
Number of analysts	7.3	1.0	30.0	6.0	7.8	1.0	30.0	5.7	6.9	1.0	30.0	6.2
No. of daily trades	1,382.4	20.0	32,615.0	2,271.8	1,564.1	21.0	32,615.0	2,594.0	1,278.2	20.0	18,533.3	2,057.6
Quoted spread (cents)	5.69	1.00	171.50	7.41	5.21	1.00	37.92	5.23	5.97	1.00	171.50	8.37
Relative quoted spread (%)	0.617	0.020	8.563	0.929	0.480	0.020	8.563	0.817	0.689	0.026	6.819	0.978
Effective spread (cents)	4.76	0.89	122.64	5.62	4.45	0.92	26.66	4.16	4.93	0.89	122.64	6.28
Relative effective spread (%)	0.531	0.020	8.715	0.838	0.420	0.024	8.715	0.773	0.588	0.020	6.954	0.867
Return volatility (%)	0.278	0.012	3.930	0.396	0.222	0.012	3.930	0.347	0.307	0.014	3.502	0.417

Table 4. Changes in Trading Costs for Guidance Stoppers

We model the impact of guidance cessation by the following two equations.

$$\delta_{pre} = TC_{ann,pre} - TC_{non,pre}$$

$$\delta_{post} = TC_{ann,post} - TC_{non,post}$$

$$\delta_G = \delta_{post} - \delta_{pre}$$

where $TC_{ann,pre}$ ($TC_{ann,post}$) represents trading costs during earnings announcement periods before (after) guidance cessation. $TC_{non,pre}$ ($TC_{non,post}$) represents trading costs during non-announcement periods before (after) guidance cessation. δ_{pre} is the difference in trading costs between earnings announcement periods and non-announcement periods for the pre-event quarter, and δ_{post} is the difference in trading costs between earnings announcement and non-announcement periods for the post-event quarter. The difference in δ_{post} and δ_{pre} yields δ_G, the difference in trading costs during announcement periods caused by the guidance cessation event. Announcement period is from one day prior to until one day after the earnings announcement, while non-announcement period starts from 2 days after the previous quarter's announcement through 2 days before the current quarter's announcement. In Panel A, trading costs are measured using different types of spreads. Panel B further examines the portion of trading costs arising from information asymmetry. Quoted spread and relative quoted spread are time weighted. Effective and relative effective spreads are value weighted. Percentage price impact is calculated as follows:

Percentage Price Impact = $2 \times D_{it} \times (V_{i,t+30} - M_{it}) / M_{it}$

where D_{it} is a Lee-Ready indication variable that equals 1 for buy orders and -1 for sell orders for firm *i* at time *t*. V_{t+30} is the post trade value of the security after 30 minutes. M_{it} is the midpoint of bid and ask prices. To control for the arrival of new information during *t* and *t*+30, we weight the percentage price impact by the inverse number of trades during the period. We use quoted midpoint as proxies for $V_{i,t+30}$. We estimate adverse selection costs using spread decomposition models of Lin, et al. (1995, LSB) and Glosten and Harris (1988, GH).

	Overall Sample			Persistent Guiders			Occasional Guiders		
Variable	δ_{pre}	δ_{post}	δ_G	δ_{pre}	δ_{post}	δ_G	δ_{pre}	δ_{post}	δ_G
Panel A: Spread measures									
Quoted spread	0.135	0.040	-0.094	0.209	-0.054	-0.263*	0.088	0.097	0.009
Relative quoted spread	0.035	-0.012	-0.033**	0.047	-0.013	-0.059**	0.027	-0.013	-0.018
Effective spread	0.683	0.248	-0.333**	0.800	0.254	-0.520**	0.628	0.248	-0.226
Relative effective spread	0.042	0.000	-0.046***	0.085	0.005	-0.079***	0.017	-0.004	-0.026
Panel B: Information asymmetry measures									
Percentage price impact	0.016	-0.001	-0.017*	0.018	-0.009	-0.028**	0.014	0.001	-0.013
Adverse selection costs (LSB, in %)	0.008	-0.005	-0.012***	0.011	-0.006	-0.017**	0.005	-0.004	-0.010
Adverse selection costs (GH, in %)	0.002	-0.011	-0.013*	0.009	-0.018	-0.027**	-0.002	-0.007	-0.005

Note: *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Table 5. Regression Analysis of Information Asymmetry around Earnings Announcements

The regression model is

$$\delta = TC_{ann,i} - TC_{non,i} = \beta_0 + \beta_1 POST + \beta_2 LNTRDVOL + \beta_3 LNMKTSZ + \beta_4 ANALFOLL + \varepsilon_i$$

where δ measures the elevation in information asymmetry due to earnings announcement. $TC_{ann,i}$ and $TC_{non,i}$ are the average transaction cost measures for security *i* over earnings announcement and non-announcement period, respectively. Announcement period is from one day prior to until one day after the earnings announcement, POST equals 1 if earnings announcements are made during the post-event quarter and 0 if announced during the pre-event quarter. Three additional right hand side variables are the natural logarithm of trading volume (LNTRDVOL), natural logarithm of firm size (LNMKTSZ), and number of analysts following (ANALFOLL). In Panel A, percentage price impact is calculated as follows:

Percentage Price Impact = $2 \times D_{it} \times (V_{i,t+30} - M_{it}) / M_{it}$

where D_{it} is a Lee-Ready indication variable that equals 1 for buy orders and -1 for sell orders for firm *i* at time *t*. V_{t+30} is the post trade value of the security after 30 minutes. M_{it} is the midpoint of bid and ask prices. To control for the arrival of new information during *t* and *t*+30, we weight the percentage price impact by the inverse number of trades during the period. We use quoted midpoint as proxies for $V_{i,t+30}$. In Panels B and C, we estimate adverse selection costs using spread decomposition models of Lin, et al. (1995, LSB) and Glosten and Harris (1988, GH).

Variables	Overall Sample		Persistent Guiders		Occasional Guiders	
	Coefficients	t-stat	Coefficients	t-stat	Coefficients	t-stat
Panel A: Percentage price impact						
Intercept	0.0228	0.49	0.1062	1.50	-0.0093	0.88
POST	-0.0102	-1.18	-0.0263**	-2.10	-0.0039	0.73
LNTRDVOL	-0.0023	-0.55	-0.0096	-1.60	0.0002	0.97
LNMKSZ	0.0039	0.95	0.0066	1.18	0.0041	0.46
ANALFOLL	0.0001	0.13	0.0018	1.21	-0.0010	0.48
Adj. R^2	0.0018		0.0168		0.0012	
Panel B: Adverse selection costs (LSB, in %)						
Intercept	-0.0620**	-2.50	-0.0317	-0.74	-0.0824***	-2.67
POST	-0.0099**	-2.07	-0.0181**	-2.25	-0.0052	-0.86
LNTRDVOL	0.0054**	2.42	0.0026	0.70	0.0074***	2.61
LNMKSZ	-0.0022	-0.99	-0.0004	-0.11	-0.0039	-1.29
ANALFOLL	0.0002	0.26	0.0007	0.66	0.0000	-0.02
Adj. R^2	0.0099		0.0154		0.0106	
Panel C: Adverse selection costs (GH, in %)						
Intercept	0.1480***	3.73	0.1409**	2.15	0.1568***	3.11
POST	-0.0178**	-2.33	-0.0282**	-2.30	-0.0116	-1.18
LNTRDVOL	-0.0090**	-2.52	-0.0062	-1.10	-0.0106**	-2.28
LNMKSZ	-0.0035	-1.00	-0.0044	-0.86	-0.0032	-0.66
ANALFOLL	0.0019	2.07	-0.0006	-0.38	0.0030**	2.57
Adj. R^2	0.0135		0.0242		0.0108	

Note: *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Table 6. Guider Types and Earnings Management

The regression model is

$$DACC = \alpha_0 + \alpha_1 Type + \alpha_2 LNMKTSZ + \alpha_3 Leverage + \alpha_4 CRP + \alpha_5 FRP + \varepsilon$$

where *DACC* is the absolute value of discretionary accruals defined as the difference between actual accruals and accruals predicted from the modified Jones model as a percent of total assets. *Type* is a guider type dummy variable with 0 for occasional guiders and 1 for persistent guiders. Four additional right hand side variables are the natural logarithm of firm size (*LNMKTSZ*), leverage based on the ratio of total liabilities to total assets (*Leverage*), current relative performance (*CRP*) based on current annual net income deflated by beginning total assets, and future relative performance (*FRP*) based on next year net income deflated by beginning total assets.

Variables	Before Guidance Cessation		After Guidance Cessation	
	Coefficients	t-stat	Coefficients	t-stat
Intercept	0.3954***	5.32	0.3919***	3.74
Type (Persistent guider dummy)	0.0722**	2.08	0.0313	0.55
Log of market size	0.0029	0.27	0.0004	0.03
Leverage	-0.1404*	-1.84	0.0295	0.25
Current relative performance	-0.3330***	-2.80	-0.7933***	-3.04
Future relative performance	0.0769	0.79	0.4209**	2.53
Adj. R^2	0.0146		0.0124	

Note: *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Table 7. Regression Analysis of Information Asymmetry and Discretionary Accruals

The regression model is

$$\delta_G = \delta_{post} - \delta_{pre} = \gamma_0 + \gamma_1 DACC + \gamma_2 LNTRDVOL + \gamma_3 LNMKTSZ + \gamma_4 ANALFOLL + \varepsilon$$

where the dependent variables measure the change in abnormal trading costs for firms before and after guidance cessation. Detailed measurement of the dependent variable is provided in Table 4. DACC is the absolute value of discretionary accruals defined as the difference between actual accruals and accruals predicted from the modified Jones model as a percent of total assets. Three additional variables are the natural logarithm of trading volume (*LNTRDVOL*), natural logarithm of firm size (*LNMKTSZ*), and number of analysts following (*ANALFOLL*). In Panel A, percentage price impact is calculated as follows:

$$\text{Percentage Price Impact} = 2 \times D_{it} \times (V_{i,t+30} - M_{it}) / M_{it}$$

where D_{it} is a Lee-Ready indication variable that equals 1 for buy orders and -1 for sell orders for firm *i* at time *t*. V_{t+30} is the post trade value of the security after 30 minutes. M_{it} is the midpoint of bid and ask prices. To control for the arrival of new information during *t* and *t*+30, we weight the percentage price impact by the inverse number of trades during the period. We use quoted midpoint as proxies for $V_{i,t+30}$. In Panels B and C, we estimate adverse selection costs using spread decomposition models of Lin, et al. (1995, LSB) and Glosten and Harris (1988, GH).

Variables	Overall Sample		Persistent Guiders		Occasional Guiders	
	Coefficients	t-stat	Coefficients	t-stat	Coefficients	t-stat
Panel A: Percentage price impact						
Intercept	-0.5517***	-4.98	-0.6150***	-4.08	-0.4950***	-3.31
Absolute DACC	0.0000	-0.12	-0.0046**	-2.05	0.0000	-0.07
LNTRDVOL	0.0501***	4.51	0.0545***	3.63	0.0478***	3.19
LNMKTSZ	-0.0297**	-2.33	-0.0302*	-1.84	-0.0335*	-1.90
ANALFOLL	-0.0028	-1.17	-0.0042	-1.38	-0.0012	-0.37
Adj. R^2	0.0299		0.0635		0.0026	
Panel B: Adverse selection costs (LSB, in %)						
Intercept	-0.0545	-0.82	-0.0635	-0.58	-0.0653	-0.77
Absolute DACC	-0.0479*	-1.91	-0.1027***	-3.06	0.0136	0.37
LNTRDVOL	0.0061	0.89	0.0108	0.95	0.0038	0.44
LNMKTSZ	-0.0061	-0.76	-0.0124	-0.99	-0.0017	-0.16
ANALFOLL	0.0001	0.07	-0.0012	-0.47	0.0008	0.38
Adj. R^2	0.0093		0.0333		0.0047	
Panel C: Adverse selection costs (GH, in %)						
Intercept	-0.3537***	-3.70	-0.3766**	-2.44	-0.3587***	-2.97
Absolute DACC	-0.0078	-1.57	-0.0361***	-4.19	0.0035	0.56
LNTRDVOL	0.0380***	3.91	0.0294*	1.88	0.0451***	3.67
LNMKTSZ	-0.0350***	-3.04	-0.0135	-0.77	-0.0495***	-3.31
ANALFOLL	0.0008	0.37	0.0027	0.79	-0.0002	-0.06
Adj. R^2	0.0225		0.1011		0.0255	

Note: *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Table 8. Robustness Tests: Alternative Measures of Information Asymmetry and Earnings Management

Panel A reports information asymmetry measures for various trading periods. We define Pre (Post) as the pre-event (post-event) quarter. Announcement period is from one day prior to until one day after the announcement, while non-announcement period starts from 2 days after the previous quarter's announcement through 2 days before the current quarter's announcement. Percentage price impact (PPI) is calculated as follows:

$$\text{Percentage Price Impact} = 2 \times D_{it} \times (V_{i,t+30} - M_{it}) / M_{it}$$

where D_{it} is a Lee-Ready indication variable that equals 1 for buy orders and -1 for sell orders for firm *i* at time *t*. V_{t+30} is the post trade value of the security after 30 minutes. M_{it} is the midpoint of bid and ask prices. To control for the arrival of new information during *t* and *t*+30, we weight the percentage price impact by the inverse number of trades during the period. We use quoted midpoint as proxies for $V_{i,t+30}$. We estimate adverse selection costs using spread decomposition models of Lin, et al. (1995, LSB) and Glosten and Harris (1988, GH).
Panel B presents regression analysis of information asymmetry on signed discretionary accruals. All of the variables are the same as those in equation (8) and Table 7 except that we use signed DACC in place of absolute DACC.

Panel A: Information asymmetry measures for various trading periods

	Persistent Guiders			Occasional Guiders		
Variable	Pre	Post	Post - Pre	Pre	Post	Post - Pre
Entire quarter						
PPI	0.1446	0.1429	-0.0017*	0.1997	0.2060	0.0063
LSB	0.1750	0.1637	-0.0113**	0.1757	0.1697	-0.0060
GH	0.1519	0.1232	-0.0287***	0.1640	0.1377	-0.0263***
Announcement period						
PPI	0.1616	0.1345	-0.0271**	0.2125	0.2069	-0.0055
LSB	0.1856	0.1586	-0.0270***	0.1812	0.1660	-0.0152***
GH	0.1608	0.1065	-0.0543***	0.1626	0.1306	-0.0320***
Non-announcement period						
PPI	0.1432	0.1437	0.0006	0.1986	0.2056	0.0070
LSB	0.1745	0.1641	-0.0103*	0.1755	0.1700	-0.0055
GH	0.1514	0.1243	-0.0272***	0.1641	0.1381	-0.0260***
Announcement - Non-announcement						
PPI	0.0184	-0.0092	-0.0276**	0.0139	0.0014	-0.0125
LSB	0.0111	-0.0055	-0.0167**	0.0057	-0.0040	-0.0097
GH	0.0093	-0.0177	-0.0271**	-0.0015	-0.0075	-0.0060

Note: *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Panel B: Regression analysis of information asymmetry on signed discretionary accruals

Variables	Positive DACC			Negative DACC		
	All	Persistent Guiders	Occasional Guiders	All	Persistent Guiders	Occasional Guiders
Percentage price impact						
Intercept	-0.4199***	-0.1309	-0.5476**	-0.4798***	-0.4818**	-0.4423**
Signed DACC	-0.0230	-0.0326*	-0.0216	0.0000	0.0674*	0.0001
LNTRDVOL	0.0377**	0.0194	0.0449**	0.0433***	0.0339	0.0476**
LNMKTSZ	-0.0191	-0.0197	-0.0159	-0.0278	-0.0115	-0.0407*
ANALFOLL	-0.0022	-0.0017	-0.0030	-0.0013	0.0010	-0.0011
Adj. R^2	0.0191	0.0126	0.0174	0.0145	0.0652	0.0051
Adverse selection costs (LSB, in %)						
Intercept	0.0566	0.0037	0.0554	-0.1354*	-0.1418	-0.1408
Signed DACC	-0.0906***	-0.1750***	-0.0296	0.0001***	0.0002	0.0000
LNTRDVOL	-0.0025	0.0099	-0.0066	0.0143*	0.0156	0.0147
LNMKTSZ	-0.0044	-0.0189	0.0025	-0.0115	-0.0128	-0.0122
ANALFOLL	0.0024	-0.0010	0.0033	-0.0018	-0.0024	-0.0010
Adj. R^2	0.0169	0.0886	-0.0126	0.0113	0.0291	0.0089
Adverse selection costs (GH, in %)						
Intercept	-0.0210	-0.0943	0.0138**	-0.3596**	-0.4916**	-0.3470*
Signed DACC	-0.0983	-0.4185*	0.0076	0.0003	0.0099***	-0.0013
LNTRDVOL	0.0004	0.0079	-0.0026**	0.0425***	0.0439**	0.0493***
LNMKTSZ	-0.0009	0.0008	-0.0020	-0.0469***	-0.0353	-0.0622***
ANALFOLL	0.0043	0.0041	0.0042	0.0037	0.0047	0.0041
Adj. R^2	0.0053	0.0223	-0.0059	0.0260	0.1722	0.0284

Note: *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.