

Uddin, Faisal Sagheer; Azam, Muhammad

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*Corresponding author: Muhammad Azam, Department of Business Administration, Pakistan
E-mail: drizam@iqra.edu.pk

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Additional information is available at
the end of the article

FINANCIAL ECONOMICS | RESEARCH ARTICLE

Price-sensitive announcements and stock return anomalies: Evidence from Pakistan

Faisal Sagheer Uddin¹ and Muhammad Azam^{1*}

Abstract: The purpose of this study is to investigate the effect of price-sensitive announcements on stock return anomalies and the interaction effect of corporate announcements of firms with abnormal returns (AR). The study focused on 279 announcements for a period of two years from Jan-2016 till Dec-2017. The announcements were related to plant expansion, change in capital structure, change in ownership, and financial results. We adopted the event study methodology to calculate the Cumulative Abnormal Return (CAR) for the event window of 30 days (-15, +15). The study also used hierarchical moderated regression analysis to examine the moderating effect of corporate announcements on abnormal returns. The findings revealed that insiders received higher abnormal returns when they buy stocks before corporate announcements. The results also indicated that these returns are specifically related to purchases made before announcing plant expansion, financial results, and change in the capital structure. The study also exposed that insiders having prior information on corporate announcements can increase predictability and drive the return irrespective of the firms' operating business. The results provide more insight into the effectiveness of the Security and Exchange Commission of Pakistan (SECP) in curbing insider trading in the Pakistan Stock Exchange (PSX). The study recommends to the individual investors to diversify their investment to safeguard the returns.



Faisal Sagheer Uddin

ABOUT THE AUTHOR

Faisal Sagheer had his first degree in Commerce. Later on, he studied MBA (Finance). Afterward, he completed MPHIL (Business Finance). He has over six years of multi-industry experience at different positions, from lower management to top-level management. He has overall more than 15 years of experience. At present, he has been running his own business.

PUBLIC INTEREST STATEMENT

Individual investors are the backbone of any stock market. Their investment is considered to be of the utmost importance and must be protected. Governments and regulatory bodies, from time to time, make regulations to ensure investor protection. However, some individuals have price-sensitive content of information and use it to accumulate their wealth unethically. Therefore, harming others' returns further damages the overall sentiment of the stock market. This research is about unfolding the insider activities in the stock market concerning information asymmetry. This study found that price-sensitive information could lead to an anomaly if held with some individuals. The price-sensitive announcement that an inadequate regulatory policy framework can help activate the insiders' further damage the overall return of the securities. This study also proposes a tightened policy framework to safeguard small investors.

Subjects: Economics; Finance; Business, Management and Accounting

Key Words: price-sensitive announcements; stock return anomalies; abnormal returns; event study methodology

1. Introduction

Insider trading is a phenomenon used in the stock market, stating that the selected number of people is in the hold of some valuable, price-driven information. It can affect the security; therefore, informed traders are the individuals having that set of confidential information to execute their trades in accordance with earn Abnormal Returns (AR). (McInish & F., 2011) argued that returns are abnormally higher due to insider buying than the outsiders or their sales of the particular securities can also damage the security's performance abnormally. (Manouchehr Tavakoli et al., 2012) proposed that insiders are strong profit-takers having the power to predict the future returns of the stock. (Fishman & Hagerty, 1992) studied that informed trading can hit the market efficiency and providing abnormal returns to the insiders. (Whidbee, 2010) examined that insiders buy (sell) stocks when institutions are sellers (buyers), and the performances are disturbed accordingly. (Manouchehr Tavakoli, 2010), proposed that the insider trading concerning directors and management's share (buy/sell) and found that there is a positive forward trend of returns in terms of management's buying and selling of the stock. Insiders have the power to earn higher returns than outsiders using the content of information and making information asymmetry to make money (Fishman & Hagerty, 1992) (Mohammed Iqbal, 2018). Insider trading was studied by (McConnel, 1999), in which it concluded that informed buying has a positive effect on the stock price. (Cespa, 2008) (Kavita Chavali, 2016) suggested the methodology of the event with the same context and found validating results.

Previous studies in this regard have undergone that relating to price inefficiency that can be observed with informed trades subsequently damages the stocks' overall return. (Fishman & Hagerty, 1992) examined that under certain circumstances, insider trades lead to a more inefficient price. Two primary arguments are discussed with relates to informed trading. First is in favour, stating that informed trading leads to higher returns, further leading to new price discoveries that are considered healthy for the security in specific and the market in general (Olivier, 2008). The second view, on the other part, argues that informed trading may harm the compelling market outsiders take out their capital because insider accumulated abnormal returns and damaging the overall sentiment of the security in particular and market in general (Qi Chen, 2007) (Antoniadis, 2015).

The present study identified the problem posed by the insiders to the efficiency of the market and the returns consequently. Therefore, the studied problem developed is to look into the patterns in abnormal returns earned by the insiders before/after corporate announcements. The rise of the phenomenon within the Pakistan stock market context holds real importance as the material content of information. It has been previously used by some insiders to animalize the security return (NATION, 2013) (Transparency International Pakistan, 2018). They highlighted the issues related to insider trading in PSX, where insider activity had been reported and taken up by the concerned authorities. The regulatory body took measures to ensure transparency in the market see (SECP, 2013).

The study offers several folds; first, it will contribute to and extend the literature by reconsidering insider trades' content with a different perspective using a different and more recent data set from Jan-2016 till Dec-2017. Unlike previous work (Emanuele Bajo & Petracci, 2006), where buying and selling of corporate insiders are examined and treated. Informed traders, having available information, trade with more aggression than the others who trade with caution (Matthias Sutter, 2012). Second, it will check the part of abnormality in return that deviated from the market return. Finally, it will check the signalling theory of event study comprising events during the research period that could lead to price discovery, unlike previous studies. It focuses on all the events reported during the period (Shireen Rosario, 2016). Daily stock returns were studied by (Brown, 1985). They were found

viable to test an event study methodology, however different from traditional ways yet quite helpful in measuring in daily excess returns and variations in regular returns.

1.1. Regulatory framework on insider trading

The businesses communicate all categories of information at the exchange regulated by the Securities and Exchange Commission (SEC). (Viktoria Dalko & Wang, 2016), examined law ineffectiveness with insider trading and showed that the monopoly of insider trades damages the effectiveness of the returns. In the Pakistani context, the stock exchange is regulated by the Securities and Exchange Commission of Pakistan (SECP), which was established in 1997 under the SECP Act 1997 and became operational in 1999 to safeguard and secure the investors' interest. However, while having the presence of these regulatory bodies worldwide, it is hard to restrict insiders from making an abnormal profit (SECP, 2017). The role of the regulatory body becomes so essential to restrain any abnormality in returns. Therefore, the Securities and Exchange Commission of Pakistan (SECP) prescribed and defined the laws to avoid any discrepancies in the market regarding security return.

2. Review of literature and hypotheses

(Razaz Felimban et al., 2018), tested the signaling theory with the GCC market where the presence of less gain on capital with low-income tax is a part of the market and found the supporting evidence with the signaling theory. (Lawrence Kryzanowski, 2018), examined informed trading around Bio-Tech Merger and Acquisition tested the fall in price caused by the overall downturn in the market except for the probability in informed trading. Wen (2018) studied the options concerning its spread and volatility for the window of five days before the spin-off and observed that the abnormal returns during the spin-off announcements could be predicted, stating the insiders' presence within the options market. (Shireen Rosario, 2016) suggested that as far as the Oman market is concerned, the companies listed on Muscat Stock Exchange announce dividends only once a year, making it entirely predictable for the investors. (Sunderman, 2014), examined the stock price patterns based on the insider information and concluded that the reaction of the market towards the mergers starts occurring before the announcement of the anticipated merger. (Emanuele Bajo & Petracci, 2006) found the change in stock holdings of the insiders, which caused abnormality in returns.

In contrast, negative abnormal returns entailed the selling of strategy adopted by the insiders. (Scholes, 1972), studied the price effect and examined that stock price move when the seller may have non-public information and found that on average, share prices fall with the reflection of the data. (Mathur, 1989) proposed that merger activities play a crucial role in the expansionary economic activities, which increases the stock price besides. (Fama, 1969), examined the Theory of Efficient Markets and concluded that proof in a daily change in stock price and return. The author also found that the relationship does not have enough importance to reject efficient markets.

2.1. Corporate announcements animalize the security returns

Many studies have shown the relation between stock return and the price changes caused by public announcements (Arulsulochana, 2019). Thus the paper aims to examine the relationship affected by different categories and types of announcements in Pakistan stock exchange (PSX.) The study covers public announcements related to Expansion, Capital, Financial and Board change, issued by companies listed in PSX.

2.2. Expansion impacts the stock return

(Sheng-Syan Chen et al., 2013), argued that price reacts to announcements of investment in R&D and found that companies have positive AR in the period when the company announces new projects. Therefore, the hypothesis for the study is;

Hypothesis 1 *Corporate announcements related to expansion have a significant impact on abnormal return.*

2.3. Change in capital structure impacts the stock return

(Pawan Jain, 2014) conducted a study on BSE in 2014 over merger announcements, categorized mergers into two segments, i.e., industry and non-industry mergers. He concluded that insiders were active on non-public information specifically on industry mergers; however, this case was not observed during the non-industry mergers. Therefore, the hypothesis for the study is;

Hypothesis 2 Corporate announcements related to change in capital structure have a significant impact on abnormal returns.

2.4. Financial results impact the stock return

(Kavita Chavali, 2016) examined the stock returns around the dividend announcement in Muscat stock exchange and found that as in Oman. The dividend announcement happens once a year, which makes it crucial to link with the stock price. Therefore,

Hypothesis 3 Corporate announcements related to financial reports have a significant impact on abnormal returns.

2.5. Change in the executive board impacts the stock return

(Adriana Korczak et al., 2010) found that insiders can benefit from board changes and concluded that profits extracted from board change announcements such as directors appointed with a bad reputation. Therefore, the insiders sell out their capital to make AR. Thus, the study designs the hypothesis;

Hypothesis 4 Corporate announcements related to ownership change have a significant impact on abnormal return.

These altogether comprised of the study, encompassing all events limited to the hypotheses, and the author is trying to generate a causal relationship of abnormal return concerning insider's phenomenon.

3. Methodology, design, and sample of the study

The term insiders cannot be measured by only purchase/sale made by the Insiders. (Suryanto, 2015), studied the abnormality in returns through the value of the average abnormal return (significant) when debt rating increased by Fitch rating agency. (Strong, 1992) argued that event study methodology is a well-defined medium to extract abnormal returns. Therefore, abnormal returns are calculated through the expected return market model developed through the Capital Asset Pricing Model (CAPM) by (Sharpe, 1964) and (Lintner, 1965) as;

$$E(R_{it}) = \alpha + \beta R_{mt} + \varepsilon_{it} \quad (1)$$

where $E(R_{it})$ is the expected return of the security calculated using the Risk-adjusted return model. α and β in the equation are the intercept and coefficient, respectively, estimated separately through the estimation window. R_{mt} is the return of the market calculated through the benchmark index (KSE-100) return at day t . After that, abnormal returns are calculated as;

$$AR_{it} = R_{it} - E(R_{it}) \quad (2)$$

where AR is the Abnormal Return of security i at day t , calculated by subtracting Equation (1) from the daily return of the security.

$$CARit = \sum_{T=T_1}^{T_2} ARit \quad (3)$$

Afterward, Cumulative Abnormal Return is calculated by summing up all the abnormal returns of security i from time t_1 to t_2 .

Further, the Average Abnormal return and the Cumulative Average Abnormal Return are also calculated by averaging the values of AR and CAR, respectively, and the equation below is the mathematical representation of calculation;

$$AARit = \frac{1}{N} \sum_{T=T_1}^{T_2} ARit \quad (4)$$

where AAR is the Average Abnormal Return of security i at time t. It is calculated by summing up all the AR and dividing it by the number of observations of the ith stock.

$$CAARit = \frac{1}{N} \sum_{T=T_1}^{T_2} CARit \quad (5)$$

After that, Cumulative Average abnormal Returns (CAAR) is calculated by summing up all CAR and dividing it with the total number of observations of the i security at time t in the study. Later on, the significance level is tested through T-statistics that is calculated as;

$$TAAR = AAR \div \frac{S}{\sqrt{N}} \quad (6)$$

$$TCAAR = CAAR \div \frac{S}{\sqrt{N}} \quad (7)$$

where S is the sample standard deviation, and N is the sample size.

We adopted the event study methodology to calculate the Cumulative Abnormal Return (CAR) for the event window of 30 days (-15, 0, +15). The 0 days for the announcement during the trading hour (between 09:30, 15:30 GMT+5 h) will be the same, while 0 days for the announcement after the trading hours will be the next trading day (MacKinlay, 1997). If the estimation window is too long, the forecast structure may change. If the estimation window is too short, the results will be biased. To improve the forecast accuracy as much as possible, we selected 30 trading days. The study focused on 279 announcements for a period of two years from Jan-2016 till Dec-2017. The announcements were related to plant expansion, change in capital structure, change in ownership, and financial results. Data were categorized into main variables, i.e., information, historical price, and KSE-100 closing, and based on these, abnormal returns were calculated. The insiders that cause abnormal returns also pose a challenge to the market and the expected return model. A change in this regard is required to test the abnormality in expected returns. Therefore, four hypotheses were established, considering all factors related to the information category and the control variables that might affect the returns during the announcement and could be price sensitive.

$$CARDAY(-15, -1) = \alpha + \beta_1EPS + \beta_2ROA + \beta_3ROE + \beta_4DY + \beta_5PS + \beta_6Risk + \beta_7Liquidity + \beta_8PSA + \beta_9Risk * PSA + \beta_{10}Liquidity * PSA + e$$

3.1. Dependent variable

$CARDAY(-15, -1)$ = Cumulative abnormal return of firm i, before the press release (day - 15, day - 1)

$$CARit = \sum_{T=T_1}^{T_2} ARit$$

Cumulative Abnormal return is calculated by summing up all the abnormal returns of security i from time t_1 to t_2 . Where AR is the Abnormal Return of security i at day t , calculated by subtracting the expected rate of return from the daily return of the security.

3.2. Independent variables

$RISK = \text{Beta of firm } j, \text{ in year } t$

$LIQUIDITY(J, T) = \text{The number of stock trades of firm } j \text{ as a percentage of the total number of shares traded in KSE} - 100$

3.3. Control variables

$EPS_{j,T} = \text{Earnings per share of firm } j, \text{ at year } t, \text{ divided by the share price of firm } j, \text{ in year } t$

$ROA_{j,T} = \text{Return on assets of firm } j, \text{ in year } t$

$ROE_{j,T} = \text{Return on equity of firm } j, \text{ in year } t$

$PS = \text{Ratio of share price to total sales of firm } j, \text{ in year } t$

$DY(J, T) = \text{Dividend per share of firm } j, \text{ at year } t, \text{ divided by the share price of firm } j, \text{ in year } t$

3.4. Corporate news variables

$PSA_{j,T} = \text{Total Price-sensitive announcements made in the Two years by firm } j; \text{ and a set of dummy variables to identify the type of corporate announcement:}$

$EXPANSION_{j,T} = \text{Dichotomous variable: 1 if there is corporate news about the corporate restructuring of firm } j \text{ on day } k, \text{ and zero otherwise;}$

$CAPITAL_{j,T} = \text{Dichotomous variable: 1 if there is corporate news about changes in the capital structure of firm } j \text{ on day } k, \text{ and zero otherwise;}$

$FINANCIAL_{j,T} = \text{Dichotomous variable: 1 if there is corporate news about financial results of firm } j \text{ on day } k, \text{ and zero otherwise;}$

$OWNERSHIP - CHANGE_{j,T} = \text{Dichotomous variable: 1 if there is corporate news about changes in the board of directors or senior administrators at firm } j \text{ on day } k, \text{ and zero otherwise;}$

(Kraus, 1981) argued that insiders have the edge over average returns of the portfolios. Despite identifying all profitable trades by insiders, they cannot outperform the outsiders in all of their businesses. Therefore, the insiders' measurement is changed and treated as abnormality in return caused by the insiders. The link between abnormal return and insider trade has been established as markets are yet to claim to be energetically efficient to the information. However, the companies selected in the study having information only related to the expansion projects announced, change in capital structure, financial results, and change in ownership.

4. Results and discussion

Table 1 lists the companies and the related announcement details, and Table 2 presents the detailed description of the announcements. The study segregated the companies according to the sectors they are operating into. Further, a comparative analysis is undertaken to capture the effect of abnormal return in the paper's findings section.

4.1. Testing of hypotheses

The study established four Hypotheses altogether related to corporate announcements of the firms. The study encompasses a total of 279 corporate announcements, of which 53 associated with the expansion activities, 19 consisting change in capital structure, 153 were related to the financial events, and 54 were about ownership events announced by the firms during the study

Table 1. Sector-wise announcements

SECTOR	EXPANSION	CAPITAL	FINANCIAL	OWNERSHIP	TOTAL
OIL & GAS EXPLORATION	34	4	23	13	74
PHARMA CEUTICAL	0	3	23	7	33
CEMENT	4	4	20	4	32
REFINERY	3	2	14	9	28
GENERAL INDUSTRIES	2	0	9	0	11
STEEL	1	0	9	0	10
FERTILIZER	0	1	8	8	17
CHEMICAL	2	1	8	5	16
INSURANCE	1	0	7	0	8
AUTOMOBILE	2	0	8	1	11
POWER GENERATION	0	1	8	3	12
TRANSPORT	0	1	8	1	10
PACKAGING	4	2	8	3	17
TOTAL	53	19	153	54	279

Table 2. Category-wise announcements

Category	Description of announcements	Number
FINANCIAL	Number of Dividend announcements during the period	153
CAPITAL	Number of Merger announced during the period	8
	Number of Acquisition announcements during the period	9
	Number of Rights issued during the period	2
EXPANSION	Number of production enhancement announcements	10
	Number of new explorations announced during the period	40
	Announcements related to the installation of new machinery	3
OWNERSHIP	Number of announcements about Board member/executive/ chairman change	54

period. Further, separate analysis for AAR and CAAR is calculated for the individual events, and results are discussed after that. Table 3 reports CAAR for all the events and provides an evidence t-values' insignificance concerning CAAR for all days, except on day 4.

Table 4 reports the AAR and CAAR during the expansion projects were, on the event day, the AAR stood at 0.83%, whereas CAAR came out at 2.98% having significant T-value. The event window was split into two parts as Post-Event and Pre-Event, each comprising of 15 days. In the Post-Event window, AAR was observed stable and ranging between 0.36% at day +1 to -0.27% at day +15.

Table 3. All price-sensitive ANNOUNCEMENTS

EVENT DAY		0.15	0.39	0.54	0.38				
PRE-EVENT					POST-EVENT				
DAYS	AAR	T-STAT	CAAR	T-STAT	DAYS	AAR	T-STAT	CAAR	T-STAT
-1	0.11	0.36	0.51	0.64	15	-0.18	-1.00	-0.57	-1.08
-2	0.11	0.53	0.17	0.02	14	-0.09	-0.43	-0.41	-0.78
-3	-0.07	-0.55	-0.23	-0.94	13	0.20	0.94	0.57	0.72
-4	0.23	1.42	0.87	1.46	12	0.15	0.66	0.29	0.22
-5	-0.12	-0.62	-0.08	-0.30	11	0.20	0.71	0.60	0.52
-6	-0.01	-0.23	-0.11	-0.49	10	-0.06	-0.40	0.04	-0.19
-7	0.06	0.13	0.13	-0.05	9	0.18	0.98	0.39	0.50
-8	0.15	0.88	0.53	0.79	8	-0.10	-0.89	-0.08	-0.64
-9	0.20	0.92	0.71	0.88	7	0.01	-0.14	0.01	-0.36
-10	0.63*	2.80*	1.88*	2.77*	6	0.04	0.05	0.52	0.56
-11	0.19	0.85	0.55	0.66	5	-0.15	-0.99	-0.34	-0.92
-12	0.00	-0.17	-0.02	-0.30	4	-0.40	-1.87	-1.09*	-1.98*
-13	0.06	0.17	0.03	-0.33	3	-0.04	-0.29	0.17	0.01
-14	-0.26*	-2.19*	-0.64*	-2.17*	2	0.00	-0.12	0.28	0.13
-15	-0.21	-1.35	-0.42	-1.10	1	-0.02	-0.19	0.27	0.13

Table 4. Expansion announcements

EVENT DAY		0.83	1.54	2.98*	2.05*				
PRE-EVENT					POST-EVENT				
DAYS	AAR	T-STAT	CAAR	T-STAT	DAYS	AAR	T-STAT	CAAR	T-STAT
-1	-0.60	-1.83	-0.97	-1.26	1	0.36	0.67	0.97	0.94
-2	1.05	1.92	1.58*	2.03*	2	0.25	0.52	-0.40	-0.40
-3	-0.10	-0.21	0.21	0.24	3	0.24	0.58	-0.54	-0.65
-4	0.27	0.65	0.73	0.99	4	-0.94	-1.77	-2.64*	-2.87*
-5	0.51	1.08	-0.12	-0.17	5	-0.41	-0.82	-0.51	-0.66
-6	-0.27	-0.40	0.54	0.52	6	-0.11	-0.19	0.87	0.99
-7	0.02	0.08	-0.58	-0.58	7	0.15	0.44	-0.14	-0.17
-8	0.88*	2.00*	0.70	0.90	8	-0.62	-1.30	-0.61	-0.82
-9	0.97	1.90	0.90	0.94	9	-0.27	-0.76	-0.96	-1.36
-10	0.67	1.47	2.22*	2.10*	10	-0.73	-1.48	-0.85	-1.31
-11	0.08	0.19	0.11	0.13	11	-0.24	-1.62	-0.21	-0.50
-12	0.37	0.80	0.16	0.18	12	-0.19	-0.32	0.40	0.49
-13	-0.96	-1.87	-1.18	-0.92	13	-0.54	-1.19	-1.84*	-2.36*
-14	-1.13*	-2.66*	-1.42*	-1.97*	14	-0.15	-0.41	0.03	0.04
-15	0.33	0.83	0.09	0.10	15	-0.27	-0.58	0.49	0.48

Under the Pre-Event window, not much abnormality is found as well concerning AAR, although T-values are significant at day -14 and -8. However, CAAR in both Post-Event and Pre-Event windows reported abnormally fluctuated values ranging from 0.97% at day 1% to 0.49% at day +15. In the Pre-Event window, the values ranged from -0.97% at day -1% to 0.09% at day -15, having significant T-Values at day -2 and -10.

Table 5 reports the AAR and CAAR during the announcements of change in the Capital structure, where on event day, the AAR stood at -0.67% , whereas CAAR at 1.04% . The event window was split into two as Post-Event and Pre-Event, each comprising of 15 days. In the Post-Event window, AAR was observed stable, ranging between -0.38% at day +1 to 0.22% at day +15 with significant T-value at day 7, whereas under the Pre-Event window not much abnormality is observed as well for AAR. However, CAAR in both Post-Event and Pre-Event windows reported abnormally fluctuated values ranging from -0.85% at day 1 to 0.65% at day +15, and in the Pre-Event window, the values ranged from 0.53% at day -1 to -0.48% at day -15 .

Table 6 tests Hypothesis 3 and reports the AAR and CAAR during the financial announcements, where day 0 is the event day when the information was communicated to the exchange. On event day, the AAR stood at -0.29% , whereas CAAR t at -0.03% . The event window was split into two as Post-Event and Pre-Event, each comprising of 15 days. In the Post-Event window, the value of AAR was observed between -0.04% on day +1 and -0.27% at day +15. The Pre-Event window, AAR, is found to be around -0.11% to 0.15% with significant T on day -10 . However, CAAR in both Post-Event and Pre-Event windows also reported not to fluctuate much-having values ranging from -0.13% at day 1 to -2.14% at day +15 and in Pre-Event window the values ranged from 1.17% at day -1 to -0.84% at day -15 having significant T-Values at days -10 and +15.

Table 7 tests Hypothesis 4, which stated the change in ownership and reported the AAR and CAAR, where day 0 is the event day when the information was communicated to the exchange. On event day, the AAR value is 0.00% , whereas CAAR t at -1.19% . The event window was split into two as Post-Event and Pre-Event, each comprising of 15 days. In the Post-Event window, the value of AAR was observed between -0.05% at day +1 to 0.07% at day +15. However, in the Pre-Event window, AAR is found to be around 0.34% to 0.04% . However, CAAR in Post-Event and Pre-Event windows reported being fluctuated having values ranging from 0.24% at day 1 to $+0.12\%$ at day +7 and 1.45% at day +12 although settled at 0.36% at day +15 and in Pre-Event window the values ranged from 0.53% at day -1 to -0.57% at day -15 .

Table 5. Capital announcements

EVENT DAY	0.67	1.42	1.04	1.71					
PRE-EVENT					POST-EVENT				
DAYS	AAR	T-STAT	CAAR	T-STAT	DAYS	AAR	T-STAT	CAAR	T-STAT
-1	0.17	0.54	0.53	0.66	1	-0.38	-0.42	-0.85	-0.99
-2	-0.19	-0.07	0.11	0.40	2	-1.33	-1.93	-1.73	-1.49
-3	0.11	0.59	-0.12	0.04	3	-0.46	-1.39	-0.69	-1.51
-4	-0.04	0.19	-0.70	-0.52	4	-0.19	-0.10	-0.01	0.23
-5	0.27	0.59	-0.32	-0.14	5	-0.18	-0.09	-0.44	-0.76
-6	-0.79	-1.34	-1.25	-1.13	6	-0.17	-0.08	-0.09	0.11
-7	-0.59	-0.98	-1.08	-1.28	7	-0.35*	-2.05*	-0.48	-1.88
-8	-0.02	0.30	-0.23	-0.12	8	0.41	1.05	1.18	1.36
-9	-0.19	-0.14	-0.41	-0.69	9	-0.12	0.08	-0.21	-0.10
-10	0.22	1.19	0.67	1.72	10	-0.20	-0.30	-0.21	-0.21
-11	0.15	0.67	0.48	0.86	11	-0.36	-0.29	-0.20	-0.05
-12	-0.58	-0.65	-0.39	-0.26	12	-0.48	-1.52	-0.75	-1.53
-13	-0.39	-0.62	-0.13	0.03	13	0.22	1.03	0.49	0.95
-14	0.05	0.42	0.45	0.71	14	0.05	0.39	0.60	0.83
-15	-0.15	0.01	-0.48	-0.33	15	0.22	0.87	0.65	1.19

Table 6. Financial announcements

EVENT DAY	-0.29	-0.25	-0.03	-0.22					
PRE-EVENT					POST-EVENT				
DAYS	AAR	T-STAT	CAAR	T-STAT	DAYS	AAR	T-STAT	CAAR	T-STAT
-1	0.15	1.05	1.17	1.12	1	-0.04	-0.31	-0.13	-0.19
-2	-0.07	-0.89	-0.59	-0.84	2	0.28	1.07	1.81	0.92
-3	-0.04	-0.52	-0.35	-0.52	3	-0.05	-0.43	-0.30	-0.34
-4	0.25	1.31	1.96	1.32	4	0.00	-0.29	-0.12	-0.35
-5	-0.05	-0.31	-0.44	-0.32	5	-0.11	-0.98	-1.04	-1.18
-6	-0.06	-0.68	-0.58	-0.76	6	-0.11	-1.18	-0.77	-1.05
-7	0.13	0.63	0.80	0.49	7	-0.01	-0.26	-0.14	-0.31
-8	0.17	0.96	1.29	0.98	8	-0.10	-1.02	-0.63	-0.87
-9	0.09	0.34	0.61	0.32	9	0.19	1.31	1.58	1.46
-10	0.36*	2.53*	2.77*	2.64*	10	-0.05	-0.47	-0.24	-0.34
-11	0.10	0.48	0.76	0.53	11	0.25	1.13	1.89	1.06
-12	-0.04	-0.48	-0.22	-0.39	12	0.00	-0.26	-0.16	-0.42
-13	0.19	1.51	1.45	1.55	13	0.25	1.39	1.85	1.33
-14	-0.13	-1.40	-0.94	-1.31	14	-0.19	-0.88	-1.62	-0.94
-15	-0.11	-1.08	-0.84	-1.06	15	-0.27*	-2.27*	-2.14*	-2.35*

Table 7. Ownership announcements

EVENT DAY	0.00	-0.48	-1.19	-1.26					
PRE-EVENT					POST-EVENT				
DAYS	AAR	T-STAT	CAAR	T-STAT	DAYS	AAR	T-STAT	CAAR	T-STAT
-1	0.34	0.37	0.53	0.54	1	-0.05	-0.54	0.24	0.21
-2	0.29	0.35	-0.15	-0.21	2	-0.35	-1.09	-1.09	-0.89
-3	0.05	-0.22	-0.73	-0.81	3	0.42	0.87	0.76	1.24
-4	0.05	-0.30	-0.56	-0.69	4	-0.34	-1.15	-1.91	-1.62
-5	-0.02	-0.40	-1.24	-0.86	5	0.22	0.27	0.49	0.76
-6	0.07	-0.30	0.78	0.95	6	0.44	0.72	1.03	0.73
-7	-0.05	-0.72	0.16	0.18	7	0.36	0.38	0.12	0.08
-8	0.05	-0.25	-0.44	-0.54	8	-0.10	-0.63	-0.23	-0.30
-9	0.17	0.05	0.58	0.55	9	0.28	0.28	0.68	0.63
-10	0.56	0.84	0.68	0.52	10	0.13	-0.08	1.04	1.09
-11	0.58	0.87	0.41	0.42	11	0.57	0.78	-0.04	-0.07
-12	0.30	0.41	0.17	0.24	12	0.94	1.56	1.45	1.16
-13	-0.43	-1.77	-0.36	-0.67	13	0.45	0.60	0.10	0.07
-14	-0.37	-1.86	-0.22	-0.40	14	0.15	0.00	0.25	0.31
-15	0.04	-0.40	-0.57	-0.76	15	0.07	-0.22	0.36	0.37

The authors also estimated CAR values with different window settings at day (-5, +5). (-3, +3) and (-1, +1) to check the overall effect of the return and its pattern. Table 8 represents the CAR window and the returns during the announcements. Returns at a specified setting ranged from negative 2.47% to negative 4.16% in the window of -5, +5 stating the overall selling-off. Whereas

Table 8. CAR estimation		
CAR (-5 + 5)	CAR (-3 + 3)	CAR (-1 + 1)
-4.16%	4.64%	4.73%
-2.47%	-1.32%	2.12%

under shorter period windows for (-3, +3) and (-1, +1), insiders seem to be actively participated in buying and accumulated the return abnormally during the announcements.

4.2. Hierarchical moderated regression analysis

The relationship between corporate announcements and abnormal moderated by risk (beta) and liquidity (weighted average volume) was significant. Coefficient graphs are shown in Table 2 and figure, respectively.

4.3. Correlation results

Table II: Hierarchical Moderation results

Table II suggests a moderating effect of the price-sensitive announcement on the relationship between risk and abnormal returns. The results indicate a positive and significant effect ($\beta = 3.849$, $p = 0.003$). It shows that the higher the firm beta, the more abnormal returns (Sharpe, 1964). There is a moderating effect of the price-sensitive announcement on the relationship between liquidity and abnormal returns. The results indicate a negative and significant effect ($\beta = -2.382$, $p = 0.047$). It shows that the lesser stock traded, the higher abnormal returns. Figure 1 (a, b) provides the results of the plotted interaction plots.

5. Discussion and recommendation

The overall descriptive results suggested that abnormality, in return, is caused due to the insiders using the expansion and capital information content. This is in line with (Hong Thi Hoa Nguyen, 2019), in which it was found that there is an ACAR of rival when stock repurchase was announced in the Vietnamese stock market. Further overall results suggested that PSX is informational driven. Insiders' activities do not harm the securities' returns when information is related to dividend and payout (H3) and change in ownership (H4). It is consistent with (Pinglin, 2020), who found that COVID-19 impacted the stock returns with mixed pictures where some sectors/industries in the Chinese stock market outperformed while some lacked during the Pandemic and offered adverse returns. However, the CAAR suggested the presence of the informed traders, showed a pattern of movement in returns before announcements and showed the insiders' presence. At the same time, they trade with hands-on information prior it is reaching to the exchange. It is in line with (Tran, 2020), who suggested that there is a significant relationship between insider trading and abnormal returns and (Prasad & Prabhu, 2020), who found that statistically significant differences in the market responses to the earning announcements made during and after the trading hours. It is found that insiders achieve AR while trading before the release of corporate announcements that are considered aggregately. The results show that the effect of the consequences of CAR information is significant. This finding favors (Gupta, 2019), where the study revealed abnormal positive returns during acquisition announcements in the banking sector.

The relationship between corporate announcements and abnormal moderated by risk (beta) and liquidity (weighted average volume) was significant.

This study also offers insightful policy implications. The research provides more insight into the effectiveness of the Security and Exchange Commission of Pakistan (SECP) in curbing insider trading in the Pakistan Stock Exchange (PSX). The study recommends to the individual investors

VARIABLES	MEAN	SD	CAR	EPS	ROA	ROE	DY	P/S	Risk	Liquidity
CAR	0.52	8.78	1							
EPS	27.08	29.51	0.042*	1						
ROA	10.02	4.21	-0.073**	0.238	1					
ROE	20.99	7.73	-0.072**	0.203	0.519	1				
DIV_Y	4.59	3.52	0.034**	-0.034**	0.359	0.22	1			
P_SALES 2.06		1.47	-0.181	0.217	0.605	0.461	-0.091**	1		
BETA	1.18	0.31	0.044*	-0.317	-0.176	-0.284	-0.495	-0.233	1	
WTD_AVG_VOL 1.12		1.45	-0.003*	-0.526	-0.613	-0.374	-0.333	-0.443	0.52***	1

***p < 0.10; *p < 0.05; **p < 0.01; N = 279

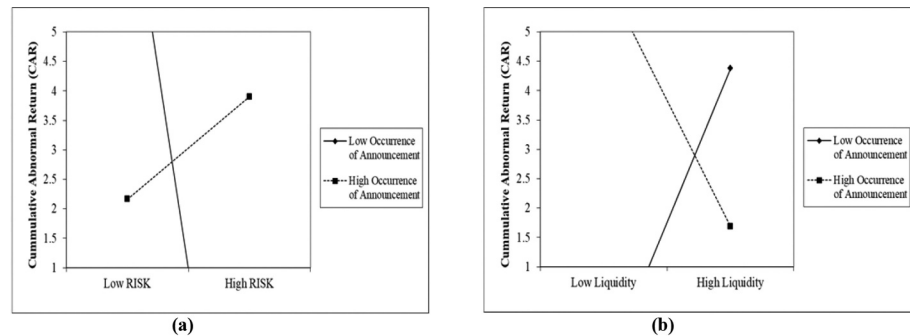
*. Correlation is significant at the 0.05 level (2-tailed). **Table 1**

. Correlation is significant at the 0.01 level (2-tailed). **Descriptive Statistics and

Variable	Model 1	Model 2	Model 3
Controls			
(Constant)	1.779** (.270)	-2.265** (.588)	5.022** (.307)
Earnings Per Share (EPS)	0.025 (.165)	0.025 (.258)	0.026 (.230)
Return on Assets (ROA)	0.078 (.675)	-0.127 (.584)	-0.192 (.408)
Return on Equity (ROE)	-0.01 (.901)	0 (.995)	0.027 (.737)
Dividend Yield (DY)	0.009 (.959)	0.146 (.538)	0.213 (.365)
Price to Sales (P/S)	-1.259* (.012)	-1.076*** (.063)	-1.02*** (.075)
Predictors			
BETA (Risk)		3.912*** (.137)	-2.98*** (.388)
Weighted Avg Vol (Liquidity)		-0.686 (.236)	0.233 (.756)
Announcements		1.514** (.185)	1.036** (.364)
Interactions			
Risk*Announcements			3.849* (.003)
Liquidity*Announcements			-2.382* (.047)
R ²	0.41	0.56	0.88
Adjusted R ²	0.23	0.28	0.54
F Statistics	2.297* (.046)	1.977* (.049)	2.570* (.006)
Notes: N = 279 for all models; Unstandardized coefficients are reported.			
Figures in parentheses are standard errors; *p < 0.05; **p < 0.01, ***p < 0.10;			
a. Dependent Variable: CAR			

Figure1. Interaction effect of announcements.

Notes: (a) Moderating effect of risk (beta); (b) moderating effect of Liquidity (Weighted Avg Vol).



to diversify their investment to safeguard the returns. Furthermore, regulatory bodies should devise a policy that ensures all the information is accessible to all investors promptly.

This study is not without limitations. It has only a two-year span considering the corporate announcements that are available on the Pakistan stock exchange. For future research, the period should be increased. Future research could also examine the stock returns by adding more press releases. The sector-wise study is also needed to see anomalies within the market.

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Author details

Faisal Sagheer Uddin¹

E-mail: faisalsu@yahoo.com

Muhammad Azam¹

E-mail: drazam@iqra.edu.pk

ORCID ID: <http://orcid.org/0000-0002-0189-4267>

¹ Department of Business Administration, Iqra University, Karachi, Pakistan.

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