Re-examining Intra-industry Information Transfers: Cross-industry Abnormal Returns and Trading Volume upon Earnings Announcements

Jan Hanousek,* Iuliia Brushko,** and Jiri Tresl***

Abstract

This paper investigates how trading activity responds to industry-related earnings announcements and whether this trading activity is informative. While previous research concentrates on the earnings surprise as the main information signal, we find that the abnormal trading volume of the subsequent announcers can explain the abnormal returns on the day of the first and subsequent own announcement and in the post announcement periods. We also show that trading activity upon the first announcement is not driven by the first announcer's earnings surprise, but rather by the history of the earnings surprises of both the first and subsequent announcers. Moreover, the first and subsequent announcers' earnings surprises history was found to have the predictive power of the subsequent announcer's own earnings surprise. We also provide some evidence that upon the first announcement the market tries to incorporate the subsequent announcer's earnings surprise predictability, but fails to do so fully.

Keywords: intra-industry information transfers; earnings annoucement; earnings surpise; trading activity

JEL Classification: G14

* Corresponding author. CERGE-EI, Charles University and the Academy of Sciences, Prague and CEPR, London. CERGE-EI, Charles University, Academy of Sciences, Politickych veznu 7, P.O. Box 882, 111 21 Prague, Czech Republic. Telephone (+420) 224-005-119; Fax: (+420) 224-005-444; E-mail: jan.hanousek@cerge-ei.cz.

** Moody's Analytics. Washingtonova 17, 110 00 Prague 1, Czech Republic. Telefone (+420) 224 222 929; E-mail: iuliia.brushko@cerge-ei.cz

*** Department of Finance and Law, Central Michigan University, Mount Pleasant, MI 48859; CERGE-EI, Charles University and the Academy of Sciences, Prague. Telephone (+ 1) 402 472 3445; E-mail: tresl1j@cmich.edu

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1. Introduction

Starting with Foster (1981) it is a well known fact that earnings announcements contain information about non-announcing industry-peer firms and that these intra-industry information transfers affects stock prices of the non-announcers. This study focuses on the information content of abnormal trading acitivity of the first industry announcing firm and of the non-announcing/subsequent announcing industry-peer firm. Specifycally, we look at the impact of both abnormal trading activities on the subsequent announcer‘s abnormal returns on and after the day of the first industry announcing firm and on the day of its own earnings announcement days. We also investigate the predictability of the non-announcing/subsequent announcing firm’s earnings surpises and the impact of the earnings surprise on abnormal trading activity.

This research builds on the existing literature which deals with the the responsiveness of trading volume to industry-realted firm’s earnings announcements (Clinch & Sinclair, 1987; Firth, 1976; Foster, 1981; Freeman & Tse, 1992; Han & Wild, 1990; Thomas & Zhang, 2008), and incorporates new insights of the impact of intra-industry information transfers on trading activity within the industry. While the previous research on intra-industry transfers concentrates mainly on the impact of announcements of the industry-related firms, we argue that although these announcements are informative abnormal trading volume reflects the market perception of the information and should therefore be informative as well.

Extensive research has shown that the volume of stock trading can serve as a useful information signal about stock performance (Gallant, Rossi, and Tauchen, 1992; Campbell, Grossman, and Wang, 1992; Conrad, Hameed, and Niden, 1994; Lee and Swaminathan, 2000; Connolly and Stivers, 2003). Changes in trading activity may be induced by information arrivals (Andersen, 1996; Barber and Odean, 2008; Busse and Green, 2002; Kim and Verrecchia, 1991; etc.), since the new information should be incorporated in the investors'

decision making (Bamber, Barron, and Stober, 1997). Interestingly, Schneider (2009) argues that trading volume is not only informative about the future performance of stocks, but it can also be used for purifying the information contained in other information signals. We incorpotate this insight.

The main finding of this paper suggests that abnormal trading volume can serve as an additional information signal. Moreover, we find that the abnormal trading volume is informative not only upon the first announcement, but also upon the subsequent announcer's own report date.

Comparing the impact of the abnormal trading volume on the cumulative average abnormal returns upon the first and subsequent own announcement, we can summarize the following. Upon the own announcement, the significance of the abnormal trading volume disappears faster than upon the first announcement. We rationalize it as follows. Upon observing the first announcement in the industry the market participants may try to produce or update their forecast of the subsequent announcer's earnings surprise. It is natural to expect that their forecast is not going to be perfect. That is why the trading volume will reflect the imperfect forecast and market participants' trading activity will be driven by the forecast update. So the abnormal trading volume serves as the purifying information signal about a subsequent announcer's earnings surprise upon the first announcement in the industry, but the informativeness of the abnormal trading volume is incorporated much faster upon the subsequent own earnings announcement.

We also show that the first and subsequent announcers' history of the earnings surprises is informative about the stock performance and trading activity of the subsequent announcer. The results suggest that both of the measures of the earnings surprise history are important – by how much the firm surprised the market (measured by the mean of the earnings surprises over the previous 20 quarters) and how often it did so in the past (measured by the number of

positive earnings surprises over the previous 20 quarters). At the same time we provide evidence that the mean of the earnings surprises has much lower power in explaining the cumulative average abnormal returns and trading volume than the number of positive earnings surprises. This suggests that the market, firstly, considers these two components of the history differently and, secondly, that there is a stronger underreaction to the sequence of positive earnings surprises compared to the mean value in the past.

Lastly, we also show that the history of both the first and subsequent announcers' earnings surprises is valuable for predicting the subsequent earnings surprise. We further use this predictability to test the market efficiency and find that although the market tries to incorporate this predictability of the subsequent announcer's earnings surprise, it fails to fully do so at once.

This paper differs from the papers on the informativeness of the trading volume and intra-industry information transfers in several respects. Contrary to most of previous research, we do not concentrate solely on the analysis of the impact of the industry-related firms' earnings announcements on the non-announcing firms' stock performance, but rather on the study of the trading activity in response to such announcements and whether this trading activity is informative. Secondly, we investigate whether the stock performance and trading activity of non-announcing firms upon the first announcement is also dependent, besides the current quarter first earnings surprises, on the history of earnings surprises of both the first and subsequent announcers.

The paper is organized as follows. The second section is devoted to the discussion of existing research on the topic of this study. In the third section, the methodology is introduced. The fourth section deals with the data and sample selection. In the fifth section we present the results. The final, sixth, section concludes.

2. Related Literature

Trading volume is not only informative about the future performance of stocks, but it can also be used for purifying the information contained in other information signals. For example, Schneider (2009) develops a model in which investors learn from private signals, market prices and aggregate trading volume. The author shows that besides being the information signal by itself, trading volume can help investors to evaluate the precision of other information signals, such as private information and asset prices.

The hypothesis of trading volume being an extra information signal is also supported by the findings of Gervais, Kaniel, and Mingelgrin (2001) showing that the high trading volume return premium cannot be explained by the firm's returns autocorrelation, announcements, market risk, or liquidity. The authors explain the high trading volume return premium by the higher visibility of the stock and subsequent demand and price changes, while on the contrary, the lower trading volume can be explained by higher attention distraction (Hirshleifer, Lim, & Teoh, 2009).

In its turn, the visibility of the stocks and demand for them can be affected by industry-related news through at least two channels. Firstly, the literature on the intra-industry information transfer has shown that industry-related firm's earnings announcements may provide valuable information about its peers in the industry (Clinch & Sinclair, 1987; Firth, 1976; Foster, 1981; Freeman & Tse, 1992; Han & Wild, 1990; Thomas & Zhang, 2008)[1]. If the industry-related firm's announcement is perceived by the market as news for its peers, the trading volume of the non-announcing firms in the industry should respond to the first announcement in the industry. This effect can be considered to be direct – the market reacts to the new piece of the information relevant to the the non-announcing firm's future performance.

[1] Besides earnings announcements, the prior studies on the intra-industry transfer include managers' (Baginski, 1987; Han et al., 1989; Pyo & Lustgarten, 1990) and analysts' (Ramnath, 2002) earnings forecasts, bankruptcy (Lang & Stulz, 1992) and equity offerings announcements (Szewczyk (1992)).

The second, indirect, effect of the first announcer's earnings releases on trading activity in the non-announcing firm's stock will arise as the result of changes in the announcing firm's stock trading activity.

The higher trading volume upon the first announcement can result from the heterogeneity in responses to first announcements. As shown by Kandel and Pearson (1995), investors do not incorporate market information rationally and "agree to disagree". Li (2007) comes to the same conclusion, showing that upon observing the identical informatin signal all investors use different models of updating their beliefs. In both models, disagreement about the implications of the new piece of information may lead to higher dispersion in expectations of the announcing and non-announcing firm's performance. Consequently, due to the increased dispersion in beliefs there will be more investors willing to buy as well as those willing to sell[2], but these changes in demand and supply for the stock may drive the stock returns either up or down.

The other explanations of the increase in trading volume can be previous disagreement before the news arrival. For example, Karpoff (1986) shows that abnormal trading volume can arise even when investors interpret an information signal identically, but had divergent expectations prior to the arrival of the news. This heterogeneity prior to the news arrival and identical interpretation of the new information signal should prompt corrective measures by investors and the changes in the demand for the stock will result in price changes.

Previous research findings suggest that regardless of whether the increased trading volume results from disagreement about the news consistent with Kandel and Pearson (1995) or identical interpretation of the news with previous disagreement as in the Karpoff's (1986) model, trading volume can signal the direction of the stock performance. In the former case, the disagreement may lead to the failure of meeting expectations of some of the investors and

[2] Other research on the increase in trading volume due to the increase in the heterogeneity in beliefs includes Shalen (1993), Barron (1995), Bessembinder, Chan, and Seguin (1996), Bamber et al. (1997), Goetzmann and Massa (2005), Buraschi and Jiltsov (2006), etc.

subsequently open profitable opportunities due to the corrective actions of the market. The latter case is even more straightforward since it directly implies the corrective market actions due to the previous sub-optimal incorporation of the available information. One example of such expectations prior to the arrival of the news could be short-selling, which has been shown to signal informative trading (Christophe, Ferri, & Angel, 2004).

The increase in trading activity can also be induced by the presence of heterogeneous agents leading to heterogeneous responses to the same information signal. This hypothesis is motivated by the findings of Barber and Odean (2008) who show that individual investors are more likely to buy on high attention days (on days of new information arrivals) while institutional investors are more likely to sell on those days. In our context, this may imply that on the first announcement day in the industry the less sophisticated investors (usually believed to be individual investors) may be more inclined to buy the stock of announcing firms, and more sophisticated investors (usually believed to be institutional investors) may be more inclined to sell those stocks. This trading activity upon the first announcement might be reinforced by the presence of informed and uninformed traders, since Collin-Dufresne and Fos (2015) show that informed investors tend to trade more actively when uninformed trading activity is quite high. As a result one might expect an increase in the trading volume of the first announcer.

Moreover, one can expect the opposite direction in trading with the non-announcing firms stocks. Ramnath (2002) shows that the underreaction to the first announcer earnings reports of such sophisticated market players as analysts is smaller compared to the market underreaction. Due to this smaller underreaction more sophisticated investors may put higher weights on the non-announcing firms, the earnings surprises for which are not known, but the beliefs about which will be updated based on the first announcer's earnings releases, and, on the contrary, put lower weights on the stocks of the announcing firms. Such trading practices

can be profitable since Foster, Olsen, and Shevlin (1984) emphasize that constructing a portfolio based on the foreknowledge of earnings surprises is much more profitable than the one constructed on the known earnings surprises. Based on this reasoning, it might be expected that individual investors are more likely to sell and more sophisticated investors more likely to buy the stock of non-announcing firms. This argument is consistent with the findings of Christophe et al. (2004), who show that short selling reveals the informative trading in the pre-announcement period. Moreover, Diether, Lee, and Werner (2009) show that short-sellers can correctly predict the abnormal negative returns.

Summarizing all the arguments above, the trading volume upon the announcement may contain some extra information besides the announcer's earnings surprise and reflect either heterogeneous beliefs, heterogeneous beliefs updating, and/or the presence of heterogeneous agents, all of which may have an impact on the asset prices. This suggests that upon the first announcement in the industry the market receives at least two information signals concerning the future performance of the subsequent announcer: the earnings surprise of the first announcer and the abnormal trading volume of the first and subsequent announcers upon the first announcement. While the announcing firm's earnings surprise may form the investors' expectations about the non-announcing firm's earnings surprise, the trading volume of both an announcing and non-announcing firm may reflect changes in the demand for the non-announcing firms and consequently impact the stock prices, and thus serve as an additional informational signal about the non-announcing firm's stock performance.

The history of the earnings surprises is also important in my study, since the previous studies have shown that the market rewards companies with persistent positive earnings surprises (Barth, Elliott, & Finn, 1999; Bartov, Givoly, & Hayn, 2002; Kasznik & McNichols, 2002). Moreover, Bartov et al. (2002) also show that the premium for beating the analysts' forecasts in the current quarter can be used as a leading indicator of future performance. On

the other hand, Lopez and Rees (2002) show that the market partially discounts the systemic component of the persistent positive earnings surprises since the persistency can be explained to some degree by the managers' efforts aimed at meeting analysts' forecasts (Brown & Caylor, 2005; Burgstahler & Dichev, 1997; Burgstahler & Eames, 2006; Degeorge, Patel, & Zeckhauser, 1999). Even in the absence of earnings management, the persistency in the earnings surprises may be driven by the inability of the analysts to capture some important permanent components of the earnings (Dichev & Tang, 2009), while the irregularity of the earnings surprises may result from the temporal factors or favorable market movements.

Besides that, regardless of whether the stream of positive earnings surprises results from the permanent earnings surprises driver omitted by the analysts and/or earnings management by managers, a stream of positive earnings surprises may build market representativeness bias (Alti & Tetlock, 2014; Barberis, Shleifer, & Vishny, 1998; Brav & Heaton, 2002; Gennaioli, Shleifer, & Vishny, 2015; Kahneman & Tversky, 1972; etc.), when the investors tend to extrapolate a series they were observing for a while. As the result of this representativeness bias the market may treat the firms with a long and persistent history of positive earnings surprises differently from those firms which show positive earnings surprises once in a while. For this reason we expect, firstly, that the history of the first announcer's earnings surprises may matter in how the market responds to its announcement, since it may help to filter out the permanent component of the earnings surprises from the temporal one, each of which might have a different impact on updating beliefs about the subsequent announcers. At the same time, the history of the subsequent announcer's earnings surprises may also be important, since even a huge first announcer's earnings surprise and long sequence of positive earnings surprises may not be very relevant for the subsequent announcer with a long history of negative earnings surprises.

3. Methodology and Hypotheses

3.1. Hypotheses

The purpose of this study is to analyze the impact of the first earnings announcements on trading activity and stock responses to it. For these purposes we are going to consider two event windows as depicted in Figure 1. The first event window is represented by the time interval around the first announcement date in the industry for a particular fiscal quarter. The second is concentrated around the subsequent announcer's own reporting date for that particular fiscal quarter. In both of the event windows, we consider the different time intervals in order to study the persistency of the impact of the variable of interest over time. Thus the following time intervals are analyzed: days 0-1 (where day=0 is the first announcement or own subsequent announcement date respectively), days 2-5, days 6-10, and days 11-20 upon the first or own subsequent earnings reports respectively.[3]

(Insert Figure 1 here)

Using these two event windows allows us to more deeply understand the informativeness of the trading volume. Previous research has shown that the first announcements are informative about the non-announcing firms' stock performance. While the first announcer's earnings surprise is valuable for predicting the future of the subsequent announcer, it is rather a noisy signal about the subsequent announcer's performance and there is still some uncertainty associated with this information signal. Nevertheless, the informativeness of the first

[3] Although in event studies usually [-n,n] time windows with time 0 being an event date are analyzed, we consciously consider only the post announcement period, starting with the announcement day. This is motivated by the fact that we want to analyze the trading activity and stock responses to the information known to the market. While there might be some information leakage or market anticipation about the earnings announcements several days before the announcement day, the purpose of this study is to analyze the informativeness of the trading volume resulting from the actual earnings releases.

announcement should be reflected in the trading activity and thus the trading volume on the day of the first announcement in the industry is expected to serve as a purifying signal. If the trading volume is not informative, or the trading adjustments are totally optimal, trading volume should be unable to explain the returns of the non-announcing firms. On the contrary, if the trading volume can predict the stock performance it may signal that there is some irrationality reflected in the trading activity or some extra information contained in it. The latter statement is even stronger for the firm's own subsequent announcements, since in this case its own earnings surprises have a clear implication for the subsequent announcer's performance. The ability of the abnormal trading volume to explain the stock performance upon own announcements will provide even stronger evidence that the abnormal trading volume is informative, since it may reveal the firm specific rather than fundamental financial information (Christophe et al., 2004). Based on these arguments we state the next two hypotheses.

Hypothesis 1. The abnormal trading volume of the subsequent announcing firms upon the first announcement in the industry should be informative about their stock performance around the first announcements.

Hypothesis 2. The abnormal trading volume of the subsequent announcing firms upon their own announcements may be informative about their stock performance around their own announcements.

Moreover, the first announcer's trading volume is expected to be informative about its peers in the industry, i.e. the subsequent announcers. Upon observing the first announcer's earnings report, the investors update their beliefs and adjust their positions accordingly. These adjustments will be reflected in the trading volume of the first announcer. Consistent with Barber and Odean (2008) and Christophe et al. (2004), we expect that less sophisticated investors may start buying the stocks of the announcing firm, while more sophisticated ones

may start selling these stocks and buying the stocks of non-announcing firms. These considerations lead us to the following hypothesis.

Hypothesis 3. The first announcer's abnormal trading volume upon its own announcement is informative about subsequent announcing firms stock performance and trading activity around the first announcements.

As was previously found in the literature, the market reacts differently to the same information depending on the history of analysts' forecasts being met. Therefore we also hypothesize that the history of earnings surprises should explain the stock performance and abnormal trading volume. A sequence of positive earnings surprises may serve as a confirmation signal about the stock performance and thus may trigger the trading activity. The other explanation for the history of the earnings surprises as an explanatory factor for the trading activity upon the firm's own announcement is that the firm which constantly beats market expectations at some point should attract market attention, which should lead to higher trading activity in this stock. Therefore, we also hypothesize that the earnings surprises history of both the first and subsequent announcer may play a role in the subsequent announcer's stock, and trading activity responses to the first earnings report in the industry. Based on similar logic, the subsequent announcer's earnings surprises history is expected to be able to explain the stock performance and trading activity upon the firm's own announcements, which motivates us to formulate the following hypothesis.

Hypothesis 4. The earnings surprises history of both the first and subsequent announcers can explain the subsequent announcer's stock performance and trading activity upon the first announcement, and the earnings surprises history of the subsequent announcers can explain their stock and trading activity upon their own announcements.

One could argue that the significance of the abnormal trading volume upon the first announcement is solely determined by the ability of the market to foresee the subsequent

announcers' earnings surprises. We also expect that at least some of the market participants will try, upon observing the first announcements, to build their trading strategies based on the updated information set, which will be reflected in the trading volume. Since trading based on foreknowledge of the earnings surprise is more profitable than trading based on the publicly available information, we expect that more informed traders will take the appropriate trading positions upon the first announcement, while taking the offsetting positions upon their own subsequent announcements. Thus, we expect that the abnormal trading volume of both the first and subsequent announcers upon the first announcement should explain the subsequent announcer's abnormal trading volume upon its own announcement.

On the other hand, there is much evidence that the markets are not fully rational. We hypothesize that the market tries to incorporate the new information revealed by the first announcements, but fails to incorporate it fully. Therefore, although the trading activity on the first announcement is driven by the market expectations about the future performance of the subsequent announcers, the abnormal trading volume still has some incremental power in explaining the stock performance. We formalize this argument in hypotheses 5 and 6.

Hypothesis 5. The market cannot fully incorporate the implication of the first announcements and the subsequent announcer's abnormal trading volume have incremental power in explaining the subsequent announcer's stock performance.

Hypothesis 6. The subsequent announcer's abnormal trading volume upon the first announcement is driven by the market expectations updated upon observing the first announcement.

If the market tries to predict the future subsequent earnings surprises upon the first announcement, it should be the case that the investors take the offsetting position upon the firm's own announcement. Therefore, the trading activity upon the first announcement, as well as the market expectations of the subsequent earnings surprises should be able to explain the

trading activity of the subsequent announcer upon its own announcements. We formalize this arguments in hypothesis 7.

Hypothesis 7. The subsequent announcer's abnormal trading volume upon own announcement is driven by its abnormal trading volume upon the first announcement and the market expectations updated upon observing this first announcement.

3.2. **Methodology**

In order to perform the analysis, we employ two basic models, describing stock performance and trading activity. The general form specifications of the models are as follows:

$$\boldsymbol{Y} = \alpha + \beta \boldsymbol{X} + \gamma \boldsymbol{Z} + e, \tag{1}$$

where $\boldsymbol{Y}$ is the vector of dependent variables. The matrix $\boldsymbol{X}$ contains the variables of interest, while the matrix $\boldsymbol{Z}$ consists of the other control variables. The vector $\boldsymbol{e}$ represents the error terms with zero mean and constant variances.

To study the stock performance, we compute the risk-adjusted cumulative average abnormal returns using a four-factor model which includes the Fama and French (1993) risk factors augmented with the Carhart (1997) momentum factor. This factor model is shown in equation (2):

$$R_{i,t} = \alpha_i + \beta_{i,MKT} MKT_t + \beta_{i,SMB} SMB_t + \beta_{i,HML} HML_t + \beta_{i,MOM} MOM_t + e_t. \tag{2}$$

Where $R_{i,t}$ is the rate of return of the common stock of the ith firm on dat t; *MKT* is the market risk premium factor (value-weighted market return in CRSP); *SMB* is the return difference between portfolios of small stocks and the large stocks (smallest and largest deciles);

HML the return difference between portfolios with the highest and lowest decile of stocks as measured by the ratio of book equity-to-market equity; and *MOM* (momentum) is the return difference between portfolios of the highest decile and lowest decile of stocks as measured by recent return.

We estimate the stock-specific factor betas using daily returns over a 255-day estimation period window that ends 46 days prior to each respective announcement date. These firm-specific beta estimates allow us to generate the expected returns adjusted for these common risk factors. Then, the abnormal returns are calculated as the difference between these expected returns and the actual values. The abnormal return, $AR_{i,t}$, (or prediction error) for the common stock of firm *i* on day t is defined in equation (3):

$$AR_{i,t} = R_{i,t} - \left(\widehat{\alpha_i} + \hat{\beta}_{i,MKT}\, MKT_t + \hat{\beta}_{i,SMB} SMB_t + \hat{\beta}_{i,HML} HML_t + \hat{\beta}_{i,MOM} MOM_t\right), \quad (3)$$

where coefficients $\widehat{\alpha_i}$, $\hat{\beta}_{i,MKT}$, $\hat{\beta}_{i,SMB}$, $\hat{\beta}_{i,HML}$, and $\hat{\beta}_{i,MOM}$ are OLS estimates of $\alpha_i, \beta_{i,MKT}$, $\beta_{i,SMB}$, $\beta_{i,HML}$, and $\beta_{i,MOM}$ from equation (2).

Finally, the cumulative average abnormal returns over an interval starting on day *T1* and ending on day *T2* , $CAAR_{T1,T2}$ are obtained according to equation (4):

$$CAAR_{T1,T2} = \frac{1}{N} \sum_{t=T1}^{T2} AR_{i,t}, \quad (4)$$

where *N* is the number of days between time *T1* and *T2* (i.e. *N=T2-T1*).

In the analysis of the trading activity, the dependent variable is the abnormal trading volume. Since there is always some level of trading activity, any extra information should rather be reflected in the abnormal trading volume. The abnormal trading volume is defined as following (6):

$$ATV_{i,t} = \frac{TV_{i,t} - \sum_{t=-10}^{-375} TV_{i,t}/365}{\sum_{t=-10}^{-375} TV_{i,t}/365}, \quad (6)$$

where $ATV_{i,t}$ is the abnormal trading volume of stock *i* and time *t*, and $TV_{i,t}$ is the trading volume of stock *i* at time *t*.

The matrix X of the variables of interest includes: $SAATV_{i,t}$ ($SAATVown_{i,t}$) - the subsequent i announcer's abnormal trading volume on the day of the first (own) announcement in quarter *t*; $FAATV_{i,t}$ - the first announcer's abnormal trading volume in quarter t ; $SAMES_{i,t}$ and $FAMES_{i,t}$ - the subsequent *i* announcer's and the first announcer's mean earnings surprises respectively over the previous 20 quarters before the current quarter *t*, where the earnings surprise was calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter, scaled by the last available stock price in the quarter; $SANPS_{i,t}$ and $FANPS_{i,t}$- the subsequent i announcer's and first announcer's number of positive earnings surprises respectively over the previous 20 quarters before quarter *t*; $SAES_{i,t}$ and $FAES_{i,t}$ - the subsequent *i* announcer's and first announcer's earnings surprise in quarter *t*.

Previous research on the persistency of earnings surprises takes into account the sequence of the earnings surprises signs, but in this study we are going to consider two aspects of the earnings surprises: how often the firm outbid the analysts' forecasts (measured by the number of the positive earnings surprises over the previous 20 quarters) and by how much on average it did so over the previous 20 quarters (measured by the mean of the earnings surprises over the previous 20 quarters). While the former history may evidence the persistency in the positive earnings surprises, the latter can provide some expected estimate of the earnings surprise.

The matrix Z of the other control variables consists of: $MRET10_{i,t}$ ($MRET10own_{i,t}$) - the subsequent *i* announcer's mean of the returns excluding dividends over the last 10 trading days before the first (own) announcement in quarter *t*; $MATV10_{i,t}$ ($MATV10own_{i,t}$) - the

subsequent *i* announcer's mean of the abnormal trading volume over the last 10 trading days before the first (own) announcement in quarter *t*; $MRET182_{i,t}$ ($MRET182own_{i,t}$) - the subsequent *i* announcer's mean of returns over the last six months but 10 trading days prior to the first (own) announcement in quarter *t*; $MV_{i,t}$ - the logarithm of the market value of firm *i* in quarter *t*, calculated as the number of shares outstanding at the end of the quarter multiplied by the last available share price for that quarter; $BM_{i,t}$ - the book-to-market value of firm *i* in quarter *t*, which is calculated as the logarithm of the ratio of total assets minus depreciation to the market value; and $ACC_{i,t}$ - the accruals of firm *i* in quarter *t*, calculated as the change in the working capital from the previous quarter minus depreciation scaled by total assets.

Means of the returns over the last six months and 10 trading days should take into account the long- and short-term price momentum. The mean of the abnormal trading volume over the last 10 trading days is included to remove the short-term trend in trading volume and/or the managers' incentives to trade strategically shortly before the announcements (Korczak, Korczak, & Lasfer, 2010). Consistent with Thomas and Zhang (2008) such variables as *MV* and *BV* are included for the control of previously documented size and book-to-market effects, while *ACC* is used to account for the investors' failure to incorporate the information contained in the accruals (Sloan, 1996).

The data set covers the time period from January 1994 to March 2013. For the analysis of the cumulative average abnormal returns over the days 0-1, 2-5, 6-10, and 11-20 upon first earnings announcement in the industry we have 53463, 47554, 37707 and 14048 observations respectively, which cover 4597 different firms. For the analysis of the cumulative average abnormal returns upon subsequent announcers' own reporting we have 52149 observations, which comprise 4467 different firms. The analysis of the abnormal trading volume on the first announcement day and the subsequent announcer's own reporting was done on 53463 and 52149 observations respectively.

4. Data and Sample Selection

For the analysis of this study, we are working with US stocks from January 1994 to March 2013. The data on the market variables such as stock prices, trading volume, and returns come from CRSP. We use IBES quarterly data to obtain the analysts' forecasts of earnings per share. The accounting information from the Compustat dataset.

From the IBES summary data file, we take the actual earnings per share (EPS) and the last available mean of EPS forecasts for a given forecast period and consider only the forecasts made for the current quarter. We drop those observations, which have the estimates and/or reporting of the earnings in non-USD currency. We use the IBES earnings announcement dates. We restrict the sample to those firms, which have a standard fiscal quarter end (March 31, June 30, September 31, December 31) to make sure that the first announcing firm and its peers report results for the same fiscal quarter.[4] We discard those observations if a firm reports later than 91 days after the end of a forecast period. We also do not take into account those observations when there is more than 1 firm reporting on the first announcement date.

In the analysis of the cumulative average abnormal returns upon the first announcement, for every time window we restrict the sample of subsequent announcing firms to those firms, which report at least 3 days after the end of the appropriate time interval (i.e. in order to be included in the sample for the time window of days 0-1 the subsequent announcer should report no earlier than the 5th day after the first announcement). In doing so we take care of the following. Firstly, we eliminate the confounding effect of the stock reaction to the first in the industry, defined by 2 digit Standard Industrial Classification (SIC) code and own announcements. Secondly, we are avoiding working with a very specific sample. Restricting the sample to those firms reporting after the 20th day after the first announcement (for the

[4] In the whole sample there were 10% of observations with non-standard fiscal quarter ends.

purpose of studying the persistency we consider the return windows of up to 20 days after the first announcement) would lead to the very specific sample, since there are only 25% of the firms announcing that late in the reporting season. This, in turn, can also result from the fact that managers postpone the release of bad news (Kothari, Shu, & Wysocki, 2009). At the same time, for the analysis of different return windows upon the firm's own announcement we only require the firms to report at least 3 days after the first announcement.

Calculating the means of the returns and trading volume from the CRSP daily data set, we require the firms to have at least 50% of non-missing observations for a particular interval window, i.e. for calculating the mean over 10, 182, or 365 trading days to be included in the sample the observations should have non-missing values for at least 5, 63, and 126 trading days respectively.

The comparison of the cumulative average abnormal returns upon the first and own announcements (Table 1 and Figure 2) suggests that the cumulative average abnormal returns are, on average, higher upon the firm's own announcement for the first time window of days 0-1 and the last time window of days 11-20 considered in the study. At the same time we do not find any differences in the behavior of the cumulative average abnormal returns upon the first and own announcements for the time windows of days 2-5 and 6-10.

(Insert Figure 2 here)

(Insert Table 1 here)

In order to avoid the impact of the outliers, we winsorize all of the variables below the 1st and above the 99th percentiles respectively.[5] We also discard those observations for which the Cook's distance is equal or greater than one. The descriptive statistics of the cumulative

[5] The analysis was also done without dropping any observation, as well as with dropping the observations with the explanatory variables in the lowest and highest percentiles, but the results show the similar pattern.

average abnormal returns, abnormal trading volume and the other control variables is provided in Tables 1, 2, and 3 respectively.

(Insert Table 2 here)

(Insert Table 3 here)

(Insert Figure 3 here)

The summary statistics of the abnormal trading volume of the first and subsequent announcers upon their own announcements (Table 2 and Figure 3) reveals that for both the first and subsequent announcer it follows the same pattern of increasing 1 day before the firm's own announcement, then jumping on the day of the announcement and the next day after the announcement, and consequently slowly decaying. This pattern is consistent with Chae (2005), since the announcements are the new informational signals about the announcing firms in the first place. That is why these announcements draw market attention to these firms, which may also result in higher trading activity (Hirshleifer et al., 2009). The higher trading volume before the announcement is consistent with the pre-announcement informative trading by short sellers (Christophe et al., 2004). Although the pattern is the same for both first and subsequent announcers, we find some evidence that the abnormal trading volume of the first announcer is, on average, higher for the first announcer compared to the subsequent announcer. We hypothesize that this difference in the trading activity upon the first and subsequent announcements upon their own announcements results from the trading activity in the subsequent announcer stocks between the first and firm's own subsequent announcements.

Figure 3 also provides a graphical comparison of the subsequent announcer's abnormal trading volume upon the first and own announcements. The behavior of the subsequent announcer's abnormal trading volume upon the first announcement does not follow the pattern of the abnormal trading volume upon the firm's own subsequent announcement. Moreover, one can see that the mean abnormal trading volume of the subsequent announcer is, on average,

higher before the first announcement than upon the firm's own announcement, which suggests that the trading volume can contain different information, depending on what type of announcement one observes.

The data set covers the time period from January 1994 to March 2013. For the analysis of the cumulative average abnormal returns over the days 0-1, 2-5, 6-10, and 11-20 upon first earnings announcement in the industry we have 53463, 47554, 37707 and 14048 observations respectively, which cover 4597 different firms. For the analysis of the cumulative average abnormal returns upon subsequent announcers' own reporting we have 52149 observations, which comprise 4467 different firms. The analysis of the abnormal trading volume on the first announcement day and the subsequent announcer's own reporting was done on 53463 and 52149 observations respectively.

5. Results

5.1. Intra-industry Price Responses upon the First Announcement

For testing the hypotheses of informativeness of the first and subsequent announcers' abnormal trading volume (hypotheses 1 and 3) in the model (1) for the cumulative average abnormal returns we include the subsequent and first announcers' abnormal trading volume as the variables of interest. In order to test the informativeness of the earnings surprises history (hypothesis 4) we also include the subsequent and first announcers' means of earnings surprises as well as their numbers of positive earnings surprises over the previous 20 quarters. The full specification of the model for the analysis of the price responses to the first announcement in the industry is the following:

$$CAAR_{i,t} = \beta_0 + \beta_1 SAATV_{i,t} + \beta_2 FAATV_{i,t} + \beta_3 SAMES_{i,t} + \beta_4 SANPS_{i,t} + \beta_5 FAMES_{i,t} + \beta_6 FANPS_{i,t} + \beta_7 FAES_{i,t} + \gamma Z + \epsilon_{i,t}, \quad (5)$$

where $CAAR_{i,t}$ - the cumulative average abnormal returns of firm *i* over the appropriate time interval upon the first announcement in quarter *t*; $SAATV_{i,t}$ and $FAATV_{i,t}$ - the subsequent *i* and first announcer's abnormal trading volume on the day of the first announcement in quarter *t*; $SAMES_{i,t}$ and $FAMES_{i,t}$ - the subsequent *i* and the first announcer's mean of the earnings surprises over the previous 20 quarters before the current quarter *t*, where the earnings surprise was calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter scaled by the last available stock price in that quarter; $SANPS_{i,t}$ and $FANPS_{i,t}$ - the subsequent *i* and first announcer's number of positive earnings surprises over the previous 20 quarters before quarter *t*; $FAES_{i,t}$ - the first announcer's earnings surprise; *Z* is the matrix of other control variable: $MRET10_{i,t}$, $MATV10_{i,t}$ $MRET182_{i,t}$, $MV_{i,t}$, $BM_{i,t}$, and $ACC_{i,t}$; and $\epsilon_{i,t}$ is the error term with zero mean and constant variance.

The significance of such estimates as β_1 and β_2 will provide the support of hypotheses 3 and 4 of the informativeness of the subsequent and first announcers' abnormal trading volume about the subsequent announcer's stock performance upon the first announcement. The significance of the estimates β_3, β_4, β_5, and β_6 will be consistent with the hypothesis that the earnings surprise history of both the subsequent and first announcer can explain the subsequent announcer's stock performance upon the first announcement (the first part of hypothesis 4).

Table 4 contains the estimation results of the cumulative average abnormal returns model, where we compare the basic model, the model extended for the abnormal trading volume, and the full specification over different time interval windows. For all of the returns windows, except for the last one, we observe that the extended and full models perform better than the basic model – the adjusted R-squared increases.

(Insert Table 4 here)

From the extended and the full specification models we can see that the subsequent announcer's abnormal trading volume on the first announcement in the industry can explain the subsequent announcer's returns over the first three time windows (columns 2, 3, 5, 6, 8 and 9 in Table 4), while we do not find evidence of the subsequent announcer's abnormal trading volume being able to explain the abnormal returns over a time interval of days 11-20 since the first announcement. We have three explanations for this pattern. The first is that more sophisticated investors (or better informed ones) may respond to the new information quite fast and adjust their trading activity immediately upon observing the first earnings report. This adjustment will be reflected in the subsequent announcer's abnormal trading volume on the day of the first announcement. Less sophisticated investors, in turn, observing the trading activity of the market may decide to follow the suit of the more sophisticated ones and adjust their own trading activity accordingly.

The second explanation for the fast decaying significance of the subsequent announcer's trading volume is the arrival of new information signals coming from the other reporting firms (those firms which report after the first announcer but before the subsequent announcer in the sample).

The third explanation comes from the point of view that an increase in the trading volume arises as the result of the heterogeneity in the beliefs. Since the market participants may perceive differently the implications of the first announcer's earnings surprise for the subsequent announcer they may adjust their trading activity quite fast and as a result the abnormal trading volume should not be able to explain the abnormal returns over the later time windows. This explanation can also be supported by the finding that the first announcer's abnormal trading volume on the day of the announcement is also significant for two return windows. These findings are consistent with the evidence of Barber and Odean (2008), if the

institutional investors are selling while individual investors are buying the stocks of the first announcer, while the opposite may happen to the trading activity in the subsequent announcer's stocks.

The fourth hypothesis states that the history of the earnings surprises of both the first and the subsequent announcer can explain the abnormal returns upon the first announcement in the industry. Contrary to expectations, the subsequent announcer's mean of the earnings surprises is not significant except for the first returns window, while the opposite holds for the number of positive surprises – the estimate is positive and significant except for the last two return windows.

Analyzing the effect of the first announcing surprise history, we can see that both the mean and the number of positive earnings surprises of the first announcer are also significant for the third returns windows. The insignificance of the first announcer's of the mean and number of the earnings surprises over the first two return windows may evidence some lag in the response to the first announcer's earnings report.

5.2. Can the Market Foresee the Earnings Surprises?

We are also interested in studying whether the significance of the abnormal trading volume upon the first announcement is not solely determined by the ability of the market to foresee the subsequent announcer's earnings surprises and whether the abnormal trading volume has any additional informational content (hypothesis 5). This analysis may also be considered to be the robustness check for the abnormal trading volume being informative.

If the abnormal trading volume has no additional information besides the subsequent announcer's earnings surprises, then its estimates must be insignificant if we include some expectations of the subsequent earnings surprise into the model for the analysis of cumulative average abnormal returns. In other words, we want to see whether the abnormal trading volume is of any use given that the market has some forecast of the subsequent announcer's earnings

surprise. For these purposes we consider two forecast models: the perfect forecast model and the imperfect forecast model.

The first model we call the perfect forecast model, which we obtain by modifying model 7 and including the yet unknown earnings surprise of the subsequent announcer. Since the perfect forecast is desirable, but not achievable, we want to compare the models with the perfect forecast to that with imperfect forecast.

The subsequent announcer's earnings surprise imperfect forecast model takes into account the history of both the first and the subsequent announcers and the first announcer's earnings surprise in the current quarter. While the history of both the first and subsequent announcers is supposed to take into account the persistency in the earnings surprise history, the first announcer's earnings surprise accounts for the new information for the current quarter. In addition, we also include the mean and standard deviation of the subsequent announcer's earnings forecast for the current quarter. The mean of the forecast is supposed to take into account the degree to which the managers are able to manage the current quarter earnings if there is any earnings management. We expect that the higher the mean forecast the harder is it for the managers to beat the analysts' expectations. The standard deviation of the earnings forecasts for the current quarter is included in order to control for the disagreement between the analysts – the higher the disagreement the fewer incentives the managers may have to beat the mean of the analysts' forecasts. We also expect the standard deviation of the forecasts to have negative impact on the earnings surprise since the higher agreement between the analysts could imply that it is much easier to produce the forecast, the smaller should be the earnings surprise. Another explanations of why the mean forecast and the standard deviation of the analysts' forecast being able to explain the earnings surprise is the findings of Doukas, Kim, and Pantzalis (2006) who show that the investors preferences for a particular stock are driven by the combination of the analysts being pessimistic or optimistic about the firm and the level

of their divergence in the opinions. The managers may realize this and adjust their earnings management accordingly. The specification of this model is the following:

$$SAES_{i,t} = \alpha_0 + \alpha_1 SAMES_{i,t} + \alpha_2 SANPS_{i,t} + \alpha_3 FAMES_{i,t} + \alpha_4 FANPS_{i,t} + \alpha_5 FAES_{i,t} + \alpha_6 SAMF_{i,t} + \alpha_7 SASDF_{i,t} + u_{i,t}, \quad (8)$$

where $SAES_{i,t}$ and $FAES_{i,t}$ are the subsequent *i* and first announcer's earnings surprises in quarter t , calculated as the difference between the actual EPS and mean forecast scaled by the last available stock price in quarter *t*; $SAMES_{i,t}$ and $FAMES_{i,t}$ - the subsequent *i* and first announcer's mean earnings surprises over the previous 20 quarters before quarter *t*; $SANPS_{i,t}$ and $FANPS_{i,t}$ - the subsequent *i* and first announcer's numbers of positive earnings surprises over the previous 20 quarters before quarter *t*; $SAMF_{i,t}$ and $SASDF_{i,t}$ - the subsequent *i* announcer's mean and standard deviation of the EPS forecasts for the current quarter respectively; and $u_{i,t}$ is the error term with mean zero and constant variance.

The estimation results of the imperfect forecast model are presented in Table 5, where we compare two models: one with only the subsequent announcer's own history (column 1 of Table 5) and the other with the history of both first and subsequent announcer as well as the first announcer's earnings surprise in the current quarter.

The first inference is that the history of the subsequent announcer is able to predict the subsequent earnings surprise. The mean and standard deviation of the EPS forecast are also significant and of the expected sign. The results of column 2 of Table 5 provide evidence that it is not only that the first announcer's earnings surprise can predict the current quarter subsequent announcer's earnings surprise, but also that the history of the first announcer can predict the subsequent announcer's earnings surprise. In other words, the results suggest that

the history of both the first and subsequent announcers can predict the earnings surprises of the subsequent announcers.

(Insert Table 5 here)

The fully rational market agents should be able to exploit and incorporate the predictable part of the subsequent announcer's earnings surprise in their actions. This implies that the predicted part of model (8) cannot explain the cumulative average abnormal returns if the investors are fully rational. On the contrary, the significant estimate next to the predictive part of the subsequent announcer's earnings surprises will provide evidence of market inefficiency in incorporating the available information.

In order to study the market efficiency more deeply, we also compare the perfect and imperfect forecast models. The full specification of these models is as follows:

$$CAAR_{i,t} = \beta_0 + \beta_1 SAATV_{i,t} + \beta_2 FAATV_{i,t} + \beta_3 FAES_{i,t} + \beta_4 FOREC_{i,t} + \gamma Z + \epsilon_{i,t}, \quad (9)$$

where $CAAR_{i,t}$ - the cumulative average abnormal returns of firm *i* over the appropriate time interval upon the first announcement in quarter *t*; $SAATV_{i,t}$ and $FAATV_{i,t}$ - the subsequent *i* and first announcer's abnormal trading volume on the day of the first announcement in quarter *t*; $FAES_{i,t}$ - the first announcer's earnings surprise; $FOREC_{i,t}$ – the forecast of the earnings surprise; Z is the same matrix of other control variables specified above, and $\epsilon_{i,t}$ is the error term with zero mean and constant variance.

Depending on the model, the variable $FOREC_{i,t}$ can obtain the following values:

• *for the perfect forecast model* $FOREC_{i,t} = SAES_{i,t}$, i.e. the forecast is the subsequent announcer's earnings surprise itself;

• *for the imperfect forecast model* $FOREC_{i,t} = PSAES_{i,t}$, where $PSAES_{i,t}$ - is the predicted part of the subsequent i announcer's earnings surprise in quarter t obtained from model (8);

• *for the imperfect forecast model with a forecast error* $FOREC_{i,t}$ is the vector of the variables consisting of $PSAES_{i,t}$ and $USAES_{i,t}$, where $PSAES_{i,t}$ and $USAES_{i,t}$ are the predicted and unpredicted parts of the subsequent i announcer's earnings surprise in quarter t obtained from model (8).

Table 6 contains the estimation results from three models: one with the perfect forecast of the subsequent announcer's earnings surprise, and imperfect forecast models with and without the forecast error.

Firstly, we find that in all three models – even in the model with the perfect forecast – the estimate of the abnormal trading volume is significant and of the same magnitude when we did not have any forecasts of the subsequent announcer's earnings surprises (Table 4). Thus, we conclude that even taking into account the subsequent announcer's earnings surprise, the abnormal trading volume upon the first announcement is informative, which again supports hypothesis 1 of the subsequent announcer's trading volume being informative about its stock performance upon first announcement.

Further, we compare the estimates of the subsequent announcer's earnings surprise and its predicted value. The findings show that for the first return window the estimate of the perfect and imperfect forecasts (columns 1 and 3 of Table 6) are significant and of the opposite sign, being positive for the former and negative for the latter. The negative sign of the predicted part of the subsequent announcer's earnings surprise for the first return window (Table 6 column 3) we explain as the efforts of some market agents to exploit the predictability of the subsequent announcer's earnings surprise. On the other hand, the positive sign of the earnings surprise itself

(Table 6 column 1) is rather driven by the unpredictable part of the earnings surprise, which is supported by its significant and positive estimate (Table 6 column 2). In the later return windows, the results suggest that both the foreknowledge of the subsequent announcer's earnings surprise and the imperfect forecast can explain the subsequent announcer's cumulative average abnormal returns upon the first announcement. Moreover, we do not find any statistical difference of the perfect and imperfect forecasts in being able to explain the subsequent announcer's abnormal trading volume upon the first announcement. Taken together, these results support the hypothesis 5 that the market participants are not fully rational. Comparing the models with perfect and imperfect forecasts (columns 1 and 3, 4 and 6, 7 and 9, and 10 and 12 of Table 6), we conclude that the model with imperfect forecast still performs well – the adjusted R-squared is almost the same as in the model with the perfect forecast.

(Insert Table 6 here)

5.3. Drivers of the Abnormal Trading Volume upon the First Announcement

The second part of hypothesis 3 states that the first announcer's abnormal trading volume is informative about the trading activity of the subsequent announcer, while the second part of hypothesis 4 states that the history of both the first and subsequent announcers' earnings surprises histories are informative about the trading activity of the subsequent announcer. To test the second part of hypotheses 3 and 4, we study the drivers of the trading activity of the subsequent announcing firms upon the first announcement in the industry. For the purposes of this analysis we build a basic model and compare the results with the model with the earnings surprise forecast.

The basic model of the subsequent announcer's abnormal trading volume, first of all, includes the first announcer's earnings surprise as a piece of new information. Since we want to test whether the first announcer's trading volume leads to the changes in the trading activity in the subsequent announcer's stocks, we also include the first announcer's abnormal trading

volume. We also expect that, depending on the earnings surprises history, the market is going to treat the firms differently: the investors may have different incentives to trade in the stocks with a long history of positive earnings surprises compared to the firms with irregular positive earnings surprises. This might be the case since, for example, the firms with a strong positive earnings surprise history may be perceived as good investment firms, while the firms with an irregular earnings surprise history may be considered as more risky. We also expect that the history of both the first and subsequent announcers would matter and therefore we include the earnings surprise history of both into the basic model.

Since we also expect that the market participants try to update their beliefs based on the new information observed, these updated beliefs should be reflected in the trading activity (the hypothesis 6). In order to test this hypothesis, we study whether the perfect and imperfect forecasts can explain the subsequent abnormal trading volume upon the first announcement.

The general forms of the full specification of the basic model and the model with the earnings forecast are as follows respectively:

$$SAATV_{i,t} = \beta_0 + \beta_1 FAATV_{i,t} + \beta_2 SAMES_{i,t} + \beta_3 SANPS_{i,t} + \beta_4 FAMES_{i,t} + \beta_5 FANPS_{i,t} + \beta_6 FAES_{i,t} + \gamma Z + \epsilon_{i,t}, \quad (10)$$

and

$$SAATV_{i,t} = \beta_0 + \beta_1 FAATV_{i,t} + \beta_2 FAES_{i,t} + \beta_6 FOREC_{i,t} + \gamma Z + e_{i,t}, \quad (11)$$

where $SAATV_{i,t}$ and $SAATV_{i,t}$ - the subsequent *i* and first announcer's abnormal trading volumes on the day of the first announcement in quarter *t*; $SAMES_{i,t}$ and $FAMES_{i,t}$ - the subsequent *i* and the first announcer's mean earnings surprises over the previous 20 quarters before the current quarter *t*, where the earnings surprise was calculated as the difference

between the actual quarterly EPS and the mean forecast for that quarter scaled by the last available stock price in that quarter; $SANPS_{i,t}$ and $FANPS_{i,t}$ - the subsequent i and first announcer's number of positive earnings surprises over the previous 20 quarters before quarter t; $FAES_{i,t}$ - the subsequent announcer's i and first announcer's earnings surprise in quarter t; $FOREC_{i,t}$ - the forecast of the earnings surprise; Z is the same matrix of other control variables specified above, and $\epsilon_{i,t}$ and $e_{i,t}$ are the error terms with zero mean and constant variance. In a similar manner to the above, depending on whether we have the perfect or imperfect forecast model, the variable $FOREC_{i,t}$ can be either $SAES_{i,t}$ or the vector consisting of $PSAES_{i,t}$ and $USAES_{i,t}$ respectively.

Table 7 contains the estimation results of three models: the basic model with the history of the first and subsequent announcers' earnings surprises (column 1), the model with the history of the earnings surprises and the perfect forecast of the earnings surprises (column 2), and the model with the imperfect forecast (i.e., the predicted and unpredicted parts) of the subsequent announcer's earnings surprise (column 3).

The first finding, supported by the estimation results from all the three models, is that the first announcer's earnings surprise does not have any impact on the trading activity in the stocks of the subsequent announcer. We interpret the inability of the first announcer's earnings surprise to explain the trading activity in the subsequent announcer's stocks as the further evidence of trading volume being the extra information signal.

(Insert Table 7 here)

All the three models show that the abnormal trading volume of the subsequent announcer is increasing in the first announcer's abnormal trading volume upon its own (first announcer's) earnings report. We explain the positive sign of the estimate by the heterogeneity of the beliefs or the presence of heterogeneous agents, which is in line with the previous literature. Consistent with the findings of Barber and Odean (2008) the institutional investors may be selling the

stocks of the first announcer and individual investors are more likely to buy them upon the first announcement date. At the same time we expect that the institutional investors are more likely to buy the subsequent announcers' stocks on the first announcement, since according to Boehmer and Kelley (2009) they may be more efficient in incorporating the new information about the future subsequent announcers based on the first announcer's report.

We also find evidence that the history of the earnings surprises of both the first and subsequent announcers can explain the abnormal trading volume of the subsequent announcer upon the first announcement. But while the mean of the subsequent announcer's earnings surprises is insignificant in explaining the subsequent announcer's trading volume, the first announcer's mean of earnings surprises is significant. Moreover, the number of positive earnings surprises in the past of both announcers is significant and negative. We interpret the negative sign of these two estimates in the following way. The probability of observing the subsequent announcer's positive earnings surprise in the current quarter is increasing in both the number of positive surprises in the past of the first and subsequent announcers, which is consistent with the model of predicting the subsequent announcer's earnings surprise from Table 5. Realizing this, the market agents may be more inclined to hold those subsequent announcers' stocks with higher probability of a positive surprise, which results in lower trading activity in the stocks of these firms.

The estimation results also show that the perfect forecast (column 2 Table 7) cannot explain the subsequent announcer's trading activity. On the contrary, the predicted part of the subsequent announcer's earnings surprise is significant and negative (column 3 Table 7), which is expectable: if the market is expecting the higher earnings surprise of the subsequent announcers, there will be fewer participants willing to trade in this stock.

Comparing all the models of abnormal trading volume, we can infer that the abnormal trading volume of the subsequent announcer is driven rather by market expectations of the

subsequent announcer future performance than just solely by the news from the first announcer, since the first and subsequent announcers earnings surprises are insignificant, while the predicted part of the subsequent announcer can explain its earnings surprise. So these findings also support the hypothesis that at least some of the market agents will try to trade strategically based on the updated beliefs upon the first announcement.

5.4. Price Responses upon Own Announcement

The main idea is that the abnormal trading volume upon the first announcement should serve as additional information for purifying the information content to the implication of the first announcer's earnings surprise for the subsequent announcer. On the other hand, upon the firm's subsequent own announcement the market receives a clear information signal about the subsequent announcer's performance. If the abnormal trading volume has only incremental informative power for purifying the noisy signals, the subsequent announcer's abnormal trading volume upon its own announcement should be unable to explain the cumulative average abnormal returns upon own announcement. On the contrary, the findings that the subsequent announcer's abnormal trading volume upon its own announcement are able to explain the stock performance can be considered as stronger evidence of trading volume informativeness (hypothesis 2). Moreover, we also expect that the subsequent announcer's history of own earnings surprises can explain the stock performance of the subsequent announcer upon its own announcement (hypothesis 4).

For testing these hypotheses, we again consider three models: the basic model, the model with the history of subsequent announcers' earnings surprises, and that with the imperfect forecast of the earnings surprise. The full specification of these models is as follows:

The basic model of cumulative average abnormal returns upon own announcement:

$$CAARown_{i,t} = \beta_0 + \beta_1 SAATVown_{i,t} + \beta_2 SAMES_{i,t} + \beta_3 SANPS_{i,t} + \beta_4 SAES_{i,t} + \beta_5 FAES_{i,t} + +\gamma Zown + \epsilon_{i,t}, \quad (12)$$

The cumulative average abnormal returns model with the imperfect forecast of the earnings surprises

$$CAARown_{i,t} = \beta_0 + \beta_1 SAATVown_{i,t} + \beta_2 PSAES_{i,t} + \beta_3 USAES_{i,t} + \beta_4 FAES_{i,t} + \gamma Zown + \epsilon_{i,t}, \quad (13)$$

where $CAARown_{i,t}$ - the subsequent *i* announcer's cumulative average abnormal returns over the appropriate time interval upon the own announcement, $SAATVown_{i,t}$ - the subsequent *i* announcer's abnormal trading volume on the day of the firm's own announcement in quarter *t*; $SAMES_{i,t}$ - the subsequent *i* announcer's mean earnings surprises over the previous 20 quarters before quarter *t*; $SANPS_{i,t}$ - the subsequent *i* announcer's numbers of positive earnings surprises over the previous 20 quarters before quarter *t*; $SAES_{i,t}$ - the subsequent *i* announcer's earnings surprise, which was calculated as the difference between the actual quarterly EPS and mean forecast scaled by the last available stock price in quarter *t*; $PSAES_{i,t}$ and $USAES_{i,t}$ - the predicted and unpredicted parts of the subsequent *i* announcer's earnings surprise in quarter *t*; $Zown$ is the matrix of other control variables, namely $MRET10own_{i,t}$, $MATV10own_{i,t}$ $MRETown182_{i,t}$, $MV_{i,t}$, $BM_{i,t}$, and $ACC_{i,t}$; and $\epsilon_{i,t}$ is the error term with zero mean and constant variance.

Table 8 contains the estimation results of the cumulative average abnormal returns upon the subsequent announcer's own reporting. Firstly, according the results the abnormal trading volume upon the subsequent own announcement is significant for the first two return windows. What is interesting is that the abnormal trading volume changes its sign from negative for the first return window to positive for the second return window. We explain this in the following way. Since the firm's announcement draws the market attention to the announcing firm, the

market may overreact to the new information, resulting in higher trading activity and lower returns, but then this overreaction is quickly offset, which is consistent with the reversal of the sign of the estimate of the abnormal trading volume. The findings also show that the significance of the abnormal trading volume is more persistent upon the first announcement than upon the firm's own subsequent announcement. The higher persistency of the trading volume upon the first announcement can result from the fact that upon the first announcement the market receives more noisy signals, explaining why it might take longer for its informativeness to disappear or be incorporated fully.

The extended model shows us that the earnings surprise history of the subsequent announcer can also explain the subsequent announcer's price responses upon its own announcement. We observe that the two measures of history are perceived differently by the market. The significant and negative estimate of the mean of the earnings surprises we explain as the market overreaction to the history of the stock. Upon observing the subsequent announcer's own report the market participants may realize the predictive power of the mean of the past positive earnings surprises and take appropriate corrective steps. On the other hand, the significant and positive estimate of the number of positive earnings surprise for all the returns window provides evidence that the market underreacts to the sequence of positive earnings surprises.

To get more insights into the efficiency of the market, we also compare how the subsequent announcer's earnings surprise itself and its imperfect forecast, available at the first announcement, can explain the subsequent announcer's stock performance upon its own announcement (Table 8). The estimates of the subsequent announcer's earnings surprise as well as the predicted and unpredicted parts of the forecast model are positive and significant. The positive and significant estimate of the subsequent announcer's earnings surprise is consistent with previous research and suggests the market underreacts to the earnings surprise. Moreover,

the results also provide further evidence of market inefficiency (the first part of hypothesis 5) since the estimates of the earnings surprise and the predicted and unpredicted parts are not economically or statistically different from each other.

The findings also show that the underreaction to the unpredicted part persists a while longer – the estimate of the unpredicted part is still significant and positive for the third return window, while it is not significant for the predictive part. Since the estimate of the subsequent announcer's earnings surprise is also significant and positive for the third return window, we believe this significance is driven by the unpredicted part. These findings are also quite reasonable and can be interpreted such that it takes less time to adjust to something more expectable than to something less expectable, which is consistent with the literature on representativeness bias as the explanation of market inefficiencies (Barberis et al., 1998; Brav & Heaton, 2002; Alti & Tetlock, 2014; Gennaioli et al., 2015).

(Insert Table 8 here)

5.5. Trading Volume and Own Announcement

As the last step in the analysis, we study the driving forces on the abnormal trading volume upon own announcement. The second part of hypothesis 4 states that the subsequent announcer's abnormal trading volume is driven by its own history of the earnings surprises. Moreover, in hypothesis 7 we state that the subsequent announcer's abnormal trading volume is also driven by the beliefs updated upon observing the first announcement.

To test these hypotheses we compare three models: the basic model, the model with the earnings surprise history, and the imperfect forecast model of earnings surprise. These models have the following specifications:

The basic model of the abnormal trading volume upon own announcement

$$SAATVown_{i,t} = \beta_0 + \beta_1 SAATV_{i,t} + \beta_2 FAATV_{i,t} + \beta_3 SAMES_{i,t} + \beta_4 SANPS_{i,t} + \beta_5 SAES_{i,t} + \beta_6 FAES_{i,t} + \gamma Zown + \varepsilon_{i,t}, \quad (14)$$

The model of the abnormal trading with the imperfect forecast of earnings surprises

$$SAATVown_{i,t} = \beta_0 + \beta_1 SAATV_{i,t} + \beta_2 FAATV_{i,t} + \beta_3 PSAES_{i,t} + \beta_4 USAES_{i,t} + \beta_6 FAES_{i,t} + \gamma Zown + \varepsilon_{i,t}, \quad (14)$$

where $SAATVown_{i,t}$ - the subsequent *i* announcer's abnormal trading volume on the day of the own announcement in quarter *t*; $SAATV_{i,t}$ and $FAATV_{i,t}$ - the subsequent *i* and first announcer's abnormal trading volume on the day of the first announcement in quarter *t*; $SAMES_{i,t}$ – the subsequent *i* announcer's mean earnings surprises over the previous 20 quarters before the current quarter *t*, where the earnings surprise was calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter scaled by the last available stock price in that quarter; $SANPS_{i,t}$ - the subsequent *i* announcer's number of positive earnings surprises over the previous 20 quarters before quarter *t*; $SAES_{i,t}$ $FAES_{i,t}$ - the subsequent announcer's *i* and first announcer's earnings surprise in quarter *t*; $PSAES_{i,t}$ and $USAES_{i,t}$ - the predicted and unpredicted parts of the subsequent *i* announcer's earnings surprise in quarter *t*; *Zown* is the matrix of other control variables specified above, and $\varepsilon_{i,t}$ is the error term with zero mean and constant variance.

The estimation results are reported in Table 9. The significance of the subsequent announcer's abnormal trading volume upon the first announcement supports hypothesis 7. The positive estimate of the subsequent announcer's abnormal trading volume is in line with the reasoning that at least some of the market participants may see the profitable opportunities on the day of the first announcement (which is also supported by the findings in section 5.3) take

the appropriate trading positions and then subsequently take the offsetting trading position upon the subsequent announcer's own earnings reporting. As discussed in section 5.3, the more sophisticated market players such as institutional investors may buy the subsequent announcers' stocks on the day of the first announcement, thus we expect that on their subsequent own announcement these market players may take the offsetting position. We expect the opposite for the trading activity for the first announcer and as a result the trading activity in the first announcer's stock on the first announcement has the predictive power in explaining the subsequent announcer's trading activity.

(Insert Table 9 here)

We also find that both aspects of the history of earnings surprises – the mean and number of positive earnings surprises – are positive and significant. Taking into account that the mean of the earnings surprises was significant and negative for the cumulative average abnormal returns upon own announcement for the first return window, the significance of the mean of the earnings surprise in the regression of the abnormal trading volume upon own announcement can be considered as further evidence of the market overreaction to this measure of earnings surprise history. The trading activity upon own announcement also increases in the number of positive earnings surprises. This suggests that the market is aware of the predictability of the subsequent announcer's earnings surprise, but underreacts to this measure of the earnings surprise history, given the significant and positive estimate of the number of positive earnings surprises in the regression of the cumulative average abnormal returns for all of the returns window from section 5.4 (Table 8).

Comparing the models with the earnings surprise itself and the imperfect forecast, we can conclude that the trading activity upon own announcement is driven by the earnings surprise. At the same time we also find that the predictive part of the earnings surprise has a much stronger impact on trading activity than the unpredicted part. This larger trading activity

response to the predicted part can also explain the faster decay of the significance of the predicted part in the regression of the cumulative average abnormal returns discussed in section 5.4.

6. Conclusion

While consistent with previous research we find that the first announcer's earnings surprise can explain the non-announcing firms' stock performance upon such announcements, we contribute to the literature by showing that the trading volume upon the first announcement in the industry is informative as well. Secondly, we also find that the history of the earnings surprises of both the first and subsequent announcers can explain the stock performance and trading activity upon the first announcement. Thirdly, we find evidence that not only the the first announcer's earnings surprise, but also the earnings surprises history of both the first and subsequent announcers can predict the latter's earnings surprise. Fourthly, the results show that the market does not fully realize the subsequent announcer's earnings surprise predictability, which may be interpreted as some form of market inefficiency. Fifthly, the findings also suggest that the trading volume has a higher persistency upon the first announcement than upon subsequent announcement.

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Figure 1
Timeline of the events

This figure depicts the event windows. The first announcement is the announcement of the first firm in the industry. On that date we also obtain the abnormal trading volume of non-anouncing/subsequent announcing firms. The second window is the announcement of the subsequent anncouncing firms. The time intervals which we analyze to study the persistency of the impact of the variable of interest over time are days 0-1 (where day=0 is the first announcement or own subsequent announcement date respectively), days 2-5, days 6-10, and days 11-20 upon the first or own subsequent earnings reports respectively.

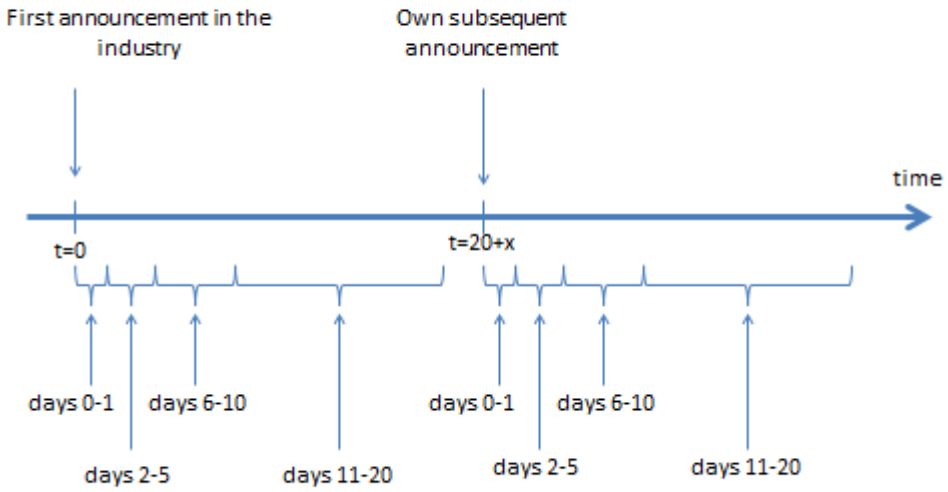
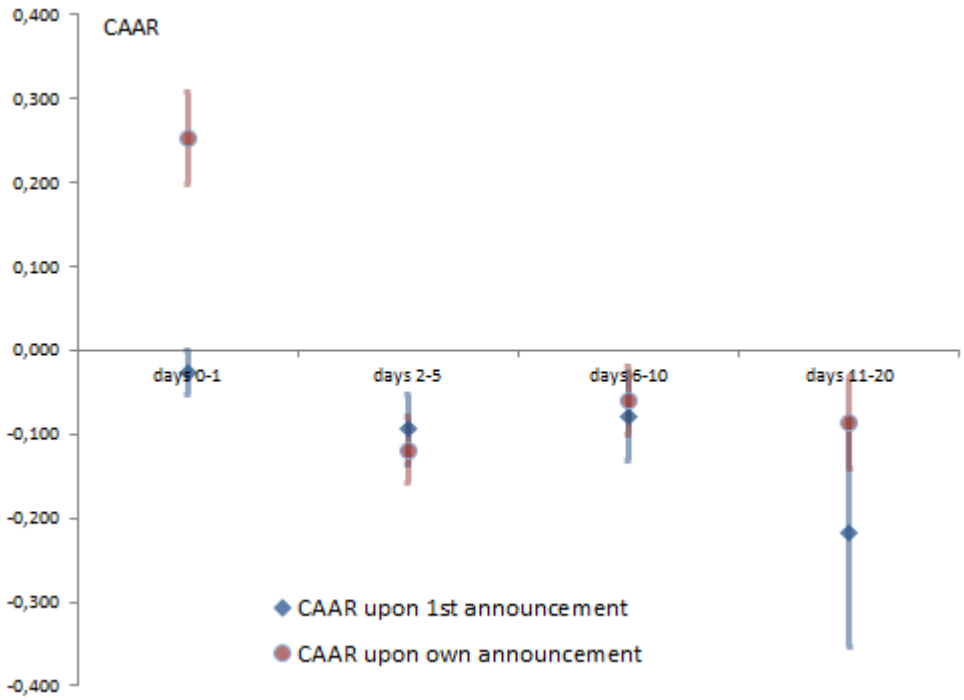


Figure 2
Average Cumulative Average Abnormal Returns Over Event Windows
This figure shows the mean and 95% confidence intervals of the cumulative average abnormal returns from January 1994 to March 2013. Abnormal returns come from a four-factor model with 252-day estimation period that ends 46 days prior to the announcement day. The cumulative average abnormal returns are calculated over the days 0-1, 2-5, 6-10, and 11-20. We use the IBES earnings announcement dates and restrict the sample to those firms which have a standard fiscal quarter end (March 31, June 30, September 31, December 31) . We discard observations if a firm reports later than 91 days after the end of a forecast period and observations when there is more than 1 firm reporting on the first announcement date. We restrict the sample of subsequent announcing firms to those firms which report at least 3 days after the end of the appropriate time interval. The descriptive statistics of the cumulative average abnormal returns are presented in Table 1.



Note: CAAR - cumulative average abnormal return, %

Figure 3
Average First and Subsequent Announcers' Abnormal Trading Volume
This figure shows the mean and 95% confidence intervals of abnormal trading volume of the first and subsequent announcing firms around the earnings announcement day from January 1994 to March 2013. *SAATV* and *FAATV* are the subsequent and first announcer's abnormal trading volume respectively. We use the IBES earnings announcement dates and restrict the sample to those firms which have a standard fiscal quarter end (March 31, June 30, September 31, December 31) . We discard observations if a firm reports later than 91 days after the end of a forecast period and observations when there is more than 1 firm reporting on the first announcement date. We restrict the sample of subsequent announcing firms to those firms which report at least 3 days after the end of the appropriate time interval. The descriptive statistics of the average abnormal trading volume is presented in Table 2.

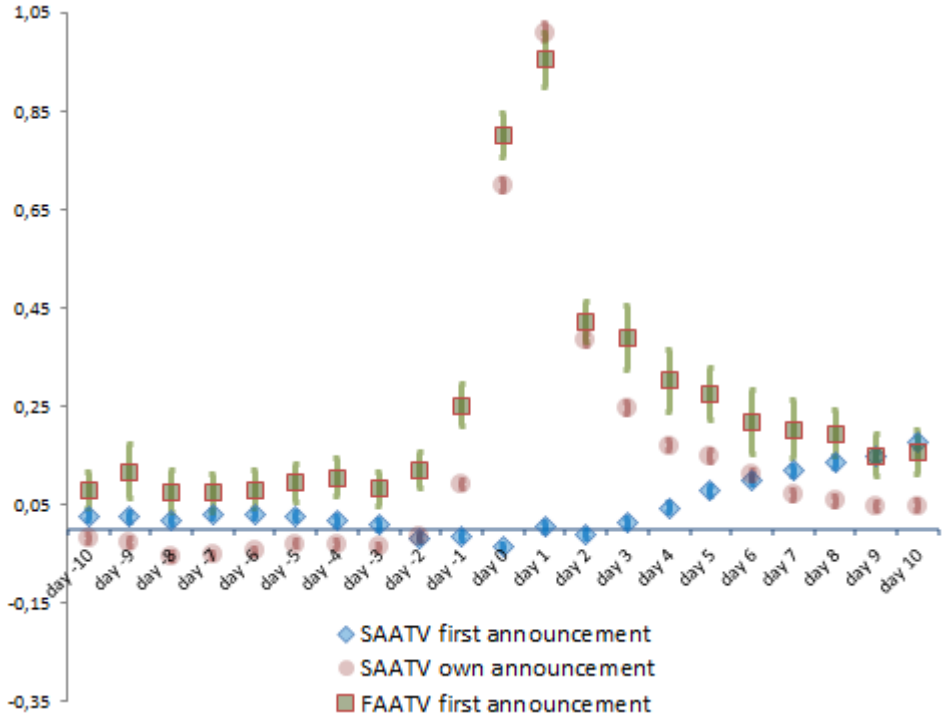


Table 1
Summary Statistics of Cumulative Average Abnormal Returns

This table shows the summary statistics of the cumulative average abnormal returns from January 1994 to March 2013. Abnormal returns come from a four-factor model with 252-day estimation period that ends 46 days prior to the announcement day. The cumulative average abnormal returns are calculated over the days 0-1, 2-5, 6-10, and 11-20. We use the IBES earnings announcement dates and restrict the sample to those firms which have a standard fiscal quarter end (March 31, June 30, September 31, December 31) . We discard observations if a firm reports later than 91 days after the end of a forecast period and observations when there is more than 1 firm reporting on the first announcement date. We restrict the sample of subsequent announcing firms to those firms which report at least 3 days after the end of the appropriate time interval.

Days upon announcement	Earnings Announcement of Either First or Subsequent Firm in Industry	*N*	Mean	St. Dev	Min	Max
0-1	first	53,584	0.02	3.15	-12.9	14.7
	subsequent	50,374	0.24	6.37	-23.8	22.8
2-5	first	45,891	-0.17	4.49	-17.3	20.2
	subsequent	50,374	-0.13	4.64	-17.7	19.3
6-10	first	36,308	-0.10	5.24	-20.7	23.2
	subsequent	50,374	-0.06	4.61	-17.6	20.1
11-20	first	13,479	-0.39	8.03	-28.7	31.2
	subsequent	50,374	-0.10	6.35	-24.6	28.6

Table 2

Summary Statistics of Abnormal Trading Volume

This figure shows the summary statistic of abnormal trading volume of the first and subsequent announcing firms around the earnings announcement day from January 1994 to March 2013. $FAATV$ is the abnormal trading volume of the first industry announcing firms. $SAATV$ is the abnormal trading volume of the subsequent industry announcing firms on the day of the first industry announcing firm. $SAATVown$ is the abnormal trading volume of the subsequent industry announcing firm on the day of its own first quarterly earnings announcement. We use the IBES earnings announcement dates and restrict the sample to those firms which have a standard fiscal quarter end (March 31, June 30, September 31, December 31) . We discard observations if a firm reports later than 91 days after the end of a forecast period and observations when there is more than 1 firm reporting on the first announcement date. We restrict the sample of subsequent announcing firms to those firms which report at least 3 days after the end of the appropriate time interval.

				Subsequent Industry Announcing Firms					
	Abnormal Trading Volume of First Industry Announcing Firms (FAATV)			Abnormal Trading Volume Around Day of First Industry Announcing Firm(SAATV)			Abnormal Trading Volume Around Its Own Announcement Day (SAATVown)		
Days	N	Mean	SD	N	Mean	SD	N	Mean	SD
-10	4,620	0.12	1.62	53,584	0.05	1.07	50,374	-0.02	0.96
-9	4,620	0.12	1.93	53,584	0.04	1.14	50,374	-0.02	0.93
-8	4,716	0.07	1.47	53,584	0.02	1.03	50,374	-0.05	0.86
-7	4,716	0.07	1.31	53,584	0.03	1.07	50,374	-0.05	0.89
-6	4,717	0.08	1.31	53,584	0.03	1.09	50,374	-0.04	0.87
-5	4,719	0.09	1.20	53,584	0.03	1.02	50,374	-0.03	0.89
-4	4,719	0.09	1.14	53,584	0.02	1.01	50,374	-0.03	0.89
-3	4,719	0.07	1.15	53,584	0.01	1.02	50,374	-0.04	0.91
-2	4,721	0.11	1.29	53,584	-0.02	0.98	50,374	-0.01	0.93
-1	4,722	0.25	1.55	53,584	-0.01	0.99	50,374	0.09	0.96
0	4,722	0.79	1.54	53,584	-0.04	0.75	50,374	0.70	1.45
1	4,722	0.95	2.95	53,584	0.00	1.15	50,374	1.01	2.14
2	4,722	0.42	1.45	53,584	-0.01	1.05	50,374	0.39	1.36
3	4,722	0.35	2.29	53,584	0.01	1.18	50,374	0.24	1.32
4	4,721	0.30	2.31	53,584	0.05	1.31	50,374	0.17	1.29
5	4,721	0.27	1.91	53,584	0.08	1.31	50,374	0.14	1.41
6	4,721	0.22	2.29	53,584	0.10	1.29	50,374	0.11	1.26
7	4,721	0.20	2.07	53,584	0.12	1.35	50,374	0.07	1.21
8	4,721	0.19	1.65	53,584	0.14	1.32	50,374	0.06	1.13
9	4,720	0.15	1.54	53,584	0.15	1.33	50,374	0.05	1.08
10	4,719	0.15	1.52	53,584	0.18	1.41	50,374	0.05	1.30

Table 3
Summary Statistics Control Variables

This table contains the summary statistics for the control variables. The data covers the period from January 1994 to March 2013. *SAMES* and *FAMES* are the subsequent and first announcer's mean earnings surprises over the previous 20 quarters, where the earnings surprise is calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter, scaled by the last available stock price in that quarter. *SANPS* and *FANPS* are the subsequent and first announcer's number of positive earnings surprises over the previous 20 quarters. *SAES* and *FAES* are the subsequent and first announcer's earnings surprise. *MRET10* and *MRET10own* are the subsequent announcer's mean of the returns excluding dividends over the last 10 trading days before the first announcement and own announcement respectively. *MATV10* and *MATV10own* are the mean abnormal trading volume over the last 10 trading days before the first and own announcement respectively. *MRET182* and *MRET182own* are the subsequent announcer's mean of the returns over the last 182 days (or six months) before the first and own announcement respectively. *MV* is the logarithm of the market value, calculated as the number of shares outstanding at the end of the quarter multiplied by the last available stock price in that quarter. *BM* is the book-to-market value, which is calculated as the logarithm of the ratio of total assets minus depreciation to the market value. *ACC* are the accruals calculated as the change in the working capital from the previous quarter minus depreciation scaled by total assets. The data comes from the CRSP, IBES and Compustat Databases.

Variables	Mean	SD	Min	Max	*N*
SAMES	0.00	0.00	-0.03	0.01	53,584
SANPS	10.68	5.29	0.00	20.00	53,584
FAMES	0.00	0.00	-0.01	0.01	53,584
FANPS	11.88	5.42	0.00	20.00	53,584
SAES	0.00	0.01	-0.04	0.02	50,374
FAES	0.00	0.00	-0.06	0.02	53,584
MRET10	0.06	0.83	-3.13	3.29	53,584
MRET10own	0.06	0.76	-2.83	3.41	50,374
MATV10	0.02	0.56	-0.73	3.84	53,584
MATV10own	-0.02	0.50	-0.83	3.43	50,374
MRET182	0.08	0.22	-0.71	0.91	53,584
MRET182own	0.08	0.21	-0.72	0.91	50,374
MV	13.67	1.53	9.57	17.72	53,584
BM	-7.03	0.81	-0.09	-3.68	53,584
ACC	-0.01	0.06	-0.27	0.38	53,584

Table 4

Cumulative Average Abnormal Returns Upon The First Earnings Announcement in the Industry

SAATV and *FAATV* are the subsequent and first announcer's abnormal trading volume on the day of first announcement. *SAMES* and *FAMES* are the subsequent and first announcer's mean earnings surprises over the previous 20 quarters, where the earnings surprise was calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter, scaled by the last available stock price in that quarter. *SANPS* and *FANPS* are the subsequent and first announcer's number of positive earnings surprises over the previous 20 quarters; and *FAES* is the first announcer's earnings surprise. *Other controls include*: *MRET10* is the subsequent announcer's mean of the returns excluding dividends over the last 10 trading days before the first announcement. *MATV10* is the mean abnormal trading volume over the last 10 trading days before the first announcement. *MRET182* is the subsequent announcer's mean of the returns over the last 182 days (or six months). *MV* is the logarithm of the market value, calculated as the number of shares outstanding at the end of the quarter multiplied by the last available stock price for that quarter. *BM* is the book-to-market value, which is calculated as the logarithm of the ratio of total assets minus depreciation to the market value. *ACC* - the accruals calculated as the change in the working capital from the previous quarter minus depreciation scaled by total assets. Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

	Cumulative Average Abnormal Returns Over Windows (Days upon the First Industry Announcing Firm)											
	Days 0-1			Days 2-5			Days 6-10			Days 11-20		
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SAATV		0.33***	0.33***		0.09***	0.09***		0.07*	0.07*		-0.05	-0.05
		(0.02)	(0.02)		(0.03)	(0.03)		(0.04)	(0.04)		(0.09)	(0.09)
FAATV		0.01	0.01		0.00	0.00		0.03*	0.03*		0.09**	0.08*
		(0.01)	(0.01)		(0.01)	(0.01)		(0.02)	(0.02)		(0.04)	(0.04)
SAMES			-12.65***			6.39			-12.95			30.82
			(4.47)			(6.80)			(8.48)			(19.13)
SANPS			0.00			0.00			0.01*			0.03*
			(0.00)			(0.01)			(0.02)			(0.01)
FAMES			-2.78			2.68			21.41*			29.55
			(5.57)			(8.65)			(11.26)			(28.93)
FANPS			0.00			-0.01			-0.02***			0.00
			(0.00)			(0.00)			(0.01)			(0.01)
FAES	6.15*	6.10*	6.29**	15.64***	15.59***	15.25***	10.96*	10.58*	8.47	-11.03	-12.54	-16.89
	(3.17)	(3.16)	(3.18)	(4.87)	(4.87)	(4.91)	(6.31)	(6.32)	(6.38)	(16.85)	(16.86)	(17.12)
Other controls	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
Observations	55,463	55,463	55,463	47,554	47,554	47,554	37,707	37,707	37,707	14,048	14,048	14,048
Adj. R-squared	0.006	0.011	0.011	0.007	0.007	0.007	0.006	0.006	0.007	0.004	0.004	0.004

Table 5
Predictability of the Subsequent Announcer's Earnings Surprise

SAES and *FAES* are the subsequent and first announcer's earnings surprise. *SAMES* and *FAMES* are the subsequent and first announcer's mean earnings surprise over the previous 20 quarters, where the earnings surprise was calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter, scaled by the last available stock price in that quarter. *SANPS* and *FANPS* are the subsequent and first announcer's number of positive earnings surprise over the previous 20 quarters. *SAMF* and *SASDF* are the subsequent announcer's mean and standard deviation of the EPS forecast for the current quarter respectively. Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

VARIABLES	SAES	SAES
SAMES	0.31***	0.30***
	(0.01)	(0.01)
SANPS	0.00***	0.00***
	(0.00)	(0.00)
FAMES		0.04***
		(0.01)
FANPS		0.00***
		(0.00)
FAES		0.03***
		(0.01)
SAMF	-0.02***	-0.02***
	(0.00)	(0.00)
SASDF	-0.59***	-0.60***
	(0.01)	(0.01)
Constant	0.00***	0.00
	(0.00)	(0.00)
Observations	93,749	93,749
Adj. R-squared	0.076	0.076

Table 6
Market Efficiency and Cumulative Average Abnormal Returns Upon the First Announcement in the Industry

SAATV and *FAATV* are the subsequent and first announcer's abnormal trading volume on the day of first announcement; *SAES* and *FAES* are the subsequent and first announcer's earnings surprise; *PSAES* and *USAES* are the predicted and unpredicted parts of the subsequent announcer's earnings surprise. *Other controls include*: *MRET10* is the subsequent announcer's mean of the returns excluding dividends over the last 10 trading days before the first announcement; *MATV10* is the mean abnormal trading volume over the last 10 trading days before the first announcement. *MRET182* is the subsequent announcer's mean of the returns over the last 182 days (or six months). *MV* is the logarithm of the market value, calculated as the number of shares outstanding at the end of the quarter multiplied by the last available stock price in that quarter; *BM* is the book-to-market value, which is calculated as the logarithm of the ratio of total assets minus depreciation to the market value. *ACC* are accruals calculated as the change in the working capital from the previous quarter minus depreciation scaled by total assets. Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

	Cumulative Average Abnormal Returns Over Windows (Days upon the First Industry Announcing Firm)											
	Days 0-1			Days 2-5			Days 6-10			Days 11-20		
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SAATV	0.33***	0.33***	0.33***	0.09***	0.09***	0.09***	0.07*	0.07*	0.07*	-0.05	-0.05	-0.04
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.09)	(0.09)	(0.09)
FAATV	0.01	0.01	0.01	0.00	0.00	0.00	0.03	0.03*	0.03	0.09**	0.09**	0.08*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)
SAES	12.54***			20.42***			52.75***			138.8***		
	(2.71)			(4.08)			(5.04)			(11.13)		
PSAES		-25.79***	-31.14***		33.65***	27.43**		39.71***	22.73		136.7***	99.59***
		(7.99)	(7.93)		(12.13)	(12.05)		(15.18)	(15.12)		(34.73)	(34.78)
USAES		15.75***			19.31***			53.83***			138.9***	
		(2.78)			(4.19)			(5.18)			(11.46)	
FAES	5.78*	7.12**	7.16**	15.14***	14.67***	14.65***	9.25	9.72	9.78	-15.1	-15.02	-16.45
	(3.16)	(3.17)	(3.17)	(4.87)	(4.89)	(4.89)	(6.31)	(6.33)	(6.34)	(16.77)	(16.82)	(16.91)
Other controls	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
Observations	55,463	55,463	55,463	47,554	47,554	47,554	37,707	37,707	37,707	14,048	14,048	14,048
Adj. R-squared	0.011	0.012	0.011	0.008	0.008	0.007	0.009	0.009	0.007	0.015	0.015	0.005

Table 7
Abnormal Trading Volume Upon the First Announcement

SAATV and *FAATV* are the subsequent and first announcer's abnormal trading volume upon the first announcement; *PSAES* and *USAES* are the predicted and unpredicted parts of the subsequent announcer's earnings surprise. *SAMES* and *FAMES* are the subsequent and first announcer's mean earnings surprises over the previous 20 quarters, where the earnings surprise was calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter, scaled by the last available stock price in that quarter. *SANPS* and *FANPS* are the subsequent and first announcer's number of positive earnings surprises over the previous 20 quarters. *SAES* and *FAES* are the subsequent and first announcer's earnings surprise. *Other controls include*: *MRET10* is the subsequent announcer's average returns excluding dividends over the last 10 trading days before the first announcement. *MATV10* is the mean abnormal trading volume over the last 10 trading days before the first announcement. *MRET182* is the subsequent announcer's average returns over the last 182 days (or six months). *MV* is the logarithm of the market value, calculated as the number of shares outstanding at the end of the quarter multiplied by the last available stock price in that quarter. *BM* is the book-to-market value, which is calculated as the logarithm of the ratio of total assets minus depreciation to the market value. And *ACC* is the accruals calculated as the change in the working capital from the previous quarter minus depreciation scaled by total assets. Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

	SAATV		
Independent Variables	(1)	(2)	(3)
SAES		-0.21	
		(0.59)	
PSAES			-3.47**
			(1.73)
USAES			-0.09
			(0.60)
FAATV	0.02***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)
FAES	-0.75	-0.74	-0.48
	(0.69)	(0.69)	(0.69)
SAMES	0.51	0.56	
	(0.97)	(0.98)	
SANPS	-0.00**	-0.00**	
	(0.00)	(0.00)	
FAMES	3.04**	3.04**	
	(1.20)	(1.20)	
FANPS	-0.00***	-0.00***	
	(0.00)	(0.00)	
Other controls	Incl.	Incl.	Incl.
N	55,463	55,463	55,463
Adjusted R-squared	0.184	0.184	0.183

Table 8
Cumulative Average Abnormal Returns Upon Own Subsequent Announcement

SAATVown is the abnormal trading volume on the day of the own announcement. *SAMES* is the subsequent announcer's mean earnings surprises over the previous 20 quarters, where the earnings surprise was calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter, scaled by the last available stock price in that quarter. *SANPS* is the subsequent announcer's number of positive earnings surprises over the previous 20 quarters. *SAES* and *FAES* are the subsequent and first announcer's earnings surprise. *PSAES* and *USAES* are the predicted and unpredicted parts of the subsequent announcer's earnings surprise. *Other controls include*: *MRET10own* is the subsequent announcer's mean of the returns excluding dividends over the last 10 trading days before the own announcement. *MATV10own* is the mean abnormal trading volume over the last 10 trading days before the own announcement. *MRET182own* is the subsequent announcer's mean of the returns over the last 182 days (or six months). *MV* is the logarithm of the market value, calculated as the number of shares outstanding at the end of the quarter multiplied by the last available stock price in that quarter. *BM* is the book-to-market value, which is calculated as the logarithm of the ratio of total assets minus depreciation to the market value. And *ACC* is the accruals calculated as the change in the working capital from the previous quarter minus depreciation scaled by total assets. Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1

	Cumulative Average Abnormal Returns Over Windows (Days upon the First Industry Announcing Firm)											
	Days 0-1			Days 2-5			Days 6-10			Days 11-20		
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SAATVown	-0.05***	-0.05***	-0.05***	0.03**	0.03*	0.03**	0.02	0.02	0.02	-0.00	-0.00	-0.00
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
SAMES		-64.26***			-17.19**			-13.16*			-23.21**	
		(9.24)			(6.95)			(6.94)			(9.58)	
SANPS		0.013**			0.02***			0.02***			0.01*	
		(0.01)			(0.00)			(0.00)			(0.01)	
SAES	293.5***	298.5***		40.87***	41.04***		20.15***	19.93***		3.83	5.09	
	(5.65)	(5.72)		(4.25)	(4.30)		(4.24)	(4.29)		(5.86)	(5.93)	
PSAES			250.1***			39.03***			15.58			-10.59
			(16.46)			(12.37)			(12.35)			(17.05)
USAES			297.1***			41.02***			20.53***			5.01
			(5.79)			(4.36)			(4.35)			(6.00)
FAES	3.26	3.17	4.74	-12.26**	-12.85***	-12.20**	-0.96	-1.59	-0.80	13.36**	13.06**	13.85**
	(6.42)	(6.43)	(6.45)	(4.83)	(4.83)	(4.85)	(4.82)	(4.82)	(4.84)	(6.66)	(6.66)	(6.68)
Other controls	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
Observations	52,149	52,149	52,149	52,149	52,149	52,149	52,146	52,146	52,146	52,095	52,095	52,095
Adj. R-squared	0.056	0.057	0.056	0.010	0.011	0.010	0.005	0.006	0.006	0.010	0.010	0.010

Table 9
Abnormal trading volume upon own subsequent announcement

SAATVown is the abnormal trading volume upon own announcement. *SAES* and *FAES* are the subsequent and first announcer's earnings surprise. *PSAES* and *USAES* are the predicted and unpredicted parts of the subsequent announcer's earnings surprise. *SAATV* and *FAATV* are the subsequent and first announcer's abnormal trading volume upon the first announcement. *SAMES* is the subsequent announcer's mean earnings surprises over the previous 20 quarters, where the earnings surprise was calculated as the difference between the actual quarterly EPS and the mean forecast for that quarter, scaled by the last available stock price in that quarter. *Other controls include*: *MRET10own* is the subsequent announcer's mean of the returns excluding dividends over the last 10 trading days before the own announcement. *MATV10own* is the mean abnormal trading volume over the last 10 trading days before the own announcement; *MRET182own* is the subsequent announcer's average returns over the last 182 days (or six months). *MV* is the logarithm of the market value, calculated as the number of shares outstanding at the end of the quarter multiplied by the last available stock price in that quarter. *BM* is the book-to-market value, which is calculated as the logarithm of the ratio of total assets minus depreciation to the market value. *ACC* is the accruals calculated as the change in the working capital from the previous quarter minus depreciation scaled by total assets. Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1.

	SAATVown		
Independent Variables	(1)	(2)	(3)
SAATV	0.04***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)
FAATV	0.03***	0.03***	0.03***
	(0.00)	(0.00)	(0.00)
SAMES		7.91***	
		(2.05)	
SANPS		0.02***	
		(0.00)	
SAES	7.61***	5.59***	
	(1.26)	(1.27)	
PSAES			33.37***
			(3.66)
USAES			5.48***
			(1.29)
FAES	3.05**	2.42*	2.18
	(1.43)	(1.43)	(1.44)
Other controls	Incl.	Incl.	Incl.
Observations	52,149	52,149	52,149
Adjusted R-squared	0.110	0.113	0.111