# The Information Content of Earnings Announcements: Evidence from the Saudi Market

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Prepared by:

Abdulrahman Alhassan
Asem Alhomaidi
Bader Almuhtadi

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# The Information Content of Earnings Announcements: Evidence from the Saudi Market

Abdulrahman Alhassan, Asem Alhomaidi, Bader Almuhtadi

## Abstract

Do earnings announcements convey useful information to investors in the marketplace? Our results reveal that the market reaction to the information content of earnings announcement, measured by abnormal trading volume, has been increasing over the years. The results provide supportive evidence that regulatory applications have played an important role to enhance the efficiency of announcements released by companies in the marketplace. Additionally, our findings suggest that the leakage of information and the level of insider trading have relatively decreased due to the Capital Market Authority's efforts in improving the information environment.

*Keywords:* Earnings announcements; abnormal trading volume; regulations.

# 1. Introduction

How effective are earnings announcements in conveying information to market participants in the Saudi market? Did the regulatory and technological developments enhance the information content of earnings announcements? Did insider trading activity decrease with the improvement of the information content of earnings announcement? While the effectiveness of earnings announcements in terms of transmitting information from the company's management to market participants has captured the attention of scholars throughout the years (e.g., Beaver, 1968; Kim and Verrecchia, 1994; Bamber et al., 2000; Bailey et al., 2006; Landsman and Maydew, 2002; DeFond et al., 2007), these questions are of paramount importance to address in order to document the effectiveness of earnings announcements in the Saudi market.

Since earnings announcements convey information on the performance of a company to market participants, investors in the marketplace compete to gather information related to the company. More importantly, the release of earnings announcements often spurs large stock price changes. For instance, the absolute stock price change on earnings announcement dates is approximately 56% higher than the absolute stock price movement on different days within the same month (Chae, 2005). This indicates that information asymmetry is acute before such announcements. Earnings announcements offer a fertile ground to explore the information environment in the marketplace since many scholars have considered earnings as the main event for scheduled announcements that involve the release of information to market participants (Chorida et al., 2001). In an efficient market, earnings announcements should convey information that allow investors to make judgements related to a company's performance. However, in reality, the existence of information asymmetry gives an advantage to informed traders to be more aggressive around earnings announcements. Previous research have shown

that earnings announcements are less informative in countries with weaker insider trading laws and weaker investor protection institutions (DeFond et al., 2007). Consistent with this stream of literature, Bhattacharya et al. (2000) document that, in the Mexican market, corporate announcements have no effect on stock prices due to the increasing activity of insider trading causing stock prices to incorporate any information before its release. DeFond et al. (2007) document that the market reaction to earnings announcements is higher when stricter insider trading regulations and stronger investor protection rules are enforced. Specifically, when insider trading activity is curbed, the information content of earnings announcement is less likely to be impounded in stock prices, supporting the argument that earnings announcements are likely to be more useful in conveying information to market participants. On the other hand, when insider trading activity is relatively high in the marketplace, earnings announcements are expected to convey little information in the marketplace as evident by the relatively low market reaction to announcements. Consequently, the credibility of the information content of earnings announcements is salient to ensure an efficient market reaction. Previous studies find that the stock market reaction to earnings announcements is higher when market participants perceive earnings announcements as credible (Balsam et al., 2003; Teoh and Wong, 1993). Pevzner et al. (2015) find that trust enhances the information content of earnings announcement which in return, increases the stock market reaction to such announcements. This constructs the view that trust plays a vital role in enhancing the information environment and lowers the level of insider trading while increasing market credibility.

The regulatory and technological environment in the Saudi market has significantly improved over the past decade. Specifically, the amount of information and resources disseminated to market participants have played a vital role in improving the information content

of earnings announcement, measured by the speed and the magnitude in which information is reflected in stock prices, and in return, decreasing the activity of insider trading. Fargher and Weigand (1998) find that the enhancement in the regulatory and technological setting is reflected with a bigger market response by companies in the stock market. In a related strand of literature, Landsman et al. (2012) find that the information content has improved following the adoption of International Financial Reporting Standards (IFRS) in sixteen countries. On the other hand, Francis et al. (2002) provide evidence that the information content of earnings announcement, or increases in market reactions to earnings announcements, has enhanced over time due to the increasing in concurrent disclosures such the detailed income statement or the bottom line earnings. Considering the fact that the Saudi market is mostly populated with individual or retail investors rather than institutional or sophisticated investors, the question of how credible or useful are earnings announcements in conveying information to market participants has yet to be addressed. In this research, our goal is to investigate this issue by examining the information content of earnings announcements through abnormal trading volume around the announcement date. This will help shed light on how the Capital Market Authority (CMA) plays a role in enhancing the regulatory environment. In light of the corporate scandal of Etihad Etisalat Co. (Mobily) in 2015, the implications of implementing new regulations to improve the informational setting in the market have yet to be looked upon. Therefore, in this paper, we investigate whether earnings announcements in the Saudi market are informative and whether the implementation of new regulations have enhanced the credibility of the information environment.

While DeFond et al. (2007) suggest that earnings announcements are more informative in countries with higher insider trading regulations, and Fargher and Weigand (1998) find that the

improvement in the regulatory setting enhances the information content of earnings announcement, we mainly follow their logic by focusing on the information content of earnings announcements in a market that has not been studied before, the Saudi market. We address this issue by focusing on earnings announcements of publicly listed Saudi companies from 2007 to 2017. Inspired by Landsman et al., (2012), we use abnormal trading volume to measure the information content of earnings announcements. Our sample consists of 145 publicly traded companies with 138,247 daily observations along with 4,676 quarterly earnings announcements. To further understand the effects of regulatory changes, we separate our sample to two periods covering 2007 to 2012 and 2013 to 2017.

Consistent with previous studies, we find that the market reaction on earnings announcement dates is high. That is, we find that the information content of earnings announcement is effective and that the leakage of information and the insider trading activity prior to earnings announcements is relatively minimal. Furthermore, we find that the market response to earnings announcements to be higher and more significant in shorter windows period with the difference denoted statistically significant at the 1% level. More importantly, the detrended effect of the information content provides clear evidence that the market reaction has been tending upwards which suggests that the response to earnings announcements has been increasing throughout the years.

In the multivariate results, we test the effect of the time trend on the market reaction, measured by abnormal trading volume. We find that the market reaction for earnings announcements is increasing over time and that the result is statistically significant at the 1% level. This is consistent with our argument that the improvement in regulatory and technological environment have played a vital role in i) increasing the credibility of earnings announcements,

and ii) lowering the leakage of information and insider trading activity prior to the announcement dates.

This study contributes to the information content of earnings announcements literature in two ways. First, since earnings' value relevance differs among markets, we add to the literature by looking at the Saudi market which is a unique market in its setting considering that the market is mostly dominated by retail investors. Second, we extend on previous work by establishing that the regulatory changes impact earnings' informative power in a positive manner in developing markets. Our findings suggest that the market reaction to earnings announcements increases over time, which implies that the insider trading activity decreases. This study will benefit investors in the sense that they will assess their investment opportunities while considering the amount of information content being conveyed through earnings announcements. Moreover, this study will benefit CMA in understanding its role in making sure that market operations are transparent in order to guarantee investor protection in the marketplace.

The remainder of the paper is structured as follows. Section 2 describes the data and methodology. Section 3 reports the empirical findings. Finally, section 4 offers the conclusion.

## 2. Data and Empirical Methodology

### 2.1. Data Sample

Our sample period spans from 2007 to 2017 and covers all Saudi firms. We obtain daily prices and quarterly firm fundamentals from Global Compustat and number of analysts from I/B/E/S. We require that firms have available data on key variables such as market capitalization (Size), leverage ratio (Lev), market-to-book ratio (MtB), return on assets (ROA), quarterized

standard deviation of daily returns (SD_Ret), quarterly average stock turnover (Turn), and number of analysts (Numest). We define these variables as follow: Size is end-of-quarter share price multiplied by quarterly average shares outstanding; Lev is total liabilities divided by total assets; MtB is market capitalization divided by total assets; ROA is income before extraordinary items divided by total assets; SD_Ret is the standard deviation of daily returns in a quarter multiplied by the square root of the number of daily observations in that quarter; Turn is the quarterly average of daily trading volume divided by shares outstanding; Numest is the number of forecasts reported in I/B/E/S prior to the annual earnings announcement date. The final number of firms in our sample is 145 with 138,247 daily observations and 4,676 quarterly earnings announcements.

It is salient to point out that prior studies on non-US companies use annual earnings announcement due to the lack of quarterly reporting on I/B/E/S, which is a key source for earnings announcement dates. Nevertheless, we overcome this issue by obtaining a unique dataset of quarterly earnings announcement from the Saudi Stock Exchange (Tadawul) and manually match it with the firm-level data obtained from Global Compustat.

In addition to the firm-level variables, we also construct market-wide variables. Specifically, market return (RM) is defined as the quarterized return of Tadawul All Share Index (TASI). Standard deviation of market return (SD_RM) is the quartrized standard deviation of daily market returns. We also construct the size (SMB) and value (HML) effects, following Fama and French (1992). That is, we define SMB as the average return on the three smallest portfolios minus the average return on the three largest portfolios. Similarly, HML is defined as the average return on the two highest book-to-market ratio portfolios minus the average return on the two lowest book-to-market ratio portfolios. Table 1 shows the summary statistics for the full sample.

On average, the number of quarterly observations for a firm is 26 while the minimum and maximum are 1 and 44, respectively. The mean market capitalization for the full sample is nearly 13.36 billion Riyal Saudi, with the top one percentile of firms are valued at approximately 161 billion Riyal Saudi and the bottom one percentile of firms are valued at about 115.6 million Riyal Saudi.

### 2.2.Empirical Methodology

Following prior studies (e.g. , Landsman et al. 2012; Pevzner et al. 2015), we measure market reaction to earnings announcements using abnormal trading volume around the announcements. We calculate daily trading volume as the number of traded shares divided by the total number of shares. Then, for each announcement event of firm $i$, we compute the average trading volume of firm $i$ over the event window (0, +5) and scale it by the average trading volume over the estimation window (-35, -5), where day 0 is the earnings announcement date. Additionally, we merge the constructed market reaction variable with the firm-level and market-wide dataset to conduct our univariate and multivariate analyses.

We begin with the univariate analysis to test the null hypothesis that the abnormal trading volume pre and post-earnings announcements are equal. For robustness, we consider three different event windows which include a 3-days, 6-days, and 9-days windows. A 3-days window is measured as a pre-earnings announcement period of (-3, -1) and a post-earnings announcement period of (0,2), where 0 is the announcement date. Further, we test the mean equality of market reaction using a two-sample t-test. To mitigate a potential non-normality issue, we consider a non-parametric test (median of market reaction) and use the Wilcoxon rank-sum test to test the median equality between pre- and post-announcement abnormal trading volume. To further

extend our analysis and examine the possibility of changes in market reaction over time, we separate our sample into 2007-2012 and 2013-2017 periods in order to test the differences between pre- and post-announcement abnormal trading volume and more importantly, the difference in post-announcement market reaction between the 2007-2012 and 2013-2017 periods. To document the market reaction around the announcement date, Figure 1 illustrates the average abnormal trading volume around earnings announcements and suggests a clear market reaction during the announcement date. Moreover, the abnormal trading volume for the post-announcement period is higher than its counterpart. In Figure 2, we plot the time series of the abnormal trading volume and the evidence indicates an upward trend which suggests that the market reaction to earnings announcements is increasing over time.

The findings from the univariate analysis may suffer from an endogeneity bias due to ignoring the variations in firm characteristics (i.e. omitted variable bias). To address this, we advance to the multivariate analysis that allows us to control for the heterogeneities across firms and other time-varying market-wide forces. Specifically, we estimate the following panel equation,

$$Market\ Reaction_{it} = \alpha + c_i + \sum_{j=1}^{k} \gamma_j X_{jit} + \varepsilon_{it} \qquad (1)$$

The subscripts $i$, $t$, $j$, and $k$ are firm $i$, quarter $t$, control variable $j$, and the total number of control variables $k$, respectively; whereas, ci is the firm fixed-effects and is included to capture time-invariant firm-specific effects. $X$ is a vector of firm characteristics and market-wide variables defined in the data section. The key parameter is $\alpha$, which measures the average market reaction to earnings announcements after controlling for other relevant variables influencing

market reaction. On a non-event day, the theoretical value of $\alpha$ is one. Therefore, we report the p-values for the null hypothesis test that $\alpha$ is equal to one.

The implication of implementing new regulations can be investigated by observing the trend of market reaction over time. In particular, our goal is to examine whether an improvement in the regulatory environment would enhance the information content of earnings announcements. To tackle that, we test for a time trend that persists after controlling for other related variables. We modify Equation (1) to the following form,

$$Market\ Reaction_{it} = \alpha + c_i + Trend_t + \sum_{j=1}^{k} \gamma_j X_{jit} + \varepsilon_{it} \qquad (2)$$

Where *Trend* is a time trend variable that takes a value of 1 for the first quarter of 2007, a value of 2 for the subsequent quarter, and up to a value of 44 for the fourth quarter of 2017.

Another approach is to split the sample in two periods and allow the intercept to change over those periods. We adopt this method to assure that our conclusion is insensitive to the choice of including a time trend. We modify Equation (2) to the following form,

$$Market\ Reaction_{it} = \alpha + c_i + Recent_t + \sum_{j=1}^{k} \gamma_j X_{jit} + \varepsilon_{it} \qquad (2)$$

Where *Recent* is a dummy variable that takes the value of 1 if quarter $t$ is or after the first quarter of 2013, and zero otherwise.

# 3. Empirical Results

## 3.1. Univariate Analysis

In this section, we first test whether the market reaction in the post-earnings announcement period is higher than the pre-earnings announcement period. To verify our results, Table 2 presents the pairwise correlation between our variables. Further, we use the abnormal volume through a 3-days, 6-days, and 9-days windows. The results in Table 3 clearly supports the prediction that the abnormal trading volume or market reaction is higher during the post-earnings announcement period relative to the pre-earnings announcement period. As shown in Table 3, post-earnings announcement always realize higher abnormal volume than pre-earnings announcement and the difference is statistically significant at 1% for all windows. Specifically, the 3-days window shows that the post-earnings announcement abnormal volume is approximately 20% higher than the pre-earnings announcement period. This pattern remains when the 6-days and 9-days windows are used. Overall, consistent with DeFond et al., (2007), these findings suggest that the market reaction is higher during and after the earnings announcement. This provides further evidence that the information content of earnings announcement is well perceived by investors and that the leakage of information was relatively small before the announcement date.

The evidence presented in Table 3 suggests that the information content of earnings announcement is credible as shown by the market reaction. To address the question of whether the improvement in the regulatory and technological environment enhanced the perception of market participants towards earnings announcement, we separate our sample and initially perform a different-in-mean test for the post-earnings announcement periods. The sample is

separated into the 2007-2012 period and the 2013-2017 period. The results of this test in Table 4 reveal a pattern of higher market reaction that is clearly consistent with the hypothesis of this study. That is, the evidence documents that the market reaction for post-earnings announcement is higher in the 2013-2017 relative to the 2007-2012 period. Specifically, the difference is statistically significant at the 1% level for all windows. For instance, in the 3-days window, the post-earnings announcement abnormal volume for the period 2013-2017 is approximately 30.51% higher than the pre-announcement period. On the other hand, its counterpart in the period 2007-2012 is nearly 11% higher than the pre-announcement period. Clearly, the market reaction to earnings announcement has tripled in the period 2013-2017 relative to the period 2007-2012 and this shift is statistically significant at the 1% statistical level.

These statistics suggest that there is an improvement in the regulatory and technological environments throughout the years. Hence, the prediction that the addition of regulations have improved the information content in the market is consistent with Fargher and Weigand (1998). The evidence thus far, consistent with our prediction, seems to suggest that the increasing in market reaction to earnings announcement is directly related to the increasing credibility of the information content and the enhancing of regulatory and technological environment. This has led to a less leakage of information and less insider trading prior to the announcement date (DeFond et al., 2007).

### 3.2. Multivariate Analysis

The univariate results in the previous section indicate that the information content in the marketplace is credible, the regulatory and technological advancements have enhanced the information environment, and as a result, the leakage of information and insider trading have

decreased throughout the years. However, it is important to examine whether these results hold in a multivariate context where we control for other variables that are likely to affect the market reaction towards earnings announcements which is captured by abnormal trading volume.

In models (1) through (3) of Table 5, the main variable of interest is the time-trend, which captures the improvement of regulatory applications throughout the years. The coefficient estimate for the time-trend is positive and consistent with our main hypothesis mentioned above and is statistically significant at the 1% level. This evidence indicates that the implementation in regulations have increased the market reaction measured in abnormal volume throughout the years. Furthermore, in model (3) where we control for all relevant control variables, the coefficient on firm size is negative and significant at the 1% level, which implies a negative relation between firm size and market reaction. This finding is consistent with Buchheit and Kohlbeck (2002), DeFond et al., (2007), Landsman et al. (2012) and others. Buchheit and Kohlbeck (2002) argue that because small firms tend to receive less other news relative to large firms, the information contents of earnings announcements are assumed to be relatively more informative in smaller firms.

In models (4) through (6), we separate our sample into 2007-2012 and 2013-2017 periods. After controlling for all relevant variables, the evidence indicates that the market reaction for the 2013-2017 is higher relative to the 2007-2012 period and the result is statistically significant at the 5% level. Consistent with previous studies (e.g. Zhang 2008), the coefficient on the number of analysts' estimates is positive and significant at the 5% level, indicating a higher market reaction when the number of analysts is higher. Zhang (2008) argues that analysts coverage facilitates market efficiency and mitigate the underreaction of investors around earnings announcements. Jointly, the results in Table 5 demonstrate a higher market reaction over time as

the implementation of regulations have enhanced the information environment; moreover, the leakage of information and insider trading activity have decreased throughout the years. This further validates our argument that the information content of announcements is credible in the marketplace.

## 4. Policy Implications:

This research provides evidence that the market reaction to earnings announcements increases over time, which implies that the insider trading activity decreases. Additionally, the increase in market reaction to earnings announcement is directly related to the increasing credibility of the information content and the enhancing of regulatory and technological environment. This suggests that CMA has been effective in enhancing the informational environment. Further, our finding of a positive and significant relation between the number of analysts and market reaction provides a fertile ground for the CMA to encourage the number of analysts which in return, facilitates superior market transparency and reaction due to the improvement in market efficiency. Finally, the negative relation between firm size and market reaction indicates that firm size plays a role in the informational environment. All in all, CMA could further improve the information content of earnings announcements by: (i) enhancing the regulatory environment; (ii) encouraging the number of analysts' coverage; and (iii) documenting the size effect in understanding the informational environment for all firm sizes.

## 5. Conclusion

This paper examines the information content of earnings announcements and the market reaction towards such announcements. Following DeFond et al., (2007) who find evidence that earnings announcements are informative when there are stricter insider trading laws, and Fargher and Weigand (1998) who find that information content of earnings announcement is more pronounced with improvements in the regulatory environment, our study documents that the regulatory developments have enhanced the earnings announcements' information content throughout the years and as a result, the level of insider trading has relatively decreased in the Saudi market.

Our tests are performed using a sample of 145 publicly traded Saudi firms from 2007 through 2017. The evidence presented in this paper suggests that the increasing market reaction could be linked to the increasing credibility of the information environment which has been aided by the implementation of regulations by CMA throughout the years. This provides further evidence that leakage of information and insider trading have been decreasing throughout the years.

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**Table 1: Summary Statistics**

|  | Obs | Mean | Median | STD | Max | Min |
|---|---|---|---|---|---|---|
| **Ab_Volume** | 4676 | 1.2321 | 1.0380 | 0.8643 | 13.3275 | 0.0984 |
| **Time-trend** | 4676 | 26 | 28 | 12 | 44 | 1 |
| **Rm** | 4676 | 0.0001 | 0.0006 | 0.0021 | 0.0062 | -0.0067 |
| **STD(RM)** | 4676 | 0.0891 | 0.0757 | 0.0536 | 0.3172 | 0.0349 |
| **SMB** | 4676 | -0.0001 | -0.0001 | 0.0020 | 0.0054 | -0.0068 |
| **HML** | 4676 | -0.0002 | -0.0003 | 0.0012 | 0.0027 | -0.0026 |
|  |  |  |  |  |  |  |
| **Market cap** | 4676 | 13355.88 | 2714.998 | 27602.65 | 161131.3 | 115.64 |
| **Leverage** | 4676 | 0.4555 | 0.4466 | 0.2571 | 0.9075 | 0.0240 |
| **MtB** | 4676 | 2.1292 | 1.5101 | 1.7060 | 10.5711 | 0.5909 |
| **ROA** | 4676 | 0.0124 | 0.0084 | 0.0229 | 0.0862 | -0.0586 |
| **SD(Ret)** | 4676 | 0.0231 | 0.0200 | 0.0130 | 0.0763 | 0.0062 |
| **Turnover** | 4676 | 0.0194 | 0.0067 | 0.0298 | 0.1660 | 0.0002 |
| **Ln(1+numest)** | 4676 | 1.1994 | 0.0000 | 1.3465 | 4.0073 | 0.0000 |

**Table 2: Pairwise Correlation Matrix**

|  | Ab_Vol | t-trend | Rm | Sd_RM | SMB | HML | INDIV | MCAP | LEV | MtB | ROA | SD(Ret) | Turn | numest |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Ab_Volume** | 1 | | | | | | | | | | | | | |
| **Time-trend** | 0.1415* | 1 | | | | | | | | | | | | |
| **Rm** | 0.0004 | -0.0256 | 1 | | | | | | | | | | | |
| **STD(RM)** | -0.0391* | -0.3003* | -0.6204* | 1 | | | | | | | | | | |
| **SMB** | 0.0278 | -0.0293 | 0.0085 | 0.0343 | 1 | | | | | | | | | |
| **HML** | 0.0749* | 0.1780* | 0.1482* | -0.0427* | -0.1753* | 1 | | | | | | | | |
| **INDIV** | -0.1323* | -0.1629* | 0.0914* | -0.0297 | 0.1117* | -0.3361* | 1 | | | | | | | |
| **MCAP** | -0.0044 | -0.1053* | 0.0469* | -0.0052 | -0.0268 | -0.005 | 0.0493* | 1 | | | | | | |
| **LEV** | 0.0364 | 0.0917* | -0.0096 | -0.0259 | -0.0004 | 0.0179 | -0.0151 | 0.2655* | 1 | | | | | |
| **MtB** | -0.0673* | -0.2455* | 0.0851* | 0.0062 | -0.027 | -0.0517* | 0.1021* | 0.1170* | -0.1857* | 1 | | | | |
| **ROA** | -0.0214 | -0.1060* | 0.0372 | -0.0231 | -0.0419* | -0.0317 | 0.0834* | 0.2918* | -0.2558* | 0.4007* | 1 | | | |
| **SD(Ret)** | 0.001 | -0.2275* | -0.3185* | 0.5389* | 0.0848* | -0.1356* | 0.0745* | -0.2241* | 0.0528* | 0.0734* | -0.1695* | 1 | | |
| **Turn** | -0.0444* | -0.1823* | 0.0616* | 0.0385* | 0.0978* | -0.1093* | 0.1722* | -0.5338* | -0.1341* | 0.1335* | -0.2498* | 0.4312* | 1 | |
| **numest** | 0.0634* | 0.2671* | 0.0196 | -0.1485* | 0.0185 | 0.0092 | 0.0365 | 0.6441* | 0.2249* | -0.0425* | 0.2306* | -0.3014* | -0.4411* | 1 |

**Table 3: Reactions to Earnings Announcements**

Reported p-values are from (i) two-sample t-test for equal means, and (ii) Wilcoxon rank-sum test (Mann-Whitney two-sample test) for equal medians. n-day window considers (-n, 2-n) a pre-announce period and (3-n, 5-n) a post-announce period. For example, a 3-day window considers (-3, -1) a pre-announce period

| | 3-day window | | 6-day window | | 9-day window | |
|---|---|---|---|---|---|---|
| | mean | median | mean | median | mean | median |
| Pre-announce | 1.0349 | 0.9879 | 1.0409 | 0.9923 | 1.0427 | 0.9975 |
| Post-announce | 1.2377 | 1.1706 | 1.2076 | 1.1662 | 1.2097 | 1.1632 |
| | | | | | | |
| Difference | 0.2028 | 0.1828 | 0.1667 | 0.1739 | 0.1671 | 0.1657 |
| p-value | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

and (0, 2) a post-announce period.



Abnormal Volume



Abnormal Volume
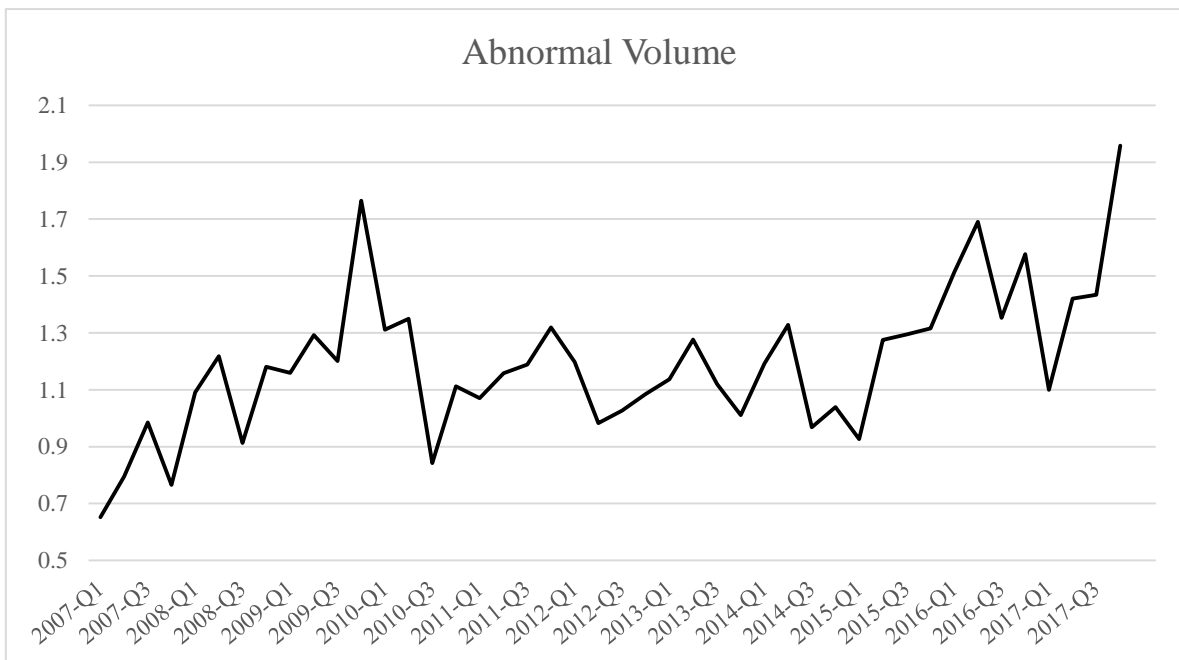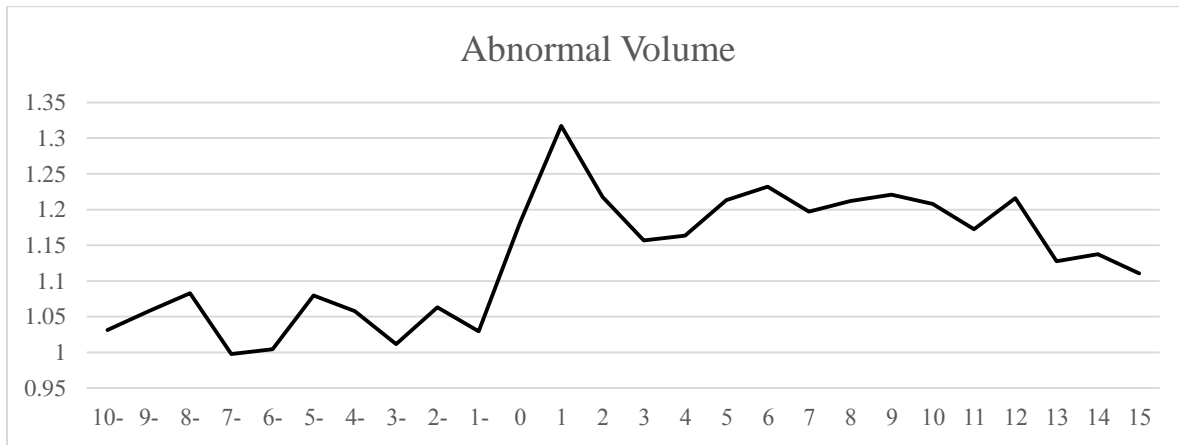
**Table 4. Difference in Reactions to Earnings Announcements Over Time**

Subperiod 2007-2012

|  | 3-day window | | 6-day window | | 9-day window | |
|---|---|---|---|---|---|---|
|  | mean | median | mean | median | mean | median |
| Pre-announce | 1.0281 | 0.9854 | 1.0396 | 0.9875 | 1.0344 | 0.9916 |
| Post-announce | 1.1374 | 1.0392 | 1.1281 | 1.0581 | 1.1566 | 1.0937 |
|  |  |  |  |  |  |  |
| Difference | 0.1093 | 0.0538 | 0.0884 | 0.0706 | 0.1221 | 0.1021 |
| p-value | 0.0746 | 0.2147 | 0.0499 | 0.0184 | 0.0009 | 0.0002 |
|  |  |  |  |  |  |  |

Subperiod 2013-2017

|  | 3-day window | | 6-day window | | 9-day window | |
|---|---|---|---|---|---|---|
|  | mean | median | mean | median | mean | median |
| Pre-announce | 1.0429 | 0.9887 | 1.0425 | 0.9942 | 1.0524 | 1.0025 |
| Post-announce | 1.3480 | 1.2964 | 1.2965 | 1.2481 | 1.2697 | 1.2038 |
|  |  |  |  |  |  |  |
| Difference | 0.3051 | 0.3077 | 0.2540 | 0.2538 | 0.2172 | 0.2013 |
| p-value | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
|  |  |  |  |  |  |  |

Post Announcement Difference

|  | 3-day window | | 6-day window | | 9-day window | |
|---|---|---|---|---|---|---|
| Subperiod | mean | median | mean | median | mean | median |
| 2007-2012 | 1.1374 | 1.0392 | 1.1281 | 1.0581 | 1.1566 | 1.0937 |
| 2013-2017 | 1.3480 | 1.2964 | 1.2965 | 1.2481 | 1.2697 | 1.2038 |
|  |  |  |  |  |  |  |
| Difference | 0.2106 | 0.2572 | 0.1684 | 0.1900 | 0.1131 | 0.1101 |
| p-value | 0.0020 | 0.0001 | 0.0001 | 0.0000 | 0.0009 | 0.0000 |

**Table 5: Regression Results**

Dependent variable is abnormal volume. Firm Fixed-effect model is estimated with standard errors clustered at the firm level. P-values are reported in parenthesis.

| | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|
| Time trend | 0.0105 | 0.009 | 0.00882 | | | |
| | (0.000) | (0.000) | (0.000) | | | |
| Intercept | 3.94 | 4.328 | 4.343 | | | |
| pvalue(intercept=1) | (0.001) | (0.000) | (0.000) | | | |
| | | | | | | |
| **Intercept (2007-2012)** | | | | 4.735 | 5.094 | 5.092 |
| **p-value (intercept=1)** | | | | (0.000) | (0.000) | (0.000) |
| **Intercept (2013-2017)** | | | | 4.878 | 5.208 | 5.1858 |
| **p-value (intercept=1)** | | | | (0.000) | (0.000) | (0.000) |
| | | | | | | |
| Difference (p-value) | | | | (0.000) | (0.000) | (0.001) |
| | | | | | | |
| **Market-wide variables** | | | | | | |
| RM | | -0.539 | -0.422 | | -8.737 | -6.975 |
| | | (0.941) | (0.953) | | (0.228) | (0.329) |
| SD_RM | | -0.922 | -0.911 | | -1.512 | -1.365 |
| | | (0.018) | (0.018) | | (0.000) | (0.001) |
| INDV (detrended) | | | | | | |
| | | | | | | |
| SMB | | 12.53 | 12.43 | | 14.86 | 13.8 |
| | | (0.030) | (0.031) | | (0.010) | (0.017) |
| HML | | 47.32 | 47.61 | | 54.8 | 56.04 |
| | | (0.000) | (0.000) | | (0.000) | (0.000) |
| | | | | | | |
| **Firm-level variables** | | | | | | |
| Log(mkt_size) | -0.138 | -0.152 | -0.153 | -0.163 | -0.176 | -0.179 |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| LEV | -0.0336 | -0.0331 | -0.0298 | 0.0263 | 0.013 | 0.0328 |
| | (0.772) | (0.773) | (0.796) | (0.826) | (0.912) | (0.782) |
| MTB | 0.00139 | 0.00242 | 0.00309 | -0.0188 | -0.0127 | -0.00652 |
| | (0.921) | (0.864) | (0.826) | (0.166) | (0.364) | (0.639) |
| ROA | -1.503 | -1.361 | -1.357 | -1.777 | -1.599 | -1.542 |
| | (0.189) | (0.226) | (0.227) | (0.132) | (0.163) | (0.175) |
| SD_Ret | 2.628 | 5.331 | 5.359 | 1.37 | 5.332 | 5.529 |
| | (0.006) | (0.000) | (0.000) | (0.145) | (0.000) | (0.000) |
| Turnover | 0.974 | 0.553 | 0.532 | 0.582 | 0.129 | 0.0247 |
| | (0.070) | (0.330) | (0.351) | (0.310) | (0.828) | (0.967) |
| numest | | | 0.00547 | | | 0.0384 |
| | | | (0.756) | | | (0.023) |
| | | | | | | |
| N | 4676 | 4676 | 4676 | 4676 | 4676 | 4676 |
| R-sq | 0.03 | 0.036 | 0.036 | 0.02 | 0.029 | 0.03 |