

# Differential Precision of Predisclosure Information across Traders and Trading Volume at Earnings Announcements\*

Ashiq Ali  
University of Arizona

Sandy Klasa  
University of Arizona

Oliver Zhen Li\*  
University of Notre Dame

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\*Corresponding author.

Address: 384 Mendoza College of Business, University of Notre Dame, Notre Dame, IN 46556

Tel: (574) 631-9469; Fax: (574) 631-5255.

*E-mail address:* oli@nd.edu (Oliver Zhen Li)

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### **Abstract**

Kim and Verrecchia (1991a) propose that volume reaction to a public announcement is proportional to the product of absolute price change at the announcement and a measure of differential precision of predisclosure information across traders. We use ownership by institutions with medium stakes (between 1 to 5 percent of outstanding shares) as a measure of differential information precision, given that these institutional investors, as compared to other institutional and individual investors, are likely to have more precise predisclosure information and are more likely to trade at earnings announcements based on their belief revision about stock value. We examine this proposition in the context of earnings announcements and obtain results consistent with the theory. Tests of the theory by prior studies have yielded somewhat inconclusive results.

# **Differential Precision of Predisclosure Information across Traders and Trading Volume at Earnings Announcements**

## **1. Introduction**

Kim and Verrecchia (1991a), hereafter KV, propose that volume reaction to a public announcement is proportional to absolute price change at the time of the announcement and to a measure of differential precision of predisclosure information across traders. They argue that when public information is released, traders revise their beliefs, leading to a change in market price. However, better-informed traders revise their beliefs less because the new information is less important to them than to those who are poorly informed. The differential belief revision among traders causes trading amongst them. In this paper, we test the above proposition.

Prior studies have tested KV's proposition but the results have been somewhat inconclusive. Stickle (1991) and Atiase and Bamber (1994) use dispersion in analysts' forecasts as a measure of differential precision of predisclosure information across traders, but acknowledge that the measure has obvious limitations. It reflects divergent expectations of only a subset of market participants, namely, analysts, and is influenced by the average precision of the analysts' private predisclosure information in addition to their differential precision. Abarbanell, Lanen, and Verrecchia (1995) add that the relation between trading volume and forecast dispersion cannot be unambiguously attributed to differential precision of information across traders. Utama and Cready (1997), hereafter UC, use total institutional ownership as a measure of differential precision, arguing that institutional investors are likely to have more precise predisclosure information than individual investors. They argue that as ownership by institutional

investors increases, the cross-sectional variation in precision across traders would first increase and then decrease. For example, at both 0% and 100% ownership by institutional investors there would be minimum cross-sectional variation in informedness across investors. However, UC's results are also not completely consistent with KV's theory. Moreover, they acknowledge that their results are consistent with an alternative explanation, which we discuss later. In this paper, we address the limitations of prior studies by reexamining KV's theory using a more refined measure of differential precision of predisclosure information across traders. For further validation of the theory, we also examine whether the proposed multiplicative specification of the trading volume model is better at explaining the data as compared to the additive specification that has been commonly used by prior empirical studies on this issue.

The main challenge in testing KV's theory is identifying a measure for difference in the precision of predisclosure information across investors who would trade at earnings announcements consistent with their revision in belief about stock value. The total institutional ownership measure used by UC is innovative, but has the following shortcomings. First, the measure assumes that the level of precision of predisclosure information is the same across all institutional investors. Second, it assumes that all institutional investors will have the same propensity to trade at earnings announcements for a given level of change in their belief revision about stock value. We refine the UC measure to address the above limitations. We consider that institutional investors may differ both in terms of information precision and propensity to trade on their information at earnings announcements. To operationalize this idea we classify institutional investors into three categories: institutional investors with high, medium, and low stakes.

Institutions with high (medium, low) stakes own 5 percent or more (between 1 and 5 percent, less than 1 percent) of the equity of the firm.<sup>1</sup> Given that the cost of information gathering for a stock is fixed, the average cost of information per unit of investment decreases with the amount of total investment (Lev 1988). Thus, the greater the percentage of a stock that an institution owns, the more likely it is that the institution will gather information on that stock. Consequently, we argue that institutions with medium and high stakes are likely to have greater precision of predisclosure information relative to institutions with low stakes.

We further argue that among institutions with medium and high stakes, those with high stakes are less likely to trade on their information at earnings announcements for the following reason. Institutions with high stakes are likely to be “dedicated owners” (see Potter (1992), Bushee (1998) and Hartzell and Starks (2003)). They gather information primarily for monitoring the firms in their portfolio rather than to trade around earnings announcements. Consistent with this proposition, Barclay and Holderness (1991), in a study that examines block trades of more than 5% of a firm’s equity, document that such trades are unlikely to be the result of informed trading. In KV’s model, since trading volume results from informed trading, ownership by institutional investors with high stakes should not be relevant for explaining trading volume at earnings announcements. Thus, we argue that only percentage ownership by institutional investors with medium stakes should be relevant for explaining trading volume at earnings announcements. We examine the relative power of ownership by institutions with high, medium, and low stakes in explaining cross-sectional variation in trading volume. If ownership by

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<sup>1</sup> These cutoff values are somewhat arbitrary. However, we examine the sensitivity of our results to the cutoff values.

institutions with medium stakes is found to have the most power in explaining trading volume at earnings announcements, it would provide a stronger support to KV's theory on trading volume, as compared to the results of an analysis that uses only total institutional ownership as a measure of differential information.

The KV model specifies trading volume as the product of the absolute price change at the time of an earnings announcement and differential precision of predisclosure information across traders. However, prior studies testing KV's model consider absolute price change and the measure of differential precision across traders as additive terms (e.g., Stickle (1991), Atiase and Bamber (1994) and UC). We examine whether the multiplicative specification or the additive specification is better at explaining cross-sectional variation in trading volume at earnings announcements. If the multiplicative specification is found to have superior explanatory power, it will further validate KV's theory on trading volume.

Our results show that trading volume is related to percentage ownership by institutional investors with medium stakes, and it is not related to percentage ownership by institutional investors with low or high stakes. Moreover, our results suggest that the product of absolute price change and ownership by institutional investors with medium stakes is a better specification for explaining trading volume than when the two terms are included additively in the regression model

Our study makes the following contributions. First, our results provide strong support to KV's proposition on the relationship of volume reaction to a public announcement with absolute price change at the announcement and differential precision of predisclosure information across traders. Second, it addresses two limitations faced by

UC in examining KV's theory. UC find a positive concave quadratic relation between trading volume and total institutional ownership as predicted. However, they find that maximum trading volume occurs at about 50% of institutional ownership. The maximum at 50% would have been consistent with KV's theory if all investors had the same level of risk tolerance. However, Verrecchia (1982) argues that the more informed class is likely to be more risk tolerant and hence the maximum should be at less than 50% ownership by the informed class. Thus, the UC result is not completely consistent with KV's theory. On using ownership by institutions with medium stakes rather than ownership by all institutions as a proxy for differential information, we find that maximum trading volume occurs at 40% ownership by institutions with medium stakes. Thus, our results provide better support to KV's theory.

Another important limitation of the UC study is that the relationship between trading volume and total institutional ownership they document may obtain even though total institutional ownership may not be actually proxying for differential information precision. They acknowledge that institutional ownership could be a proxy for earnings announcement precision because institutional owners are considered as better monitors than individual investors. If that is the case, the quadratic relation between abnormal trading volume and institutional ownership can be attributed to the following explanation. Kim and Verrecchia (1991b) propose that differential precision of predisclosure information first increases and then decreases with earnings announcement precision.<sup>2</sup>

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<sup>2</sup> Kim and Verrecchia (1991b) argue that if the precision of a public earnings announcement is low the announcement causes little belief revision and consequently few opportunities to trade. Thus, low precision announcements provide little incentive for investors to acquire information in anticipation of the announcement and consequently such announcements keep information asymmetry across investors at low levels. Conversely, if the precision of a public earnings announcement is large there are also few opportunities to trade around the announcement and hence investors have minimal incentives to acquire information. Consequently, information asymmetry across different investors also remains low if the

Furthermore, trading volume is proportional to differential precision of predisclosure information across traders (Kim and Verrecchia 1991a)). Thus, as noted by UC, it is not clear whether the relation between abnormal trading volume at earnings announcements and total institutional ownership is obtained because total institutional ownership is proxying for differential precision of predisclosure information, precision of earnings announcement, or both. Our analysis clarifies this issue. We find that the relation between abnormal trading volume at earnings announcements and total institutional ownership is driven by ownership of institutions with medium stakes and not by ownership of institutions with high stakes. It is unlikely that institutional ownership acts as a proxy for earnings announcement precision for institutions with medium stakes but not with high stakes. Thus, the lack of a relationship between abnormal trading volume and ownership by institutions with high stakes suggests that the relation between abnormal trading volume at earnings announcements and total institutional ownership observed by UC is not due to institutional ownership proxying for earnings announcement precision.

The third contribution of our paper is with regards to several recent studies using *total* institutional ownership to proxy for a class of investors that have more precise predisclosure information about forthcoming earnings or that are better at interpreting publicly available information and thereby trade to benefit from informational inefficiencies in stock prices. Our study underscores the importance of differentiating among different types of institutional investors. Based on our results, we believe that a classification of institutional investors similar to ours would be useful in getting a better measure of investors with the specific characteristics that the researcher is interested in

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precision of a public earnings announcement is high. Thus, as precision of earnings announcements increases, predisclosure information asymmetry across traders first increases and then decreases.

and thereby providing a tighter analysis and better inferences. For example, Jimbalvo et al. (2002) find that for firms with higher total institutional ownership, stock prices have a greater lead in reflecting the information that is contained in an earnings report. This effect is unlikely to be due to the ownership by institutional investors with small stakes because their investments may not be large enough to justify gathering information. Bartov, Krinsky and Radhakrishnan (2000) show that post earnings announcement drift is lower for stocks with greater total institutional ownership. Institutional investors with medium stakes likely drive this result because they are the ones who are better informed about mispricing and are motivated to trade on this information. Collins, Gong and Hribar (2003) show that the accruals effect is smaller when ownership by transient institutional owners (as defined by Bushee (1998)) is large. They do not use total institutional ownership because they argue that only transient owners would actively trade on the accruals related mispricing (Sloan 1996). However, even though transient owners have a high propensity to trade, they are not likely to be well informed because they tend to own a small percentage of shares outstanding.<sup>3</sup> Thus, to test whether the accruals effect is due to mispricing it might be useful to examine whether or not this effect is smaller for stocks owned largely by institutions with medium stakes.

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<sup>3</sup> Bushee (1998) shows that dedicated investors and quasi indexers have limited propensity to trade and transient investors have high turnover. However, it seems that the transient investors are unlikely to be informed because on the Block factor they have a negative weight meaning they own a rather small percentage of outstanding shares of a stock providing them insufficient incentives to gather information. The transient investors have a positive weight on the momentum factor suggesting that these investors trade in the direction of the reported change in earnings, but this does not imply that these investors are better at interpreting publicly available information. Also, none of the Bushee's categories can be considered as having investors that have more precise predisclosure information as well as a high propensity to trade. Thus, for explaining abnormal trading volume at earnings announcements, we do not use Bushee's categories.

The remainder of the paper is organized as follows. Section 2 discusses the KV model on trading volume and UC's simplification of it when there are only two classes of investors with different precision of predisclosure information. Section 3 discusses the operationalization of the model for empirical testing, variable definitions, and data sources. Section 4 presents the results and Section 5 concludes the study.

## 2. Kim and Verrecchia model

KV propose the following model for volume reaction to a public announcement,

$$Volume = \left( \frac{1}{2} \int r_i |s_i - s| d_i \right) |\tilde{P}_2 - \tilde{P}_1|. \quad (1)$$

The term  $\int r_i |s_i - s| d_i$  is the weighted average of the absolute deviation of the precision of trader  $i$ 's private predisclosure information  $s_i$  from the average precision  $s$ , weighted by the trader's relative risk tolerance  $r_i$ . The term  $|\tilde{P}_2 - \tilde{P}_1|$  is the absolute value of price change at the time of the public announcement.

As we argue before, institutions with medium stakes in a stock are likely to have relatively more precise predisclosure information and are more likely to trade on their information. Individual and institutional investors with low stakes are likely to have less precise information because their small investment does not justify the fixed cost of gathering information for the stock. Institutions with high stakes are likely to have more precise predisclosure information but they are likely to be dedicated investors who are unlikely to trade at earnings announcements. KV's model does not allow for investors who do not trade at public announcements consistent with their belief revision about

stock value. Accordingly, for our analysis, we consider only two groups: (i) institutional investors with medium stakes, representing investors with high level of precision of predisclosure information and (ii) institutional investors with low stakes and all individual investors, representing investors with low level of information precision.<sup>4</sup>

UC derive a version of KV's model with traders with two levels of precision of predisclosure information  $s_1$  and  $s_2$ . Let  $n_1$  and  $n_2$  be the number of traders in the two groups and if risk tolerance,  $r$ , is the same across all investors, then Equation (1) simplifies to

$$Volume = (c - c^2)r(s_1 - s_2) | \tilde{P}_2 - \tilde{P}_1 |, \quad (2)$$

where  $c = n_1/(n_1 + n_2)$ . Equation (2) indicates that trading volume at earnings announcements is concave and quadratic in  $c$  with a maximum at  $c = 0.50$ . The maximum at 50% of institutional ownership obtains because of the assumption of the same level of risk tolerance across all traders. Verrecchia (1982) proposes that risk tolerance is likely to be greater for investors with greater precision of predisclosure information. This implies that institutions with medium stakes are likely to be more risk tolerant than other investors and that they would trade more aggressively on their information. The maximum point should therefore be at below 50% ownership by institutions with medium stakes.

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<sup>4</sup> An implicit assumption we make in our analysis is that all individual investors are homogeneous in terms of precision of information and propensity to trade on information. We do not have data on individual investors to partition them on these factors.

### 3. Model specification, variable definitions, and data

#### 3.1. Model specification

We use the following model to test KV's proposition,

$$EXVOL_{it} = a_0 + a_1 ADJINSTM_{it} \times ARET_{it} + a_2 ADJINSTM_{it}^2 \times ARET_{it} + e_{it}. \quad (3)$$

The dependent variable *EXVOL* is excess trading volume at earnings announcements. *ADJINSTM* stands for adjusted ownership by institutions with medium stakes. It is defined as the shares held by institutions with medium stakes in the stock (1 to 5% of outstanding shares) divided by total shares held by individuals and by institutions with low (less than 1% of outstanding shares) and medium stakes, but not high stakes (greater than 5% of outstanding shares). The variable *ADJINSTM* represents the term *c* in equation (2). Note that per the definition of *c*, we adjust the percentage ownership by institutions with medium stakes to reflect our argument that ownership by institutions with high stakes is likely to be ownership by dedicated investors who are not motivated to trade at earnings announcements, and are therefore not relevant in KV's trading volume model. *ARET* is the absolute value of excess return at the earnings announcement. As per Equation (2), we predict that  $a_1$  is positive and  $a_2$  is negative. Results consistent with these predictions would validate KV's proposition.

Next, we introduce several control variables in Equation (3) to rule out the possibility that results from Equation (3) are due to confounding factors. We use the following regression model,

$$\begin{aligned}
EXVOL_{it} = & a_0 + a_1ADJINSTM_{it} \times ARET_{it} + a_2ADJINSTM_{it}^2 \times ARET_{it} \\
& + a_3ADJINSTM_{it} + a_4ADJINSTM_{it}^2 + a_5ARET_{it} + a_6LSIZE_{it} \\
& + a_7LPRICE_{it} + a_8ADVOL_{it} + a_9BETA_{it} + a_{10}SRISK_{it} + e_{it}
\end{aligned} \tag{4}$$

*LSIZE* is the natural logarithm of the average value of market capitalization during the non-announcement period. The non-announcement period is days -70 to -11 and +11 to +70, where day 0 is the earnings announcement day. *LPRICE* is the natural logarithm of stock price two days before the earnings announcement. *ADVOL* is the average daily dollar values of shares (in million) traded during the non-announcement period. *BETA* is the beta of the stock estimated over the non-announcement period and *SRISK* is the standard deviation of the market model residuals estimated over the non-announcement period deflated by the standard deviation of market returns during the same period.

In Equation (4), we introduce *ADJINSTM*, *ADJINSTM*<sup>2</sup> and *ARET* as separate variables to capture any main effects associated with these variables. Without these controls, the coefficients on the interaction terms using these variables may provide biased results. Including these variables simultaneously with the interaction terms will also enable the examination of whether trading volume is better explained by a multiplicative specification or an additive specification of the absolute price change at earnings announcements and differential precision of predisclosure information.

The other control variables in Equation (4) have been suggested by prior studies. In examining trading volume at earnings announcements, Bamber (1986, 1987), Atiase and Bamber (1994), and UC use *LSIZE* as an explanatory variable. The other explanatory variables used in each of these studies differ, accordingly the rationale for using the size variable as well as the predicted sign of its coefficient also differ. In our

operationalization of KV's model, size does not factor in. However following prior studies, we include it in the model, but make no prediction on the sign of its coefficient.

Following UC, we include *LPRICE* and *ADVOL* to control for the effect of transaction costs on trading volume at earnings announcements. A trader is unlikely to engage in a trade if the benefit from it is less than the transaction costs (Michaely and Villa (1995 and 1996) and Michaely and Murgia (1995)). *LPRICE* proxies for the direct transaction costs, bid-ask spread and trading commission, and *ADVOL* proxies for indirect transaction costs such as price pressure on illiquid stocks (Bhushan (1994)). We expect *LPRICE* and *ADVOL* to be positively related to excess trading volume around earnings announcements.

Michaely and Vila (1996) show that trading volume around ex-dividend days is related to a stock's risk. They argue that the higher the risk, the smaller the position traders are willing to assume since they cannot arbitrage away that risk. Further, they argue that in the absence of transaction costs, trading volume is independent of the market risk component of the stock risk because it can be costlessly hedged away. However, when transactions are costly, trading volume is a decreasing function of both the market risk component of stock risk and its idiosyncratic component. This argument should also apply in the context of trading volume at earnings announcements. Thus, we expect *BETA*, the market risk component, and *SRISK*, the idiosyncratic risk component, to be negatively related to trading volume at earnings announcements.

### 3.2. Data and variable definitions

We follow prior studies (Bamber and Cheon (1995) and UC) in measuring excess trading volume. We measure normal trading volume,  $NVOL$ , as the average daily volume during the non-announcement period, i.e., the 120-day period from day  $-70$  to  $-11$  and from day  $11$  to  $70$ .

$$NVOL_{it} = \frac{\sum_{d \in [-70, -11] \cup [11, 70]} VOL_{it,d}}{120},$$

where  $VOL_{it,d}$  is the number of shares traded on a given day. We calculate a two-day (days  $-1$  and  $0$  relative to the earnings announcement date) measure of excess trading volume as,

$$EXVOL_{it} = \frac{\sum_{d \in [-1, 0]} VOL_{it,d}}{2NVOL_{it}} - 1.$$

This measure captures the percentage increase in daily trading volume during the announcement period relative to the non-announcement period.<sup>5</sup>

We use the absolute value of 2-day ( $-1$  to  $0$ ) cumulative abnormal returns,  $ARET$ , as our measure of absolute price change. Abnormal returns are estimated using the market model. The parameters of the market model, for each firm-year observation in the sample are estimated over the corresponding 120-day non-announcement period as follows:

$$RET_{it,d} = \alpha_{it} + \beta_{it}MKT_{t,d} + u_{it,d},$$

where  $RET_{it,d}$  is the daily stock return for firm  $i$ , year  $t$ , and day  $d$  belongs to the non-announcement period (from day  $-70$  to  $-11$  and from day  $11$  to  $70$ ) and  $MKT_{t,d}$  is daily value-weighted market return.  $ARET$  is computed as

$$ARET_{it} = |RET_{it} - \hat{\alpha}_{it} - \hat{\beta}_{it}MKT_t|,$$

where  $RET_{it}$  and  $MKT_t$  are the 2-day (-1,0) announcement period stock return and market return, respectively.

$BETA$  is the estimate of  $\beta$  from the market model and firm-specific risk  $SRISK$  is computed as

$$SRISK_i = \frac{\sigma_{it}}{\sigma_{mt}},$$

where  $\sigma_{it}$  is the standard deviation of the error term,  $u_{it,d}$ , of the market model and  $\sigma_{mt}$  is the standard deviation of the market returns,  $MKT_{t,d}$ , during the 120-day non-announcement period.

We identify 22,037 annual earnings announcements from Compustat for the period 1992 to 2001. The data for computing  $EXVOL$ ,  $ARET$ ,  $LSIZE$ ,  $LPRICE$ ,  $ADVOL$ ,  $BETA$ , and  $SRISK$  are from CRSP. We obtain required data from CRSP for 13,424 firm-year observations. Data for institutional ownership related variables are obtained from monthly Compact Disclosure CDs which have data constructed on the basis of 13-F filings with the Securities and Exchange Commission (SEC). In these filings, institutions are defined as entities other than natural persons that have investment discretion over at least \$100 million of equity securities. We obtain institutional ownership data for a given year from January CDs of that year given that we have access to only the January CDs. Our final sample has 9,862 firm-year observations with all required data.

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<sup>5</sup> As in UC, we also use seven-day (-1 to 5) excess trading volume and obtain similar results.

## 4. Results

### 4.1. Descriptive statistics

Table 1 provides descriptive statistics for all the variables in Equation (4). The mean value of the dependent variable *EXVOL* is 0.482, suggesting that trading volume at earnings announcements is 48.2% higher than that during the non-announcement period. The two main explanatory variables, *ARET*, price reaction at earnings announcement, and *ADJINSTM*, adjusted ownership by institutions with medium stakes, have mean values of 0.048 and 0.230. UC report similar magnitudes for most of the variables that are defined similarly in the two studies. Table 2 reports correlations among all the variables. Note that *ADJINSTM* and *ARET* have significant correlations with many of the control variables, suggesting that it is important to examine the sensitivity of the results to these control variables.

### 4.2. Regression results

#### 4.2.1 The basic model

Table 3 presents regression estimates of Equation (3). As expected, the coefficient on  $ADJINSTM \times ARET$  is positive and significant (87.942,  $t = 35.58$ ) and the coefficient on  $ADJINSTM^2 \times ARET$  is negative and significant (-118.875,  $t = -23.58$ ). These results suggest that as predicted by KV, trading volume at earnings announcement is related to the absolute price change at the time of the announcement and traders' differential precision of predisclosure information.

Table 3 also presents regression estimates of Equation (4), which incorporates several control variables. Once again, the coefficient on  $ADJINSTM \times ARET$  is positive and

significant (31.075,  $t = 6.44$ ) and the coefficient on  $ADJINSTM^2 \times ARET$  is negative and significant (-38.636,  $t = -4.68$ ). Thus, the regression results for Equation (3) are not completely driven by correlated omitted variables. However, the magnitude of these coefficients are substantially smaller than are those for equation (3), emphasizing the importance of using the control variables. These results once again suggest that trading volume at earnings announcements is related to the absolute price change at earnings announcements and traders' differential precision of predisclosure information. Results in table 3 also suggest that for explaining trading volume, the product terms containing  $ADJINSTM$ ,  $ADJINSTM^2$ , and  $ARET$  are better specified than the additive terms of these variables. As previously noted, coefficients on both the product terms,  $ADJINSTM \times ARET$  and  $ADJINSTM^2 \times ARET$ , are significant with predicted signs, but  $ADJINSTM$  and  $ADJINSTM^2$  in their additive forms are both insignificant ( $t = -0.22$  and  $t = 0.40$ , respectively). The positive and significant coefficient on the additive term  $ARET$  ( $t=16.82$ ) by itself is not sufficient for validating the additive specification. Given that KV's model proposes a multiplicative specification, our results provide further validity to KV's theory.

The signs of the coefficients on other control variables are generally as expected. Specifically, the coefficient on  $LPRICE$  is positive and significant (0.199,  $t = 8.06$ ), suggesting that low price per share stocks have high levels of transaction costs due to bid-ask spreads and commissions, which make these stocks less attractive to trade. The coefficient on the second proxy for transaction costs,  $ADVOL$ , is not significant.<sup>6</sup> The

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<sup>6</sup> This may be because of the way  $ADVOL$  and the dependent variable,  $EXVOL$ , are defined. The denominator  $NVOL$  (average trading volume in units during the non-announcement period) used in the computation of the dependent variable,  $EXVOL$ , is highly correlated with  $ADVOL$  ( $\rho = 0.860$ ,  $p < 0.0001$ ), inducing a negative association between  $EXVOL$  and  $ADVOL$ . This negative association may be

coefficients on *BETA* and *SRISK* are negative and significant (-0.086,  $t = -4.36$ ; -0.024,  $t = -3.47$ , respectively), as expected.

We use the regression results of Equation (4) to estimate the value of *ADJINSTM* at which the trading volume is maximized. On taking the first derivative of equation (4) with respect to *ADJINSTM* and equating it to zero, we get the maxima when

$$ADJINSTM^* = -\frac{a_1}{2a_2} = -\frac{31.075}{2 \cdot (-38.636)} = 0.402 = 40.2\% . \quad (5)$$

The maximum at less than 50% is consistent with higher precision traders (in our case, the medium institutional investors) having higher risk tolerance than low precision traders (Verrecchia (1982)) and consequently being more aggressive in their trades.

#### 4.2.2 Model with ownership by institutions with high, medium, and low stakes

UC use total institutional ownership as a proxy for differential precision across traders. They implicitly assume that institutional owners are homogeneous in terms of precision of their predisclosure information as well as their propensity to trade on their information at earnings announcements. We, on the other hand, argue that institutional owners with small stakes are unlikely to have high precision information because they may not be able to justify costs of gathering information, and institutional owners with high stakes tend to be dedicated investors who are unlikely to trade on their information at earnings announcements. Thus, institutional owners with medium stakes are the ones who possess high precision information and have a high propensity to trade on their information. Hence, we argue that only ownership by institutions with medium stakes

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responsible for neutralizing the possible positive association between *EXVOL* and *ADVOL* due to transaction costs.

should be relevant for explaining trading volume at earnings announcements. To examine this argument we estimate two models which are variations of Equation (4). First, we replace *ADJINSTM* with *INST*, which stands for total percentage institutional ownership. We then breakup *INST* into *INSTH*, *INSTM*, and *INSTL*, defined as percentage ownership by institutions with high stakes (greater than 5%), medium stakes (1% to 5%) and low stakes (less than 1%), respectively. Specifically, we replace each variable with *INST* in it with three variables such that *INST* is replaced with *INSTH*, *INSTM*, and *INSTL*, respectively. For example, we replace  $INST \times ARET$  with the following three variables:  $INSTH \times ARET$ ,  $INSTM \times ARET$ , and  $INSTL \times ARET$ . We predict that variables with *INSTM* would be associated with trading volume as per KV's theory and variables with *INSTH* or *INSTL* are unlikely to be associated with trading volume in the direction predicted by KV.

Panel A of table 4 reports descriptive statistics of *INST*, *INSTH*, *INSTM*, and *INSTL*. Mean values of *INST* and *INSTM* are 42.4% and 19.4%, respectively. Thus, the measurement error from using *INST* instead of *INSTM* is substantial. Panel B of table 4 reports correlations between *INST*, *INSTH*, *INSTM*, and *INSTL*. Figure 1 further illustrates this correlation by plotting mean values of *INST*, *INSTH*, *INSTM*, and *INSTL* against *INST* deciles. The correlation between *INST* and *INSTM* is 0.828 suggesting that in a cross-sectional analysis using *INST* in place of *INSTM* may be acceptable if power of the test is not an issue and only the signs and not the magnitudes of the coefficients are of interest. In our analysis, both the sign and the magnitudes of the coefficients are of interest.

The first column of Table 5 provides results when total institutional ownership is used as a proxy for differential information precision. The coefficients on the variables  $INST \times ARET$  and  $INST^2 \times ARET$  are 19.075 ( $t = 4.97$ ) and -17.672 ( $t = -4.07$ ), respectively. The signs on these coefficients are consistent with KV's theory as well as the notion that total institutional ownership proxies for differential precision of predisclosure information. However, based on the magnitudes of these coefficients, maximum trading volume (estimated using an approach similar to equation (5)) occurs at 54.0% ( $= -19.075 / (2 \times -17.672)$ ). This result is inconsistent with the Verrecchia (1982) prediction that the maxima should occur at below 50% ownership of the better informed group. This result calls into question the efficacy of total institutional ownership as a proxy for differential precision of predisclosure information.

Results in the second column of Table 5 show that the significance of the  $INST$  interaction variables in the first column is driven by ownership by institutions with medium stakes and not ownership by institutions with high or low stakes. The coefficient on  $INSTM \times ARET$  and  $INSTM^2 \times ARET$  are 60.4969 ( $t = 8.18$ ) and -86.1583 ( $t = -5.94$ ), respectively, consistent with KV's theory. The coefficients on  $INSTH \times ARET$ ,  $INSTH^2 \times ARET$ , and  $INSTL^2 \times ARET$  are insignificant and the coefficient on  $INSTL \times ARET$  is significant but negative. Based on the coefficients on  $INSTM \times ARET$  and  $INSTM^2 \times ARET$ , abnormal trading volume is maximized when medium institutional ownership equals 35.1% ( $= -60.497 / (2 \times -86.158)$ ). This finding supports the Verrecchia (1982) proposition that abnormal trading volume is maximized when traders with more precise information own less than 50% of the firm's equity. Thus, the Table 5 results validate our argument for considering different levels (high, medium, and low) of stakes

by institutional investors in measuring differential precision of information and differential propensity to trade on earnings information across institutional investors.

The results in Table 5 also allow us to discriminate whether the relation between trading volume and total institutional ownership is because institutional ownership is proxying for differential precision of predisclosure information or earnings announcement precision, a concern raised by UC. Given that our results in Table 5 show that trading volume is related with *INSTM* but not with *INSTH*, the earnings announcement precision explanation is unlikely to be valid. It is unlikely that *INSTM* proxies for precision of earnings announcement but *INSTH* does not. In fact institutions with high stakes are likely to play a stronger monitoring role causing earnings announcements to be more precise.

#### 4.2.3 Sensitivity to the definitions of high, medium, and low institutional stakes

Given that our cutoffs for classifying institutional ownership stakes as high, medium and low are somewhat arbitrary, we examine the sensitivity of our results to these cutoffs. Specifically, we break each of the classes further into two groups. *INSTH* is broken into *INSTHH* (greater than 10%) and *INSTHL* (between 5% and 10%). *INSTM* is broken into *INSTMH* (between 2% and 5%) and *INSTML* (between 1% and 2%). *INSTL* is broken into *INSTLH* (between 0.5% and 1%) and *INSTLL* (below 0.5%). We then reestimate the model in Table 5 with these additional classes of institutional ownership and report the results in Table 6.

The coefficients on  $INSTMH \times ARET$ ,  $INSTMH^2 \times ARET$ ,  $INSTML \times ARET$ , and  $INSTML^2 \times ARET$  are all significant with the predicted signs. These results suggest the

two subgroups of *INSTM* behave similarly. That is, within the 1% to 5% ownership group, institutional investors are quite homogeneous in terms of the precision of predisclosure information and propensity to trade at earnings announcements. The coefficients on  $INSTHH \times ARET$ ,  $INSTHH^2 \times ARET$ ,  $INSTHL \times ARET$  and  $INSTHL^2 \times ARET$  do not have the signs and significance that would be consistent with KV's theory. Thus, for our analysis it seems reasonable to classify all institutional owners with greater than 5% ownership in one group.<sup>7</sup> Finally, the coefficients on  $INSTLL \times ARET$  and  $INSTLL^2 \times ARET$  though significant do not have signs consistent with KV's theory. However, the coefficients on  $INSTLH \times ARET$  and  $INSTLH^2 \times ARET$  are significant and have signs consistent with KV's theory. Thus, it seems that when ownership of a stock by an institution is greater than 0.5%, the institution tends to have more precise information than that of individual traders. Consequently, it may be argued that our low group is not homogeneous and should be accordingly further partitioned. Thus, the assumption we make in this study that investors with more precise predisclosure information and propensity to trade on their information at earnings announcements are institutions with 1% to 5% ownership of the stock needs to be slightly modified. We repeat the analysis in the paper after redefining *INSTL*, *INSTM* and *INSTH* as corresponding to less than 0.5% stake, between 0.5% to 5% stake, and greater than 5% stake, respectively. All of the results remain qualitatively the same.

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<sup>7</sup>We also partition *INSTH* into *INSTHH* (greater than 7%) and *INSTHL* (between 5% and 7%) and then reestimate the model in table 6. Our results remain qualitatively the same.

#### 4.2.4 Comparison with the UC model

We modify the UC analysis in two main ways. We do not consider all institutional owners to be homogeneous and we use a multiplicative specification as against their additive specification of the trading volume model. It is possible that the multiplicative specification may have in some way caused the *INSTM* related variables to be significant and the *INSTH* and *INSTL* related variables to be insignificant. To address this concern, we keep the additive specification of UC and then examine the explanatory power of variables related to *INSTH*, *INSTM*, and *INSTL*. Table 7 reports the results of this analysis. The first column replicates the UC results. The coefficient on *INST* is positive and significant (1.085,  $t = 4.78$ ) and the coefficient on  $INST^2$  is negative and significant (-1.111,  $t = -4.68$ ). The second column presents results with *INST* replaced by its components *INSTH*, *INSTM* and *INSTL*. The coefficient on *INSTM* is positive and significant (2.073,  $t = 4.81$ ) and the coefficient on  $INSTM^2$  is negative and significant (-3.101,  $t = -3.84$ ). The coefficients on *INSTH*,  $INSTH^2$ , *INSTL* and  $INSTL^2$  are all insignificant. These results suggest that even with an additive specification, results related to total institutional ownership are driven by ownership by institutions with medium stakes.

## 5. Conclusion

Kim and Verrecchia (1991a) propose that volume reaction to a public announcement is proportional to the product of absolute price change at the announcement and a measure of differential precision of predisclosure information across traders. We use ownership by institutions with medium stakes (between 1% to 5% of outstanding shares)

as a measure of differential information precision, given that these institutional investors, as compared to other investors, are likely to have more precise predisclosure information and are more likely to trade at earnings announcements based on their belief revision about stock value. We examine this proposition in the context of earnings announcements and obtain results consistent with the theory.

We argue that institutional investors with low stakes cannot justify costs of obtaining information; and institutions with high stakes are likely to have relatively precise information but they tend to be dedicated investors holding long-term positions in a firm's stock and thus are unlikely to trade at earnings announcements as per their belief revision about stock value. Accordingly, we find that abnormal trading volume at earnings announcements is related to ownership by institutions with medium stakes but is not related to ownership by institutions with low or high stakes.

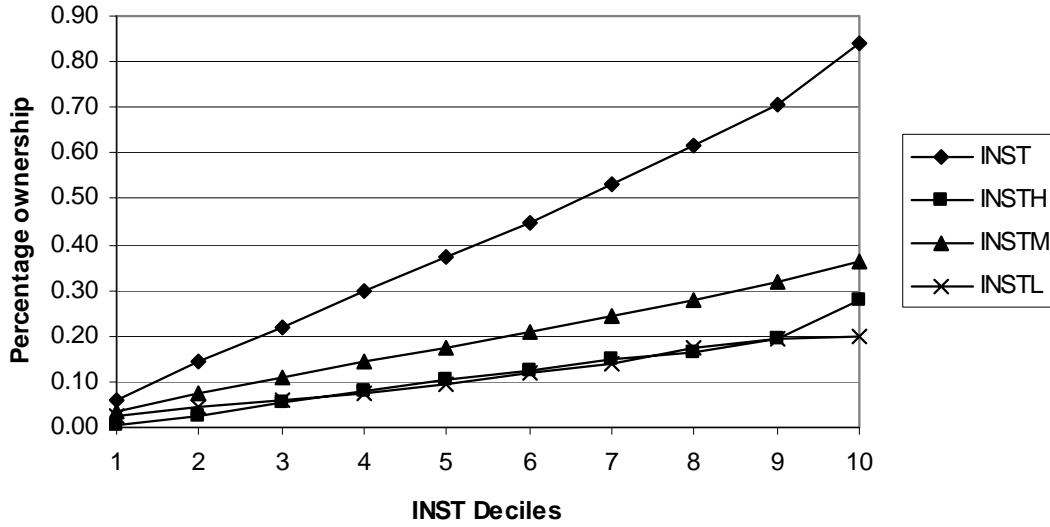
Our finding that precision of information and propensity to trade on information differ across institutions with different stake levels also has implications for studies other than those on trading volume. A number of recent studies use *total* institutional ownership to identify a class of investors that have more precise predisclosure information about forthcoming earnings (e.g., Jiambalvo et al. 2002) or that are better at interpreting public information and consequently prevent systematic mispricing of stocks (Bartov et al. 2000). We believe that in such studies classification of institutional investors similar to ours would be useful in getting a better measure for investor class with the characteristic that the researcher is interested in.

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Figure 1  
 Plot of percentage ownership by institutions with high, medium, and low stakes against aggregate institutional ownership deciles



*INST* is the percentage of shares held by institutional investors. *INSTH* is the percentage of shares held by institutional investors with more than a 5% stake. *INSTM* is the percentage of shares held by institutional investors with a stake of between 1% and 5%. *INSTL* is the percentage of shares held by institutional investors with less than a 1% stake.

Table 1  
 Descriptive statistics of variables in Equation (4). Sample period: 1992 to 2001. Number of observations = 9,862

Variable	Mean	25th Pct	Median	75th Pct	Std Dev
<i>EXVOL</i>	0.482	-0.335	0.087	0.768	1.525
<i>ADJINSTM</i>	0.230	0.103	0.208	0.333	0.155
<i>ARET</i>	0.048	0.014	0.031	0.063	0.054
<i>SIZE</i>	2182.390	118.547	325.847	1046.430	11312.380
<i>LSIZE</i>	5.949	4.775	5.786	6.953	1.624
<i>PRICE</i>	23.506	9.000	18.125	31.062	23.401
<i>LPRICE</i>	2.782	2.197	2.897	3.436	0.928
<i>ADVOL</i>	14.717	0.514	1.702	6.247	82.981
<i>BETA</i>	0.942	0.432	0.795	1.325	0.768
<i>SRISK</i>	4.159	2.439	3.640	5.245	2.504

*EXVOL* is daily trading volume over the 2-day earnings announcement period (-1,0) divided by normal trading volume minus 1, where normal trading volume is calculated during the non announcement period (days -70 to -11 and 11 to 70). *ADJINSTM* is the percentage of shares held during the announcement period by institutions with medium stakes in the stock (1 to 5%) divided by total shares held by individuals and by institutions with low (less than 1%) and medium stakes (1 to 5%). *ARET* is the absolute value of the abnormal returns during the announcement period. *SIZE* is the average market capitalization over the non-announcement period. *LSIZE* is the natural logarithm of *SIZE*. *PRICE* is stock price on day -2 relative to the announcement date. *LPRICE* is the natural logarithm of *PRICE*. *ADVOL* is the average daily dollar value (in millions) of shares traded during the non-announcement period. *BETA* is estimated using the market model over the 120-day non-announcement period. *SRISK* is the standard deviation of the error term from the market model estimated over the non-announcement period deflated by the standard deviation of market returns over the market model estimation period.

Table 2

Correlations of variables in Equation (4). Sample period: 1992 to 2001. Number of observations = 9,862.

	<i>EXVOL</i>	<i>ADJINSTM</i>	<i>ARET</i>	<i>LSIZE</i>	<i>LPRICE</i>	<i>ADVOL</i>	<i>BETA</i>	<i>SRISK</i>
<i>EXVOL</i>	1.000							
<i>ADJINSTM</i>	0.017*	1.000						
<i>ARET</i>	0.425***	-0.092***	1.000					
<i>LSIZE</i>	-0.032**	0.332***	-0.169***	1.000				
<i>LPRICE</i>	-0.001	0.403***	-0.208***	0.767***	1.000			
<i>ADVOL</i>	-0.017*	0.038***	-0.009	0.373***	0.224***	1.000		
<i>BETA</i>	0.011	0.031**	0.120***	0.177***	0.180***	0.174***	1.000	
<i>SRISK</i>	0.020**	-0.262***	0.231***	-0.493***	-0.483***	-0.067***	0.207***	1.0000

*EXVOL* is daily trading volume over the 2-day earnings announcement period (-1,0) divided by normal trading volume minus 1, where normal trading volume is calculated during the non announcement period (days -70 to -11 and 11 to 70). *ADJINSTM* is the percentage of shares held during the announcement period by institutions with medium stakes in the stock (1 to 5%) divided by total shares held by individuals and by institutions with low (less than 1%) and medium stakes (1 to 5%). *ARET* is the absolute value of the abnormal returns during the announcement period. *LSIZE* is the natural logarithm of average market capitalization over the non-announcement period. *LPRICE* is the natural logarithm of stock price on day -2 relative to the announcement date. *ADVOL* is the average daily dollar value (in millions) of shares traded during the non-announcement period. *BETA* is estimated using the market model over the 120-day non-announcement period. *SRISK* is the standard deviation of the error term from the market model estimated over the non-announcement period deflated by the standard deviation of market returns over the market model estimation period. \*\*\* (\*\*, \*) represents significance level at 1% (5%, 10%).

Table 3  
 Regression estimates of the models of trading volume at earnings announcements (Equations 3 and 4)  
 Dependent variable = *EXVOL*. Sample period: 1992 to 2001.

Variable	Expected Sign		
Intercept	?	-0.019 (-1.04)	-0.084 (-0.94)
<i>ADJINSTM</i> × <i>ARET</i>	+	87.942 (35.58)***	31.075 (6.44)***
<i>ADJINSTM</i> <sup>2</sup> × <i>ARET</i>	-	-118.875 (-23.58)***	-38.636 (-4.68)***
<i>ADJINSTM</i>	?	-	-0.085 (-0.22)
<i>ADJINSTM</i> <sup>2</sup>	?	-	-0.255 (-0.40)
<i>ARET</i>	?	-	9.263 (16.82)***
<i>LSIZE</i>	?	-	-0.067 (-4.60)***
<i>LPRICE</i>	+	-	0.199 (8.06)***
<i>ADVOL</i>	+	-	-0.000 (-1.23)
<i>BETA</i>	-	-	-0.086 (-4.36)***
<i>SRISK</i>	-	-	-0.024 (-3.47)***
Adj. R <sup>2</sup>		0.164	0.202
# of Observations		9,862	9,862

*EXVOL* is daily trading volume over the 2-day earnings announcement period (-1,0) divided by normal trading volume minus 1, where normal trading volume is calculated during the non announcement period (days -70 to -11 and 11 to 70). *ADJINSTM* is the percentage of shares held during the announcement period by institutions with medium stakes in the stock (1 to 5%) divided by total shares held by individuals and by institutions with low (less than 1%) and medium stakes (1 to 5%). *ARET* is the absolute value of the abnormal returns during the announcement period. *LSIZE* is the natural logarithm of average market capitalization over the non-announcement period. *LPRICE* is the natural logarithm of stock price on day -2 relative to the announcement date. *ADVOL* is the average daily dollar value (in millions) of shares traded during the non-announcement period. *BETA* is estimated using the market model over the 120-day non-announcement period. *SRISK* is the standard deviation of the error term from the market model estimated over the non-announcement period deflated by the standard deviation of market returns over the market model estimation period. \*\*\* (\*\*, \*) represents significance level at 1% (5%, 10%).

Table 4

Descriptive statistics and correlations for percentage ownership by institutions with high, medium, and low stakes. Sample period: 1992 to 2001. Number of observations = 9,862.

<b>Panel A: Descriptive statistics</b>					
Variable	Mean	25th Pct	Median	75th Pct	Std Dev
<i>INST</i>	0.424	0.221	0.411	0.616	0.241
<i>INSTH</i>	0.118	0.000	0.085	0.187	0.122
<i>INSTM</i>	0.194	0.094	0.179	0.279	0.123
<i>INSTL</i>	0.112	0.042	0.088	0.163	0.088

<b>Panel B: Correlations</b>				
	<i>INST</i>	<i>INSTH</i>	<i>INSTM</i>	<i>INSTL</i>
<i>INST</i>	1.000			
<i>INSTH</i>	0.651***	1.000		
<i>INSTM</i>	0.828***	0.236***	1.000	
<i>INSTL</i>	0.674***	0.064***	0.541***	1.000

*INST* is the percentage of shares held by all institutional investors. *INSTH* is the percentage of shares held by institutional investors with more than a 5% stake. *INSTM* is the percentage of shares held by institutional investors with a stake of between 1% and 5%. *INSTL* is the percentage of shares held by institutional investors with less than a 1% stake. \*\*\* (\*\*,\*) represents significance level at 1% (5%,10%).

Table 5

Regression estimates of the model of trading volume at earnings announcements with ownership by institutions with high, medium, and low stakes considered separately. Sample period = 1992 to 2001. Dependent variable = *EXVOL*.

Variable	Predicted Sign		
Intercept	?	-0.156 (-1.61)*	0.079 (0.74)
<i>INST</i> × <i>ARET</i>	+	19.075 (4.97)***	-
<i>INST</i> <sup>2</sup> × <i>ARET</i>	-	-17.672 (-4.07)***	-
<i>INST</i>	?	0.042 (0.14)	-
<i>INST</i> <sup>2</sup>	?	-0.155 (-0.48)	-
<i>INSTH</i> × <i>ARET</i>	?	-	-7.953 (-1.55)
<i>INSTH</i> <sup>2</sup> × <i>ARET</i>	?	-	-5.345 (-0.45)
<i>INSTH</i>	?	-	-0.068 (-0.19)
<i>INSTH</i> <sup>2</sup>	?	-	0.024 (0.03)
<i>INSTM</i> × <i>ARET</i>	+	-	60.497 (8.18)***
<i>INSTM</i> <sup>2</sup> × <i>ARET</i>	-	-	-86.158 (-5.94)***
<i>INSTM</i>	?	-	-1.002 (-1.76)*
<i>INSTM</i> <sup>2</sup>	?	-	1.349 (1.25)
<i>INSTL</i> × <i>ARET</i>	?	-	-28.246 (-2.32)**
<i>INSTL</i> <sup>2</sup> × <i>ARET</i>	?	-	60.082 (1.57)
<i>INSTL</i>	?	-	0.521 (0.59)
<i>INSTL</i> <sup>2</sup>	?	-	0.545 (0.24)
<i>ARET</i>	?	9.378 (13.63)***	9.300 (14.43)***
<i>LSIZE</i>	?	-0.062 (-4.20)***	-0.089 (-4.21)***
<i>LPRICE</i>	+	0.210 (8.60)***	0.200 (7.95)***
<i>ADVOL</i>	+	-0.000 (-1.31)	-0.000 (-1.30)
<i>BETA</i>	-	-0.089 (-4.50)***	-0.080 (-4.03)***
<i>SRISK</i>	-	-0.024 (-3.36)***	-0.030 (-4.24)***
Adj. R <sup>2</sup>		0.200	0.207
# of Observations		9,862	9,862

*EXVOL* is daily trading volume over the 2-day earnings announcement period (-1,0) divided by normal trading volume minus 1, where normal trading volume is calculated during the non announcement period (days -70 to -11 and 11 to 70). *INST* is the percentage of shares held by institutional investors during the announcement period. *INSTH* is the percentage of shares held by institutional investors that own more than a 5% stake. *INSTM* is the percentage of shares held by institutional investors that own a stake of between 1% and 5%. *INSTL* is the percentage of shares held by institutional investors that own less than a 1% stake. *ARET* is the absolute value of the abnormal returns during the announcement period. *LSIZE* is the natural logarithm of average market capitalization over the non-announcement period. *LPRICE* is the natural logarithm of stock price on day -2 relative to the announcement date. *ADVOL* is the average daily dollar value (in millions) of shares traded during the non-announcement period. *BETA* is estimated using the market model over the 120-day non-announcement period. *SRISK* is the standard deviation of the error term from the market model estimated over the non-announcement period deflated by the standard deviation of market returns over the market model estimation period. \*\*\* (\*\*, \*) represents significance level at 1% (5%, 10%).

Table 6

Sensitivity of results to the definitions of high, medium, and low institutional ownership stakes. Sample period 1992 to 2001. Dependent variable = *EXVOL*.

Variable	Predicted Sign	Estimate	Variable	Predicted Sign	Estimate
Intercept	?	0.115 (1.06)	<i>INSTLH</i> × <i>ARET</i>	?	97.532 (3.50)***
<i>INSTHH</i> × <i>ARET</i>	?	-6.064 (-1.03)	<i>INSTLH</i> <sup>2</sup> × <i>ARET</i>	?	-403.197 (-2.15)**
<i>INSTHH</i> <sup>2</sup> × <i>ARET</i>	?	-20.307 (-1.32)	<i>INSTLH</i>	?	-4.215 (-2.14)**
<i>INSTHH</i>	?	-0.506 (-1.26)	<i>INSTLH</i> <sup>2</sup>	?	16.068 (1.36)
<i>INSTHH</i> <sup>2</sup>	?	1.383 (1.40)	<i>INSTLL</i> × <i>ARET</i>	?	-141.784 (-6.59)***
<i>INSTHL</i> × <i>ARET</i>	?	-22.022 (-3.08)***	<i>INSTLL</i> <sup>2</sup> × <i>ARET</i>	?	526.503 (5.41)***
<i>INSTHL</i> <sup>2</sup> × <i>ARET</i>	?	41.632 (1.84)*	<i>INSTLL</i>	?	4.904 (3.17)***
<i>INSTHL</i>	?	0.865 (1.69)*	<i>INSTLL</i> <sup>2</sup>	?	-11.924 (-2.15)**
<i>INSTHL</i> <sup>2</sup>	?	-2.915 (-1.71)*	<i>ARET</i>	?	9.090 (14.26)***
<i>INSTMH</i> × <i>ARET</i>	+	56.389 (5.90)***	<i>LSIZE</i>	?	-0.096 (-4.20)***
<i>INSTMH</i> <sup>2</sup> × <i>ARET</i>	-	-132.093 (-4.67)***	<i>LPRICE</i>	+	0.197 (7.69)***
<i>INSTMH</i>	?	-1.080 (-1.58)	<i>ADVOL</i>	+	-0.000 (-1.66)*
<i>INSTMH</i> <sup>2</sup>	?	2.899 (1.46)	<i>BETA</i>	-	-0.070 (-3.54)***
<i>INSTML</i> × <i>ARET</i>	+	102.332 (5.88)***	<i>SRISK</i>	-	-0.031 (-4.44)***
<i>INSTML</i> <sup>2</sup> × <i>ARET</i>	-	-423.739 (-5.31)***			
<i>INSTML</i>	?	-1.985 (-1.58)			
<i>INSTML</i> <sup>2</sup>	?	7.821 (1.45)	Adj. R <sup>2</sup>		0.213
			# of observations		9,862

*EXVOL* is daily trading volume over the 2-day earnings announcement period (-1,0) divided by normal trading volume minus 1, where normal trading volume is calculated during the non announcement period (days -70 to -11 and 11 to 70). *INSTHH* corresponds to a stake of more than 10%. *INSTHL* corresponds to a stake of between 5% and 10%. *INSTMH* corresponds to a stake of between 2% and 5%. *INSTML* corresponds to a stake of between 1% and 2%. *INSTLH* corresponds to a stake of between 0.5% and 1%. *INSTLL* corresponds to a stake of less than 0.5%. *ARET* is the absolute value of the abnormal returns during the announcement period. *LSIZE* is the natural logarithm of average market capitalization over the non-announcement period. *LPRICE* is the natural logarithm of stock price on day -2 relative to the announcement date. *ADVOL* is the average daily dollar value (in millions) of shares traded during the non-announcement period. *BETA* is estimated using the market model over the 120-day non-announcement period. *SRISK* is the standard deviation of the error term from the market model estimated over the non-announcement period deflated by the standard deviation of market returns over the market model estimation period. \*\*\* (\*\*, \*) represents significance level at 1% (5%, 10%).

Table 7

Regression estimates of the model of trading volume at earnings announcements with additive specification of the explanatory variables. Sample period = 1992 to 2001. Dependent variable = *EXVOL*.

Variable	Predicted Sign		
Intercept	?	-0.345 (-3.80)***	-0.157 (-1.54)
<i>INST</i>	+	1.085 (4.78)***	-
<i>INST</i> <sup>2</sup>	-	-1.111 (-4.68)***	-
<i>INSTH</i>	?	-	-0.495 (-1.80)*
<i>INSTH</i> <sup>2</sup>	?	-	-0.045 (-0.07)
<i>INSTM</i>	+	-	2.073 (4.81)***
<i>INSTM</i> <sup>2</sup>	-	-	-3.101 (-3.84)***
<i>INSTL</i>	?	-	-0.706 (-0.97)
<i>INSTL</i> <sup>2</sup>	?	-	2.665 (1.55)
<i>ARET</i>	+	12.927 (48.90)***	12.950 (49.00)***
<i>LSIZE</i>	?	-0.068 (-4.57)***	-0.087 (-4.10)***
<i>LPRICE</i>	+	0.214 (8.78)***	0.208 (8.24)***
<i>ADVOL</i>	+	-0.000 (-1.26)	-0.000 (-1.31)
<i>BETA</i>	-	-0.085 (-4.27)***	-0.082 (-4.13)***
<i>SRISK</i>	-	-0.025 (-3.50)***	-0.030 (-4.21)***
Adj. R <sup>2</sup>		0.197	0.199
# of Observations		9,862	9,862

*EXVOL* is daily trading volume in the 2-day earnings announcement period (-1,0) divided by normal trading volume minus 1, where normal trading volume is calculated during the non announcement period (days -70 to -11 and 11 to 70). *INST* is the percentage of shares held by institutional investors during the announcement period. *INSTH* is the percentage of shares held by institutional investors that own more than a 5% stake. *INSTM* is the percentage of shares held by institutional investors that own a stake of between 1% and 5%. *INSTL* is the percentage of shares held by institutional investors that own less than a 1% stake. *ARET* is the absolute value of the abnormal returns during the announcement period. *LSIZE* is the natural logarithm of average market capitalization over the non-announcement period. *LPRICE* is the natural logarithm of stock price on day -2 relative to the announcement date. *ADVOL* is the average daily dollar value of shares traded during the non-announcement period. *BETA* is estimated using the market model over the 120-day non-announcement period. *SRISK* is the standard deviation of the error term from the market model estimated over the non-announcement period deflated by the standard deviation of market returns over the market model estimation period. \*\*\* (\*\*, \*) represents significance level at 1% (5%, 10%).