



## Corporate Frauds, Information Asymmetry and Stock Market Reaction in Pakistan

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**Abstract** *Corporate financial frauds have shaken the investors' trust in the credibility of financial reports. Given the significance of the association between the quality of governance structure and reliability of the financial reporting mechanism, the study evaluates this relation to evidence whether firms accused of financial misconduct improve their credibility. Applying a sample of 63 firms involved in violations of Securities and Exchange Commission of Pakistan (SECP) rules, the study affirms a positive relation between fraud disclosure and successive improvements in governance structure. The study further notices a positive relation between the buy-and-hold abnormal returns and the intensity of increase in outside director percentage after three years of fraud detection. These empirical assertions extend the understanding of the aftereffects of manipulating financial reports. They would be helpful to the regulators debating corporate governance rules, to the management when crafting policies to reinstate investors' trust after fraud revelation, and to the investors while deciding on future investments in these securities.*

**Key Words:** Corporate Frauds, Corporate Governance, Credible Financial Reporting, Investors' Trust, Agency Costs, Concentrated Ownership

### Introduction

Corporate frauds, considering their intensity and pervasiveness, influence the reporting mechanism, equity markets and in the due course hit the functioning of an economy. Several audit firms and fraud examiners emerged, but deterrence of fraud is still deemed a despicable failure. Even more, the problem is still on the rise. Since Pakistan is not safeguarded from the influence of financial market in form of external headwinds, this developing economy must settle internally generated economic problems comprising corporate financial misconduct. Despite that, the corporate frauds in their nature are not the same when comparing economies having concentrated ownership structures and dispersed ownership structures in their respective capital markets (Coffee, 2005). It is, though, an established fact that firms committing fraudulent activity face several difficulties in doing business and thus find a decline in their financial performance (Bonini and Boraschi, 2010; Gande and Lewis, 2009; Karpo et al., 2008a).

Considering economic happenings, the equity markets today are a momentous component. The corporations take advantage of them by consuming the funds required for their capital progression and trade, thereby playing important function in developing a state's gross domestic product (GDP). The stockholders wherein are the central players of these markets, as reasoned by their risk-taking factor while investing in stocks being uncertain about their future realized returns. Nevertheless, the level of risk borne is invariably assessed prior to stock trading. The firm's indentation is greatly blemished due to financial scams; the market in subsequent amends nature of terms and conditions of business placed by creditors and shareowners and thus entails a multitudinous level of uncertainty attached with future prospects of firm's performance. In addition, the investors of scandalous firms reframe their prior views concerning the risk associated with their investments and eventually generate a negative influence on the cost and level of investment.

The study offers direct evidence while assessing the violations- information asymmetry association in the

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developing economy, connecting thereby market microstructure and corporate ethics literature. Verrecchia (2001) discloses that developing economies offer a unique scenario, provided with their low information climate, for examining the influences of organizational attributes on changes subject to the information. In addition, the study considers comprehensive liquidity measures and split the whole analysis period into three sub-periods. The study, further, applies a system of equations to regress the impact of deteriorated liquidity measures on cumulative abnormal return. Empirical testing at this length is rarefied generally and particularly in the context of Pakistan.

Furthermore, not much has been retrieved in testing the relationship of financial violations on the aspects of the stock market referred as stock price volatility, liquidity, and trading volume and specifically translating liquidity deterioration into abnormal returns in a system of equations. This study is noteworthy, as it adds to the literary work through contributing discernment concerning the impact of fraud disclosure on the capital market subject to these perspectives.

### **Prior Studies**

A severe decline in the stock prices leading to a reduction in the net earnings is found because of fraud revelation. In addition, serious reputational costs incur along with deterioration in monetary terms affecting the company to engage with new terms and conditions of doing business with close stakeholders (Murphy et al., 2009). Consistent with the results of various studies on stock market reactions the finding suggests that a scandal committed by the means of shares and bonds leads the company to abrupt decline in security values right after the information about filing a lawsuit case spreads in the market (Pritchard and Ferris, 2001). Stock liquidity though undertaken as a barometer of efficiency offers useful information about firm's performance in the market perspective. When it comes to drawing the firms' price discovery, stock liquidity embeds an effective role in the due course (Chung et al., 2009). Along with the new work environment with key stakeholders of business operations, the market bears a high level of uncertainty about future prospects of the firms that commit financial fraud. But, the linkage between this fraud and stock price liquidity may not be simple as anticipated (Klein and Leffler, 1981).

Avoiding range differences in the beliefs, the inclusion of asymmetric information and the firm's less access to financing as well as investing options lead a company to downhill variation in stock prices. The same can be analyzed in the context of the revelation of financial scandals (Raju and Ghosh, 2004). Abrupt changes in investor's beliefs cause fraudulent companies to undergo uncertain cash flows and a higher cost of financing. The volume of trading in such scenarios is expected not to remain the same depending upon the nature of fraud, length of deterioration and recovery process trading volume is found to go in the negative direction (Atiase and Bamber, 1994).

### **Sample Construction**

The study follows the framework based on the Beneish M-score model as a source of sampling criteria to study the market reactions over the announcement of violations, at least once in a year, publicly. The details of mentioned criteria are elaborated previously in study's first objective in sample construction section. For obtaining reliable findings in testing hypotheses, the study implements certain specified filters while picking the firms in the sample. First, if the firm appears in a violation more than once, only the first announcement is held. Second, the sample firms are necessary to maintain data against the end of the previous year for market capitalization in related stock exchange.

For the purpose of computing liquidity measures, transaction data pertaining to sample shares, the quote data, bid price, ask price, bid-depth, ask-depth, timestamp, and ticker symbols are acquired from the database of trades and quotes (released by the stock exchange) maintained at SECP. Since several errors exist in the transaction data concerning trades and quotes dataset, a standard filtering mechanism from microstructure literature [for instance, (Huang and Stoll, 1996, 1997)] is imposed to attain appropriate trades and quotes. The mechanism constitutes the following filters. First, if there is a negative ask or price, study drops out the quote. Second, if the trades hold negative price or volume, they are excluded. Third, if the trades or quotes arise before market opening or aftermarket closing and if they are non-sequential or hold an error, they are eliminated.

Apart from these filters, the stocks are necessitated to carry trades twice a day minimum and maintain 100 trading days when considering the benchmark period. In addition, applying trading day filter of 200 and 150 days, in each case, a loss of some degree occurred in the number of sample firms. After meeting all filtering requirements, the sample populated from 63 listed firms.

## Estimation Techniques

### Univariate Analysis

The study considers five liquidity measures along with volume, using the methodological framework of Jain et al. (2008). The five liquidity measures are determined as under.

$$\text{Quoted spread} = \text{ask price} - \text{bid price} \quad (1)$$

$$\text{Effective spread} = (\text{transaction price} - \text{quote midpoint}) \times 2 \quad (2)$$

$$\text{Percentage (relative/proportional) quoted spread} = \text{quoted spread} / \text{quote midpoint} \quad (3)$$

$$\text{Percentage (relative/proportional) effective spread} = \text{effective spread} / \text{quote midpoint} \quad (4)$$

$$\text{Depth} = \text{depth at ask} + \text{depth at bid} \quad (5)$$

The traders have the knowledge of quoted spread and the depth prior to the respective transaction, thereby these measures represent the cost of trading in pre-violation context (Benston and Hagerman, 1974; Amihud and Mendelson, 1986; Brennan and Subrahmanyam, 1998). The actual cost of trading, on the contrary, is computed through the effective spread. It generally exhibits the quoted spread with high frequency of trades taking place (Chordia et al., 2000b). The higher the value of spreads gets the less liquid a stock becomes. However, for depth, the liquidity is supposed to be improved if depth value becomes higher. In spite the fact that values of spreads and depth may be useful for drawing intuitive inference pertaining to the direction of liquidity, such inference may result in an ill-advised interpretation of market liquidity when the spread or depth is adopted in segregation. Lee et al. (1993) in their discussion support to this argument that taking alone the spread or depth cannot determine the direction of market liquidity.

The inference becomes unambiguous in a case where spread and depth supplement one another. For instance, a rise in the spread is supplemented by a decrease in depth. Further, both of the measures are used to manage liquidity risk, because of the institutional constraint set by the specialists (i.e. sustaining an acceptable range of spread and depth). Thus, an empirical association should be present in their movements. Bacidore et al. (2002) propose a depth improvement measure while arguing the inadequacy of applying spread or depth alone for liquidity measurement. They formulate a conglomerate liquidity measure that can be effective if their movements are dissimilar. The study employs this measure to address the issue while drawing inference about direction of the market liquidity either through employing spreads or the depth alone. The proxy of this measure is determined below.

$$\text{Depth/Spread ratio} = \text{depth} / \text{quoted spread}$$

The study splits the whole analysis period into the three sub-periods, in order to frame the event study. These periods comprise the pre-violation (or pre-event) period, the violation (or event) period and the post-violation (or post-event) period. In particular, five days ranging from day -2 to the day +2 i.e. two days prior to and after the violation announcement respectively define the event period. In this way, day 0 is very date when Security and Exchange Commission publicly declares a violation. There are 248 trading days prior to day (-2) in the pre-event period. Using a pre-event period data, the benchmark for respective measures of liquidity is captured by averaging the cross-sectional means (daily). In order to represent hypothesized mean for sample firms, the grand mean of a liquidity measure is utilized. Thereby, in order to examine whether the mean (average) value of an event day and the benchmark are statistically different, t statistics for a grand mean (i.e. hypothesized mean) is performed. It is analyzed for all liquidity measures and for all days. The study, further, applies a system of equations to regress the impact of deteriorated liquidity measures on cumulative abnormal return.

## Multivariate Analysis

For further investigation, the study continues the investigation to test whether erosion in any liquidity measure can translate the cumulative abnormal return days around the declaration of violations. The study considers applying the method of Jain and Kim (2006) to respond to the proposed question. In their work, they try to respond this query by studying how announcements influence exchange switching. However, in this study, the context of the announcement is concerned with the announcement of violations. The study regresses the simultaneous system of equations mentioned below.

$$\Delta S_i = \alpha_0 \text{Violation}_i + \alpha_1 \Delta \log P_i + \alpha_2 \text{VAR}_i + \alpha_3 \Delta \log V_i + \alpha_4 \Delta \log MV_i \quad (6)$$

$$\text{Car}_i = \beta_0 + \beta_1 \Delta S_i \quad (7)$$

A notable trading-cost estimation model formulated by Stoll (2000) that analyzes the spread and a firm's trading attributes is used in this study essentially to examine equation (6). In order to address the study's aim that how the transformed attributes in trading a firm (involved in violation) create influence on the spread, the study incorporates a change in values in all variables. The intercept in the equation is marked as a violation to reflect the impact of violations after the impact of other variables being controlled. The "i" in subscript symbolizes a sample firm. The change in the proportional quoted spread is represented by  $\Delta S_i$  taken as dependent variable. The study measures a 20 trading day average prior to computation of difference in each variable apart from MV. This average comprises the time window -22 (days) to -3 (days) and +3 (days) to +22 (days). Cumulative abnormal return expressed as  $\text{CAR}_i$  is computed using the period -2 (days) to +2 (days). The difference, consequently, is computed by deducting the preceding window amounts from those concerning last inline window. Change in market capitalization is applied to compute market value. The change is calculated by taking the difference in closing market capitalization of preceding period and that of present period (i.e. the year a sample firm is attached with violation). Referring to equation (7), Capital Asset Pricing Model (CAPM) is applied on a 248-day window (-250 to -3) to measure the predicted returns for individual sample stock.

$$R_{it} = \alpha_i + \beta_i R_{mt} \quad (8)$$

In equation (8),  $R_{it}$  and  $R_{mt}$  represent the sample stock return and market return on day respectively. The study follows the Pakistan Stock Exchange-100 index return as a proxy for capturing market return on daily basis. For obtaining the estimated values, expected returns are computed for the stocks around the event window (-2, 0). A cumulative abnormal return ( $\text{CAR}_i$ ) is computed by differencing predicted returns from the daily raw returns (deducting the predicted returns from the raw returns) and summing their difference (daily). Eventually, at first a two-stage least square (2SLS) model is applied for regressing the actual values of explanatory variables over  $\Delta S_i$ . Thereafter, the resultant estimated value becomes part of equation (7) described above. The implementation of the expected quoted spread- change (cents) can be expressed in a way that investors are unable to predict accurately the level of corrosion in the spread. Hence considering the period of event-window, it will indicate how abnormal returns are influenced by the predicted drop in liquidity.

## Empirical Results

**Table 1.** Summary Statistics of Liquidity Measures

	Mean	Median	St
QSPRD (in cent)	9.86	8.74	14.61
RQSPRD (in %)	1.41	0.63	2.42
ESPRD (in cent)	7.96	5.83	11.54
RESPRD (in %)	0.96	0.38	1.83
DEP (in shares)	4761	1559	11327
DS-Ratio	1277	239	8461
Volume (in shares)	906,462	157,658	2,968,353
Return (in %)	-0.04	0	4.01

In table 1, summary statistics of the liquidity measures, DS ratio, volume, and return are reported. The results exhibit some right skewness for spreads, which is conventional as per expectations from distribution traits of spreads with the cross-section of daily data (Chordia et al., 2000a). Quoted spread contains larger mean and median compared to effective spread, implying that within the bid-ask spread a large amount of trade takes place. Depth, on the other hand, contains mean and median as 4,761 and 1,559 shares respectively, which suggests that a right skewness prevails in it as well. Although the explanation of DS ratio is made dynamically, on average a quoted spread with a one-cent rise causes depth of around 1,100 shares to increase correspondingly.

## Univariate Analysis

**Table 2.** The Results for the Scandal Period

	<b>Benchmark</b>		<b>day - 2</b>	<b>day - 1</b>	<b>day 0</b>	<b>day +1</b>	<b>day +2</b>	<b>Intermediate</b>	<b>Long-term</b>
QSPRD	(in cent)	6.63	4.97	5.83	6.04*	6.82**	6.87**	4.96	3.77
	t-value		0.14	0.24	0.84	1.99	2.04	0.57	0.46
RQSPR	(in %)	1.21	1.13	1.22	1.24	1.32	1.33	1.14	1.01
	t-value		-0.31	0.11	0.42	0.73	0.08	-0.67	-0.16
ESPRD	(in cent)	6.57	4.38	5.51	5.92	6.91**	6.99*	4.71	3.46
	t-value		0.91	0.74	0.36	1.98	0.46	0.32	0.29
RESPRD	(in %)	1.07	0.94	1.03	1.05	1.10	1.13	0.98	0.82
	t-value		0.16	-0.14	0.18	0.61	0.21	-0.63	0.55
DEP	(in shares)	5061	4473	4921	4854*	4831**	4581*	4593*	4766
	t-value		0.9	0.82	2.26	2.41	1.84	1.65	1.55
DS-Ratio		1267	1164	1183	1181*	1144*	1076*	1153*	1162
	t-value		0.83	0.47	1.85	1.91	1.93	1.71	1.61
Volume	(in million)	0.73	0.87	1.13	1.47*	1.32***	1.05***	0.95	0.97
	t-value		0.88	1.24	1.82	5.89	3.69	0.13	0.99
Return	(in %)	-	-	-	-	-	-0.584	-0.07	0.108
	t-value	0.031	0.201	0.24*	0.538***	0.577***			1.19

\*, \*\*, \*\*\* Significant at the 10%, 5%, and 1% levels, respectively, based on two-tailed tests.

The table reports a statistical comparison of the average level of each liquidity measure based on daily data with the corresponding benchmark, considering the previous 248 trading days.

The study, in table 2, tests whether the liquidity measures on average are significantly different from the benchmark values for the sample period. The results obtained support the hypothesis that the liquidity keeps a declining trend, partially (in terms of significance), in the days surrounding violations when quoted and effective spread is considered. These measures of liquidity are deteriorated on average in the course of event dates (ranging from the day -2 to the day +2). However, they are found significantly different at 10 percent on day (0) and 5 percent level on days (+1, +2) in case of quoted spread whereas that in respect of effective spread found same at 5 percent level on day (+1) and at 10 percent on day (+2). Apparently, the announcement day (day 0) does not carry expected abnormalities (i.e. worsening of measures) when results are compared to the benchmark. Comparing pattern of quoted and effective spreads, price improvement is observed (effective spread being lesser than quoted spread) in period of benchmark-to-announcement day (day 0) and intermediate to long-term effects, whereas price worsening (quoted spread being lesser than effective spread) is revealed in days (+1, +2). Depth, in like manner, portrays deterioration from announcement day (day 0) to the day (+2), but with little variations and given with only 5 percent level of significance on day, +2 (significant at 10 percent level on rest). Analogous to the deterioration of spread and the depth, DS ratio displays deterioration likewise, though it is different statistically at only 10 percent level in surrounding days (0 to Intermediate) after the announcement.

Further, similar results are generated in percentage measures of spreads (RQSPR and RESPRD) compared

to their counterparts in absolute terms. Notwithstanding, when comparing the benchmark with intermediate and long-run effects these percentage measures remain indifferent statistically. However, during the event dates (except intermediate and long-term effects) the percentage spreads are observed to rise, implying that liquidity conditions are worsening in the market. The spreads in cents, confirming the Easley and O'hara (1992) estimation that shocks in the volume associated with high information risk and low market liquidity, may veritably reveal the status of sample firms' liquidity during the event time. Further, the mean return reduces during the event dates. It appears that the rise in-depth size and the movement in volume series are correlated around the event dates inferring direction of the market liquidity as posited in Lee et al. (1993). In addition, as projected by Easley and O'hara (1992) the abnormally low volume of trading displays an inverse relation with the liquidity measures.

In general, sample firms are observed to deteriorate in respect of cent spread around the event date whereas percent spreads breed out an unfavorable liquidity movement, though statistically insignificant. In addition, a high degree of information asymmetry prior to violations' announcement is indicated through a movement in intermediate and long-term effects relative to the benchmark. The same is observed in case of post-violations' announcement.

### Multivariate Analysis

**Table 3.** The Results of 2SLS

<b>Panel A: Dependent variable is <math>\Delta S</math></b>						
	<b>(1)</b>		<b>(2)</b>		<b>(3)</b>	
	<b>Entire Period</b>		<b>Pre-violation</b>		<b>Post-violation</b>	
<b>Variable</b>	<b>Estimate</b>	<b>t-Value</b>	<b>Estimate</b>	<b>t-Value</b>	<b>Estimate</b>	<b>t-Value</b>
Intercept (Violation)	-0.017**	-2.16	0.068***	3.11	-0.021**	-2.09
$\Delta P$	-0.794***	-8.43	-0.37**	-2.13	-0.983***	-7.185
$\Delta VAR$	1.063*	1.84	-2.24	-0.44	1.129***	5.14
$\Delta V$	-0.054	-0.9	-0.216*	-1.85	-0.12**	-2.04
$\Delta MV$	0.007	0.13	-0.011	-0.21	-0.003	-0.06
Adj_Rsquare	0.164		0.234		0.205	

  

<b>Panel B: Dependent variable is <math>\Delta CAR</math></b>						
	<b>Entire Period</b>		<b>Pre-violation</b>		<b>Post-violation</b>	
<b>Variable</b>	<b>Estimate</b>	<b>t-Value</b>	<b>Estimate</b>	<b>t-Value</b>	<b>Estimate</b>	<b>t-Value</b>
Intercept	-0.002***	-11.34	0.005***	10.78	0.003***	9.66
$\Delta S$	-0.133**	-2.24	-0.086*	-1.76	-0.054**	-2.16
Adj_Rsquare	0.124		0.147		0.082	

\*, \*\*, \*\*\* Significant at the 10%, 5%, and 1% levels, respectively, based on two-tailed tests

Table 3 reports the findings obtained from estimating the simultaneous system of equation. For the reason that there is a distinguishing level of liquidity drop when comparing the pre-violation duration and in the post-violation duration across the sample, the study accounts for the results of the system for these periods in column 2 and 3 therewith besides column 1 in which the results concerning entire period are reported. The findings in the context of association between violations and the change in the spread are also provided in the support to study inferences. An unfavorable impact is observed for the change in price on the change in a spread in both periods; considering comparatively lesser price after the violation, it deteriorates liquidity through an increase in the change in spread. Further, in the post-violation period the influence of price on the spread is more vigorous than the pre-violation duration. A similar influence is observed in case of variance return. The estimate of trading activity through rupee volume in post-violation further implies that liquidity deterioration is followed by a decline in the activity leads. In a nutshell, the study infers that the change in trading activity, change in price, and change

in return given that each contains a negative value, are the major factors explaining deterioration in liquidity.

Referring equation (7), the coefficient of CAR equation is reported in panel B. Seemingly the abnormal return is influenced by the negative variations in the spread implying an additional return over the market. In addition, a coefficient level on the expected value of spread in the pre-violation is statistically more significant than that in the pre-violation period. This finding suggests that abnormal return in the post-violation period is greatly reactive to the change in the expected spread. By and large, univariate analysis and multivariate analysis recommends a decline in liquidity after the violations announcements. In the long-term, information asymmetry originated through financial violations is diminished. The informational environment considering its change could assist in lowering the information asymmetry (between uninformed and informed investors).

## Conclusion

This study examines the association between violations announcements and the market liquidity of corresponding fraudulent firms. Estimation of five liquidity measures is examined to test the market response on days around a violation announcement. Throughout the analysis period, the study reveals that on days subsequent to the announcement of violations the deterioration status of liquidity is identified through a quoted and effective spread in cents. It is inferred that violations announcements contain a negative impact on the measures of market liquidity only in the surrounding days (+1, +2) in the analysis period. Low market liquidity as demonstrated through broader bid-ask spreads and lower depths subsequent to violation announcement are observed. It confirms the study hypothesis that violation announcements carry a negative impact on the measures of market liquidity.

Nevertheless, abnormality in liquidity on the day of announcement is not detected in absolute terms. It is further found that return is abnormally low on the day of the violation's announcement and the subsequent day (day +1). Estimating the simultaneous system of equation, the study examines the impact of deteriorated liquidity on abnormal returns of the stocks surrounding the day of violations' announcement. The analysis recommends a decline in liquidity after the violations announcements and that abnormal return in the post-violation period relatively is greatly responsive to the change in expected spread.

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