The impact of public news on return predictability following major one-day price or volume shocks: Evidence for Canada

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A Thesis

In

The John Molson School of Business

Presented in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Administration (Finance) at
Concordia University
Montreal, Quebec, Canada

August, 2015

CONCORDIA UNIVERSITY

School of Graduate Studies

This is to certify that the thesis prepared

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Entitled: The impact of public news on return predictability following major one-day price or volume shocks: Evidence for Canada

and submitted in partial fulfilment of the requirements for the degree of

MASTER OF SCIENCE IN ADMINISTRATION (FINANCE)

complies with the regulations of this University and meets the accepted standards with respect to originality and quality.

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ABSTRACT

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This paper focuses on the stocks that experience large one-day price or volume movements in Canadian stock market and explores the relationship between the release of public news and the short-term post-event stock return predictability. First, I find that in general, large one-day price changes signal the following poor performance, while large volume increases predict good performance in the near future. Then I divide the samples into informed and uninformed events base on the presence of contemporary public news. I find that for both price and volume shocks, informed events tend to experience more price drifts than uninformed events. For stocks with negative initial price changes, informed events lead to price continuations while uninformed events are followed by price reversals. The results suggest that stock price patterns become more predictable after taking account of the availability of public news. Finally, a portfolio strategy suggests that investors can profit from the information conveyed jointly by the large price movement, abnormal trading volume and availability of public news, reflecting a violation of weak-form market efficiency.

ACKNOWLEDGEMENT

I would like to express my gratitude to all those who helped me during the writing of this thesis.

Foremost, I am greatly indebted to my supervisor, Professor Lorne N. Switzer, for his useful suggestions and guidance. Without his valuable instructions, the completion of this thesis would be impossible.

Also, I deeply appreciate all the professors in MSc (Finance) department. From their devoted teaching and enlightening lectures, I have benefited a lot and academically prepared for the thesis.

Last but not the least, I want to thank my friends who gave me continuous support and encouragement during the course of the thesis.

TABLE OF CONTENTS

1. Introduction ... 1
2. Literature review ... 4
    2.1 Studies on large price changes ... 4
    2.2 Studies on trading volume ... 5
    2.3 Studies on public news ... 7
3. Hypothesis ... 8
    3.1 Impact of public news on price shocks ... 8
    3.2 Impact of public news on volume shocks ... 9
    3.3 Other influential factors ... 10
4. Data and methodology ... 12
    4.1 Sample selection ... 12
    4.2 Identifying extreme price movements and major trading activities ... 12
    4.3 Calculation of post-event abnormal returns ... 14
    4.4 Availability of public information ... 14
    4.5 Regression model ... 15
5. Results ... 16
    5.1 Data description ... 16
        5.1.1 Comparison of price events versus volume events ... 16
        5.1.2 Comparison of winners versus losers ... 17
        5.1.3 Comparison of informed events versus uninformed events ... 17
    5.2 Unconditional post-event returns ... 18
    5.3 Impact of public news ... 19
        5.3.1 Evidence from price events ... 19
        5.3.2 Evidence from volume events ... 21
        5.3.3 A broader definition of public news ... 22
    5.4 Cross-sectional analysis ... 22
6. Portfolio strategies ... 24
7. Conclusion ... 26
References ... 27
Appendix ... 31

1. Introduction

Stock markets often show sudden and abnormal movements in price and volume. In a market with complete and instantaneous information, there should be an immediate revaluation in stock prices at the time of these movements. However, numerous studies of different markets and time periods have found that stock prices do not assimilate the unanticipated information immediately but continue to gravitate toward the new equilibriums after the external shocks, which present a violation of the efficient market hypothesis. As a result, there is evidence of systematic stock price continuations or reversals, suggesting that stock returns are predictable after large price or volume shocks.

In this paper, I firstly examine the information content of sudden and unusual one-day price changes and trading activities. Several papers have studied the patterns of stock returns following extreme movements in price and volume. The contradictory results among these studies may be attributed to the variations in the markets, methodologies, model parameters and the time periods of investigation. The majority of the related studies investigate the U.S. stock markets. Many other significant markets have also been examined. But there is little research covering Canadian stock markets. Since each market has its own trading features which can also change over time, there might be quite different return patterns in different markets and during different time periods. In this paper, I focus on common stocks trading on Toronto Stock Exchange for the latest years from 2011 to 2014. I find that on average, in a 20-day period, stocks earn negative excess returns following extreme price movements and positive excess returns following large volume increases regardless of the directions of the initial price changes. This seems to imply that in general, large one-day price changes tend to signal the following poor performance, while unusual increases in volume predict good performance in the near future. I also find that the magnitude and trend of the price patterns differ across industries.

The main objective of this paper is to examine how public announcements affect stock return patterns following large price or trading volume movements. In addition to the conflicting results, there is also much disagreement about what contributes to stock price continuation or reversal. The reactions of stock prices to external shocks may depend on several factors, including macroeconomic environment, market conditions and firm-specific characteristics. Since public news disseminates new information broadly among investors, it may be an important determinant of return predictability.

My basic approach is straightforward. I first identify firms' major price and trading volume movements and then explore for the public news that might drive such movements. Non-availability of public announcements may be due to several reasons, including private information among insiders, liquidity shocks, shifts in investor sentiment, and significant changes in macroeconomic or industry-wide factors. Since I focus on the significant price and volume movements, only price-sensitive and value-relevant information is examined.

My hypothesis is motivated by two stock market anomalies from the finance literature: post-news stock price drifts and pure stock price reversals. I combine these two phenomena and test the joint hypothesis that investors respond differently to large price and trading volume movements accompanied by public announcements and to other movements without publicized reasons. By examining daily price adjustments following the events up to 20 days, I find evidence supporting this hypothesis. The price patterns become more predictable after taking account of the availability of public news. Specifically, when sudden and abnormal changes in price and volume are accompanied by news disclosure, stock prices continue to move in the direction of the initial price changes. While when there is no publicized reason for the shocks, stock prices tend to move in the opposite directions. Investors seem to underreact to news about fundamentals but overreact to other shocks that cause unusual stock price changes and trading activities. These post-event return patterns are more pronounced for stocks with negative initial price changes.

Next, I apply a regression analysis to reassess whether the subsequent market reactions to price and volume shocks are conditioned on the release of public information after controlling for other factors. The results confirm that information availability determines post-event performance, but mostly for volume events. Additionally, initial price change, firm size, pre-event information leakage, volatility of stock returns and past stock price and volume also affect the post-event returns.

Finally, I test whether investors can profit from the different market responses to information and no-information based price and volume shocks by focusing on the losers sample (Stocks with negative abnormal returns on day 0). A possible portfolio strategy is proposed and analyzed. The results show that the portfolio profits are positive after taking into account transaction costs. The abnormal returns are not only statistically significant but also economically meaningful

To summarize, in this paper, I take a fresh look at of the return predictability following major price and volume shocks. In the process, the study contributes to the existing researches in several ways. First, previous studies which examine the stock behavior after significant price or trading volume movements do not identify whether such movements are driven by firm-specific news and therefore draw different conclusions. In this paper, I partition the events based on the availability of public news. This method provides a greater understanding of the underlying reasons for the abnormal stock activities. Second, in much of the literature, how large price or volume changes are defined as extreme shocks is arbitrarily. Most studies rely on an absolute trigger value. In this paper, I concentrate only on the extremes of the return and trading volume distributions. I examine unexpected changes in price and volume measured by deviations from their expectations. Since the nature of the findings may depend on the size of the initial price and volume movements, this study might come to different conclusions from previous studies. Third, empirical researches traditionally only use unexpected price changes to measure the information content of public announcements, whereas the trading volume has been studied less frequently. The change in price reflects only the average change in traders' beliefs, whereas trading volume contains the differences among traders. The evidence from the extant literature indicates that trading volume increases at the time when public news is released. Therefore, in my study, both price reaction and trading volume activity accompanied by public announcements are examined. Fourth, the study of information-based events in this paper sheds some new light on the information content of public announcements. Although the relationship between public information disclosures and the post-event stock returns has been well investigated with event study methodology, limited prior work distinguish the public information which are value-relevant and which convey no new information. Not all reported news is unanticipated and price or trading volume sensitive. In this paper, I adopt a novel methodology by first identifying firms' abnormal price or trading volume movements and then exploring for the news that might drive such movements. Thus, it allows me to focus only on the economically significant news that are of most relevance to investors without being constrained by an a priori determined set of information events. Finally, studies of extreme price changes and trading activities could provide insights into several related streams of finance research. For example, literatures on momentum effects, asymmetric information, behavioral bias and liquidity effects all deal with similar issues in a variety of contexts. In broad terms, all these literatures document and seek to explain predictable movements in asset prices which may violate the weak form of the efficient market hypothesis.

The rest of the paper is organized as follows. Section 2 reviews the related literature. Section 3 develops the testable hypothesis. Section 4 defines the variables and outlines the methodology. Section 5 describes the sample data and presents the empirical results. Section 6 tests the profits of a possible trading strategy. Finally, Section 7 concludes.

2. Literature review

Large price change, trading volume and public announcement capture the three major characteristics of information signal: magnitude, precision and dissemination (Pritamani and Singal, 2001). These three signal-identifying proxies jointly predict future returns and have received considerable attention in the literature.

2.1 Studies on large price changes

Many papers have investigated the behavior of stock prices following large one-day price movements. While there is evidence suggesting that returns are indeed predictable subsequent to extreme price changes, the results are contradictory and there is no agreement about the underlying reasons for this predictability. Mainly three categories of explanations have been proposed: over- or under-reaction hypothesis, uncertain information hypothesis and the influence of market microstructure (Amini et al., 2013). Support for these hypotheses can be found in several studies.

One of the most influential papers is by De Bondt and Thaler (1985) who study long-term return anomalies and first formally state stock market overreaction hypothesis. This hypothesis suggests that investors respond too strongly to the release of information. Extreme movements in stock prices are followed by price reversals to "correct" the initial temporary overreation. In contrast to the overreaction hypothesis, underreaction hypothesis postulates that investors do not respond strongly enough to information. The slow incorporation of news into prices causes stock prices to move in the same direction of the initial price change.

Brown et al. (1988) use a one-day price trigger of 2.5% to identify winners and losers for 200 of the largest firms in the S&P 500 during the period 1962 through 1985. They find that the cumulative average abnormal returns following the extreme price changes are positive and statistically significant for both winners and losers. They attribute the results to the response of market participants to changing risk. According to their uncertain information hypothesis, investors initially underprice stocks when confronted with new information (unfavorable or favorable) in order to compensate for uncertainty. As the uncertainty is resolved, stock prices rise to their post-event intrinsic values.

Cox and Peterson (1994) investigate short-term stock return behavior following one-day price declines of 10 percent or more over a twenty-day period. They find that most of the reversals are due to the bid-ask spread. Akhigbe et al. (1998) find a relationship existing between the size of the reversal and the size of the bid–ask spread. These findings support the hypothesis that bid–ask bounce is significant in explaining the reversal pattern. A large one-day price increase (decline) is likely to be associated with the closing transaction at ask (bid) price due to substantial buying (selling) pressure. However, the stock has an equal chance of closing at bid or ask price the next day and thus cause spurious negative serial correlation in stock prices due to the bid-ask bounce.

2.2 Studies on trading volume

As Beaver (1968) points out, an important distinction between the price and volume is that the former reflects changes in the expectations of the market as a whole while the latter reflects changes in the expectations of individual investors. Bajo (2010) states that trading volume is an efficient proxy for information flow and plays an important role in information based models where prices alone are unable to provide full information about the magnitude and precision of news signals. The information based models have been developed with heterogeneous investors and an incomplete asset market. In these models, information trading stems from heterogeneous expectations among traders over the revised value of the firm after a public announcement is released. The disagreements among traders can arise either because they have different private information or because they simply interpret the common information differently.[1]

The literature on stock trading volume is extensive. There are many empirical studies on the relation between volume and price changes. Kim and Verrecchia (1991) and Harris and Raviv (1993) investigate theoretically how the price and volume reactions to a public announcement are related to each other and find that absolute price changes and volume are positively correlated. Conrad et al. (1994) find price reversals following increases in volume and price continuations following low volume over weekly horizons. By examining the dynamic relation between volume and prices, Wang (1994) studies how the nature of investor heterogeneity determines the behavior of asset prices. He finds that volume is always positively correlated with absolute price changes and the correlation increases with information asymmetry. Lee and Swaminathan (2000) find evidence that a volume-based strategy of buying past high-volume winners and selling past high-volume losers outperforms the traditional momentum strategy over intermediate horizons. They also advance momentum life cycle (MLC) hypothesis which presents the interaction between price momentum, reversals, and trading volume in a single framework.

Many studies distinguish only between high and low volume stocks. But in order to fully address the potential informative role of volume, it is important to understand the effect of unusual trading activities relative to normal activities. Gervais et al. (2001) investigate whether extreme trading activity contains information about the future evolution of stock prices. They find that stocks experiencing unusually high (low) trading volume over a day or a week tend to appreciate

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[1] Kim and Verrecchia (1991) assume that traders are diversely informed and differ in the precision of their private prior information. Therefore, they respond differently to the public news, which leads to positive volume. However, in the models of Holthausen and Verrecchia (1990) and Harris and Raviv (1993), traders share common prior beliefs and receive common information but differ in the way in which they interpret the information. As a result, trading is generated by differences of opinion among traders.

(depreciate) over the following month. This high-volume return premium is consistent with the hypothesis that trading volume shocks could affect the subsequent demand and stock prices. Zheng (2007) argue that unusual trading volume has different implications for past winner and loser stocks. Specifically, high trading volume for losers is driven by purchases made by informed investors; while high trading volume for winners could be driven by either information or representativeness bias or both. Another study is by Bajo (2010) who examines the information content of abnormal trading volumes. He finds excess returns in a three-day window around abnormal trading but transaction costs can make most of the theoretical gains disappear. He concludes that information filters slowly into prices and there is a positive relation between abnormal trading volume and excess returns.

2.3 Studies on public news

It is apparent that financial markets usually respond to the release of relevant information. To measure the market response at the time of public announcements, most studies examine the post-event price reactions. It is generally agreed that unexpected price changes imply that an announcement alters investors' beliefs and thus contains information. However, evidences have shown that trading volume also responds to public news. One influential related study is by Beaver (1968), who finds that trading volume increases at the time of earnings announcements. Therefore, it is incomplete to interpret price change as a solely measure of information. Holthausen and Verrecchia (1990) provide an economic rationale for examining both price and volume effects at the time of information releases. They identify an informedness effect and a consensus effect of the information. These two effects generally occur jointly when information is disseminated and affect both the variance of unexpected price changes and trading volume. Therefore, they conclude that studies of unexpected price changes or volume are equally relevant means of assessing information content.

Most literature examining stock price behavior around public announcements suggests that the release of public news is an important determinant of return predictability. But the strength of the relation between publicly available information and market activity is questioned. Roll (1988) finds that for individual firms, a model that includes aggregate economic developments, industry effects, and firm-specific news explains only a fraction of daily and monthly return variance.

Cutler et al. (1989) suggest that macroeconomic variables explain less than half of the variance in aggregate stock prices, and large market movements often do not coincide with new information. Mitchell and Mulherin (1994) also state that the relation between news reported in the financial press and stock returns and trading volume activity is not particularly strong.

The objective of this paper is to determine how the availability of public news affects returns subsequent to large price and volume movements. My research approach is most similar to those of Pritamani and Singal (2001), Chan (2003), Larson and Madura (2003) and Savor (2012). The results from these studies show that the degree of price continuation or reversal depends on whether there is an announcement that explains the underlying reason for the shocks. But all of these researches focus on U.S. stock markets and none of them investigates the role of public announcements on stock behaviors after extreme volume increases which I believe is also important and will examine in this study.

Overall, there have been extensive researches on stock return predictability conditional on large price changes, trading volume or public announcement. But few of them combine these three information signals together and examine whether there is an improvement in return predictability.

3. Hypothesis

3.1 Impact of public news on price shocks

Release of public news may reduce the uncertainty and be an important determinant of return predictability following extreme stock price changes. On one hand, there is substantial evidence of short-term stock price continuation which is often attributed to a gradual market response to public announcements. Many event studies find that investors are slow to respond to valid information about fundamentals demonstrated by significant post-event abnormal returns. On the other hand, short-term price reversal in the stock market is also a well-established phenomenon. Evidence shows that investors overreact to pure price shocks caused by private information, shifts in investor sentiment or liquidity shocks, leading to price reversals and excess trading volume. [2]

Several behavioral models attempt to explain how investors react to new information and predict that investors respond differently according to the availability of public news. Daniel et al. (1998) use overconfidence and biased self-attribution to model investor behavior. They postulate that stock price underreact to public information but overreact to private information. Barberis at al. (1998) built a behavior model based on conservatism bias and representativeness bias, and argue that conservatism bias causes investors to update their priors insufficiently when they observe new public information about a firm. Hong and Stein (1999) define two types of traders: news watchers, who trade only on private information about fundamentals, and momentum traders, who trade only on past price movements. News watchers usually underreact to news as information moves gradually across them, whereas momentum traders tend to overreact to non-information based price movements. Based on these behavior models and previous empirical evidence, the first hypothesis to be tested in this paper is the following:

Stock price behavior after extreme price movements is related to the release of public information that explains the underlying reason. Price shocks accompanied by public news are followed by price drifts while those unaccompanied by public news result in price reversals.

3.2 Impact of public news on volume shocks

Trading activity reflects changes in the heterogeneous expectations of individual investors or differential interpretations on the news release. According to semi-strong market efficiency, when new information flows into the market, an increase in volume is just the resulting effect of informed trades and provides no additional information. However, in reality, abnormal trading activities do not always happen simultaneously with public announcements. There could be substantial trading without any news release. Since the behavior of prices crucially depends on

[2] Da at al. (2014) find that both liquidity shocks and investor sentiment contribute to the observed short-term reversal, but in different ways: Liquidity shocks are more likely to explain the reversal on recent losers, whereas investor sentiment, combined with short-sale constraint, are more important for explaining the reversals on recent winners.

the nature of investor heterogeneity, trading volume conveys important information about how assets are priced in the market.

Unusual trading activity could be driven by information trading, momentum chasing or liquidity demand. Different causes of abnormal trading activity may result in different stock price performance afterwards. Trades are information generated if the informed investors trade when they receive new information about the stock's future cash flow. Under asymmetric information, investors update their expectations differently in response to public information. As a result, public news generates abnormal trading. If new information is incorporated in prices slowly over time, the price doesn’t fully adjust to reflect the new information immediately and the strategic trading by informed traders will lead to price continuations. Since the trade is information-based, price will not reverse in the long term. However, noninformational trading could lead to different stock price patterns. Campbell et al. (1993) find that because of the price pressure caused by portfolio rebalancing, volume increases due to liquidity trading without the release of new information would lead to subsequent price reversals as compensation for those who provide liquidity. Trading activities based on momentum chasing could also result in price reversals. Momentum chasers tend to temporarily push the stock price higher or lower than its intrinsic value and this behavioral bias will be corrected finally. According to the analysis above, I hypothesis:

Large increases in volume can convey information to the market and predict the evolution process of stock prices. Post-event return patterns depend on whether the trading volume shocks are accompanied by public news. The release of contemporary public information is a necessary condition for price continuation.

3.3 Other influential factors

I hypothesize that the magnitude of the under- or overreaction to major price and volume shocks also depends on the following factors:

Initial price change

According to the overreaction hypothesis, price reversal in stock returns reflects the overreaction of investors to the disclosure of unexpected information. Greater overreaction would lead to greater corrections. So it is expected that the initial price movements are negatively related to the subsequent stock returns in the post-event period.

Firm size

Cox and Peterson (1994) find evidence that small firms experience larger price reversals than large firms. However, when the bid-ask bounce element is removed, no size effect remains. They suggest that size may be more closely proxy for bid-ask spreads than for other liquidity-based factors. Chan (2003) finds that news drift and no-news reversal are stronger for smaller firms. He concludes that drifts and reversals are related to ease of trading, liquidity, attention, institutional ownership, or other factors related to size. Benou and Richie (2003) examine the long-run reversal pattern for a sample of large firms and conjecture that since the market for large firms is generally more liquid, investors should possess high quality and superior information about such firms in which case investors' reactions to firm-specific news should hardly be an overreaction. On the other hand, small firms are not monitored as closely by market participants as larger firms and therefore subject to larger degree of error when the market re-evaluates their stock prices in response to new information. In light of these findings, it is expected that the degree of reversal will be larger for small firms.

Stock return volatility

The volatility of the stock returns reflects the degree to which investor sentiment or liquidity shocks affect trading activity in the stock. Hirshleifer (2001) posits that the greater uncertainty about stocks leave more room for psychological biases. Daniel et al. (1998) further argue that investors tend to be more overconfident when firms' businesses are hard to value. Firms with higher stock return volatility are associated with a higher degree of uncertainty and therefore larger degrees of error when investors re-evaluate share prices. Therefore, it is possible that firms with higher return volatility will experience more pronounced reversals.

Pre-event leakage

Information leakage suggests that traders are trading on private information. According to Daniel et al. (1998), investors are overconfident about the precision of private information, causing stock prices to overreact. So pre-event leakage is hypothesized to be positively related to the level of overreaction.

4. Data and methodology

4.1 Sample selection

The initial sample consists of all common stocks listed on the Toronto Stock Exchange from 2011 to 2014. Previous studies have found evidence that market microstructure effects may contribute to the observed price pattern. The price reversal after extreme price change may only reflect oscillation between bid and ask price. Since the bid–ask bounce mostly affects small and illiquid stocks, stocks with the annually average prices less than $10 are eliminated from the sample. However, Cox and Peterson (1994) find that the bid-ask bounce effect still exists even after excluding low-price stocks. To lessen the bias, I calculate stock prices as the mid-point of closing bid and ask prices. The stock price data are obtained from CFMRC database. This database contains both closing prices and bid-ask prices for stocks traded on TSX. In order to ensure the reliability of the findings, I check for the correctness of the data, requiring the bid-ask price not equal to zero and ask price higher than bid price. Missing and erroneous bid-ask prices are replaced with closing prices. For each year, I eliminate the firm if its share price or trading volume data is not available for more than 250 trading days in that year and one year before. The requirement for the data of previous year is to derive appropriate benchmarks for the abnormal return and volume models.

4.2 Identifying extreme price movements and major trading activities

A large abnormal price change is called a price event. The definition of a large price change is somewhat arbitrary and therefore varies across the existing literature. Most papers rely on an absolute trigger value and define a daily return of 10% or more to be an extreme price movement. However, an absolute threshold is likely to be biased in favor of selecting highly volatile stocks. To avoid this problem, I use returns scaled by volatilities. A price event is defined if market adjusted abnormal return is more than three standard deviations away from the mean, based on mean and standard deviation calculated over the preceding 200 days (-205,-6) for that stock.[3] Pritamani and Singal (2001) use the same selection methods and they believe that this criterion is more appropriate since abnormal price change is a proxy for the significant change in investor expectations. These returns are in the extreme tails of the return distributions and accounting for approximately the largest 1% of price movements. This threshold should be high enough to reflect substantial changes in market perception and is likely to be associated with firm specific news releases. All of the events are between January 2011 and November 2014. The December of 2014 is reserved for examining the post-event price movements.

An extreme level of daily trading volume is called a volume event. Since raw trading volume is likely to be highly correlated with firm size, I use daily turnover as a measure of the trading volume, calculated as the ratio of the number of shares traded each day to the number of shares outstanding at the end of that day. An abnormal volume event is the extreme deviation from what can be considered standard trading activity. Following Bajo (2010), I use normalized abnormal volume (NAV) to measure abnormal trading. The NAV for stock i on day t is computed as:

$$NAV_{i,t} = \frac{TV_{i,t} - \mu_{i,t}}{\sigma_{i,t}}$$

Where $TV_{i,t}$ is trading volume for stock i on day t; $\mu_{i,t}$ and $\sigma_{i,t}$ are the mean and standard deviation of trading volume in the preceding 66 days. The threshold for volume events is set to NAV equal to 3. To ensure that the increase in volume is not caused by a change in the number of shares outstanding, I exclude the event if the shares outstanding changes greater than 1% on the event day or the preceding 60 trading days.

After identifying all the abnormal price and volume shocks, I further screen the events based on the following criteria: First, to avoid multiple events in the same time period for the same firm being included, I select observations with no large price or volume movement over the preceding 20 trading days of the price and volume events respectively. Second, I require the stock to be traded on each of the 60 days preceding the event day to avoid the infrequent trading problem, and on each of the 20 days following the event day to investigate after-event price behavior. Finally, I classify both the price and volume events into two subsamples based on the direction

[3] A minimum of 180 non-missing observations is required to calculate the mean and standard deviation.

of the price change on the event day: winners and losers. To minimize cross-sample correlation, only one event per trading day is included in each sample. For either sample, the events are sorted first by date and then alphabetically by firm name. Only the observation appearing first in the alphabetic sort for that day is retained.

4.3 Calculation of post-event abnormal returns

To control for the bid-ask bounce, I calculate stock returns based on the mid-point of closing bid-ask prices adjusted for dividends. Abnormal return is calculated as a firm's daily return in excess of its return predicted by market model.[4] Market model parameters are estimated from 205 through 6 trading days prior to the event day. Average abnormal returns are calculated as the sum of the individual stock abnormal returns for that day divided by the number of observations. I also calculate the proportion of stocks with positive abnormal returns and test whether it is significantly different from 0.5. Results are reported for various periods up to 20 days following an event.

4.4 Availability of public information

To examine the impact of public information, I classify both the return and volume events into two groups based on whether they are accompanied by contemporary news disclosure: the informed events and uninformed events. Most of previous studies use public news as a proxy for the presence of public information (Pritamani and Singal 2001, Chan 2003, Larson and Madura 2003). Whereas Savor (2012) uses analyst reports to identify news-based events. He suggests that analyst reports focus more on news about fundamentals and their content is more relevant to investors. For my study, I search for firm-specific news in the publications to distinguish informed and uninformed events. Since public news is timely available to the broadest investors, I believe it is a more appropriate proxy for the release of public information and will not bias the results.

To capture the public news driving significant price and volume movements, I use the EUREKA.CC database to search for any firm-specific news. This database provides full text

[4] Previous researches (Peterson,1995; Pritamani, 2001; Bajo, 2010; Savor, 2012) have shown that the results do not depend on the choice of a particular asset pricing model.

access to regional and local Canadian newspapers in both English and French, as well as other formats such as newswires, specialized periodicals, and radio and television transcripts. I select only those news sources with coverage of topics in finance and economics, publicized daily or continuously, distributed nationwide, and available in electronic format in database for the whole sample period. The resulting list of news sources includes Canadian Press (Presse canadienne), Marketwired (English and French) and Canada NewsWire (English and French). These sources have a complete coverage across time and firms in Canada.

I employ a 2-day window to search for news. It comprises the event day (t=0) and the immediately preceding day (t=-1) to account for news release after trading hours and short-term delays in the market's reaction.[5] An event is classified as informed if there is at least one piece of firm-specific news publicized. This simple definition does not distinguish different forms of public information, thus avoiding selection bias.

4.5 Regression model

The regression analysis provides a framework for testing the importance of public news on the price evolution process after controlling for other possible influential factors. The effects of initial price change, firm size, pre-event information leakage, volatility of stock returns and past stock price and volume are also examined. Control variables are included to account for month-of-the-year and day-of-the-week effects. The following model is separately applied to the sample of winners and losers or both price and volume events.

$$CAR_{i(m,n)} = \beta_0 + \beta_1 UND_i + \beta_2 AR_{0i} + \beta_3\, SIZE_i + \beta_4\, LEAK_i + \beta_5\, NAV_i + \beta_6\, SD_i + \beta_7\, AvgR_i + \beta_8 AvgV_i + \beta_9 \mathrm{MON} + \beta_{10}\mathrm{JAN} + \beta_{11}\mathrm{DEC} + \varepsilon$$

Where

$\mathrm{CAR}_{\mathrm{i(m,n)}}$ = the cumulative abnormal return for firm i over a period starting m and ending n trading days after the event day;

$\mathrm{UND_i}$ = a dummy variable equals to one if no news is published for firm i on the event day or one day before, and zero otherwise;

5 Since the stock market is closed on weekends, if the event occurs on Monday, I will broaden the search window back to the last Friday.

AR_{0i} = the abnormal return for firm i on the event day;

$SIZE_i$ = the percentile ranking of firm i based on the firm's market value of equity calculated six days before the event day;

$LEAK_i$ = the abnormal return for firm i on the day before the event day;

NAV_i = the normalized abnormal volume for firm i on the event day;

SD_i = the standard deviation of firm i's returns over trading days 205 through 6 before the event day;

$AvgR_i$ = the average of firm i's returns over trading days 205 through 6 before the event day;

$AvgV_i$ = the average daily turnover of firm i over previous 66 trading days of the event;

MON = a dummy variable equals to 1 if the event occurred on Monday, and zero otherwise;

JAN = a dummy variable equals to 1 if the event occurred in January, and zero otherwise;

DEC = a dummy variable equals to 1 if the event occurred in December, and zero otherwise.

5. Results

5.1 Data description

There are 302 firms in the whole sample. The distribution of the industries among the sample firms are presented in Table 1. Since the firms are drawn from 20 different stock market sectors, a single industry should not dominate the analysis. With the requirement of stock price greater than 10$, no stock lies in the bottom quintile of TSX. Therefore, it is unlikely that small firms derive the results in this paper.

Table 2 and Figure 1 presents the time-series distribution of events. There is no obvious intertemporal trend or clustering effect which may bias the results. The events are classified according to the direction of initial price change and the availability of public news. Some summary statistics for each subsample are presented in Table 3.

5.1.1 Comparison of price events versus volume events

Table 3 shows that there are about half of the price changes accompanied by public news, while there are more uninformed volume events than informed ones, with the ratio of the former to the latter being close to 2:1. This seems to suggest that large price change is a more informative signal for detecting new information about fundamentals than abnormal trading volume. Not surprisingly, price events have more significant abnormal returns while volume events have higher abnormal volumes on the event day. The other variables are quite the same among price and volume events.

5.1.2 Comparison of winners versus losers

For large one-day price movements, there are more winners than losers for both informed and uninformed events. The magnitude of the average positive abnormal returns is smaller than that of the negative ones. The abnormal volume associated with a price increase generally exceeds that with a price decrease, perhaps due to the short selling restrictions. The winners and losers are quite different in terms of most firm characteristics. In general, winners tend to be smaller, have lower prices and perform worse than losers in the past. For stocks experiencing major trading volume movements, the numbers of winners and losers are almost the same. Winners on average have larger event day abnormal returns in absolute value and are accompanied by lower abnormal volumes.

5.1.3 Comparison of informed events versus uninformed events

Consistent with previous literature showing that publicly available information cannot fully explain stock market movements, only 52 % of major price changes and 35 % of major volume movements are accompanied by firm specific news. The informed events, assumed to be driven by firms' fundamental information, are accompanied by more extreme stock returns on the event day than the uninformed ones.

Measured by market equity, firms with information-based price and volume movements are larger than no-information ones. This finding suggests that public news is a more influential factor for large stocks, whereas private signals or shifts in investor sentiment are more important for smaller stocks. The possible explanation is that financial press is usually prone to report developments affecting larger companies, while smaller stocks have less information available for the market and might be more subject to microstructure movements.

5.2 Unconditional post-event returns

Table 4 and 5 present the average daily abnormal returns and cumulative abnormal returns for the sample of price and volume events respectively. The abnormal returns for days from −3 to −1 are used to determine whether there is leakage of information. Various intervals are examined over a 20-day time horizon after the events. The proportions of positive abnormal returns are also presented.

In the price events sample, both winners and losers experience negative cumulative abnormal returns over the twenty-day period following the event. Generally, winners experience reversals whereas losers are followed by additional stock price decreases. This finding doesn't support the uncertain information hypothesis which predicts positive abnormal returns after extreme stock price increases and decrease. The results suggest that the market is overoptimistic when evaluating stocks in reposes to favorable and unfavorable information. Large one-day price changes in either direction signal the beginning of a period of relatively poor performance. However, we should notice that the negative CARs for losers are mostly driven by the excess return on day 1 and that an insignificant reversal actually takes place since day 2. Prior to the event day, excess returns are in the same direction as the initial price change on day 0 and statistically significant on day -1. This may be an effect of information leakage. This effect seems to be more pronounced for losers since they have more extreme pre-event abnormal returns. Among the literature in this research area, most studies find reversals for both winners and losers (e.g., Corrado, 1997; Park, 1995; Akhigbe et al. 1998). But this does not directly contradict my results since the nature of the findings may depend on the size of the initial price move. The large movements examined in this paper are smaller than the 10% minimum reported in previous literature and this raises the possibility that the results may be different.

The results for volume events are quite the opposite. Stock prices rise after extreme volume activities for both winners and losers. The abnormal returns are persistent beyond the event day and significant for winners. This suggests that abnormal trading volume contains information not yet reflected in prices. The return patterns imply that unconditional large volume increases seem to be a precursor of positive performance.

Table 6 presents the average abnormal returns for three subsamples based on industry classification. The three main industries are mining, finance and insurance, and manufacturing. There are 159 firms from these three sectors, accounting for more than half of the whole samples (0.53%). Figure 2 displays the CARs for the three subsamples as well as the whole sample starting from day -3 to day 5. The graphs clearly show the large movements in price and the subsequent drift or reversal process. The magnitude and trend of the price patterns differ across industries. On the event day of large price or volume shocks, manufacturing and mining stocks experience much greater abnormal returns than the finance and insurance sector. This finding suggests that finance and insurance firms are much less volatile. In the subsequent 5 days period, finance and insurance stocks exhibit the largest and strongest reversal pattern after extreme price movements. Mining industry stocks reverse most after abnormal volume increases, largely consistent with the overreaction hypothesis which predicts the more extreme initial price movements followed by the greater reversals. Akhigbe et al. (2002) and Benou and Richie (2003) also find variations among different industries. They argue that the different levels of uncertainty associated with each industry lead to differences in the investors' reactions.

5.3 Impact of public news

Previous analyses examine the return predictability with no regard to the presence of contemporaneous news. To examine the impact of public news, I divide the sample based on its information status. Results for price and volume events are presented in Tables 7 and 8 respectively. I also calculate the differences of abnormal returns for informed and uninformed events and apply a paired t-test to compare the stock price behaviors.[6]

5.3.1 Evidence from price events

The informed winners earn insignificant positive abnormal returns over days 1 through 5. But these positive abnormal returns are more than reversed over days 6 through 20 which result in negative 20-day CARs. Uninformed winners subsequently earn negative abnormal returns which

[6] Since I have exclude low price stocks from the sample and calculate stock returns based on bid-ask average, bid-ask bounce should not be the cause of observed reversal patterns. The methods of measuring abnormal returns should not be the reason for any difference between losers and winners or between informed and uninformed events, because the abnormal returns are derived in the same manner for all categories.

last up to 20 days. This finding, along with the return patterns documented in Table 4, suggests that large one-day price increases signal, after a possible brief recovery, the beginning of a period of relative poor performance. Much of the initial price change might be a result of investors' overreaction. For negative price shocks, the informed losers earn negative cumulative abnormal returns of -0.664% over 5 days, while the uninformed ones earn positive cumulative abnormal returns of 0.217%. But these patterns get a little bit reversed through day 6 to 20. The differences of abnormal returns for informed and uninformed events are more statistically large for losers than for winners. Figures 3 provides a more detailed view of the continued drift experienced by informed events in contrast with the reversal pattern experienced by uninformed events.

Short-term stock price continuation is often attributed to investor behavioral biases such as investor underreaction to new information. However, the results above indicate that there is distinction between informed winners and informed losers. Stocks seem to primarily underreact to unfavorable news. There is an asymmetric response to public information. There are two possible reasons which can help explain this asymmetric drift pattern. The first is that informed traders are more willing to take long positions than short positions in stocks or they simply have different attitudes to favorable and unfavorable news. They form incorrect expectations about future performance of the firms and mostly underreact to unfavorable news. Another explanation is that stock exchanges and regulators often impose restrictions on short selling, which prevents information, particularly bad news, from being incorporated into the stock price.

Overall, considering winners and losers collectively, the differential responses to news and no-news price shocks is broadly consistent with the hypothesis that large price changes accompanied by information are followed by drifts while no-information ones result in reversals over the immediately following periods. Previous studies which also examine large stock returns conditional on whether they are driven by public information all find similar results. These papers are generally similar in the overall approach but different in the detailed research design compared with mine. For example, Chan (2003) focuses on the monthly data. Larson and Madura (2003) examine price movements of 10% or more. Savor (2012) uses recommendation-issuing analyst reports as a proxy for the presence of public information.

5.3.2 Evidence from volume events

Table 8 presents the abnormal returns around extreme trading activities. Results for informed events reveal how stock market reacts to news in a setting of large trading volume. The existence of high volume enhances the precision of the related signal and makes the empirical findings more reliable. Results for uninformed events reveal the information role of extreme trading volume without disclosed public information.

The results show that market reaction largely occurs on the event day, simultaneously with large volume. But the price adjustment is not instantaneous to its full informative level on the event day. Information presence appears to be a key determinant of post-event performance. After price increases, the average cumulative abnormal return over a 20-day horizon is 1.127% if it is information-based and 0.081% if it is not. Although the large volume increases accompanied by information disclosure exhibit a stronger market reaction, excess returns still persist when no public information is contemporaneously released. Informed winners outperform uninformed ones and the return differences are statistically large. This pattern is reversed for losers. The average 20-day cumulative abnormal return after price declines is -0.745% if it is information based and 0.432% if it is not. Actually the uninformed losers experience price reversals. There is evidence of overreaction for losers when information is not publicized at the time of the volume shocks. The different stock price patterns between informed and uninformed volume events are more clearly observed from Figures 4.

In conclusion, the results confirm the hypothesis that post-event returns depend on whether the trading volume shocks are accompanied by public news. The difference in return predictability between informed and uninformed events implies that release of information is a necessary condition for price continuation. These results are not consistent with the findings of Bajo (2010) which show that both informed and uninformed sample experience price continuation after large volume increases. But it is not surprising given that different stock markets and time periods are examined.

5.3.3 A broader definition of public news

In the previous analysis, I define informed events as the large price or volume movements accompanied by firm-specific news. Thus, these events are assumed to be driven by firms' fundamental information. However, company news only account for part of the publicly available information. The non-availability of public announcements for the remaining uninformed events may be due to significant movements in macroeconomic factors. Although macroeconomic news might be less relevant to firms' future prospect, it can still attract the investors' attention. So next I will reclassify the informed and uninformed events based on a broader definition of public news, including both company and macroeconomic news. This division results in more informed events and less uninformed events.

In Table 9 and 10, I present the results for the informed and uninformed events with the broader definition of news. The same general stock return patterns persist. But compared with Table 7 and 8, the informed events experience less extreme abnormal returns on the event day and less price drifts afterwards. This suggests that investors underreact less to economic news, despite such information might be less relevant for firms' future performance. The unformed events exhibit higher post-events abnormal returns for both winner and losers. Because of the difficulty in associating macroeconomic news with the observed stock movements, I might mix some informed events with uninformed events. So the return differences between the two groups are smaller with the broader definition of news. Overall, the stock return patterns observed in previous analysis are robust to other definitions of news.

5.4 Cross-sectional analysis

A cross-sectional analysis can test more rigorously whether information presence affects post-event returns and examine the effects of other relevant factors. Coefficients from the estimation of equation (1) for each subsample are presented in Table 9 and 10 for price and volume events respectively.

Table 11 contains results for price events. The most important finding is the coefficients on dummy variable *UND* which are negative for winners and positive for losers in all periods. This finding, along with the return patterns documented in Table 7, supports the hypothesis that stock prices reverse more when there is no accompanied public news. The coefficients on the event day abnormal return are mostly negative. Therefore, there is some evidence consistent with the overreaction hypothesis, which assumes that the greater overreaction would lead to the greater correction. But this effect mainly holds for losers. Excess returns have a negative relationship with pre-event leakage and the coefficients are significant for losers. This suggests that higher degree of pre-event leakage is associated with more overreaction.

In terms of firm characteristics, the coefficients on the *SIZE* variable are negative for winners in all time period and positive for losers in the immediate period. Generally, the degree of overreaction is positively related to firm size. But for losers over longer periods, the smaller stocks experience greater reversals. The opposite effects of size on stock returns following good and bad news suggest that firm size is more than just a common risk factor in the cross section of stock returns. Further, I find that after controlling for public information and previous volume, there are still consistent relationships between excess return and abnormal trading volume. Post-event abnormal return is positively associated with *NAV*. This result perhaps implies that abnormal volume activity conveys new information that is not captured by public news and liquidity. The coefficients on variable *SD* are negative for winners and mostly positive for losers. This indicates that market participants overreact more to both favorable and unfavorable information when firms are associated with higher degree of uncertainty. Previous stock return appears to be a key determinant of post-evet performance. The coefficients on *AvgR* variable are negative in all periods and mostly significant at 1 percent level, suggesting that unconditional stock returns tend to reverse for up to 20 days. Previous trading volume is another critical variable in explaining the magnitude of excess returns. The coefficients on *AvgV* variable are positive for winners in all periods and negative for losers over short horizons. This result suggests that the illiquid stocks experience more price reversals after positive and negative price shocks. However, in the case where the dependent variable is the abnormal return over day 6 through 20, the coefficient for the losers is positive and significant which implies that losers with higher trading volume reverse more over longer term.

Results from the estimation of equation (1) for volume events are presented in Table 12. The results in most explanatory variables are quite similar with those of price events. But the equations have less significant explanatory power, as indicated by the adjusted R square and F-statistics. The coefficients on dummy variable *UND* also confirm previous analysis that the degree of overreaction is stronger for extreme volume increases without public news release. Compared to price events, the coefficients are much more significant, suggesting that news disclosure is a more important determinant of price behavior for major volume movements. The coefficients on *NAV* are mostly positive for winners and negative for losers, suggesting that more extreme events (higher NAV) predict a higher degree of price continuation.

Overall, the regression analysis presented above indicates that the availability of public information affects post-event returns. The news effects are more pronounced for volume events.

6. Portfolio strategies

Previous findings provide evidence that major price and volume shocks predict future excess returns. The different post-event return patterns between informed and uninformed events might allow investors to implement profitable strategies. Next, I test whether investors can profit from the portfolio strategies and assess the economic significance of the returns after taking into account transaction costs.

Because previous results suggest that the predicted return patterns are more pronounced for losers, I focus on the sample of losers to assess whether investors can earn systematic profits from reacting to the large price and volume movements. Investors can detect the opportunity of trades based on the observation of stocks experiencing both abnormal price declines and trading volume increases. These two types of new information is public available. According to Karpoff (1987), the observations of simultaneous large volumes and large price changes may be traced to their common ties to information flow. Combing large price changes and high trading volume together can enhance the precision of the related signal and might improve the return predictability.

To construct the sample, I follow the same methodology for identifying major price and volume movements as before. But for the portfolio strategy, I do not require only one event per day. There are 359 events during the whole sample period. Investors cannot accurately predict the subsequent return patterns by observing price and volume shocks alone. they need to search for the availability of public news to decide the trading direction. Because previous findings show that the informed losers experience negative returns during the 20-day period following the event day while the uninform losers subsequently recover and show positive returns. I apply the trading strategy of short in informed losers and long in uninformed losers. The portfolio is equally-weighted. The returns of the portfolio can reflect the joint ability of extreme price changes, large trading volume and public news coverage to predict future returns.

Since the anomalies in return and trading volume can only be detected after the stock market is closed, I assume that investors initiate trades at the beginning of the next day. They buy (sell) at the opening ask (bid) price of the day following the event, and sell (buy) at the closing bid (ask) price at the end of the holding period. This trading strategy allows me to assess the real profitability after taking account for the bid-ask spread. I also estimate the theoretical gain obtained in the absence of market frictions for comparison[7]. The theoretical strategy assumes that the investors initiate the trade at the end of the event day and trade at closing prices. This strategy is not feasible since it requires investors to trade at the moment when the abnormal return and volume are not necessarily known and does not reflect the bid-ask spread costs embedded in the round-trip trades. Since previous results show that excess returns tend to persist for 20 days after the event, I examine the trading strategies of several holding periods up to 20 days. The portfolio returns are compared to the returns earned by a replicating market index portfolio. If the price patterns from previous findings are sufficiently strong, the profits from theoretical strategy would be positive. But if stock market is efficient, stock price should adjust to its full informative value at the time the large price and volume shock happens and the returns from feasible strategy would be negative, implying that the gains from the predicted price pattern is less than the transaction coasts of trading.

Table 13 shows the results obtained by both feasible and theoretical strategies for various holding periods. The results show that the portfolio is profitable over all holding periods. The long strategies in uninformed losers earn much higher and more significant raw and market adjusted returns than the short strategies in informed losers. This finding suggests that the price

[7] This method is also used by Bajo (2010).

reversals following uninformed events are more profound than the drifts after informed events. Both long and short strategies earn most over short holding periods. Combining the two strategies together, investors can earn a raw daily return of 2.753% and a market adjusted daily return of 3.612% after the bid-ask spread cost over a 3-day holding period, and both returns are statistically significant at the 1% level. Even though the returns of the feasible strategy are smaller than those of the comparing theoretical portfolio, the transaction costs and the different trading time cannot make the gains vanish.

Overall, the results suggest that the difference of post-event performance between informed and uninformed events is economically meaningful for losers. The existence of this profitable trading strategy is inconsistent with stock prices fully and quickly reflecting relevant information and apparently violates the efficient markets hypothesis. Among the literatures which deal with the profitability of trading on short-term price patterns induced by large price or volume movements, most find that no abnormal returns could be obtained (e.g., Benou & Richie, 2003; Chan, 2003; Ma et al., 2005). However, some studies report significant profits. For example, Pritamani and Singal (2001) find that the trading strategy conditional on large price changes, high volume and public information yields annual profits of 12–18% after controlling for bid–ask spreads. Bajo (2010) also find statistically significant profits for the portfolio strategies trying to exploit the persistence of excess returns following large trading after considering transaction costs and the different trading timing. However, Amini et al. (2013) point out that those studies in favor of profitability fail to account for all costs associated with trading, including the price impact of trades and direct fees and taxes. In addition, the stability of the price patterns is questioned if the ever-changing nature of markets is taken into consideration.

7. Conclusion

In this paper, I study the short-term stock return predictability following three measures of new information: large one-day price movement, abnormal trading volume increase and release of public news.

Focusing on common stocks trading on Toronto Stock Exchange during the period 2011-2014, I initially identify major price and volume shocks and examine the subsequent abnormal returns. I find that in general, large one-day price changes signal the following poor performance, while unusual volume increases predict good performance in the near future. I also find that the magnitude and trend of the price patterns differ across industries. These price patterns mean that stock returns are to some extent predictable. Then, I investigate how public announcements affect stock return predictability following large price and trading volume movements. I divide the samples into informed and uninformed events base on the availability of contemporary public news. I find that for both price and volume shocks, informed events tend to experience more price continuations than uninformed events. For stocks with negative initial price changes, informed events lead to price drifts while uninformed events are followed by price reversals. Investors seem to underreact to news about fundamentals but overreact to other shocks that cause unusual stock prices changes and trading activities. And these stock return patterns are more pronounced in losers. The cross-sectional analysis tests whether the subsequent market reactions to price and volume shocks are related to the presence of public information while controlling for initial price change, firm size, pre-event information leakage, volatility of stock returns and past stock price and volume. The results confirm that public news availability determines post-evet performance, but mostly for volume shocks. Finally, focusing on the sample of losers, I test whether the trading rule trying to exploit different market responses to information and no-information based price and volume shocks is profitable. I find that the portfolio profits are large enough to cover the transaction cost, reflecting a violation of weak-form market efficiency

Overall, the results from this paper indicate that much of the disagreement regarding the behavior of stock prices following large one-day movements in stock price or trading volume can be traced to the type of the events motivating the extreme shocks. The price patterns become more predictable after taking account of the availability of public news.

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Appendix

Table 1. Industries classification for the sample firms

This table presents the industry distribution of the sample firms. The classification of the industries is based on The North American Industry Classification System (NAICS).

Industry	Number	Industry	Number
Mining	62	Professional, Scientific, and Technical Services	8
Manufacturing	59	Accommodation and Food Services	4
Finance and Insurance	38	Administrative and Support and Waste Management and Remediation Services	3
Real Estate Rental and Leasing	27	Health Care and Social Assistance	2
Information	24	Other Services (except Public Administration)	2
Retail Trade	23	Agriculture, Forestry, Fishing and Hunting	1
Utilities	14	Arts, Entertainment, and Recreation	1
Transportation and Warehousing	14	Health Care and Social Assistance	1
Wholesale Trade	9	Arts, Entertainment, and Recreation	1
Construction	8	Health Care and Social Assistance	1

Table 2. Number of events in each year

This table presents the time-series distribution of events. The TSX common stocks that experience one-day large price and volume movements are selected over the sample period of January 2011 through November 2014. A return event is defined if market adjusted abnormal return is more than three standard deviations away from the mean over the preceding 200 days (-205,-6) for that stock. A volume event is defined if the daily trading volume is more than three standard deviations away from its mean volume of the preceding 66 days. The closing prices of the stock must be at least $10. All stocks must trade on the event day and the following 20 trading days. Stocks traded less than 180 days over the benchmark period (-205, -6) are eliminated. There must be no large price or volume movement over the preceding 20 trading days of the event. Winners and losers subsamples are classified based on the direction of the price change on the event day. Informed and uninformed events are classified based on whether they are accompanied by contemporary news disclosure. In each subsample, all firms that meet the above criteria are ranked alphabetically for each trading day and the only the first firms are selected.

Events		Price Events			Volume Events		
Year	Sample	All	Informed	Uninformed	All	Informed	Uninformed
2011	Winners	162	72	90	149	48	101
	Losers	115	53	62	164	59	105
	All	277	125	152	313	107	206
2012	Winners	113	65	48	157	48	109
	Losers	102	57	45	167	70	97
	All	215	122	93	324	118	206
2013	Winners	152	88	64	178	67	111
	Losers	129	67	62	164	48	116
	All	281	155	126	342	115	227
2014	Winners	144	73	71	164	61	103
	Losers	109	56	53	141	51	90
	All	253	129	124	305	112	193
Total	Winners	571	298	273	648	224	424
	Losers	455	233	222	636	228	408
	All	1026	531	495	1284	452	832

Table 3. Sample characteristics

This table summarizes the characteristics for each subsample. Winners and losers subsamples are classified based on the direction of the price change on the event day. Informed and uninformed events are classified based on whether they are accompanied by contemporary news disclosure. Mean value for each variable is reported. R_0 denotes the raw return on day 0. AR_0 denotes the abnormal return on day 0. PRICE denotes the closing stock price for firms i six trading days before day 0. SIZE denotes the percentile ranking of firm i based on the firm's market value of equity calculated six days before Day 0. AvgV denotes the average daily turnover of firm i over previous 66 trading days of Day 0. NAV denotes the normalized abnormal volume on day 0. SD denotes the standard deviation of firm i's returns over trading days 205 through 6 before Day 0. BETA denotes market model beta estimated from 205 to 6 trading days before Day 0. AvgR denotes the average of firm i's returns over trading days 205 through 6 before Day 0.

Panel A. Price Events

Samples		Number	R_0(%)	AR_0(%)	PRICE	SIZE	Avg V(%)	NAV	SD(%)	BETA	Avg R(%)
Winners	All	571	6.295	6.295	35.794	0.818	0.203	3.820	1.516	0.695	0.054
	Informed	298	7.20	7.104	39.219	0.836	0.214	5.753	1.552	0.694	0.054
	Uninformed	273	5.308	5.226	32.054	0.799	0.19	1.709	1.477	0.696	0.053
Losers	All	455	-7.252	-7.252	38.437	0.837	0.217	3.456	1.51	0.716	0.065
	Informed	233	-8.204	-8.196	38.771	0.858	0.23	3.803	1.534	0.751	0.057
	Uninformed	222	-6.253	-6.161	38.086	0.815	0.202	3.091	1.484	0.679	0.073

Panel B. Volume Events

Samples		Number	R_0(%)	AR_0(%)	PRICE	SIZE	Avg V(%)	NAV	SD(%)	BETA	Avg R(%)
Winners	All	648	2.799	2.735	34.965	0.822	0.190	6.322	1.587	0.681	0.051
	Informed	224	4.587	4.533	35.906	0.842	0.204	6.92	1.622	0.731	0.055
	Uninformed	424	1.855	1.785	34.469	0.812	0.183	6.006	1.569	0.654	0.049
Losers	All	636	-2.334	-2.395	36.351	0.823	0.191	6.54	1.545	0.659	0.061
	Informed	228	-3.494	-3.596	38.09	0.837	0.224	6.402	1.586	0.691	0.059
	Uninformed	408	-1.686	-1.724	35.38	0.815	0.173	6.617	1.521	0.642	0.062

Table 4. Abnormal returns for price events

This table presents the average daily abnormal returns and cumulative abnormal returns for the sample of price events. Day 0 is the day of the event when the large abnormal price movements occur. Winners (Losers) are the subsamples where the day 0 stock returns are positive (negative). Stock return is calculated based on the mid-point of closing bid-ask prices adjusted for dividends. Abnormal return is calculated as a firm's daily return in excess of its return predicted by market model. Market model parameters are estimated from 205 through 6 trading days prior to the event day. Average abnormal return is calculated as the sum of the individual stock abnormal returns for that day divided by the number of observations. Cumulative abnormal return is formed by summing daily abnormal returns. Results are reported for various periods up to 20 days following an event. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Sample	Winners		Losers	
Sample Size	571		455	
Day	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns
-3	-0.084	0.466*	-0.004	0.501
-2	0.006	0.483	-0.067	0.462*
-1	0.135**	0.541**	-0.293***	0.429***
0	6.206***	1***	-7.203***	0***
1	-0.105	0.478	-0.265**	0.431***
2	0.048	0.487	0.04	0.473
3	-0.146*	0.445***	0.025	0.495
4	0.166***	0.511	0.049	0.497
5	0.031	0.476	-0.082	0.475
Window	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns
(-3,-1)	0.057	0.515	-0.365***	0.448**
(1,2)	-0.056	0.489	-0.226	0.459**
(1,3)	-0.203	0.485	-0.201	0.464*
(1,5)	-0.006	0.511	-0.234	0.481
(6,20)	-0.554*	0.483	0.054	0.477
(1,20)	-0.56	0.475	-0.181	0.49

Table 5. Abnormal returns for volume events

This table presents the average daily abnormal returns and cumulative abnormal returns for the sample of volume events. Day 0 is the day of the event when the large abnormal volume movements occur. Winners (Losers) are the subsamples where the day 0 stock returns are positive (negative). Stock return is calculated based on the mid-point of closing bid-ask prices adjusted for dividends. Abnormal return is calculated as a firm's daily return in excess of its return predicted by market model. Market model parameters are estimated from 205 through 6 trading days prior to the event day. Average abnormal return is calculated as the sum of the individual stock abnormal returns for that day divided by the number of observations. Cumulative abnormal return is formed by summing daily abnormal returns. Results are reported for various periods up to 20 days following an event. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Sample	Winners		Losers	
Sample Size	648		636	
Day	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns
-3	-0.172*	0.457**	-0.099*	0.458**
-2	0.038	0.477	-0.119**	0.454**
-1	0.086*	0.48	-0.174**	0.461**
0	2.735***	1***	-2.395***	0***
1	0.207***	0.532**	-0.062	0.5
2	0.103**	0.503	0.086	0.458**
3	0.112**	0.502	-0.1	0.462**
4	-0.037	0.486	0.011	0.502
5	-0.053	0.458**	0.07	0.481
Window	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns
(-3,-1)	-0.047	0.511	-0.392***	0.454**
(1,2)	0.31***	0.514	0.024	0.487
(1,3)	0.422***	0.522	-0.076	0.491
(1,5)	0.331**	0.511	0.006	0.503
(6,20)	0.111	0.485	0.005	0.489
(1,20)	0.442*	0.528*	0.01	0.502

Table 6. Abnormal returns by industry classification

This table presents the average daily abnormal returns for the subsamples of three different industries: mining, finance and insurance, and manufacturing. Day 0 is the day of the event when the large abnormal price or volume movements occur. Winners (Losers) are the subsamples where the day 0 stock returns are positive (negative). Stock return is calculated based on the mid-point of closing bid-ask prices adjusted for dividends. Abnormal return is calculated as a firm's daily return in excess of its return predicted by market model. Market model parameters are estimated from 205 through 6 trading days prior to the event day. Average abnormal return is calculated as the sum of the individual stock abnormal returns for that day divided by the number of observations. Cumulative abnormal return is formed by summing daily abnormal returns. Results are reported for various periods up to 20 days following an event. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Panel A. Price Events

Events	Positive			Negative		
Industry	Mining	Finance and Insurance	Manufacturing	Mining	Finance and Insurance	Manufacturing
Sample Size	91	45	101	62	52	67
Event Window	Mean Abnormal Return (%)			Mean Abnormal Return (%)		
-3	-0.269	0.122	-0.075	0.305*	-0.059	0.078
-2	-0.059	-0.087	-0.079	-0.355	-0.071	-0.046
-1	0.055	-0.035	0.153	-0.727***	-0.128	-0.388
0	7.564***	4.196***	7.531***	-6.448***	-4.45***	-9.12***
1	-0.13	-0.269	-0.137	-0.05	-0.041	-0.501
2	-0.11	0.118	0.161	0.153	0.12	0.395*
3	-0.066	-0.005	-0.189	0.24	0.049	0.074
4	-0.129	0.003	0.378**	-0.084	0.077	0.249
5	0.251	-0.151	-0.121	-0.453*	-0.14	-0.31
(-3,-1)	-0.274	0.001	-0.002	-0.777**	-0.258	-0.356
(1,3)	-0.305	-0.156	-0.165	0.342	0.128	-0.032
(1,5)	-0.184	-0.304	0.092	-0.195	0.065	-0.094
(6,20)	-0.939	0.354	-1.286	0.134	-0.785	0.755
(1,20)	-1.122	0.05	-1.194	-0.062	-0.72	0.661

Panel B. Volume Events

Events	Positive			Negative		
Industry	Mining	Finance and Insurance	Manufacturing	Mining	Finance and Insurance	Manufacturing
Sample Size	86	71	83	69	79	91
Event Window	Mean Abnormal Return (%)			Mean Abnormal Return (%)		
-3	-1.005*	0.307	-0.215	-0.065	0.051	-0.157
-2	0.021	0.112**	-0.118	-0.349	-0.257**	-0.326**
-1	0.012	0.167**	0.18	-0.359	-0.423**	-0.175

0	4.606***	2.022***	2.902***	-3.302***	-1.726***	-3.281***
1	-0.25	0.094**	0.168	0.129	0.303**	-0.167
2	0.073	0.113	0.081	-0.064	0.064	0.198
3	0.312*	0.285	0.053	-0.255	0.065	-0.015
4	-0.314	-0.135	0.026	0.293	-0.135	0.251
5	-0.318	0.062	0.09	0.28	-0.108	-0.14
(-3,-1)	-0.972	0.585**	-0.153	-0.774	-0.63**	-0.657*
(1,3)	0.136	0.491**	0.302	-0.391	0.432**	0.017
(1,5)	-0.496	0.418	0.418	0.182	0.188	0.127
(6,20)	-0.839	0.65	0.611	-0.169	-0.152	1.051
(1,20)	-1.335	1.068	1.028*	0.013*	0.036	1.179

Table 7. Abnormal return differences between informed and uninformed return events

This table presents the average daily abnormal returns and cumulative abnormal returns for the subsamples of informed and uninformed price events. Informed and uninformed events are classified based on whether they are accompanied by contemporary news disclosure. Day 0 is the day of the event when the large abnormal price movements occur. Winners (Losers) are the subsamples where the day 0 stock returns are positive (negative). Stock return is calculated based on the mid-point of closing bid-ask prices adjusted for dividends. Abnormal return is calculated as a firm's daily return in excess of its return predicted by market model. Market model parameters are estimated from 205 through 6 trading days prior to the event day. Average abnormal return is calculated as the sum of the individual stock abnormal returns for that day divided by the number of observations. Cumulative abnormal return is formed by summing daily abnormal returns. Results are reported for various periods up to 20 days following an event. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Panel A. Winners					
Public News	Informed Events		Uninformed Events		
Sample Size	298		273		
Day	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Difference (%)
-3	0.069	0.513	-0.251***	0.414***	0.32***
-2	0.012	0.48	-0.001	0.487	0.013
-1	0.182**	0.54*	0.083	0.542*	0.099
0	7.104***	1***	5.226***	1***	1.878***
1	-0.022	0.51	-0.196	0.443**	0.174
2	0.105	0.49	-0.014	0.484	0.119
3	-0.12	0.45**	-0.175	0.44**	0.054
4	0.259***	0.507	0.064	0.516	0.196
5	-0.017	0.483	0.083	0.469	-0.1
Window	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Difference (%)
(1,2)	0.084	0.523	-0.209	0.451*	0.293
(1,3)	-0.037	0.5	-0.384*	0.469	0.347
(1,5)	0.206	0.547*	-0.237	0.473	0.443

(6,20)	-0.577	0.477	-0.529	0.491	-0.048
(1,20)	-0.372	0.48	-0.766	0.469	0.395

Panel B. Losers

Public News	Informed Events		Uninformed Events		
Sample Size	233		222		
Day	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Difference (%)
-3	0.063	0.519	-0.074	0.482	0.137
-2	-0.09	0.455*	-0.044	0.468	-0.045
-1	-0.176*	0.455*	-0.417***	0.401***	0.241
0	-8.196***	0***	-6.161***	0***	-2.035**
1	-0.445**	0.395***	-0.077	0.468	-0.368
2	-0.022	0.481	0.104	0.464	-0.126
3	-0.023	0.476	0.076	0.514	-0.099
4	0.0008	0.489	0.099	0.505	-0.098
5	-0.175**	0.425**	0.015	0.527	-0.19
Window	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Difference (%)
(1,2)	-0.467**	0.429**	0.027	0.491	-0.494
(1,3)	-0.49**	0.442**	0.103	0.486	-0.593*
(1,5)	-0.664	0.433**	0.217	0.532	-0.881**
(6,20)	0.268	0.468	-0.172	0.486	0.44
(1,20)	-0.396	0.446*	0.045	0.536	-0.442

Table 8. Abnormal return differences between informed and uninformed volume events

This table presents the average daily abnormal returns and cumulative abnormal returns for the subsamples of informed and uninformed volume events. Informed and uninformed events are classified based on whether they are accompanied by contemporary news disclosure. Day 0 is the day of the event when the large abnormal volume movements occur. Winners (Losers) are the subsamples where the day 0 stock returns are positive (negative). Stock return is calculated based on the mid-point of closing bid-ask prices adjusted for dividends. Abnormal return is calculated as a firm's daily return in excess of its return predicted by market model. Market model parameters are estimated from 205 through 6 trading days prior to the event day. Average abnormal return is calculated as the sum of the individual stock abnormal returns for that day divided by the number of observations. Cumulative abnormal return is formed by summing daily abnormal returns. Results are reported for various periods up to 20 days following an event. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Panel A. Winners					
Public News	Informed Events		Uninformed Events		
Sample Size	224		424		
Day	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Difference (%)
-3	-0.059	0.469	-0.232*	0.45**	0.172
-2	-0.018	0.469	0.068	0.481	-0.087
-1	0.012	0.487	0.126*	0.476	-0.113
0	4.533***	1***	1.785***	1***	2.747***
1	0.569***	0.594***	0.015	0.5	0.553***
2	0.181*	0.527	0.062	0.491	0.119
3	0.086	0.487	0.126**	0.509	-0.04
4	-0.082	0.464	-0.014	0.498	-0.068
5	-0.059	0.451*	-0.05	0.462*	-0.009
Window	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns	Cumulative Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Difference (%)
(1,2)	0.75***	0.576**	0.077	0.481	0.673***
(1,3)	0.836***	0.554*	0.203*	0.505	0.633**
(1,5)	0.695***	0.549*	0.139	0.491	0.556*
(6,20)	0.432	0.545*	-0.058	0.453**	0.49
(1,20)	1.127**	0.58***	0.081	0.5	1.046*

Panel B. Losers			
Public News	Informed Events	Uninformed Events	
Sample Size	228	408	

Day	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return (%)	Proportion of Positive Abnormal Returns	Mean Difference (%)
-3	-0.162*	0.461	-0.063	0.456**	-0.1
-2	-0.112	0.469	-0.124*	0.446**	0.011
-1	-0.205	0.443**	-0.157*	0.471	-0.048
0	-3.596***	0***	-1.724***	0***	-1.872***
1	-0.114	0.461	-0.033	0.522	-0.082
2	-0.14	0.425**	0.213	0.475	-0.353
3	-0.306***	0.417***	0.015	0.488	-0.321**
4	0.064	0.496	-0.019	0.505	0.083
5	0.042	0.478	0.086	0.483	-0.044
Window	**Cumulative Abnormal Return (%)**	**Proportion of Positive Abnormal Returns**	**Cumulative Abnormal Return (%)**	**Proportion of Positive Abnormal Returns**	**Mean Difference (%)**
(1,2)	-0.255	0.447*	0.18	0.51	-0.434*
(1,3)	-0.561**	0.425**	0.195*	0.527	-0.756***
(1,5)	-0.454*	0.465	0.263	0.525	-0.717**
(6,20)	-0.291	0.478	0.17	0.495	-0.46
(1,20)	-0.745	0.452*	0.432	0.529	-1.177*

Table 9. Abnormal return differences between informed and uninformed price events, using a broader definition of news

This table presents the average daily abnormal returns and cumulative abnormal returns for the subsamples of informed and uninformed price events. Informed events are defined as those accompanied by contemporary firm-specific or macroeconomic news disclosure. Day 0 is the day of the event when the large abnormal price movements occur. Winners (Losers) are the subsamples where the day 0 stock returns are positive (negative). Stock return is calculated based on the mid-point of closing bid-ask prices adjusted for dividends. Abnormal return is calculated as a firm's daily return in excess of its return predicted by market model. Market model parameters are estimated from 205 through 6 trading days prior to the event day. Average abnormal return is calculated as the sum of the individual stock abnormal returns for that day divided by the number of observations. Cumulative abnormal return is formed by summing daily abnormal returns. Results are reported for various periods up to 20 days following an event. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Panel A. Winners

Public News	Informed Events		Uninformed Events		
Sample Size	339		232		
Day	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Difference(%)
-3	0.025	0.519	-0.242**	0.388***	0.267**
-2	-0.021	0.469	0.046	0.504	-0.067
-1	0.156**	0.534	0.103	0.552*	0.053
0	6.812***	1***	5.322***	1***	1.49
1	-0.096	0.501	-0.118	0.444**	0.023
2	0.096	0.484	-0.022	0.491	0.118
3	-0.15	0.434***	-0.141	0.461	-0.009
4	0.223***	0.516	0.083	0.504	0.14
5	0.012	0.481	0.059	0.47	-0.046
Window	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Difference(%)
(1,2)	0.001	0.507	-0.14	0.461	0.141
(1,3)	-0.149	0.49	-0.281	0.478	0.132
(1,5)	0.086	0.531	-0.14	0.483	0.226

(6,20)	-0.659*	0.469	-0.402	0.504	-0.257
(1,20)	-0.573	0.466	-0.542	0.487	-0.031

Panel B. Losers

Public News	Informed Events		Uninformed Events		
Sample Size	268		187		
Day	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Difference(%)
-3	0.019	0.515	-0.037	0.481	0.056
-2	-0.017	0.474	-0.139	0.444*	0.122
-1	-0.215**	0.451*	-0.406***	0.396***	0.191
0	-7.66***	0***	-6.548***	0***	-1.112
1	-0.418**	0.396***	-0.046	0.481	-0.372
2	-0.004	0.485	0.102	0.455	-0.105
3	0.003	0.496	0.056	0.492	-0.052
4	0.028	0.489	0.078	0.508	-0.05
5	-0.16*	0.433**	0.03	0.535	-0.19
Window	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Difference(%)
(1,2)	-0.422**	0.429**	0.055	0.503	-0.477
(1,3)	-0.418*	0.451*	0.111	0.481	-0.529
(1,5)	-0.551**	0.44**	0.219	0.54	-0.769*
(6,20)	0.1	0.459*	-0.012	0.503	0.112
(1,20)	-0.451	0.455*	0.206	0.54	-0.657

Table 10. Abnormal return differences between informed and uninformed volume events, using a broader definition of news

This table presents the average daily abnormal returns and cumulative abnormal returns for the subsamples of informed and uninformed volume events. Informed events are defined as those accompanied by contemporary firm-specific or macroeconomic news disclosure. Day 0 is the day of the event when the large abnormal volume movements occur. Winners (Losers) are the subsamples where the day 0 stock returns are positive (negative). Stock return is calculated based on the mid-point of closing bid-ask prices adjusted for dividends. Abnormal return is calculated as a firm's daily return in excess of its return predicted by market model. Market model parameters are estimated from 205 through 6 trading days prior to the event day. Average abnormal return is calculated as the sum of the individual stock abnormal returns for that day divided by the number of observations. Cumulative abnormal return is formed by summing daily abnormal returns. Results are reported for various periods up to 20 days following an event. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Panel A. Winners					
Public News	Informed Events		Uninformed Events		
Sample Size	283		365		
Day	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Difference(%)
-3	-0.127	0.452*	-0.207	0.46*	0.08
-2	0.022	0.47	0.051	0.482	-0.03
-1	-0.015	0.481	0.165**	0.479	-0.18
0	4.036***	1***	1.727***	1***	2.309***
1	0.416***	0.569**	0.044	0.504	0.372**
2	0.138*	0.498	0.076	0.507	0.062
3	0.058	0.488	0.154**	0.512	-0.096
4	-0.084	0.484	-0.001	0.488	-0.083
5	-0.077	0.445**	-0.035	0.468	-0.043
Window	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Difference(%)
(1,2)	0.554***	0.548*	0.121	0.488	0.433*
(1,3)	0.612***	0.534	0.274**	0.512	0.337

(1,5)	0.451**	0.537	0.239	0.49	0.212
(6,20)	0.319	0.516	-0.051	0.46*	0.37
(1,20)	0.77**	0.548*	0.188	0.512	0.582
Panel B. Losers					
Public News	Informed Events		Uninformed Events		
Sample Size	302		334		
Day	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Difference(%)
-3	-0.12	0.474	-0.079	0.443**	-0.041
-2	-0.043	0.49	-0.188**	0.422***	0.145
-1	-0.122	0.467	-0.22**	0.455*	0.098
0	-3.168***	0***	-1.696***	0***	-1.472***
1	-0.05	0.477	-0.073	0.521	0.023
2	-0.091	0.434**	0.246	0.479	-0.337
3	-0.23**	0.437**	0.018	0.485	-0.248*
4	0.107	0.51	-0.076	0.494	0.183
5	-0.032	0.48	0.163	0.482	-0.195
Window	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Abnormal Return(%)	Proportion of Positive Abnormal Returns	Mean Difference(%)
(1,3)	-0.371*	0.45**	0.191	0.527	-0.562**
(1,5)	-0.296	0.483	0.278	0.521	-0.574*
(6,20)	-0.222	0.48	0.21	0.497	-0.432
(1,20)	-0.518	0.467	0.488	0.533	-1.006

Table 11. Regression results for price events

This table reports coefficients estimates of the following regression:

$$CAR_{i(m,n)} = \beta_0 + \beta_1 UND_i + \beta_2 AR_{0i} + \beta_3\ SIZE_i + \beta_4\ LEAK_i + \beta_5\ NAV_i + \beta_6\ SD_i + \beta_7\ AvgR_i + \beta_8 AvgV_i + \beta_9 MON + \beta_{10} JAN + \beta_{11} DEC + \varepsilon$$

Variables are defined as follows:

$CAR_{i(m,n)}$ = the cumulative abnormal return for firm i over a period starting m and ending n trading days after the event day;

UND_i = a dummy variable equals to one if no news is published for firm I on the event day or one day before, and zero otherwise;

AR_{0i} = the abnormal return for firm i on the event day;

$SIZE_i$ = the percentile ranking of firm i based on the firm's market value of equity calculated six days before the event day;

$LEAK_i$ = the abnormal return for firm i on the day before the event day;

NAV_i = the normalized abnormal volume for firm i on the event day;

SD_i = the standard deviation of firm i's returns over trading days 205 through 6 before the event day;

$AvgR_i$ = the average of firm i's returns over trading days 205 through 6 before the event day;

$AvgV_i$ = the average daily turnover of firm i over previous 66 trading days of the event;

MON = a dummy variable equals to 1 if the event occurred on Monday, and zero otherwise;

JAN = a dummy variable equals to 1 if the event occurred in January, and zero otherwise;

DEC = a dummy variable equals to 1 if the event occurred in December, and zero otherwise.

The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Panel A. Winners

CAR	Intercept	UND	AR_0	SIZE	LEAK	NAV	SD	AvgR	AvgV	MON	JAN	DEC	Adj R^2	F statistic
(1,2)	0.006	-0.0025	0.0022	-0.0029	-0.1373*	0.00005	-0.6416***	-3.9263***	3.904***	0.0023	0.0047	-0.0007	0.059	4.25***
(1,3)	0.0101	-0.0037	-0.0603	-0.0101	-0.0869	0.0002***	-0.3206	-4.0902***	3.5542***	0.0033	0.005	-0.0021	0.04	3.164***
(1,5)	0.0226*	-0.0045	-0.0381	-0.0213	-0.1415	0.0003***	-0.4277	-6.5493***	3.6004**	0.0056	0.0066	-0.0059	0.059	4.24***
(6,20)	0.0514**	-0.001	0.0452	-0.0406*	0.2198	-0.0001	-1.202**	-18.0572***	1.6935	-0.0028	-0.012	-0.0043	0.092	6.226***

(1,20)	0.074***	-0.0055	0.0071	-0.0618**	0.0783	0.0002	-1.6296**	-24.6065***	5.2939*	0.0028	-0.0055	-0.0102	0.125	8.405***

Panel B. Losers

CAR	Intercept	UND	AR_0	SIZE	LEAK	NAV	SD	AvgR	AvgV	MON	JAN	DEC	Adj R^2	F statistic
(1,2)	-0.0242**	0.005	-0.0053	0.0183	-0.1488	0.0001	0.5162*	-2.1297	-2.0161	0.0059	0.0014	0.0027	0.012	1.501
(1,3)	-0.0209*	0.0051	-0.0026	0.0184	-0.3371***	0.0001	0.5363*	-4.018***	-3.5916**	0.0084*	0.0047	0.0077	0.037	2.577***
(1,5)	-0.0169	0.0088**	0.0003	0.0163	-0.3544***	0.0002	0.2389	-6.0336***	-2.5632	0.0051	-0.0037	0.0041	0.037	2.583***
(6,20)	0.0232	0.0019	-0.0869**	-0.0396*	-0.0588	0.0001	-0.0805	-21.8175***	8.539***	-0.0037	0.0026	0.0017	0.17	9.446***
(1,20)	0.0063	0.0107	-0.0867**	-0.0232	-0.4132*	0.0003	0.1584	-27.8511***	5.9759*	0.0014	-0.0011	0.0058	0.162	8.979***

Table 12. Regression results for volume events

This table reports coefficients estimates of the following regression:

$$\mathrm{CAR}_{i(m,n)} = \beta_0 + \beta_1 \mathrm{UND}_i + \beta_2 \mathrm{AR}_{0i} + \beta_3\ \mathrm{SIZE}_i + \beta_4\ \mathrm{LEAK}_i + \beta_5\ \mathrm{NAV}_i + \beta_6\ \mathrm{SD}_i + \beta_7\ \mathrm{AvgR}_i + \beta_8 \mathrm{AvgV}_i + \beta_9 \mathrm{MON} + \beta_{10} \mathrm{JAN} + \beta_{11} \mathrm{DEC} + \varepsilon$$

Variables are defined as follows:

$\mathrm{CAR}_{i(m,n)}$ = the cumulative abnormal return for firm i over a period starting m and ending n trading days after the event day;

UND_i = a dummy variable equals to one if no news is published for firm I on the event day or one day before, and zero otherwise;

AR_{0i} = the abnormal return for firm i on the event day;

SIZE_i = the percentile ranking of firm i based on the firm's market value of equity calculated six days before the event day;

LEAK_i = the abnormal return for firm i on the day before the event day;

NAV_i = the normalized abnormal volume for firm i on the event day;

SD_i = the standard deviation of firm i's returns over trading days 205 through 6 before the event day;

AvgR_i = the average of firm i's returns over trading days 205 through 6 before the event day;

AvgV_i = the average daily turnover of firm i over previous 66 trading days of the event;

MON = a dummy variable equals to 1 if the event occurred on Monday, and zero otherwise;

JAN = a dummy variable equals to 1 if the event occurred in January, and zero otherwise;

DEC = a dummy variable equals to 1 if the event occurred in December, and zero otherwise.

The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Panel A. Winners

CAR	Intercept	UND	AR_0	SIZE	LEAK	NAV	SD	AvgR	AvgV	MON	JAN	DEC	Adj R^2	F statistic
(1,2)	0.0264***	-0.0068***	0.012	-0.0261***	-0.0805	0.00004	0.1981	-2.6061***	0.4962	-0.0019	-0.0029	-0.0033	0.036	3.172***
(1,3)	0.0285***	-0.0077***	-0.0376	-0.0268***	-0.0784	0.0001	0.3151*	-3.3375***	0.2729	-0.0039	-0.0013	-0.0024	0.034	3.082***
(1,5)	0.0488***	-0.0072**	-0.0084	-0.0442***	-0.0599	0.0001	-0.0298	-5.3592***	-0.2774	-0.0048	0.0009	-0.0057	0.043	3.628***
(6,20)	0.0447***	-0.0062	0.0222	-0.0448**	-0.1323	-0.0005	0.4951	-10.9383***	-1.2545	0.0034	-0.0074	0.0106	0.055	4.418***

(1,20)	0.0936***	-0.0134**	0.0137	-0.089***	-0.1922	-0.0005	0.4654	-16.2975***	-1.5319	-0.0014	-0.0065	0.0049	0.094	7.114***

Panel B. Losers

CAR	Intercept	UND	AR_0	SIZE	LEAK	NAV	SD	AvgR	AvgV	MON	JAN	DEC	Adj R^2	F statistic
(1,2)	-0.0055	0.0039	-0.0132	0.0058	0.0042	-0.0002	0.2997*	-1.2596	-2.7253**	-0.0022	0.0022	0.0123**	0.016	1.924***
(1,3)	-0.0017	0.0069**	-0.0172	0.0024	-0.0106	-0.0002	0.1597	-2.2987**	-3.3285***	-0.004	0.0011	0.0186***	0.042	3.546***
(1,5)	-0.0035	0.0076**	-0.0325	0.0011	-0.0193	-0.0002	0.2585	-4.0254***	-2.118	-0.0037	0.0001	0.0247***	0.036	3.148***
(6,20)	0.0274	0.01*	-0.2383**	-0.0435**	-0.1762	0.00001	-0.1139	-16.0735***	3.7204	0.0018	0.0093	-0.0141	0.076	5.768***
(1,20)	0.0239	0.0176***	-0.2708***	-0.0424*	-0.1955	-0.0002	0.1446	-20.0989***	1.6024	-0.0019	0.0094	0.0106	0.096	7.148***

Table 13. Portfolio strategy

This table reports the profits earned by portfolios of stocks experiencing both large price declines and abnormal volume increases on one day among the period beginning of January, 2011 to the end of November, 2014. Raw returns and market adjusted returns obtained by both feasible and theoretical strategies for various holding periods are presented. The trading strategy is short in informed losers and long in uninformed losers. The portfolio is equally-weighted. The feasible strategies assume that investors buy (sell) at the opening ask (bid) price of the day following the event, and sell (buy) at the closing bid (ask) price at the end of the holding period. The theoretical strategies assume that the investors initiate the trade at the end of the event day and trade at closing prices. The symbols *, ** and *** denote statistical significance at the 10%, 5% and 1% levels.

Holding Period	Portfolio	Feasible Strategy		Theoretical Strategy	
		Raw Returns (%)	Market Adjusted Returns (%)	Raw Returns (%)	Market Adjusted Returns (%)
(1,2)	Whole	1.675*	1.6*	2.661***	3.902***
	Informed	1.119	1.058	2.658**	2.597**
	Uninformed	2.621*	2.521*	6.221**	6.12**
(1,3)	Whole	2.753***	2.661***	3.612***	3.52***
	Informed	1.228	1.17	1.973**	1.914*
	Uninformed	5.344***	5.194***	6.399***	6.249***
(1,5)	Whole	1.919***	1.859**	2.515***	2.455***
	Informed	1.067	1.05	1.479*	1.462*
	Uninformed	3.367***	3.234***	4.275***	4.142***
(1,20)	Whole	0.437**	0.376**	0.554***	0.493**
	Informed	0.095	0.056	0.182	0.143
	Uninformed	1.02***	0.921***	1.187***	1.088***

Figure 1. Distribution of events by month

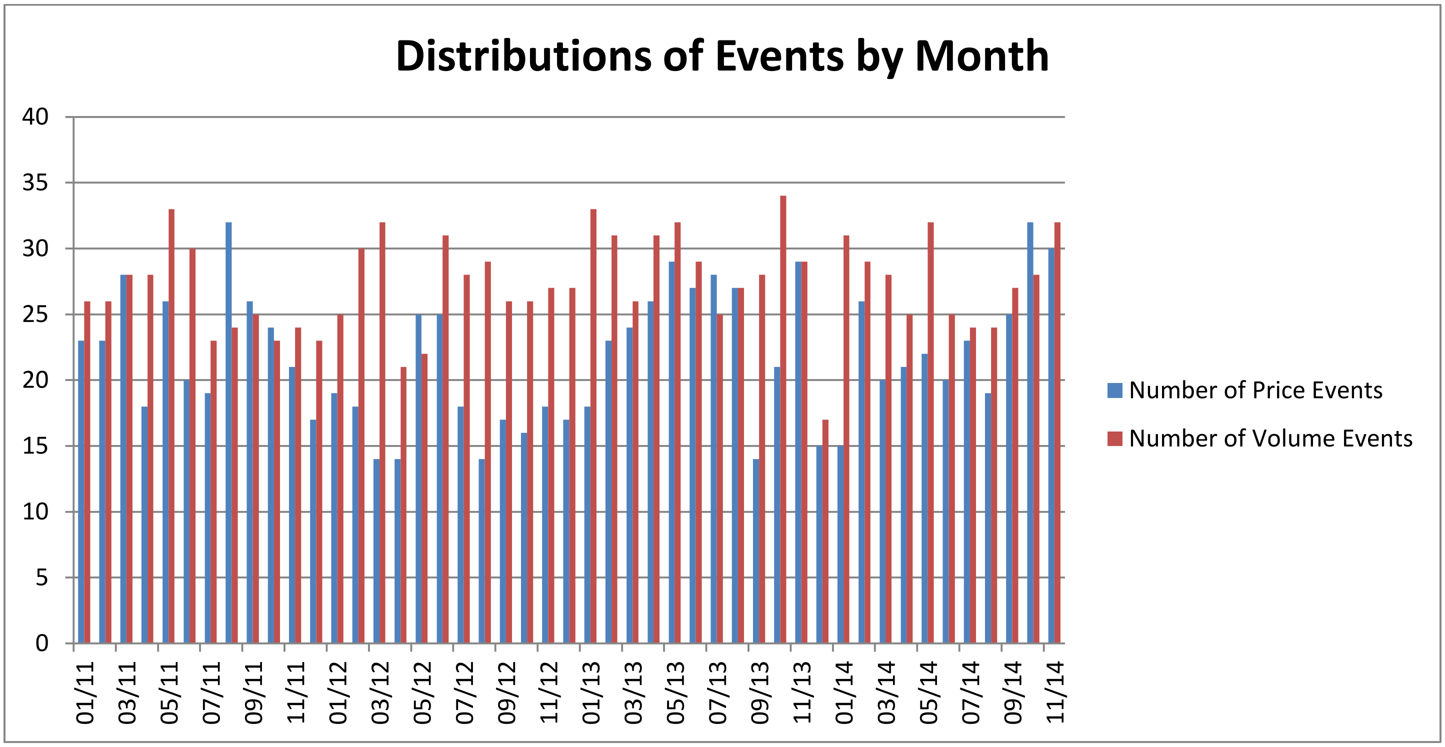
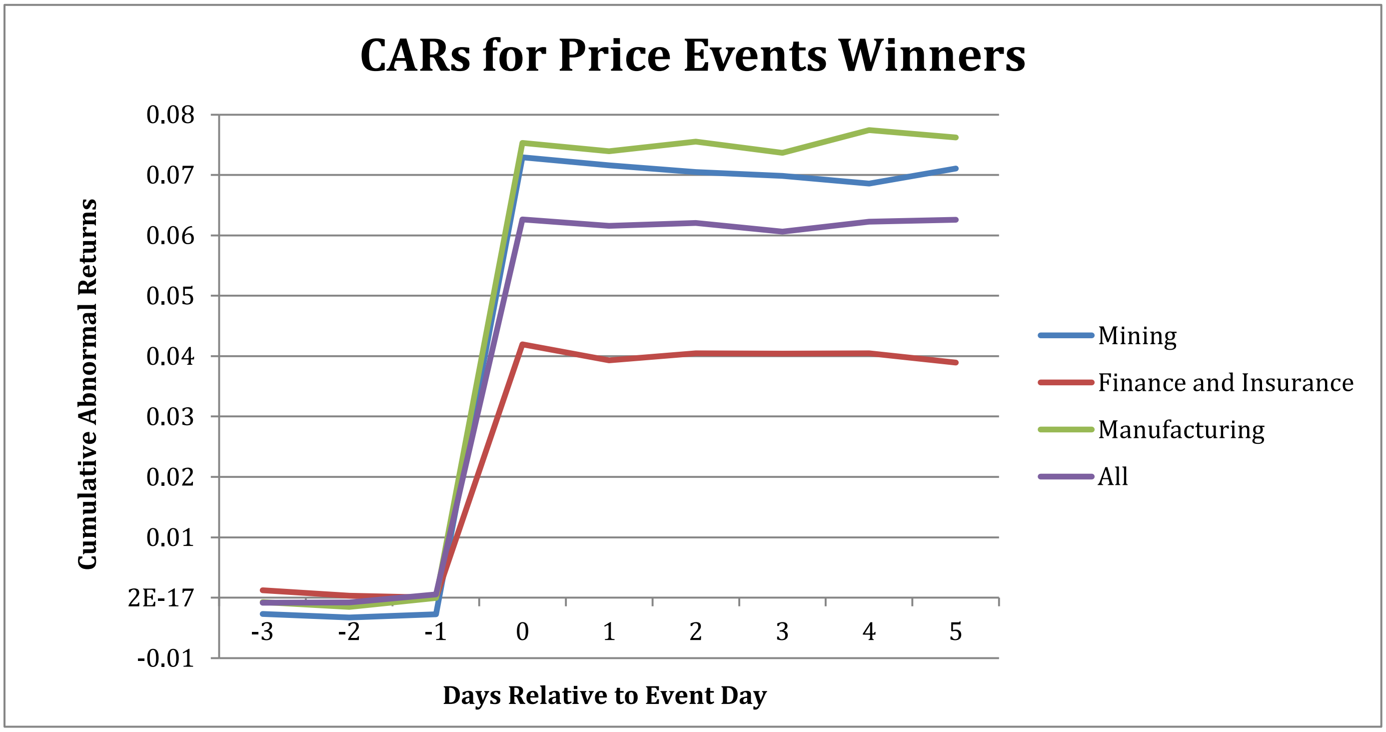
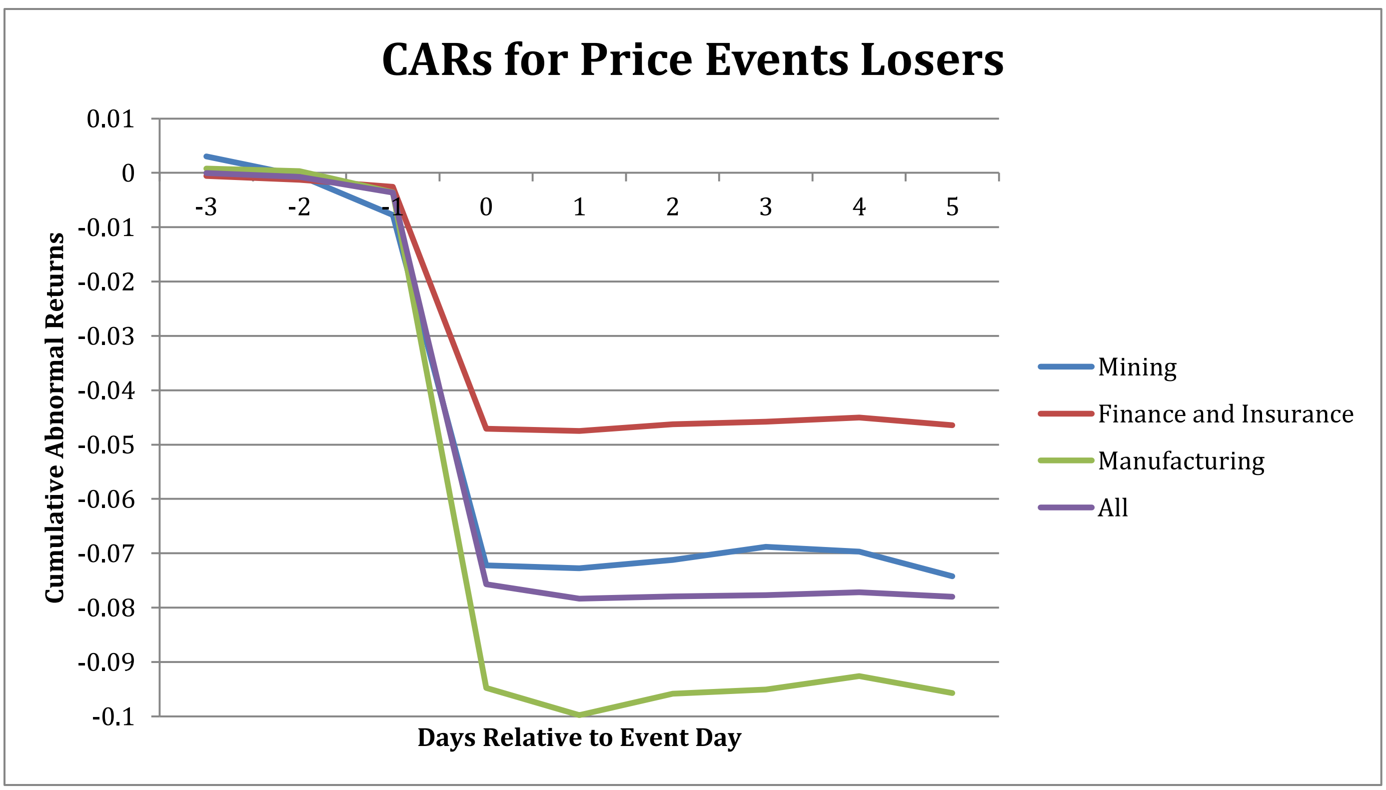
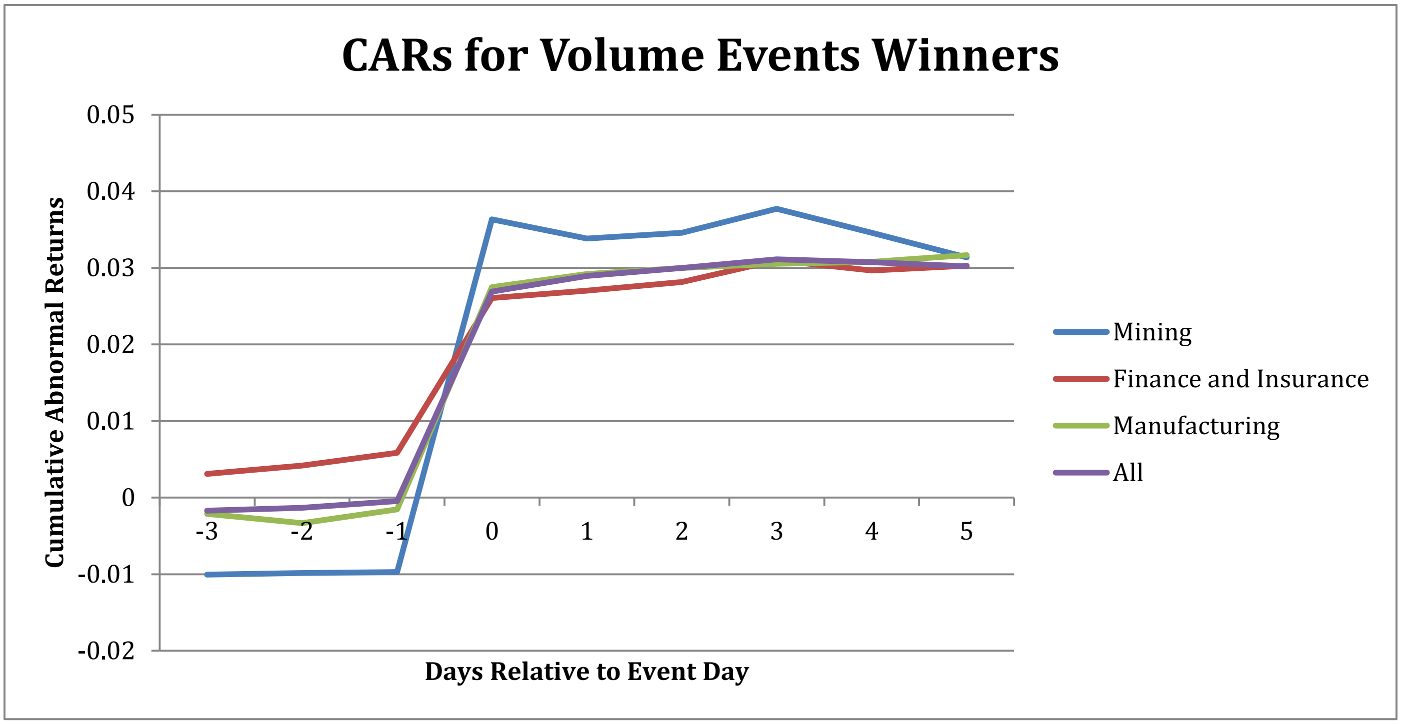


Figure 2. CARs for different industries






CARs for Volume Events Winners
Cumulative Abnormal Returns
0.05
0.04
0.03
0.02
0.01
0
-0.01
-0.02
-3
-2
-1
0
1
2
3
4
5
Days Relative to Event Day
Mining
Finance and Insurance
Manufacturing
All

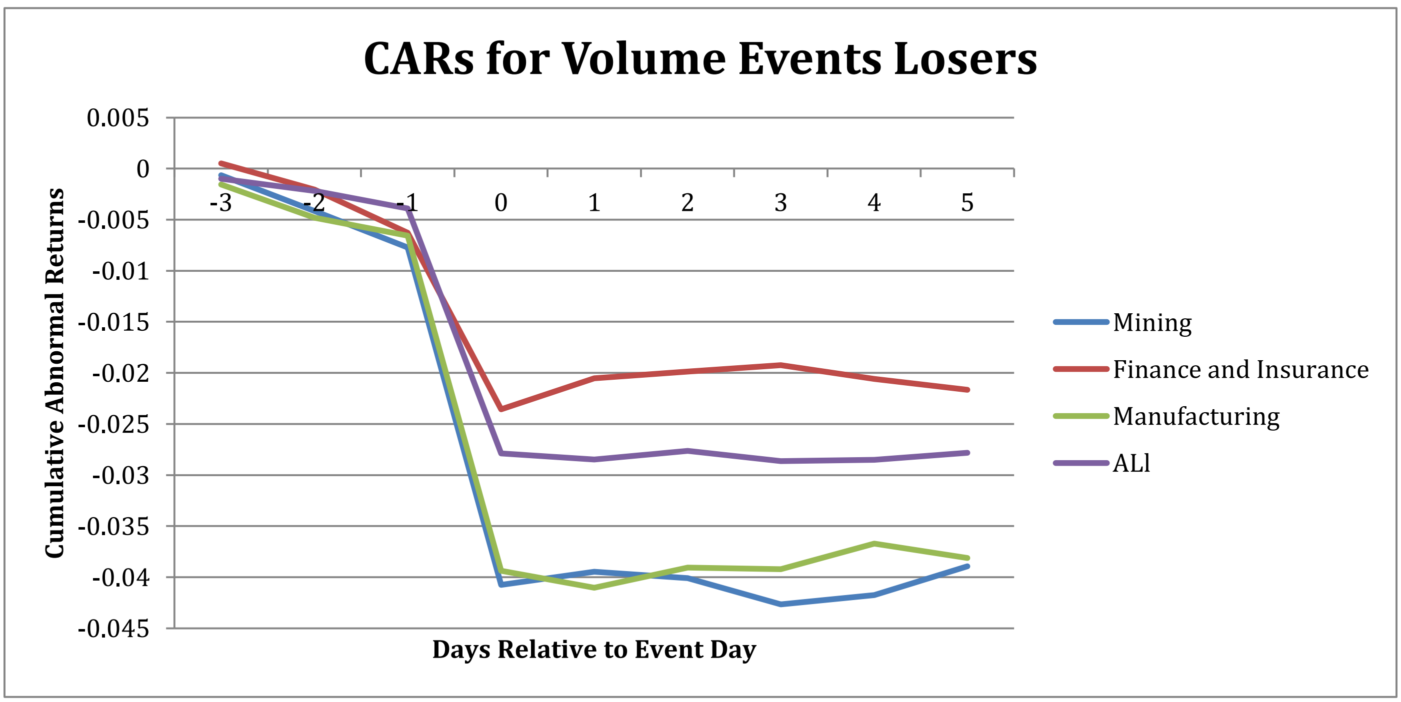
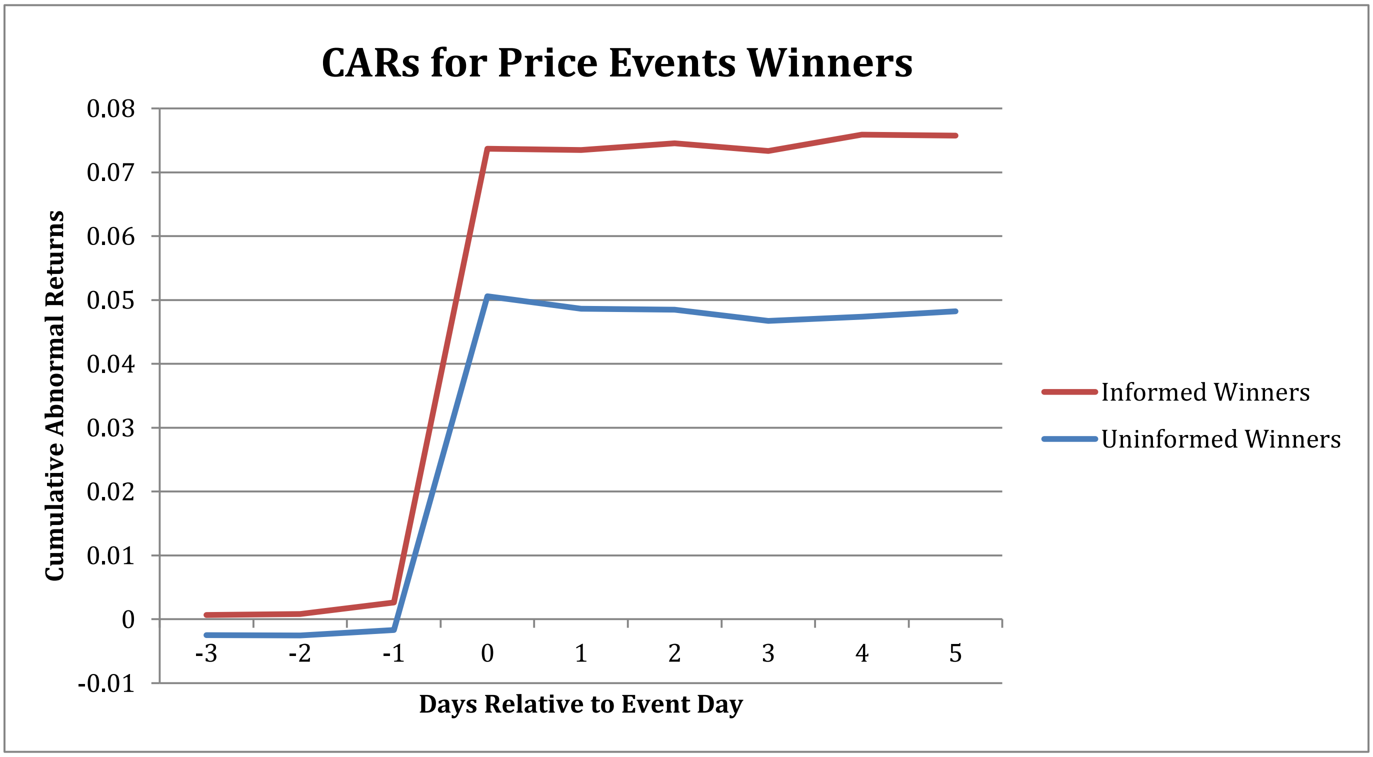

CARs for Volume Events Losers
Cumulative Abnormal Returns
0.005
0
-0.005
-0.01
-0.015
-0.02
-0.025
-0.03
-0.035
-0.04
-0.045
-3
-2
-1
0
1
2
3
4
5
Days Relative to Event Day
Mining
Finance and Insurance
Manufacturing
ALl

Figure 3. CARs for informed and uninformed price events



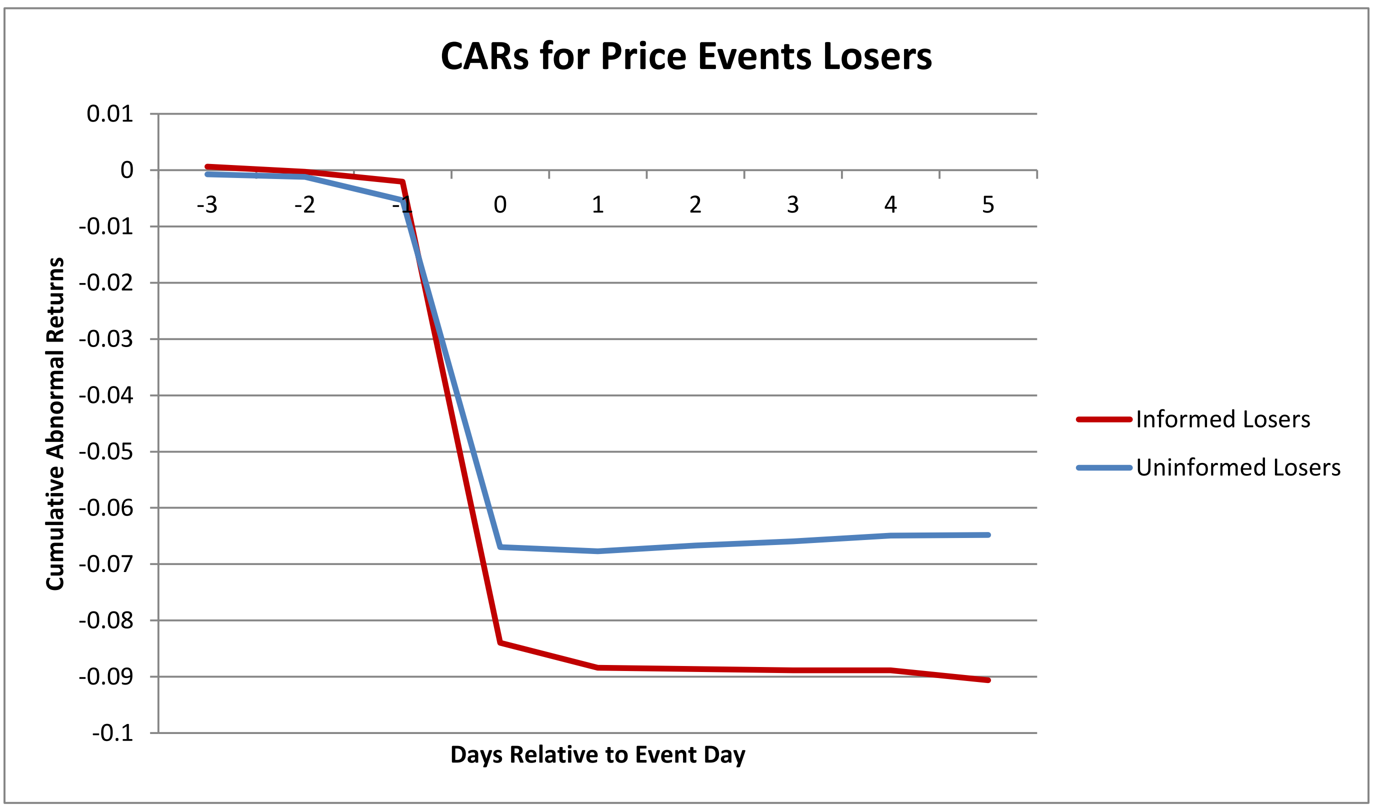


Figure 4. CARs for informed and uninformed volume events.