

CAPITAL UNIVERSITY OF SCIENCE AND
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**Corporate Frauds: Factors
Eliciting Fraud Behavior and
Firms' Financial Prospects**

by

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Corporate Frauds: Factors Eliciting Fraud Behavior and Firms' Financial Prospects

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*To my mother and father for making me who I am, and the many sacrifices they
made for me.*



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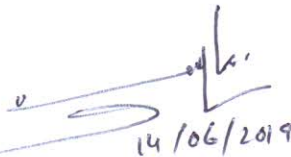
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List of Publications

It is certified that following publication(s) have been made out of the research work that has been carried out for this thesis:-

1. Rizwan, S. (2019). Corporate Frauds, Information Asymmetry and Stock Market Reaction. *Global Regional Review*, 4(2):1-11.
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Abstract

This dissertation expands the existing corporate fraud literature by providing an insight into the causes and consequences of corporate fraud in Pakistan. Four specific issues are studied in the context of Pakistan through interconnected objectives. Mentioning the first objective, the dissertation examines key factors eliciting fraudulent behavior of firms involved. The results indicate that among the variables proxied for internal antecedent factors, firm performance, organizational slack, organization size, tax aggressiveness and chief executive officer compensation significantly increase the probability of fraud occurrence. The results for the external antecedent factors indicate that dynamic environment and political connections are identified as connected with the likeliness of fraud commission. Lastly, with reference to monitoring variables, transient institutional investors, an outsider on board of directors, board size, the tenure of the chief executive officer and auditor change increase the fraud likeliness.

Referring to the second objective, the study focuses on examining changes in corporate financial decisions (i.e., financing, investment, and dividend payouts) with their interdependent and inter-temporal nature on fraud. Applying system-of-equations the study finds that financing, investment, and dividend payouts of the fraudulent firms decrease following the revelation of fraud. Moreover, the results for the simultaneity of corporate financial triad reflect that corporate financing, investment, and dividend payouts are jointly determined. It is observed that in investment decision and payout decision variables the inter-temporal nature prevails which is likely to create an omitted variable bias. The results provide conformity to the flow of fund framework.

In addition, the study finds that firms experience hurdles in raising funds from external capital markets but, on average, investment and cash flow remain unconnected while considering the financial constraint status of sample firms. Instead, they alter their net debt from cash flow changes and protect their capital expenditures. To all appearances, pecking order is involved concerning how firms use their cash flows.

In the third objective, the study dissects the response of violations announcements on the market liquidity of corresponding firms. Estimation of five liquidity

measures is performed to test the market response on days around a violation announcement. The study reveals that the quoted and effective spread (in cents) identify the deterioration status of liquidity on days subsequent to the violations' announcement, throughout the analysis period. Estimating the simultaneous system of equation, the study examines the impact of deteriorated liquidity on stock returns surrounding the day of violations' announcement. The analysis imparts 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.

Lastly, in respect of the fourth objective, the study investigates the post-fraud behavior of fraudulent firms to restore the corporate legitimacy. For this purpose, the study considers the changes in governance mechanism as ameliorating actions to improve the earning quality. The study finds that improved governance mechanism brings better performance in stock price while controlling for earnings performance. The last chapter of the dissertation discusses conclusions, implications, and limitations.

Key words: Corporate Fraud, Antecedent Fraud Factors, Concentrated Ownership Structure, Corporate Financial Triad, Corporate Governance, Stock Returns, Earning Quality, Pakistan.

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Abbreviations

AAERs	Accounting and Auditing Enforcement Releases
ACFE	Association of Certified Fraud Examiners
AICPA	American Institute of Certified Public Accountants
CEO	Chief Executive Officer
EARs	Enforcement Action Releases
FFR	Fraudulent Financial Reporting
GAAP	Generally Accepted Accounting Principals
GECS	Global Economic Crime Survey
GFS	Global Financial Crisis
IASB	International Accounting Standards Board
ISA	International Standards on Auditing
NEDs	Non-Executive Directors
PNs	Practice Notes
PSX	Pakistan Stock Exchange
PWC	PricewaterhouseCoopers
SAS	Statement of Auditing Standards
SECP	Securities and Exchange Commission of Pakistan
2SLS	Two-Stage Least Squares

Symbols

Symbol	Name
$\alpha_0, \beta_0, \gamma_0$	Constant
α_1 to α_n , β_1 to β_n , γ_1 to γ_n	Coefficient
ε	Error Term
\sim	Realized Value
i'	Unit Vector
\emptyset	Zero Vector
Δ	Change

Chapter 1

Introduction and Overview

This dissertation appertains to four perspectives of a contemporary theme of corporate fraud. These perspectives connect the theme while picturing the ex-ante and ex-post behavior of the fraudulent firms. The first objective details the ex-ante behavior by seeking the relevant factors that elicit fraudulent behavior of firms. The rest of three objectives address the ex-post behavior by means of unfolding a) interdependent and inter-temporal financial policies b) market consequences, and c) the role of governance mechanism in restoring reputation. This chapter discusses the problems statement, relevant issues, research questions and research objectives.

1.1 Overview of the Study

Corporate fraud has attained an ample consideration across several participants being a matter of an unceasing debate. Because, it in essence contains no bounds and encases firms, industries, and nations regardless of their size and nature (Aghghaleh et al., 2014; Clinard and Yeager, 2011; Hajek and Henriques, 2017). As of today, it has affected the subsistence of public world-widely owing to the fact that its complication and volume have diffused enormously (Bishop et al., 2017; Clinard and Yeager, 2011; Daily et al., 2003; Rapp, 2007). It is uncovered veritably

in a Pricewaterhouse Coopers survey (2014) that on average one out of every two firms is accused of committing financial misconduct and, with due account for, it is turned into a newsworthy problem that businesses undergo across the globe. The ferocity of corporate financial misconduct and the related monetary and non-monetary damages and deforms stand out the same (Bonini and Boraschi, 2010; Rezaee, 2005; Vlad et al., 2011).

These scandals deteriorate the impression of firm relentlessly in the market. The literary works in this context impart support to the notion that accused firms face several legal sentences together with substantial punishments imposed by the markets (Gande and Lewis, 2009; Karpoff et al., 2008a). As patterned by Klein and Leffler (1981) and Jarrell and Peltzman (1985), corporate misconducts deteriorate firms' image by ways of altered terms and conditions to operate a business from various stakeholders and lead eventually to greater information irregularity since providing the fact that outsiders do not trust the cheaters (Kreps and Wilson, 1982; Milgrom and Roberts, 1982).

Thus far, the theoretical debate subject to the matter of firms' fraudulent activities has emphasized on bounded facets of frauds, by way of illustration which constituents lead companies to commit a financial misconduct and mediums are serviceable to assist uncovering such misconducts (Dechow et al., 2011; Kedia and Rajgopal, 2011; Khanna et al., 2015; Wang and Winton, 2012; Wang et al., 2010). Despite that, a major criticism is made on reputed frameworks to capture the relevant factors. By way of illustration, agency theory is mainly criticized for not incorporating the institutional and social climate of the firms (Aguilera et al., 2008; Otten and Wempe, 2009). Fraud triangle theory is witnessed as inadequate in covering all instrumental climate factors (Murphy and Free, 2015) and in respect of theoretical and practical implications (Schuchter and Levi, 2016). Initially, economic aftermaths concerning firms' fraudulent acts are debated in the mould of shareowner's wealth (Dyck et al., 2013; Karpoff et al., 1999; Murphy et al., 2009; Palmrose et al., 2004). The successive studies overstep their emphasis from market response to corporate misconducts and examine the charges, deformity in asset appropriation, firm's cash holding, and cost of bank loan. (Chen et al., 2011;

Graham et al., 2008; Karpoff et al., 2008b; Kedia and Rajgopal, 2011; Yu and Yu, 2012).

However, with the utmost influence against fraud, a firm's financial policies do not remain the same and which eventually define their future convictions. Commensurate with the market efficiency presumptions, the stock market translates the firm's financial policies in its activities wherein the market responds to every update related to a certain firm. It, in general, imposes a negative impact in the sort of investors' trust deficiency caused by deterioration in firm's image (Gande and Lewis, 2009; Karpoff et al., 2008b), alterations in business terms and conditions (Kreps and Wilson, 1982; Milgrom and Roberts, 1982), a rise in desired return rate (Lin et al., 2012), and eventually shortfall in a firm's share values (Dyck et al., 2013; Karpoff et al., 1999; Palmrose et al., 2004). Such responses of the market impact the firm's financial policies, predominantly, incidental to investment, financing, and dividends. Nevertheless, studies are uncommon in covering the aftermaths of fraudulent activities on financial policies and not appropriately assessed in a comprehensive setting (Graham et al., 2008; Lin et al., 2012).

Elements of corporate financial policies in respect of a firm's investment, financing, and dividends theoretically are professed as the trinity of corporate financial policies (Wang, 2010). Pertaining to a firm's future prospects, these policies are deemed to be most substantial. Modigliani and Miller (1958) and Miller and Modigliani (1961) in their seminal work enplace irrelevance hypothesis related to a firm's capital mix and its dividend payouts, wherein they set forth an independence of set of policy variables. Notwithstanding, pursuing the actual fact, certain market imperfections prevail in the real world and in effect, a legitimate inference may be made that corporate financial policies are tied together with the accounting mechanism, wherein sources of funds equal the uses of funds. Therefrom, in a case when firm settles any of the financial decision, the set of related decisions are also influenced. Several advances in this notion affirm this interdependence, by way of illustration, the institutional approach (Dhrymes and Kurz, 1967), flow-of-funds framework for corporate behavior (Dhrymes and Kurz, 1967), information

approach (Miller and Rock, 1985), tax approach (Myers, 1974) and agency approach (Jensen, 1986). It is plausible, that being so, to study the aftermaths of corporate illegal activities on a set of firm's financial policies in a single setting. Stock markets may respond firm specific news in several forms. The news may instantly disturb the firm's stock price. This aspect has been emphasized in various research settings [as for instance, (Dyck et al., 2013; Goldman et al., 2012; Karpoff et al., 1999; Murphy et al., 2009; Palmrose et al., 2004)]. Second, the stock markets may react through stock liquidity, which is a substantial component of investment since it is in direct proportionate with the return on firm's securities (Amihud and Mendelson, 1986, 1988). An accused firm may face liquidity in its stocks by virtue of the fact that investors loose confidence for trading further in the market (Velikonja, 2012), since such mistrust is cultivated through information irregularity after revelation of firm's fraudulent act (Kreps and Wilson, 1982; Milgrom and Roberts, 1982). In spite of its conventional implication in evaluating stock market response (Chung et al., 2010), considering the post-fraud behavior of the firm, the stock liquidity has not been examined comprehensively. Third, volatility in security values is a benchmark tool for computing economic vulnerability and offers better comprehension in measuring the risk and return tradeoffs. In addition, it assists as a key factor in asset allocation decisions (Raju and Ghosh, 2004). In contempt of the conviction that the extant literature abundantly evinces the phenomenon of volatility in share value (Clinard and Yeager, 2011; Horng and Chyan, 2009), it still bears gap in examining the same in case of corporate frauds. In what follows a short compendious view is made to summarize the aims of the study to be followed in later sections with supplemental details. The study aims to investigate set of environmental factors eliciting fraudulent behavior in view of agency theory, fraud triangle theory and related literature on corporate crime. It further attempts to canvass potential impact of identification of firm's fraud on its future perspectives. In the first place, outgrowths of frauds are analyzed subject to financial policies of the accused firms, suchlike investment, financing, cash flows, share repurchases, and dividend announcements. Along with it, alterations in the

response of capital market in the shape of measures of liquidity and their subsequent impact on earnings are analyzed. Lastly, the study seeks for the changes in governance mechanism as ameliorating actions to improve the earning quality. A plausible ground behind this dissection is premised on the fact that once the violation announcements are exercised by the related regulatory body, firms possessing better governance mechanism face lesser severe issues concerning asymmetric information compared to those bearing poor governance structure (Kuvvet, 2014). Firms having relatively improved governance mechanism assure its shareowners that they will undertake necessary actions in deterring fraud in the future. It is asserted in various studies that ameliorated governance structure assists firms recovering their image and thus improving their earnings [For instance, (Agrawal et al., 1999; Farber, 2005)].

1.2 Corporate Frauds and Corporate Financial Decision

Corporate frauds are perceived differently in their definition in diverse arguments, media coverage, and surveys, nevertheless, a general consensus in the literary works asserts that they bring out negative implications. Despite that, it may be converged as “Fraud essentially involves using deception to make a personal gain for oneself dishonestly and/or create a loss for another ”(Coenen, 2008). Prior studies emphasize greatly on value ramification and document, thus, substantial forfeitures to the firms alleged with financial misconduct and the managers involved (Karpoff et al., 2008b). How identification and the subsequent declaration of a corporate fraud impact the related firm’s financial policies? The query has not yet been replied unequivocally reflecting that how and whether a set of firm’s financial policies persuaded against erstwhile fraud commission. As posited by Jarrell and Peltzman (1985) and Klein and Leffler (1981), corporate frauds worsens a firm’s reputation and result in decline of symmetric information enclosed by the managers and outside participants (Kreps and Wilson, 1982; Milgrom and

Roberts, 1982). Under these circumstances, firms are brought to a close to pay numerous legal charges and punishment in the sort of reputation loss (Gande and Lewis, 2009; Karpoff et al., 2008b).

The terms of trade remain not the same, when firms are involved in a financial scam and which then is revealed publicly. In specific, the suppliers and customers revisit their provisions or even more they may discontinue their business affairs with such firms. A financial misconduct, indubitably, declines the capability of firm to retain its competitive position. Further, it increases an incertitude with respect to a firm's operations, eventually shaping an unstable environment to actualize benchmark performance and cash flows in future periods (Dyck et al., 2013; Wang and Winton, 2012). In addition, identification of a firm's financial misconduct creates distrust in firm's accounting and reporting trustworthiness. For this reason, a relatively more cautious behavior is evinced among investors related to firm's reporting mechanism and adopt alternative ways to establish performance of such firms, thereby enhancing uncertainty while forecasting their future financial accomplishments (Graham et al., 2008; Khanna et al., 2015). This dubiety in firm's operations assignable to alterations in conditions of doing business from the suppliers and clients, coupled with greater risk in performance assessment from the shareowners push firms to face large information irregularity and thus consequently may influence the companies to re-think their strategic financial decisions in order to cope with new work setting.

The trinity of corporate financial policies has been spotlighted empirically for the period beyond five decades (Almeida and Campello, 2007; Baker et al., 2002; Denis and Osobov, 2008; Frank and Goyal, 2003). The decisions of financing and investment are considered independent and the partiality surrounding debt and equity is assessed irrelevant in the theoretical account of Modigliani and Miller (1958). In the open up study of Modigliani and Miller (1958) and Miller and Modigliani (1961), it is asserted that while consistent to the assumption of the perfect market condition, the decision of optimal level of investment becomes irrelevant to the capital structure as both the internal and external sources of financing behave alternatively.

Henceforth to these postulations, the subsequent literature focuses in probing how the efficient capital market conditions are influenced by imperfections prevalent in the market along with how firm's set of financial policies are crafted under such real market inefficiencies. Through proscription of perfect market presumptions placed by Modigliani-Miller and embodying the opposite of it, scholars in the domain of finance started rigorously scrutinizing all the financial decisions. Established with the fact that much work has been put forwarded to explain the companies strategies, the said choices (the trinity of financial policies) are conventionally analyzed separately.

As a case in a point, studies empirically test the financing policy in static single-equation framework wherein estimation is made on a certain number of endogenous and exogenous factors, devoid of adjusting the effects of other related policy variables. In the same vein, policies concerning firm's dividend announcement and investment are assessed in a similar fashion. Veritably, the proceeding of firm's financial policies is complex in kind since policies endeavored in other units of the business turns an essential component of corporate financial policies [Mueller \(1967\)](#). Analogously, [Fazzari et al. \(1987\)](#) document that firms may be hindered from investing in projects with a better net present value under conditions of financial constraints. These constraints may comprise bounded access to external markets for the required capital together with lower levels of cash holdings. In such a circumstance, firms would need to consider their financing options adjacent to investment options since the two together are interlinked practically ([Gatchev et al., 2010](#)). Corporate financial misconduct is verified to be an occurrence of the disaster which worsens firm's image in the market and its competitive position ([Gande and Lewis, 2009](#); [Jarrell and Peltzman, 1985](#); [Karpoff et al., 2008a](#); [Klein and Leffler, 1981](#)). In addition, it adds certain market imperfections in the moulds of financial constraints ([Campello et al., 2010](#)).

Talking about firm's decisions concerning financing, scandals companies go through the trouble of gaining funds from external sources ([Hutton et al., 2014](#)), because for such companies changed market conditions, compel larger financing prices ([Chen et al., 2011](#)) and terrible picture ([Anginer et al., 2011](#)). As a result, company's

aggregate outer financing including obligation and shareholding might diminish taking after the misrepresentation disclosure. On the other hand, over the diverse financing channels, this diminishing may not be identical. Shareholdings are touchier to data when contrasted with different choices, similar to public financing, retained earnings and financing through financial institutions (Bharath et al., 2009; Myers, 1984; Myers and Majluf, 1984). Premised on that, it may be posited that deceitful organization would undergo several alterations in its financing choices which are minimum delicate to information irregularity in the market. Along these lines, after scam revelation, the market price of equity will be deteriorated first. Whereas the creditors can gather more data about firm through their private correspondences with the company (Sokolyk, 2009), thus informational irregularity is thought to be larger in equities contrasted with debt. Subsequently, it is sensible to conclude from this premise that aggregate financing required for business operations in scam organizations will diminish after disclosure of scam with a noteworthy decline in outstanding shares in the market and as proposed by pecking order theory, companies may confront problems in financing options (Myers and Majluf, 1984).

As for investment choice, deceitful firms may go through a reduction in required investment level. Following Modigliani and Miller (1958), decisions related to capital structure become irrelevant with respect to equity and debt in presence of perfect and efficient markets. Nonetheless, in the presence of imperfect and inefficient market conditions, the choice between debt and equity get to be reliant because of the wedge that exists between the price of both sources of financing (Johansen et al., 1994).

There are different motivations to trust this wedge. To start with, there are related exchange costs with outside financing choices. Second, debt carries more prices when added with the cost of being defaulted. Such costs can be relevant in creating operational problems, for instance, lawful penalties in addition to reputational penalties. Agency cost may also play a role in the story in respect of availing external financing (Jensen and Meckling, 1976), due to the matter of the fact the controlling shareholders along with top management are of the toe in

getting higher returns on riskier investments while engaging less with debt facility (paying regular interest payments).

At long last, after the [Myers and Majluf \(1984\)](#), when there is an issue of informational inefficiency in the market among the informed or internal and uninformed or external financiers, it is found that the cost of lemon premium is suffered by external financiers. Moreover, due to expansion in information irregularity and increased cost of financing after scam disclosure, the firms face severe difficulties in handling multiple investment projects ([Sengupta and Dasgupta, 2003](#)). Thereby, firms become not in a good position to fund the entire profitable investment projects in their portfolio and will eventually find themselves as a low productive unit having a decline in investment pattern in the industry.

Discussing cash holding decisions, scam firms may choose to concentrate more on retained earnings in view of troublesome and higher costs associated with the issuance of equity or debt financing. Under such circumstances, the affected firms try to enhance their cash savings with the motive of handling unfavorable business circumstances to meet their post fraud financing needs ([Bates et al., 2009](#); [Boileau and Moyen, 2010](#); [Gao and Grinstein, 2014](#); [Han and Qiu, 2007](#)).

Additionally, observing the suggestions inferred by [Opler et al. \(1999\)](#), businesses with unpredictable cash flows, costly options of financing from money market and low approach to capital market evident to do more cash savings in their asset management. To keep away from the investment and financing problems the total marginal value of cash is kept increasing by scam firms ([Faulkender and Wang, 2006](#)). Subsequently, organizations provided with financial limitations focus on extracting cash regularly from their cash inflows ([Almeida et al., 2004](#)). To keep up liquidity and dodge the issues of decreasing investments, the management changes their pattern of assets allocation particularly in the case of cash and cash equivalents and focuses more on saving cash for rainy days after fraud revelation. The stimulus of holding more cash on hand has been regarded as a corrective measure in the presence of new business conditions whereby the scam firms face negative consequences from both the capital market and money market ([Chen and Wang, 2012](#)).

Lastly, it is posited in respect of firm's dividends payouts that financial misconducts disturb the capacity of firms to furnish dividend policy on a set pattern. A firm's value becomes autonomous when compared with dividend payouts in a situation where there an efficient capital market prevails, together with premeditated investment options and presence of symmetric information. From this perspective, dispensation of retained earnings among various segments of shareowners turns inappropriate as policies related to financing and dividend payouts are independent. Howbeit, in real business environment, market imperfections can never be ignored, thus dividend payouts may possibly influence the shareowners' wealth through furnishing them slice of advantageous information. Several theories are narrated in this context to reflect impact of dividend policy announcement on firm's value, suchlike bird in hand theory (Lintner, 1962), clientele effect (Miller and Modigliani, 1961), signaling theory (Miller and Scholes, 1982) and agency theory (Jensen and Meckling, 1976). It may be inferred from firms paying dividends regularly that their financial health is ameliorated (Pandey, 2003).

Once the declaration of corporate fraud is executed, firms bear severe difficulties in running their operations fluently since their trading partners revise their business terms and conditions adversely. It may put firm in a position where it is not longer possible to sustain in the industry. Under such circumstances, firms become doubtful with respect to their future prospects, for instance in terms of their net income and future cash flows (Dyck et al., 2013; Wang and Winton, 2012). DeAngelo et al. (2004) document that firm's quality of earnings is signaled through the dividends it furnishes, hence organizations blamed for corporate scandals have low quality of reported profits in their statements than those, which are not blamed for extortion (Caskey and Hanlon, 2005). In this way, scam firms because of generating lesser amount of earnings rely upon announcing less cash dividends as compared to industry competitors and their historic payout trends. Such decline in the dividend payouts may emerge from two possible reasons, as asserted by DeAngelo et al. (2004). Prominently forward, since the accused firms are assigned fictitious performance figures that are unstable and are anticipated to tip over after certain time (Dechow et al., 1996). For this reason, managers would

prefer lowering firm's dividend payouts as they are not in good position to uphold them. In confirmation to this notion, [Lintner \(1956\)](#) document the hesitance of management in increasing the dividend rates to the limit where they predict it not to be maintainable further. In addition, findings of a survey suggest that dividend policy is defined substantially by means of persistence in the performance (earnings) of the firm ([Brav et al., 2005](#)). As a corollary, an anticipation may be developed that the ratio of dividend payouts become less evident because of fictitious and unstable financial performance. Apart from this, the second reason may include an assertion that firms accused of committing fraudulent activities do not possess sufficient cash to offer the dividends (cash dividends) on regular intervals since their current performance is not best determined through the earnings they carry ([Dechow and Dichev, 2002](#)).

In order to overcome such situation, an option of taking fresh loans is on the table for these firms. However exercising this option would be difficult as creditors become more cautious in extending loans. On that account, it is posited that firms would generally offer low cash dividends in wake of inferior perseverance in firm's performance and that fictitious reported performance through certain indicators contain no cash flows in connection ([DeAngelo et al., 2004](#); [Miller and Rock, 1985](#)).

1.2.1 Corporate Financial Decisions' Interdependence and Cash Flow Sensitivities

It is observed from empirical research that decisions related to firm's financial policies are analyzed in segregation as is customary. Among others, these are contingent on single-equation framework wherein a group of explanatory factors explains the relevant policy. By way of illustration, tests of payout decision routinely estimate payout variables through a set of financial measures while ignoring the possibility of interdependence between payout decision and related corporate decisions. Analogous to it, other corporate decisions such as capital structure, management compensation, and so forth are tested with similar approaches.

In applied functions, nevertheless, an intrinsic principle of accounting identity relates to decisions concerning financing and investment of a corporation. Firms, in other words, undergo a constraint due to the fact that sources of funds must be identical to uses of funds while settling any one policy variable, referring that rest policy measures must also adjust. When these variables are examined in isolation, it is likely that model misspecification and inefficient coefficient estimates may crop up. Thus, examining them must embody a constrained multivariate setting. Even more, in such event, the customarily practiced framework in the literature i.e. framework of single-equation fails to present a complete picture of corporation's financial performance, since it is incapable of featuring simultaneous along with possibly offsetting impacts that one policy variable may hold on rest. It develops on the economic perspective that interpreting firm's financial prospects become difficult with the results produced by single-equation models ¹

Together with it, prior research is contingent upon static contrary to dynamic models and as a result disregards the inter-temporal dependencies subject to the policy measures, within and across. As an exemplification, studies when estimating capital expenditures of the firm on its contemporaneous cash flows conventionally neglect lagged capital expenditures to employ in the model as an explanatory variable. It happens so despite the fact that fresh projects and annual fixed asset replacement plans may include multiple years to finalize, are conventionally omitted from the model when regressing capital expenditures on cash flows. The coefficients of association mingled with firm's capital expenditures and cash flows can undergo a bias concerning omitted variables if the lagged-dependent measures are not incorporated.

This study aims to follow a model established by [Gatchev et al. \(2010\)](#) that illustrates corporate financial decisions as being interdependent ² when explaining the potential impact of adjustment frictions in measures involved. Applying an

¹[Brainard and Tobin \(1968\)](#) construct a relatively more common argument concerning "pitfalls in financial model building" while some fundamental interdependences are neglected.

²The empirical literature is embedded with well-determined interdependence among corporate financial policies [For instance, ([Fama, 1974](#); [Fama and French, 2001](#); [Harford et al., 2014](#); [McCabe, 1979](#)), along with in various theoretical approaches suchlike information approach ([Miller and Rock, 1985](#)), institutional approach ([Dhrymes and Kurz, 1967](#)), flow of fund approach ([Dhrymes and Kurz, 1967](#)), tax approach ([Myers, 1974](#)), and agency approach ([Jensen, 1986](#)).

accounting identity's constraint that sources and uses of cash suppose to be equal, the model enables a firm to establish financing and investment policies. The study examines the association of firms' spending with cash flow by way of illustrating the discussed empirical work and the biases which possibly stem from testing financial decisions in separation. The investment/cash flow relation is emphasized in the current study since the prior research is mature in a way that a number of studies exist with several datasets, the static single-equation is at the core interest of all.

This examination is, in addition, stimulated from implications of [Tobin \(1988\)](#) when debating the original paper documented by ([Fazzari et al., 1988](#), p. 204) in such a way as to that "... the firm jointly determines investment, dividend payments, and other ways of allocating its cash flow. Therefore...the authors (should) model investment and dividends as depending on the same set of explanatory variables." Put another way, the identity that sources and uses of funds are equal is compulsorily interrelated in firm's financial policies, precisely financing, investment, and distribution. Subject to operating cash flow, a firm that faces a rise of one dollar may bring an expansion in capital expenditures, as for example, with one dollar. Despite that, it may, in addition, generate any mixture of spending and financing decisions enhance or shareowner distributions, or to pay down debt that brings about from the net effect of one dollar rise in firm's operating cash flow. Additionally, adjustment frictions involved in any of policy measures are prone to influence rest of related variables within the system by virtue of this accounting identity constraint.

In detail, the model used in this study includes nine equations portraying firm's financing sources (short-run debt issuance, long-run debt issuance, equity issuance, and variations in cash balances), investment (capital expenditures, acquisitions, and asset sales), and distribution (dividends and share repurchases) policies.

One more usefulness of the systems-approach as followed in the current study is its ability to investigate the capital market constraints directly. In evidence of capital constraints, the prior literature forms a narration of positive association attributed to cash flow/investment relation. The underpinning rationality is that

there would be no requirement to adjust investments on account of changes in cash flow if firms are capable of access external capital comfortably, and, in consequence, there would be an insignificant association attached with investment and cash flow. In contrast, while applying the systems-approach, it allows testing the capital constraints comprehensively by means of enabling, two considered together, the direct (financing/cash flow sensitivities) and indirect (investment/cash flow sensitivities) responses to be analyzed in a simultaneous process. Not only does this multivariable framework generate a comparison of estimated coefficients related to investment-cash flow sensitivity with static single- equation model, but it additionally presents the dominance between investment-to-cash flow sensitivities and financing-to-cash flow sensitivities. Such dominance can thus reveal whether firms absorb cash flow fluctuations mainly through changing total debt, or by altering real assets.

This study endows two numerical illustrations to pinpoint how conclusions become incomplete and possibly misleading when sensitivity concerning investment-to-cash flow estimates are attained from static single-equation model. The study, in the first illustration, supposes two firms, both are separated on the basis of the status of financial constraint, i.e. one being financially constrained and the other as financially unconstrained. Both firms experience a shortfall of one dollar in cash flow. The firm classified as unconstrained responses by way of dropping \$0.20 worth in capital expenditures and granting debt by the value \$0.80. The constrained firm, on the other hand, is incapable of approaching external capital and rather reacts by means of reducing \$0.20 worth in capital expenditures and with the assets sale of \$0.80 worth. A single- equation model, in this illustration, would portray similar sensitivities of investment to cash flow irrespective of the firm's status in terms of financial constraints. This is so, as the investment-to-cash flow sensitivity do not hold an evidence of financial constraints. However, the sensitivities of debt-to-cash flow and asset selling-to-cash flow do hold the evidence of the existence of financial constraints, none of which are addressed in the static single-equation framework.

For another case in a point, the study supposes a firm that reacts in a situation

where it experiences a shortfall in cash flow by one dollar and in subsequent, it executes a switch in its strategy to one of the debt-financed acquisitions from one of organic growth. Since there is a decline in the organic growth, capital expenditures would also drop resulting in a positive sensitivity of investment-cash flow, thus confirming the notion that being financially constrained affects adversely in approaching equity markets. Yet, in this illustration, in actual, the firm does not hold all characteristics of being financially constrained as it is capable to acquire financing for acquisitions with an access debt markets. In addition, by the reason that a decrease in capital expenditures is counterbalanced through a rise in acquisitions, it would be illogical either to conclude that the firm makes any decline in its investments.

Testing in isolation the capital expenditure-cash flow association may result in incorrect inferences, including both of firm's financing opportunities and its investment decisions. By means of examples displayed above, it demands analysis of all financing and investment measures related to the accounting identity constraint in order to draw correct conclusions.

1.2.2 Frictions in Financial Decisions and Cash Flow Sensitivities

[Modigliani and Miller \(1958\)](#) report that firms are in a position to provide finances to each project holding positive net present value (NPV) in case of absence of financing friction, while inconsiderate to the situation whether internal funds are available. Despite that, firms become contingent upon investment opportunities (viz. availing positive NPV projects) along with the availability of funds from internal sources once financial market friction is inducted while considering their investment decisions since external funds turn into more costly as opposed to internal funds. In pursuant to this intuition, [Fazzari et al. \(1988\)](#) established a framework to test whether financing friction executes any impact on the association between internal funds and investments. They report that investment activities are influenced by cash flows (internal funds) positively after controlling

for investment opportunities of the firm which is captured through a measure of Tobin's Q. This positive influence is narrated as a confirmation to the existence of financing friction (Hubbard, 1997; Stein, 2003).

Nevertheless, there is a definite need to incorporate the constituent of financing friction evolved from external markets while studying firms' investment patterns, the fundamental findings of Fazzari et al. (1988) are further grounded on the presumption that real investment friction remains absent. In other words, the fact that the investments are reversible and possess consistent adjustment costs is ignored. Their assumption relates to the same reported by Hayashi (1982). In a case where this assumption turns dismissed, the relationship between investments and cash flow may bear a missing variable bias for the reason that when investment adjustment costs become irregular, the Tobin's Q comes forth as a poor proxy to capture the effects of investment opportunities. There may involve an influence of investment opportunities on investments when seeking for the effects of cash flows on investments.

It is evident through several prior studies that an investment friction is commonly related with real investment decisions by reason of likelihood of investments being indivisible and lumpy Whited (2006), not reversible (Cooper and Haltiwanger, 2006), and attributable to characteristics of time lags in firm's investment and long investment aspects (Lamont, 2000; Tserlukevich, 2008; Tsyplakov, 2008). It is implied from the investments, as being lumpy, that they will hold the attribute of persistence, the nature of inter-temporal and possibly bearing inflated adjustment costs, particularly in a case when investment projects are irreversible. Firms become incapable of instant investments adjustment when exposed to cash flow shocks because of the time lag between when cash flows arise and when policies concerning investments are actually executed.

This is due to the fact that while the needful investment expenditures are certain to the firms as investments being persistent, levels of cash flow for the next year remain uncertain at the time when investment decisions are executed. Thus, it may result in damage to investment projects in higher costs when stopped repeatedly and restarted, if firm's investment is dependent on contemporaneous cash flows.

Apart from cash flows, the firm may be contingent on the current cash holdings considering them as a substitute in internal sources. Cash holdings are valued on realizations in the meanwhile when firms undertake investment decisions for the coming year, for the reason they are more beneficial to the firms experiencing real investment frictions. Firms may avert possible adjustment costs related to investments provided with uncertain cash flows through making investments with cash holdings.

This study aims to investigate corporate investments based on funds obtained through internal sources (videlicet cash flows and cash holdings). Further, it attempts to examine cash flow policies linked with corporate investment while firms experience investment friction in the form of investment time lags and larger adjustment costs.

[Bates et al. \(2009\)](#) report that firms with a focus on hedging the liquidity risks seek for holding more cash in the current period against what they did in the past. [Acharya et al. \(2007\)](#) assert that while determining how cash holdings are influenced by the cash flows; a firm must examine them jointly along with the debt levels, due to the fact that cash may be instantly used to pay off debts. Even more, a major stream of cash outlays is also represented in the form of dividends and stock repurchases, as being payout policies. In addition, as reported in [Almeida et al. \(2004\)](#), [Acharya et al. \(2007\)](#) together with related studies, policies concerning firm's cash flows will differentiate in accordance with its potential degree of financial constraint toward cash holdings, debts and payouts. Thus, in this study, a system of joint determination is formulated capturing the potential effects in the thick of cash flows, cash holdings, net issuance of debt, dividend payouts and stock repurchases in presence of financial constraint status. This system enables examining cash flow sensitivities subject to pre and post- violations scenario, in particular on cash holdings, net issuances of debt, dividend payouts and share repurchases .

Through a robust analysis, this study endeavors to elongate the analysis through dissecting how firms undertake investment decisions using funds from internal sources, in a case where investment behavior is persistent and adjustment costs

are also present. For the purpose, the study introduces lagged cash holdings as an independent variable in the respective framework appertaining firm's investment decision.

1.3 Corporate Frauds and Market Response

It is greatly inopportune in this day and age to envisage our own selves the epochs when no banks, money and equity markets, financial institutions were there, and the epochs when an individual's destiny was only appraised through the means of periphery of land owned, through the heaps of animals one inherited over and above owing to numerous work hands may employ in the work field. Economies demonstrated thyselfes in the mould of usury, silver of gold stemware – the exercise embodied charging of invoicing interest on funds – was forbidden at the hand of law and the Church, the two considered together. The capital market today in any modern economy is no less than a reality addressed.

Considering economic happenings, the equity markets today are momentous component. The corporation 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 in prior to the stocks 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.

Legal sanctions refer to the punishments, penalties or fees that a firm is duty-bound to compensate. Reputation can be defined as "expectations of partners of

the benefits of trading with it in the future” (Armour et al., 2017). Such punishment levied from the market after the revelation of fraud is possibly illustrated through the certitude that a firm under these circumstance may remain no more reliable in the future. The resulting transfigurations in the expectations would influence the firm’s future prospects in terms of operations, its costs, and the nature of terms and conditions of trade. These adverse transfigurations incurred in the input and turnout costs would lower the income of a firm and consequently share value of the firm (Jarrell and Peltzman, 1985; Klein and Leffler, 1981). A greater part of research stream related to corporate illegal activity emphasizes the market response of their illegal acts. The unanimity of this stream is one: an accused firm faces adverse trend in abnormal returns through various deteriorations in liquidity measures after the initial revelation of fraudulent activities (Karpoff et al., 2008a,b; Murphy et al., 2009; Palmrose et al., 2004).

On the other hand, there are several components deriving response of capital market besides return. Certain countenances are involved by means of which a response is made by the market to news related to a specific firm suchlike liquidity of shares which is undertaken as a tool for measuring market efficiency. By and large, in two courses a market reacts to the news: in the first place, through value impact of the news on stocks and in the second place, by means of overall market response. Such reflection in a comprehensive setting is missing in the extant literature (Chung et al., 2009).

Liquidity is referred, ordinarily, as entering into buy or sell trade of a security devoid of considerable variations in its value (Agarwal, 2009; Etemadi and Re-sayian, 2010). The efficient markets are particularized by the larger volume in liquidity along with deficient transaction costs. Certain range of explicit costs, for instance taxes, and implicit costs originated out of information inefficiency shape the transaction cost. While computing price discovery, the firm’s liquidity proves to be a significant measure (Amihud and Mendelson, 1988; Benz and Hengelbrock, 2008; Polimenis, 2012; Riordan and Storckenmaier, 2012). In case a particular news is floated in the market related to specific firm, the traders, analysts and related

participants examine the floated news properly before exercising buy or sell decision. Such news shapes the behavior of these market participants including the existing shareowners. However, bounded empirical evidence exists in the literature in context of fraudulent firms.

Against the expectations, the association surrounded by liquidity and corporate fraud may not be simple. Corporate misrepresentation damages firms' image due to the changed business environment with respect to revised conditions of trading with investors and creditors and therefore let the firms face more unpredictable cash flows and future performance (Jarrell and Peltzman, 1985; Klein and Leffler, 1981). The disclosure of scam proposes that data beforehand revealed by organizations to financial specialists is not right; subsequently, former convictions about company's level of risk must be reexamined. Correspondingly, financial scams likewise bring about doubt and information irregularity in the market (Kim and Verrecchia, 1994; Kreps and Wilson, 1982; Milgrom and Roberts, 1982).

In consequence of information irregularity and changes in terms of exchange, shareholders feel reluctant and do not take an interest in trading firms' securities (Velikonja, 2012). From this stock market becomes illiquid. However, interestingly, the disclosure of corporate scam can generate liquidity because after when the fraud related information is absorbed in the market, the risk attached keeps on reducing, as the information asymmetry tends to decrease. After the exposure of fraud, the regulatory authorities apply strong mechanism of observing company's performance which signals the common stockholders that it will overcome its financial offense (Diamond and Verrecchia, 1991; Karpoff et al., 2008a).

In order to capture the element of financial vulnerability in the stock market, the factor of price volatility is found to be a significant mechanism. It offers to estimate the risk & return tradeoff and thus proves as a key constituent in decision making related to asset allocation (Raju and Ghosh, 2004). Taken separately, stock volatility has been focused on a large scale in the literature [For instance, (Clinard and Yeager, 2011; Horng and Chyan, 2009)], no profound work has been addressed to financial scandals in relation with stock price volatility. Larger the variations found in stock price, higher are the resulting informational irregularity

along with the level of uncertainty about firm's share price. It eventually leads to mistrust and reduction in investment trend among investors. [Murphy et al. \(2009\)](#) asserted that from the time of the revelation of fraud to the adjustment time taken by management to resolve it, the whole period is considered to carry a larger amount of estimated risk in terms of investment in the fraudulent firm. In addition, a spread in common beliefs amongst the investors and informational asymmetry is observed during the stated period. All these factors combined together form a new but difficult climate for operations ([Campbell and Hentschel, 1992](#); [Olsen, 1998](#)). Therefore, volatility in the stock return, in general, is thought to follow an increasing trend in post fraud period.

Trading volume offers a notable contribution within the bounds of financial markets ([Blume et al., 1994](#)). By means of inspecting the firm's trade volume, investors may identify certain useful slice of information related to its future price movement. It is more likely to establish an argument that common beliefs of shareholders are not directly measurable ([Bessembinder and Seguin, 1993](#)). A differential belief revision caused by a change in trading volume and such contentions in investors convictions are embedded with veritable financial aftermaths ([Bamber et al., 1997](#); [Kim and Verrecchia, 1994](#)). If this occurs, volume of the trade (against returns) is considered to be more significant measure capturing the consequences led by stock market ([Atiase and Bamber, 1994](#)). An understanding with the price reactions and information asymmetry related to price disclosure may be developed through observing trading volume. The differential belief revisions incurred after fraud disclosure tends to swing the trading volume, thus during post fraud period, this relationship could be very significant.

Information asymmetry would be one of the most important constituents determining the change in trading volume ([Chae, 2005](#)). Absence of symmetric information with a high level infers that informed traders possess the privilege in carrying more private information as opposed to uninformed traders. Thus, it is plausibly noted that while responding new information, the informed traders do more business with the uninformed traders. For this reason, there is a rise in trading volume before and after the revelation of fraud. In order to detect handful information,

policymakers and researchers may inspect trading volume for forecasting traders' behavior in terms of market order placement strategies and the volatility in stocks. The magnitude detailed in vast majority streams of accounting fraud literature encompasses the negative implications of fraud on stock returns, and thus on wealth of shareowners [See for instance, ([Armour et al., 2017](#); [Karpoff et al., 2008a](#); [Murphy et al., 2009](#); [Palmrose et al., 2004](#))]. Despite that, an argument can be laid that examining price response may not a whole chronicle due to the fact that variations in the price reflect the impact of entire market and subsumes that an evaluation of the future returns' dispensation is properly revised by the investor. Contingent on the reputational hypothesis of [Karpoff and Lott Jr \(1993\)](#) which asserts that violation announcements of a firm spoils its reputation and generates greater uncertain conditions, the impact of these announcements is posited to be more prominent against the stock returns in presence of asymmetric information. In the same breath, investors are not decisive to inject their funds into the capital market and enhance their desired rate of return³. By turns, the presence of asymmetric information creates an influence on the firms' share price and their cost of capital, under such conditions of uncertainty ([Armstrong et al., 2011](#); [Easley et al., 2002](#)).

There are opposing assertions in the extant literature in the context of the impact of a financial misconduct on following conditions of information asymmetry. Premised on the arguments of [Karpoff and Lott Jr \(1993\)](#), it may be posited that following the fraud news, the magnitude of asymmetric information turns high. On another note, certain arguments are placed in the studies that uphold the viewpoint that asymmetric information reduces resulting from fraud declaration. [Karpoff et al. \(2008b\)](#), for case in a point, report that announcement of fraudulent activities becomes a source of transferring private information to the external participants regarding the financial status of a firm and declines, thus, an uncertainty related to firm's future prospects in terms of cash flows. In addition, following an event of a misconduct, the regulator suchlike security commission impose unequivocal punishments and rigorous surveillance, ensuring the external members

³The empirical support on this hypothesis can be cited in [Klein and Leffler \(1981\)](#), [Jarrell and Peltzman \(1985\)](#) and [Chen et al. \(2011\)](#).

that a firm would be restrained for such commission in future, leading thereby to a subsequent decline in information asymmetry⁴.

1.4 Corporate Frauds and Firms' Governance Mechanism

Prior research documents that one of the prime element of corporate financial scandals points towards the presence of weak corporate governance (Beasley, 1996; Dechow et al., 1996). However, little is known with respect to how firms engage in actions to rehabilitate governance mechanism after when fraud is revealed, perhaps more importantly, in addition, how effectively these actions recover the trust of investors. In response to the greatly debated financial reporting frauds (for instance, Enron) theoretically and empirically, regulators are evident in appraising rules aimed to empower the governance mechanism and thus improving its quality. The quality of corporate governance, howbeit, and the trustworthy financial reporting are deemed essential. Some firms allegedly involved in financial misconduct are observed applying rehabilitation strategy which involves improvements in governance structure (Klein, 2003; Thompson, 2003). By way of illustration, Sorkin (2002) reports a press article in which the Tyco's CEO, Edward D. Breen commented on the situation of firm's poor quality of governance mechanism that the most crucial thing is to fix governance structure in order to recover its earnings, following fraudulent financial reporting.

It appears clear that firms would consider certain measures subject to governance structure, after the revelation of their corporate illegal activities, the most probable of which may relate to dismiss the culprits involved. But, it is not clear that such firms would consequently take actions to improve their governance mechanism, since they could handle it by merely exchanging the inside directors with new

⁴In this study, majority of the sample firms are concentrated firms in ownership structure, it is more probable that regulators impose intense monitoring on these firms. For instance, Anderson et al. (2015) find that enforcement actions are more applied to family firms as opposed to non-family firms since a personal bias may exist with the founder due to his influence and wealth.

insiders, instead of replacing with outside directors, for instance. From the perspective that firms tend to spend scarce resources for ameliorating governance after fraud revelation and that regulators emphasize in commanding new regulations, it is essential to examine whether these actions result into any economic benefit. The evidence would endorse the grounds for firm's spending on embellished governance and these procedures if they link with enhancing economic benefits.

Despite that, it could very well be the case that a firm, in consequence, does not obtain economic benefit and such actions come out as merely window dressing. Imparting empirical evidence through this study on either case augments the knowledge of economics concerning the association of governance structure and process of financial reporting.

1.5 Problem Identification and Gap Analysis

The unprecedented wide corporate financial scandals evinced since the financial crisis of 2001 embodying a good few from largest corporations of US. As to dig for the dirt, executive members from Enron, Global Crossing, Tyco, ImClone, Quest, WorldCom, and Adelphia attempted and thus, accused of wrongdoings in one way or another. Such series of invocation into frauds ripped off the US economy at its soul. Seven years thereafter, a global financial crisis (GFC henceforth), in 2008, transformed the economic and financial panorama worldwide, as the event disfigured global financial system badly (Sikka, 2010). Since the inception of GFC, a series of accounting frauds embarked to find a place in headlines. Taking a quick leap to 2014, several reports affirmed a considerable rise in the commission of accounting frauds. A Global Economic Crime Survey (GECS henceforth), as a case in a point, confirmed this increasing trend and the subsequent threat to players, led by PricewaterhouseCoopers (PWC, 2014). The GECS pointed to the immense risk of irreversible loss out of such corporate fraudulent activities if they are not controlled through implementation of fraud deterrence mechanism.

Though the definite score is not familiar, as per assessment several audit firms

and fraud examiners erupted following GFC with the aim of discovering fraudulent activities. Even considering the works of The Association of Certified Fraud Examiners (ACFE) along with American Institute of Certified Public Accountants (AICPA), deterrence of fraud is still deemed a despicable failure (Cooper et al., 2013; Morales et al., 2014; Murphy and Free, 2015; Neu et al., 2013; Sikka, 2010). The problem endures to a scale at which policies concerning fraud deterrence in order to curtail this increasing ratio are not convincingly executed by the standard setters (Dorn, 2011; McBarnet, 2006; Power, 2013).

Financial scams are the apprehension of universal botheration and hitch, provided with their pervasiveness and intensity. Despite that, the literature on hand is inadequate in respect to scope and context. This study partitions the problems and gaps ascertained from the previous extant literature into five parts. First, in reference to study setting, overwhelming majority of the research on corporate financial fraud is immersed on developed economies bearing ownership structure as dispersed (Arena and Julio, 2010; Bonini and Boraschi, 2010; Deng et al., 2014; Dyck et al., 2013; Lin et al., 2013).

In fact, corporate financial misconducts deranging through ownership structures characterized as dispersed are not similar to those disrupting in ownership mechanisms characterized as concentrated. Contrary to dispersed ownership mechanism in which shares are owned divergently, a conventional Asian firm includes single or certain family members retaining shares tenaciously. Firms with such magnified concentrated mechanism elevates the hazards of dispossession of rights held by the minority [For instance, (Bae et al., 2012; Bany Ariffin, 2009; Chang, 2003; Djankov et al., 2000; Ehrhardt and Nowak, 2001; Gutiérrez and Tribo, 2004; Jensen and Meckling, 1976; Qian et al., 2010)].

A huge amount of fraud forfeitures are reported by Association of Certified Fraud Examiners (2014), which are identified in direct proportionate to the greater intensity of authority of culprit. Such disposition and potency to dispossession of rights held by the minority motivate firms to commit wrongdoings (Alves, 2012; Beasley, 1996; Chang, 2003; Fan and Wong, 2002; Faulkender and Wang, 2006; Leuz et al., 2003). The research is limited concerning Asian economies that are

attributed largely by their ownership being concentrated (Chen et al., 2011; Li et al., 2014; Yu et al., 2010).

Besides, a major criticism has been made on the classical approach maintained in agency theory on account of not incorporating the institutional and social climate of the firms (Aguilera et al., 2008; Otten and Wempe, 2009). This study, thus, examines the corporate frauds commissioned in the particular framework of Pakistan.

Second, in the previous studies, several firm-level factors are detected that impart fraudulent activities. Explicitly they embodied multiple facets of fraud triangle to detect these internal and external related factors. Numerous studies examine the three dimensions of fraud triangle. Hernandez and Groot (2007) document that factors classified under opportunities and incentives are assessed by several audit partners and are linked with the likelihood of fraudulent activity. The most critical among them pertains to the unethical conduct of the executives. Rezaee (2005) finds evidence in the support of conditions suggested in fraud triangle model in the firms allegedly involved in wrongdoings. Lou and Wang (2011) while assessing the probability of fraudulent financial disclosures, determine several factors matched with fraud auditing standards.

Despite that, several studies emphasize on merely one of the three dimensions of the fraud triangle framework. By way of illustration, Dechow et al. (1996) assert that firms in the desire to captivate the external financing at relatively less cost, employ certain factors classified under motivation to distort their earnings. Gillett and Uddin (2005) point to the conduct of CFO concerning fraudulent reporting as a key constituent in developing misreporting intentions. Suyanto (2009) while assessing the likelihood of fraudulent financial reporting assigns factors related to pressures and opportunities participating therein.

However, a criticism is made on the applicability of the fraud triangle dimensions. It is observed inadequate in covering all instrumental climate factors; particularly it ignores the important social dimension (Murphy and Free, 2015). Based on the survey, theoretical and practical implications of fraud triangle are revisited (Schuchter and Levi, 2016). In addition, fraud triangle emerged in the mid-20th

century faced criticism when considering its application to detect and deter fraud. A number of academics and professionals have extended critical insights that go beyond the conventional dimensions of fraud triangle. One of the most important extensions relates to antecedent factors from the external environment (Dorminey et al., 2010). Bressler and Bressler (2007) imply empirically to improve conventional fraud triangle and in an attempt, they introduce fraud square by presenting components as incentive, capability, opportunity, and realization. Thus, the study selects an arbitrary set of variables following the contemporary literature of corporate illegal activity, besides incorporating all factors identified in fraud triangle model. It is noteworthy to mention that there is no study, thus far, on corporate frauds in Pakistan, neither in context of fraud triangle theory nor in subsequent extension to this triangle.

Third, ex-post, a well-documented stream of literature considers the emphasis on the adverse influence of firm's violations on the wealth of shareowners. A unanimity in their evidence is identified in a way that declaration of these violations bring negative abnormal returns [See for instance, (Armour et al., 2017; Karpoff et al., 2008a; Murphy et al., 2009; Palmrose et al., 2004)]. Besides, another stream of literature asserts that a large portion of the story is overlooked by emphasizing and developing understandings on "injured-shareholder-centric" perspective of the costs and consequences of fraud (Velikonja, 2012).

On this subject, studies are not extensive that undertake the behavior of corporate financial decisions (viz. financing, investment, and dividends) comprehensively in terms of fraudster firms. An empirical examination in this context is essential based on the valid premises that following declaration of corporate financial misconduct the reputation of alleged firms are damaged severely and in subsequence generates asymmetric information and market imperfections (Karpoff et al., 2008a), and the assertions proposed by Modigliani and Miller (1958) and Miller and Modigliani (1961) related to corporate policies being independent may not hold. Thus, firm's corporate policies concerning financing, investment, and dividend payouts, in post-fraud settings, are posited to be interdependent. The established literature on corporate illegal activities lacks this comprehensive

investigation.

Fourth, ex-post, the study offers direct evidence, while assessing the violations-information asymmetry association in the developing economy, connecting thereby market microstructure and corporate ethics literature. As [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. Specifically these sub-periods are classified as the pre-violation period, the event period and the post-violation period. 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.

Lastly, the literature on corporate illegal activities with respect to post-announcement issues has turned to how damaged reputation is restored by firm's ameliorating actions. Following the announcement of firm's violations, the firm is better proposed to adopt essential proceedings to signal the attempts it is pursuing to diminish the chances of such violations in future. What measures an allegedly fraud firms take on aiming to recover their integrity and the lost reputation? [Farber \(2005\)](#) answers this question while examining the US firms in the post-announcement setting for their changes in governance mechanism. Besides this work, provided with the distinctive corporate governance mechanism of Pakistan as opposed to the US, further analysis is required against this question.

It is posited that firms in post-violation period may take actions to improve their earning quality, which subsequently signals the market about their future prospects [Costello and Witternberg-Moerman \(2011\)](#); [Toms \(2002\)](#). [Farber \(2005\)](#) in this context, proposes fraud firms to improve their governance structure as a progressive scheme to reinstate the confidence of market participants. Studies in such wise and with this length are rarefied by and large and in particular context of Pakistan.

1.6 Problem Statement

Corporate frauds, considering their intensity and pervasiveness, influence the reporting mechanism, equity markets and in the due course hit the functioning of 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. 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. It is essential to observe why such firms motivate to involve in a financial fraud and how the frauds impact their financial prospects afterwards.

When studying factors contributing corporate frauds, the existing literature orients more towards applicability of the fraud triangle dimensions, which is not enough. Thus, the study posits to incorporate other related dimensions in order to capture the true picture of how firms motivate to commit fraudulent activities. Furthermore, the post-fraud scenario of how financial prospects (financial policies, market response and governance system) of the firms behave is still unknown in an uncommon context of Pakistan bearing unique ownership structure and governance structure of the firms.

1.7 Research Questions and Objectives

Premised on the issues presented in prior literature on corporate illegal activity and the problem statement, this study endeavors to fill these gaps by devising empirical research questions and their corresponding objectives as follows.

1. **Ex-ante, what factors as corporate climate contribute to financial**

fraud for listed firms in Pakistan?

The study, in accordance with this research question, purposes to examine the contribution of various factors eliciting the fraudulent environment for the listed firms in Pakistan. For the purpose of analysis, the study follows the framework based on fraud triangle, agency theory, corporate illegal activity literature, governance mechanisms, and International Standards on Auditing to determine the factors (see section 2.6.3).

2. Ex-post, what consequences financial fraud put on firms' future prospects in terms of interdependent and inter-temporal financial policies?

The study purposes to examine this research question by analyzing the impact of financial violations on the shift in corporate financial policies. Specifically, this objective intends to analyze the simultaneous changes in the corporate financial triad (i.e., financing, investment, and dividend payouts). This investigation is based on the theoretical reasoning subject to the presence of severe market imperfections and reputational penalties linked with violation announcements (see chapter 2). The prevailing literature discusses the simultaneity of corporate financial policies in a general context and lacks the empirical evidence in respect of firm-specific incident. Previous studies concerning fraud analyze the post-fraud changes in corporate financial policies separately ignoring the interdependent and inter-temporal nature of these policies. This study further analyzes the simultaneous changes in the corporate financial triad in presence of financial constraints and principle of an accounting identity. The study incorporates robust analysis to investigate these relationships.

3. Ex-post, what consequences do violations announcement bring in firms' liquidity?

The study aims to examine the response of violations announcements on the market liquidity of corresponding firms. Violations related to financial disclosure notify investors that the preceding financial statements carry material errors which possibly could adversely influence the value of the firm, the perceived degree of information asymmetry, and mistrust related to the quality of future financial

reports (Callen et al., 2006). However, there is limited analysis in the extant literature to examine long-run market liquidity upon violations for investors. The study, thus, aims to test the market liquidities for firms' financial violations and the resultant information asymmetry. The study continues the investigation to test whether deterioration in any liquidity measure can translate the cumulative abnormal return days around the declaration of violations.

4. Ex-post, whether fraudulent firms improve corporate governance in restoring reputation and recovering share value?

The study in line with this last research question aims to analyze the ex-post response of fraud firms to restore the corporate legitimacy. For the purpose, the study considers the changes in governance mechanism as ameliorating actions to improve the earning quality. Farber (2005), in this context, opines that firms declared with illegal activities should ameliorate the governance mechanism to recover their reputation. The study proceeds one step further to empirically examine the impact of these changes on earning quality as the earning quality presents objective information that highlights the future outlook of the firm to various users of information. On that account, the study analyzes the association between fraudulent behavior and quality of governance mechanism and whether the subsequent improvement in governance variables aid in reviving firm's impression linked with the informed traders and thus rehabilitating its market values.

1.8 Significance and Contribution of the Study

This dissertation imparts contribution to the existing literary work in certain means. This is the only comprehensive study on corporate fraud conducted in Pakistan. The study covers different aspects of firms' misconduct; specifically, it uses a pre and post-fraud approach to address all possible dimensions. This section details the significance and contribution of the study in three parts; the first part claims in theoretical viewpoint, the second elaborates contextual view whereas the third explains the practical perspective.

1.8.1 Theoretical Significance and Contribution

Ex-post, the study extends contribution to the corporate illegal activity, governance mechanism, and market response to financial misconduct. It is well-documented that financial misconduct influences both the cost of debt and equity capital (Chava et al., 2010; Deng et al., 2014; Sun et al., 2011), capital mix (Bonini and Boraschi, 2010; Chen et al., 2011; Graham et al., 2008), cash holding (Arena and Julio, 2010; Lin et al., 2013). A widespread review of literature also exhibits that, nevertheless much attention is paid to examining a set of financial strategic decisions including financing, investment, dividend payouts, and cash holding. However, it has generally overlooked the potential aftermaths of corporate misconduct on diverse firms' financial policies. Nevertheless, one stream of literature poses the effort contributed to analyzing a set of decision variables in this context, but they have been studied conventionally in separation instead of all together. Corporate financial misconducts impart market imperfections enabling financial policies to become more interdependent. Various frameworks in the literature affirm this interdependence among corporate financial policies, as for instance, flow of funds framework (Dhrymes and Kurz, 1967), institutional approach (Dhrymes and Kurz, 1967), tax approach (Myers, 1974), information approach (Miller and Rock, 1985) along with agency approach (Jensen, 1986). The extant literature also depicts that the element of uncertainty becomes enlarged for internal management engaged with post-fraud financial decisions.

Moreover, a common standpoint is of the view that scandal firms face a negative response after fraud revelation. Provided with these premises, it is more justifiable to investigate financial decisions i.e. investment decision, financing decision, dividend policy decision, and cash holding decision concurrently before and after the fraud revelation. Therefore, this study attempts to fill the gap by examining these policy variables bearing corporate misconducts.

The greater part of studies concerning corporate illegal activity relates to the market reactions in dispersed ownership structure. These studies carry a unanimity that such misconducts bring adverse abnormal returns after their initial disclosure. [(Armour et al., 2017; Karpoff et al., 2008a; Murphy et al., 2009; Palmrose

et al., 2004)]. Yet, not much is retrieved in testing the relationship of financial violations on the facets of stock market referred as stock price volatility, liquidity, along with 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 are linked with certain governance conducts that assist in fraud deterrence (Dechow et al., 1996; Hasnan et al., 2012a; Kamarudin et al., 2012; Owens-Jackson et al., 2009), yet not much is known respecting measures adopted by firms to refine quality of governance mechanism, and literary perchance how successfully these measures recover investor trust. Farber (2005) asserts in recapturing the image once deteriorated through a financial scam, governance mechanism assists substantially. Given the significance of credible financial disclosure and quality of governance structure, it is astonishing to find little in the context of type and magnitude of this relation. Considering this, the study contributes to literature by seeking this association by analyzing how firms aid through governance mechanism to recover their earning quality in presence of informed market participants.

1.8.2 Contextual Significance and Contribution

Smaller number of studies on financial scandals are conducted in order to draw bases to commit fraud, their impact on value of the firm, deterrence and governance mechanisms conventionally in Asian viewpoint [(Hasnan et al., 2012a,b; Kamarudin et al., 2012; Kwan and Kwan, 2011; Mohamed, 2014; Voon et al., 2008; Zaimee, 2007)]. Coffee (2005) asserts that characteristics of financial scandals observed in concentrated type of ownership structure is not the same as found from dispersed ownership. The variability in the edifice of corporate ownership provide differential evidences for the firms alleged with financial misconduct in terms of the type of misconduct, the number of frauds at any given time, and the

specification of the executioner. In addition, it is the corporate managers who possess a tendency to commence a fraudulent activity in case of dispersed ownership framework, whereas contingent to the concentrated ownership structure, controlling shareowners incline to be the rogues of the story. As a result, governance mechanisms being followed in one structure type is not similar to the one being practiced in another.

There is an inferior-visibility extraction of personal gains related to majority shareowners in respect of concentrated ownership structure. In Pakistan, published academic literature subject to fraudulent financial reporting is rare. Thus, the study additionally endows contribution to the literary works on financial scandals subject to Pakistan and the similar economies with concentrated ownership structure.

1.8.3 Practical Significance and Contribution

Fraudulent financial reporting, as being one of the constituents of misconduct, has emerged as a substantial white-collar crime in present-day business setting (Palshikar, 2014). This fact is acknowledged by numerous capital market participants validating the potential loss driven by frauds (Yusof et al., 2014). These potential aftermaths are not only enhancing but also proving unavoidable (KMPG, 2014). As 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.

The study outlays the climate elements leading to a corporate fraud in the listed firms of Pakistan. The key stakeholders along with regulatory bodies may use the study findings as per their nature and level of stake, suchlike creditors, SECP and the like. Taking into account the outcomes of corporate frauds on firm's future outlooks by the response of capital market, an investor may benefit from ex-post fraud behavior of accused firms identifying how they rehabilitate afterwards. In addition, considering the reported aftermaths a corporate fraud may have on firms' financial decisions, a suitable rehabilitation policy can thus be formulated. The

management, while deciding on corrective actions to deter fraudulent activities in the future, may take into account the role of corporate governance as attested in the findings of this study.

1.8.4 Structure of the Dissertation

The remainder of this dissertation proceeds as follows. The next chapter reviews extant literature, while the third addresses sample construction and research methods employed. The fourth chapter examines data and lists the empirical results whereas the last chapter discusses the summary, contributions, and limitations of this study.

Chapter 2

Review of Extant Literature

The literature review of this study discusses the various themes related to corporate finance and fraud. First, the literature discusses the empirical evidence in the perspectives of corporate financial fraud, factors contributing its occurrence, and consequences of it in terms of change of firm's corporate behavior, stock market reaction and changes in governance mechanism. Second, the literature details the prevalent theories of investment, financing, and dividends and simultaneity of these decisions. Third, it discusses and formulates the hypotheses concerning factors eliciting firm's fraudulent behavior. Fourth, the study relates corporate fraud and corporate decisions literature to build study hypotheses. In doing so, the study establishes the possible effect of fraud on subsequent changes in the corporate decisions separately as well as its effect on the joint determination of these decisions. Lastly, this chapter details the discussion and formulation of hypothesized relationships in the context of stock market response after the violations' announcements.

2.1 Corporate Financial Frauds

A financial fraud is resultant of intentional manipulations in recording false accounting transactions or that of misapplication of certain accounting principles.

Either way, the financial disclosures are deliberately inaccurate. Noticeably, frauds are different from the mistakes or errors committed in misstating accounts. Frauds, relatively, always are backed by intent to do something wrong (Wells, 2017). Managing earnings is one of the outlays of such intentions. The most frequent form of it is manipulations done in sales. Considering the expectations of shareholders, particularly in public limited companies, managers may overstate the financial picture of business. Complicated the rules or transaction size is, greater is the risk of unfair recording in sales. Along the same lines not recording the accrued expenses may overstate the business earnings, during a period of depressed sales in particular. Characterizing recurring expenses as non-recurring is also a way to understate expenses in the operations (Gee, 2014). Overstating assets can also be a technique to manipulate balance sheet. Most of the overstatement in assets is evident in current assets in order to articulate important ratios to attract investors. Another way to make balance sheet more attractive is to understate the liabilities. Booking low reserves against the risky accounts like accounts receivables, inventory obsolescence, warranties and sale returns may also work as pathway to inflate company's earnings (Coenen, 2008). Poor auditing along with current financial innovations are found enhancing scandals' ratio (Jickling, 2009).

A fraud has almost the same line of attack to every company irrespective of the nature and size of it. Dishonesty in personnel is not the reason to propagate it. It is independent of the case whether the company has a misfortune to hire a dishonest CEO or CFO. Likewise, it is not plausible to argue that frauds breed out from a grand conspiracy or plan. Unfortunately, frauds generate out of an environment where honest individuals are put under pressure to do fundamentally dishonest activities (Wells, 2017). Moreover, financial frauds usually take a start with smaller intensity. Rarely does a fraud in corporate environment start out massive. Though it is true that some personnel are dishonest by nature, but they get elbow out after some course of time and cannot survive for long-run in the company. A fraud begins with the unclear areas of financial reporting. For instance, the concerned finance individuals may exploit ambiguities related to revenue recognition, grey areas in applying GAAP (Generally Accepted Accounting

Principles) rules and the like. In addition, a massive financial fraud grows over the time and once it is deeply grown, it becomes irreversible ([Young, 2014](#)).

Deterring financial frauds depends on the accuracy of monitoring activities performed by shareholders. As the course varies along the life cycle, shareholders tend to change their monitoring activities as well. Also, the environment becomes fraud-friendly the time when a company wishes to generate more external financing. The frequency of fraud depends on the overall business conditions prevailing in the economy. If the shareholders perceive the business conditions as poor they tend to perform due diligence with every given company in their portfolio for investment purpose. In this way, the scam firms are likely to be weed out of their investment choices. But, if business conditions are perceived good by the shareholders, they reduce their evaluation level in the due diligence, increasing thereby the potential for fraud ([Povel et al., 2007](#)).

When investor convictions are examined with respect to short and long run compensation at the top level, the results suggest that managers prone to indulge in fraudulent activities while realizing compensation based on company's short-run performance. As per study's framework, the shareholders set this compensation on the basis of company's short-run performance and long-run performance. The manipulations induced in long-run performance are not evident and the long-run performance discourages managers to conceal the poor short-run performance ([Hertzberg, 2005](#)). Moreover, consistent with [Povel et al. \(2007\)](#), the study asserts that likelihood of a company to commit a financial scandal is dependent on the level of investors' conviction they carry about business conditions. Elaborating further, if the managers find their company performing poor, short-run incentives are high letting managers manipulating the reports and commit a fraud. Conversely, when the managers rank their firm performing good, long-run incentives are high, thereby lowering the chances of manipulations and fraud. [Hertzberg \(2005\)](#) parallel to it confirms that the probability of committing a scandal depends on the shareholders' conviction about business conditions.

[Dyck et al. \(2010\)](#) conduct a comprehensive study on the fraudulent companies in the US from the year 1996 to 2004 and categorize the whistleblowers into two

broader groups. The groups are formed on the basis of internal and external governance. The players in both governance aspects are comprised of financial experts, financial auditors, industry rivals, customers, company personnel, investors, regulatory authorities, and mass media. The study explores that in a situation when it takes more time in revealing a scandal two outcomes are evident in common. Firstly, the firm gets engaged with over-investments that mostly go wasted. On the other hand, the whistleblowers seem not to achieve attractive financial reward for revealing the scandal. They critically analyze the whistle blower's data on the basis of one-year post-scandal and three years' post-scandal. They explore the costs and benefits attached to blowing a whistle for company personnel. Costs class include termination from a job, resigning, shift in work assignments and the benefit class includes success in filling a case, better reputation in the industry, increase in job authority and job rotation. Furthermore, they reported that the analysts who blow the whistle are found to achieve advancement in their professional career but in a limited scale. They also analyze the whistleblowers from mass media through academic publications, radio, newspapers, and magazines, and collect data about the reporting context, publication's section, and location. They find that the reporter responsible for fraud detection gain less significant promotions and demotions in their career.

2.2 Factors Contributing Corporate Financial Frauds

Several types of research in the literature focus on exploring the factors that led companies to commit fraud. Certain characteristics of managerial manipulations are observed in this regard, for example, earnings management captured through discretionary accruals, regulators' accounting enforcement steps and investors' monitoring activities. For instance, [Crutchley et al. \(2007\)](#) and [Dechow et al. \(2011\)](#) associate growth rates and outside financing to be the antecedent of a financial scam. One string of the literature addresses internal factors in relation to

financial fraud. Series of studies investigate the management compensation structure and frauds in one setting [for instance, ([Bergstresser and Philippon, 2006](#); [Burns and Kedia, 2006](#); [Efendi et al., 2007](#); [Johnson et al., 2009](#); [Peng and Röell, 2007](#))]. They build a consensus in their findings that managerial performance-based compensation directly affects the likelihood of scandal.

Apart from a range of measures that capture financial scandals, another part of the literature lays importance on the usefulness of models designed for identifying a scam and on factors affecting the effectiveness of such models. [Dyck et al. \(2010\)](#) make a comparison between regulatory and market-based monitoring models to find out which one is better in rooting out scandal. As opposed to the traditional perception, they dig out that standard economic representatives expected to serve a corporate governance role do not play a considerable role in detecting scandals. Rather, identification of a scandal depends more on nonconventional agents like employees, media, and nonfinancial sector regulators. In addition, a few studies focus on the part played by certain whistleblowers and examine the incentives that either smooth the path of or debase the coherence of such models in rooting out scandal.

Among the key corporate governance agents pinpointed by [Dyck et al. \(2010\)](#), there is a part of accounting literature that addresses auditors' performance in preventing and exposing scandal ([Francis, 2004](#)). [Chung et al. \(2002\)](#) verify the responsibility of institutional shareholders. [Yu \(2008\)](#) studies the role of financial practitioners in bringing down earnings management, whereas [Karpoff and Lou \(2010\)](#) exhibit that short sellers foresee the ultimate exposure of financial manipulation and its severe effects. Short selling is linked with a rapid time-to-discovery and reduces the inflated stock prices that are resultant of earnings management. Having the capacity to identify scam in a timely manner is a sign of the overall effectiveness of a corporate governance framework. Generally, uncovering a scam is completed by looking into red flags and different signs of fraud. One arrangement of academic studies, therefore, concentrates on different measures that discover scam. Misstatement in practicing accounting framework breeding out financial maneuvering can be captured through several measures as documented by

Beneish (1999) and Dechow et al. (2011). Fich and Shivdasani (2007) describe that governance characteristics do play a role in the occurrence of fraudulent activities. Rezaee (2005) argues in wake of the study results that financial scandals can be prevented through better governance mechanism, improved accounting system, effective internal audit and due analysis of fair financial disclosures. The governance characteristics, when provided with a poor structure, become a key catalyst for fraud initiation. Fich and Shivdasani (2007) conclude that management is often associated with doing artificial accounting in different financial indicators particularly in earning quality.

Theoretical studies to substantially explore the managerial incentives drawn out of maneuvering company's information are not common. Goldman and Slezak (2006) and Peng and Röell (2014) investigate such incentives along with top-management compensation leading a firm commending fraud. Goldman and Slezak (2006) report that firms offering equity-based compensation may likely indulge in fraud ignited by managers as this sort of compensation not only attracts managers but it tempts those manipulating earnings in order to disclose increased market share price. In specific, offering performance-based compensation, the structure can lead to a point where managers become rogues of the story and commit certain fraud. Peng and Röell (2014) undertake both short-run and long-run share prices in relation to managers' salary compensation and empirically compare the impact of fraud on them through rational expectations mechanism. The reported findings exhibit that maneuvering short-run share prices are more common in compelling managers to increase compensation, on top-level in particular. However, long-run pay is not associated with maneuvering share prices, yet it is found more expensive to the company if it is attributed to any malfunctioning.

By using asymmetric information model, Peng and Röell (2014) and Fischer and Verrecchia (2000) observe managerial compensation benefits attached to maneuvering company's stock prices. They report that the market is not certain about reporting objectives of managers. Thus, the market cannot absorb fully the manipulations triggered by managers in the financial statements. The reporting objectives are expressed as the marginal rewards obtained from maneuvering the

stock price. The results depict that under a substantial amount of uncertainty the estimated rewards of maneuvering are positive with respect to reporting objectives of the managers. Moreover, it is concluded that this maneuvering decreases to the level, which share prices, outlays all possible information.

Rather than analyzing monitoring activities of shareholders [for instance, (Povel et al., 2007)] and top management compensation plan [for example, (Goldman and Slezak, 2006)] individually, Pagano and Immordino (2012) propose a situation where investors carry lesser information than the managers and where the auditors play a controlling role in shielding the fair financial reporting from manipulations. In addition, they suggest a compensation structure selected optimally by the investors. They depict that management compensation acts as an alternative to the quality of monitoring in the way that rigorous audit mechanism decreases pay-performance sensitivity. However, it increases the quality of audit and that increase in investor's protection enhances the effect of the pay-performance but lowers the dependence on audit quality.

Various studies have taken factors like governance mechanism, dividends payout, and compensation and analyzed in relation to scandal or earnings smoothing separately but the work lacks in terms of investigating them together. When tested together, not every constituent played a role in contributing fraud. Fraudulent companies as revealed by Securities and Exchange Commission are compared initially with the matched firm from the same industry against all constituents of fraud. A criterion of the matched firm is based on 30% or less near market value and book-to-market ratio. The comparison highlights whether there exists any significant difference in selected indicators or not. In order to capture the relevant factors contributing fraud, two techniques are used, the first being providing the input to other. Firstly, factor analysis is used to determine the smaller set of factors from numerous variables considered early in comparison purpose. Then, these explored smaller set of factors are investigated using logistic regression. The likelihood of a factor contributing to fraud is reported for the ones giving significant results. As per the study findings, firms with few outside members on the audit committee, overcommitted outside members, significant growth rates, earnings

smoothing and lesser dividend payout ratios are prone to commit a fraud. Compensation structure, though, is not found as the significant factor contributing any role (Crutchley et al., 2007).

2.3 Consequences of Corporate Financial Frauds

Karpoff et al. (2008a) conducted a study on the consequences of fraud revelation on the 2206 individuals who committed fraud. Only 7% of them managed to keep their jobs and rest of them was terminated. Moreover, the culprit individuals faced serious career issues, financial penalties, jail punishments up to 4.3 years on average and some more criminal charges. They also assert that the impact of this fraud was not only on those individuals but also on shareholders and governance mechanism. Fich and Shivdasani (2007) assert that the financial scandals incurred in any organization do create a negative impact on the immediate reputation in the market.

Correia (2009) and Yu and Yu (2012) observe the performance and quality of financial regulatory authorities. Correia (2009) observes that scam firms are prone to involve in political activities and are likely to single out parliamentary committees having strong links with the Securities and Exchange Commission. As a result, such political ties help companies to get away from high punishments. Whereas, Yu and Yu (2012) instead of addressing financial regulators in exploring scandals, their focus extends to the lobbying activities deterring fraud revelation. Companies that manage to avail lobbying with the regulatory authorities are found to face the lesser risk of fraud revelation as compared to other companies. In addition, they escape from uncovering a scandal 117 days longer and 38% are the chances that they are not exposed to regulators. On average scam, firms invest 77% more on lobbying in comparison with non-scandal firms, and they invest 20% more when their fraud is revealed. Furthermore, financial regulators are negatively affected by lobbying activities while identifying financial manipulations.

2.3.1 Corporate Financial Decisions

The fraudulent companies may undergo a lesser access to external financing choices along with more cost in the capital structure. One of the key drivers to face such situation is the company's bad reputation in the market, nevertheless, the intensity of this difficulty hits with different proportion to the companies bearing negative image due to any valid reason (Chen et al., 2013). In such cases, the companies may face a serious problem in issuing equity for generating required funds (Myers and Majluf, 1984). Relating the fact that the decisions of investment and financing are correlated strongly due to the existence of accounting identity, a firm with disturbed financing options may also undergo from investment problems (Johansen, 1994). The ratio of difficulty keeps on increasing when there prevails a negative reputation of the companies in their investment projects (Sengupta and Dasgupta, 2003). Due to facing hurdles in generating funds to external financing, fraudulent companies are left with the choice to execute their investment projects through an increased level of cash holdings. In such a scenario companies investment options also face a declining trend (Bates et al., 2009; Boileau and Moyen, 2010; Gao and Grinstein, 2014; Han and Qiu, 2007). As, the companies after fraud exposure face costly external financing and underinvestment problems, they tend to increase the cash savings to meet their operational needs (Hovakimian et al., 2001; Pagano and Panetta, 1998). It is expected that such companies will run out of options to pay regular cash dividends (Dechow et al., 1996).

Kumar and Langberg (2009) developed a framework of capturing the causal relationship of financial fraud and investment bias in view of investor-manager agency conflicts. They conclude that companies having low access to the outside financing and high cost of capital are less likely to face any financial scandal. They find that the scandals are linked with overinvestment in the condition of low return and that with underinvestment in the condition of high return. The report also asserts that the chances of the scandal are also evident in presence of innovations increasing the productivity or investment returns.

Although knowing the assumption that frauds cannot be eliminated entirely from the business conduct, companies must develop strategic decisions for preventing

it in future. Educating personnel can benefit the company in a way that it helps reducing scandals and also is a cost-effective tool to combat scandals relatively. Code of ethics should also be revised and aligned to specific areas covering the spectrum of frauds in general. Tone at the top may become instrumental for effective anti-scandal policy and strategic decisions [Coenen \(2008\)](#).

2.3.2 Cash Flow Sensitivities: Static Single-Equation Models

Earlier research customarily regresses the following model for studying the possible impact of capital constraints on firm's investment.

$$\frac{CAPX_{i,t}}{K_{i,t}} = \beta_1 \frac{CF_{i,t}}{K_{i,t}} + \beta_2 MB_{i,t} + \varepsilon_{i,t} \quad (2.1)$$

Where: CAPX represents the firm's capital expenditures, K represents the firm's fixed assets, CF represents the firm's cash flow, and MB represents the firm's ratio of asset's market value to asset's book value. A conventional explanation of the cash flow estimate subject to equation 2.1 is that a comparatively little estimate infers that an entity is able to inject capital expenditures facing unfavorable cash flow realizations. On the other hand, a comparatively high positive estimate implies that an entity reduces its capital expenditures, in effect, as against adverse cash flow realizations, a reaction in conformity with costly access to funds appertaining to external capital. A well-documented stream of prior studies supports this positive association between cash flow and capital expenditures, as presented in equation (2.1).

Abiding with the rationale provided in prior literature, the absence/presence of capital market constraints is aimed to be tested by examining whether the cash flow sensitivity in its estimated coefficient is lower for the sub-sample of entities which are ex-ante tend to be financially strong, and higher for the sub-sample of those which are prone to be financially distressed (in ex-ante). In pursuant to this

procedure, in their 1988 Brookings article, Fazzari, Hubbard, and Petersen (henceforth FHP) report empirically a positive association between investment (captured through capital expenditures) and internally produced cash flow and conjointly reveal that such association turns to be most intense in case of financially distressed companies. FHP express their inferences as a testimony of distinguishing costs of capital characterized as internal and external, and they establish, based on this premise, that capital market frictions may force some companies to sacrifice beneficial investments.

A number of studies provoked studying the cash flow/investment connection since this finding owns complications in reference to the proficiency of distribution of capital in an economy. However, a major stream of these investigations confirms the original FHP inferences that the cash flow sensitivity of investments are influenced positively with the presence of financial constraints [for instance, (Boyle and Guthrie, 2003; Calomiris and Hubbard, 1989; Fazzari et al., 2000; Hoshi et al., 1991; Hubbard, 1997)]. The rest finds the opposite finding. As a case in argument, Kaplan and Zingales (1997) and Kaplan and Zingales (2000) report that when the level of external market constraints and investment-cash flow sensitivity are contrasted empirically, the evidence does not find a monotonic relation. They suggest that the firms experiencing most difficult access (financially constrained) to capital markets portray the next largest sensitivity of investment to cash flow, as opposed to those that hold the easiest access exhibit largest investment to cash flow sensitivity. Companies classified into partially constrained are found least sensitive in this context. In another point of fact, Cleary (1999) implies that these financial constraints impose an inverse association with investment-cash flow sensitivities—firms with most constraint status maintain the sensitivities on smallest grade whereas those bearing least constraint profile hold the sensitivities on the largest scale.

2.3.3 Potential Problems with Static Single-Equation Estimates

A static single-equation model provokes certain generalizability problems, one of them points to biased estimates of the coefficients involved. Regressing aforementioned equation 2.1 may result in an omitted variable bias in the coefficient of investment-cash flow sensitivity if any of the policy variables are exposed to frictions. These frictions may adopt the form of major fixed costs or adjustment costs given the subsequent economies of scale. As for instance, it becomes more likely to be positively associated with the current and lagged investments when the investment projects are costly in terms of the circumstances where a firm decides to stop or restart them. Analogous to it, when replacement decisions are made by the firms on annual basis related to a considerable portion of their assets, persistence will be displayed in their capital expenditures. Neglecting this persistent can possibly result in a bias while estimating the sensitivities of investment to cash flow. Further, a typical static equation of investment to cash flow maintains an assumption that current investment decisions are not dependent on policy variables of any other kind, aside from the independence assumption relating to current investment decisions and past investment decisions. Nevertheless, it is comprehended that continuity/change in any one policy measure can accordingly influence any other related measure in the system since these policy measures are interdependent (*viz.* sources equal uses of cash in each period).

Over and done with biased estimates, inefficient coefficient estimates are one more form of generic problems attached with static single-equation models. For the results to be generalizable, the precision of the estimated coefficients is essential, since conclusions in relation with the absence or existence of external financing constraints are obtained through the instrumentality of changes in estimates against all sub-samples. However, one must come by consistently estimated coefficients asymptotically, even if accounting identity constraint is not exercised explicitly, provided with the condition that the model is correctly specified. Besides, estimators turn more efficient and differentiating the sub-samples in their estimates

become more convenient if the necessary constraint is applied in the model. Conclusively, from an economic standpoint, the resultant coefficient estimates become difficult to interpret if reliance is made only on single-equation models. For instance, it is in compliance with the absence of financing constraints when finding that cash flows and capital expenditures are not correlated. Yet, when firms cut off capital expenditures through, say, enhancing asset sales to meet the decline in cash flows, it becomes in compliance with the presence of financial constraints. The issue surfaces when “all else equal” is assumed implicitly under single-equation models, narrating that no systematic adjustment is made by a firm upon detection of cash flows through modifying other sources and uses of funds. As an illustration, a shortfall in capital expenditures could be the case since the direct effect of a shock bears negative cash flow. Despite that, a rise in debt based funding and a corresponding rise in capital expenditures could also take place in case of an indirect effect. In order to establish the total effect of a negative cash flow shock on firm’s investment, each one of the two effects should be reflected.

2.3.4 Stock Market Reactions

A severe decline in the stock prices leading 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 price discovery of companies, stocks 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 firm's that commit a 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 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 the fraudulent companies to undergo from 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).

The difference appertaining information between informed and uninformed trading participants in the market creates information asymmetry. The classical views in this respect presented by Copeland and Galai (1983) and Glosten and Milgrom (1985) point to two classifications of traders, as being informed traders and liquidity traders. The former traders are considered to hold a privilege of private information, where the latter traders are deprived of it. Informed traders often cause a monetary loss to the market makers who then restore their losses using an approach of spread enhancement ¹. This perspective of earning announcement is well-documented in the related realm of literature [For instance, (Atiase and Bamber, 1994; Bamber et al., 1997; Bhat and Jayaraman, 2009; Chordia et al., 2009; Harris, 2017; Kanagaretnam et al., 2005; Kim and Verrecchia, 1994; Libby et al., 2002)].

Krinsky and Lee (1996) identify that by enhancing the spread, the market makers adopt a response to the earnings announcements. It is possible that they may opt to make bid-ask spread widen occasioned by the information leakage, and thus seek to safeguard into contact with informed traders who could be capable of greater volatility in trading and larger trading volumes (Lee et al., 1993). On the whole, it is inferred from the studies that around corporate earnings, an increase is evident in the information asymmetry (Amiram et al., 2016; Bhattacharya et al.,

¹Evidence on earnings announcements has declared that market makers may also decline the quoted depth, thereby influencing liquidity unfavorably in equity markets.

2011; Bradshaw et al., 2016; Kim and Verrecchia, 1994; Krinsky and Lee, 1996; Venkataraman, 2001).

Apart from earning announcements, the recent research has emphasized on analyzing the spread around the earning restatement announcements (Ahmed and Goodwin, 2007; Ajina and Habib, 2017; Ascioğlu et al., 2012; Liu and Yu, 2017). As for instance, Palmrose et al. (2004) confirm such increase in a spread in their sample of firms bearing earning restatement news. In addition, Chae (2005) tests the response of market in case of firm's nonscheduled announcements concerning bond ratings, goals and acquisitions. Brooks et al. (2003), in the same vein, examine the market behavior against incidents suchlike CEO death, blast in plants, and air jet crashes. Each and all support the evidence of an increase in asymmetric information. Kuvvet (2014) while studying the impact of fraud announcement on firm's liquidity, reports adverse effects in the short and long terms. In subsequent to fraud news, the quoted and effective spreads are observed enhancing in both short as well as long run. This is the only comprehensive research conducted with the direct association of the fraud announcements with liquidity measures. Nevertheless, she considers the US-based sample which is rich in information level as opposed to developing economies like Pakistan.

2.4 Role of Corporate Governance Mechanism

A relationship of corporate governance structure and the probability of firms commissioning financial misconduct is addressed in one stream of accounting literature [For instance, (Beasley, 1996; Dechow et al., 1996)]. Dechow et al. (1996) report that firms engaged with fraudulent activities are more inclined to embody insiders in their board of directors and are less inclined to hold an audit committee. Beasley (1996) points to the significant decline in the probability of fraudulent financial reporting with the participation of bigger percentage of outside members in the boardroom, but there is no evidence found supporting less frequent meetings of audit committees in fraud firms. Contrary to Dechow et al. (1996) and Beasley (1996), this study aims to test the magnitude and economic aftermaths

of developments of firms in their governance structure after the announcement of their financial misconduct.

Several studies exist in the extant literature that investigate the reaction of firms to fraud revelation. In research closely linked with this study, [Agrawal et al. \(1999\)](#) examine the turnover in executives along with directors subsequent to the announcement of firm's fraudulent financial reporting, however, they do not find any supporting evidence. They undertake 103 sample firms with certain illegal activities but only four of them are classified as financial reporting fraud. Therefore, it is not logical to generalize their inferences in context of the impact subject to GAAP violations on governance improvements. In addition, [Karpoff and Lott Jr \(1993\)](#) assert that the average abnormal returns in two to three days window around the violation announcement are observed more negative against the sample containing fraudulent financial reporting as opposed to other cases of fraud. Based on these premises, inducements to improve firm's governance structure are inclined to be larger in respect of fraudulent financial reporting cases, in contrast with other cases of violations. Nevertheless, it remains an empirical question on part of this study.

[Livingston \(1997\)](#) and [Beneish \(1997\)](#) study turnovers in the executive body of firms engaged in any financial violation in their post-violation scenario. [Srinivasan \(2005\)](#) identify turnover in case of outside directors after the firms generate accounting restatement. [Livingston \(1997\)](#) points to a considerable level of turnover in the executive body and financial managers, whereas [Beneish \(1999\)](#) on the contrary finds no supporting evidence in the commencement of unusual turnover in top management. [Srinivasan \(2005\)](#) identifies that firms in the response of their restated earnings (as downward) undergo a considerably higher turnover in their board and that in direct proportion with the severity of restatement, the chances of director departure enhances accordingly. Unlike the studies of [Livingston \(1997\)](#) and [Beneish \(1999\)](#), this study makes an emphasis on systems designed to monitor managerial behavior as opposed to management itself. This prospect is critical due to the fact that agency costs will carry on prevailing in so far as the control and ownership of a firm are in segregation. Switching executives in subsequent to

fraud revelation does not make a firm to diagnose the root of the problem.

As [Jensen \(1993\)](#) notes, it is the corrupt rules or systems, not the evil people, lie beneath the typical deficiencies of the boardroom. Thus, it may be posited that increasing the quality of board structure is more inclined to get accustomed to that management makes no deflections from their fiduciary responsibilities. Further, unlike the research of [Srinivasan \(2005\)](#), this study emphasizes in a more comprehensive manner on the changes related to set of governance measures. It also considers testing the changes in these variables around a financial statement fraud, which is a clearly distinct event as compared to those involved in earnings restatement, as earnings restatements do not compulsorily include fraud. Unlike to the aforementioned research, the study, in addition, relates economic outcomes from the governance changes subject to post-violations period.

[Rosenstein and Wyatt \(1990\)](#) find a market's response to the alterations made in a boardroom in a non-fraud setting. They report that over a two-day window, there is minor positive abnormal return converged around the announcement dates in respect of hiring outside directors on the board. Despite that, it is not out of the question that these governance changes made after the announcement of firm's violations are ignored or discounted by the market, for the reason that such violations already tarnish the firm's reputation badly. Thus, economic consequences on the governance changes in this context are an open empirical problem that certifies an analysis to be performed.

2.5 Corporate Finance Theories

This section details the theories concerning corporate financial trilogy that are used in building arguments for study hypotheses and in the explanation of findings.

2.5.1 Corporate Investment Theories

The basics of firm-level investment theory originate from Keynes (1937) and Fisher (1930). They premised that investments are executed to the point where the present value of predicted future earnings becomes equal to the opportunity cost of capital. Fisher (1930) presented the fundamental concept of neoclassical investment theory in the book “The Rate of Interest”. He argued that the underlying concept belongs to the maximization of the present value of the business by introducing the equation of Net Present Value (NPV), mentioned as under.

$$\text{NPV} = \sum_{n=1}^N \frac{\text{CF}_t}{(1+r)^n} - \text{TC} \quad (2.2)$$

Where NPV represents the net present value of the investment, r shows the discount rate related to the opportunity cost of capital, and TC represents the total cost in beginning. The investment is considered gainful as long as the predicted return exceeds the opportunity cost. The NPV becomes zero in a case where both the predicted return on investment and opportunity cost turns equal. The predicted return on investment is a counterpart to marginal efficiency of capital determined by Keynes and internal rate of return determined by Fisher.

For firm-level investment decision making procedure, NPV along with Discounted Cash Flow (DCF) are well-documented and extensively employed analyzing techniques. Nevertheless, the DCF not being the dynamic technique of analysis neglects future uncertainty that can likely affect adversely the future cash flows. For that reason, the need for alternate methods rises for evaluating investment choices while considering DCF.

The study focuses on accelerator theory which is considered as the firstling among firm-level investment theories, following the fundamentals of investment evaluation techniques. Further, in continuation, the discussion leads to profit theory, the liquidity theory, the neoclassical theory and the Q theory.

2.5.1.1 Cash Flow/Liquidity Theory

In a stand-in to the critique placed on accelerator investment theory and the expected profit theory, the liquidity theory was formulated by Meyer and Kuh (1957), Anderson (1964), and Duesenberry (1958). The theory narrates a key argument that the level of investment is dominated by cash flow and when internal fund sources are consumed, the plans of supply funds work immediately for the purpose of maintaining the desired level of capital (Jorgenson and Siebert, 1968). The desired capital is considered in proportion to the liquidity in this framework of investment behavior.

This cash flow-liquidity model signifies both the internal sources of funds and the levels of profits (Kuh, 1963). For that reason, it is not considered as a substitute for the expected profit theory. Instead, it may be taken as extending the model proposed in expected profit theory by adding the cost of investment funds. Notwithstanding, the liquidity model has major flaws in context of ignoring constraints suchlike presence of transaction cost in the financial markets, interest rates and the values of equipment and machinery.

2.5.1.2 Financial Constraint Model

Acknowledging the pitfalls of prior models formulated under the presumption of perfect capital markets, a stream of studies have concentrated on identifying the role of financial constraints while undertaking investment choices (Almeida and Campello, 2007; Fazzari et al., 1987; Guariglia, 2008). Fazzari et al. (1987) in their pioneer paper on the subject examines the financial constraints' role in defining corporate investment applying a broad spectrum of empirical provisions comprising Tobin's Q and accelerator frameworks. The low-dividend firms are characterized as financially constrained and they are noted more sensitive to the changes in firm's cash flows, whereas high dividend firms, which are less likely to be financially constrained, are observed as relatively less sensitive. Their findings, thus, confirm that capital market imperfections create financial constraints on firm's investment.

Guariglia (2008) captures the distinct influence of internal and external financial constraints on corporate investment, both in isolation and co-jointly. She concludes that there is a monotonic increase in sensitivity of investment-cash flow with the increase in the external financial constraint. In addition, if the sample is partitioned through the instrumentality of internal financial constraints experienced by firms, the investment to cash flow association presents a U-shaped curve. It is empirically understood that financial constraints influence the firm's investment choice, although it is not yet established whether investment-cash flow sensitivity can be taken as an indication of financial constraints (Almeida and Campello, 2007).

2.5.2 Corporate Financing Theories

Studies while examining financing have attempted in explaining the way firms construct their debt-equity mix for funding investments. Recognizing the matter that the literature lacks a single and universally valid theory on corporate financing, the study, however, illustrates some influential theories in the domain. A notion put forth 17 years ago, claiming that regarding debt-equity mix, no universal theory prevails and there is no rationale to expect one (Myers, 2001), redirected studies to empirically inspect the structure of corporate finance. In accordance with that, the first decade of the new millennium is pointed as an attempt to find empirical confirmation of previously devised theories in the literature. The study in this section details the development of theories on financing and indicates trends in research in this domain.

2.5.2.1 Irrelevance Proposition Theorem

The matter of the structure of corporate finance has been pioneered in the prior work by Modigliani and Miller (1958). They premised their arguments with the two key narratives which are acknowledged mainly in the later studies: first, there is an independence among firm's market value, its capital structure and leverage

(inferring in other words that debt-equity ratio has no influence on firm's market value), second, leverage and the average cost of capital of a firm are also independent in association. The proceeding literature has proven the validity of their argument; however, it was established by serving the presumptions made by them related to an ideal condition. The assumptions mainly comprise ignorance of bankruptcy cost, the absence of corporate income tax, and absence of market imperfect conditions. Despite the criticism raised afterward, the argument proposed (and validated subsequently) based on two premises stamped the initiating point in the evolution of modern finance. As a result, financing theories witnessed widespread developments acknowledging the presence of shared aspects, the research in this domain has been organized as follows: trade-off theory; pecking order theory; agency theory; theories linking capital structure and factor-product markets; market timing theory.

2.5.2.2 Trade-off Theory

The theory, termed also as the theory of the balance between the deadweight costs of bankruptcy and the tax shield benefits derived from debt, appeared as a critique on the proposed framework of Modigliani and Miller (MM). The trade-off theory added certain variables that were previously ignored by MM suchlike corporate income tax, interest expense, and costs related to financial distress (or bankruptcy costs). This theory elaborated the concept of tax benefits emerging out of firm's debt financing. As proposed by [Kraus and Litzenberger \(1973\)](#), the standard version of this theory narrates that a trade-off is portrayed by firm's optimal leverage level between the bankruptcy costs and tax benefits generated from debt financing. On the other hand, its two proponents added that a firm's market value with certain leverage level equals unleveraged firm's market value plus the present value of tax benefits deducted from the present value of costs related to financial distress. In the sequel, as marked by Stewart C. Myers (1984) it is established that the framework of trade-off theory presumably seeks a target leverage ratio, thus aiming for a target financial structure; wherein the target leverage ratio can be defined as a balance between bankruptcy costs and tax

reductions over interest earnings. In continuation, as contributed by [Scott \(1977\)](#), it is argued that larger firms with a capacity of higher income are witnessed more in verifying the proposition of trade-off theory that increased level of leverage causes an increase in bankruptcy risk. In support, [Pettit and Singer \(1985\)](#) argue that this theory is less fitting to small-scale firms with a likeliness of lower income.

In the continual research, two alternate theories surfaced, viz. static trade-off theory and dynamic trade-off theory. Static trade-off theory asserts that firms add leveraging to their financing mix till the level where the usefulness of an additional amount of debt becomes equal to the cost of debt containing a higher likelihood of financial distress. Consequently, an optimal static point is sought by the firms, which is referred as target capital mix ([Bradley et al., 1984](#)). Dynamic trade-off theory asserts that contingent to the exogenous and endogenous elements, firms continuously adjust their capital mix. The significant contributions to the dynamic trade-off theory emphasized on: a) establishing a dynamic model in existence of transaction costs ([Fischer et al., 1989](#)), b) dynamic capital structure choice on the basis of contingent claims method ([Ju et al., 2005](#)), c) factoring in abrupt changes of firm's market value ([Leary and Roberts, 2005](#)), and d) fixing the investment size in accordance with the source of funds, i.e. internal or external financing ([Bris and Welch, 2005](#)).

Summing up the findings of studies in this domain, [Frank and Goyal \(2007\)](#) assert that a firm can seek target leverage ratio in two stages: a) a stage of static trade-off in which the firm serves the presumptions of this theory for a specific time frame, for instance, one year, and b) a stage of dynamic trade-off in which subsequent settlements are made by the firm to seek target debt-equity ratio. The concluding advancement in this theory asserts that firms preferably generate financing through debt option up to the level on which rise in the present value of bankruptcy costs is offset by the marginal amount of tax benefits emerged from debt financing ([Allen et al., 2006](#); [Myers, 2001](#)).

2.5.2.3 Agency Theory

The authors of this theory, [Jensen and Meckling \(1976\)](#), assert that firms seek for optimal capital structure through developing a trade-off between agency costs and the benefits in reference to enhanced debt financing. [Harris and Raviv \(1988\)](#) in the succeeding research indicate that there is a likelihood of originating divergent interests between managers and shareholders because of conflicts over decisions related to firm's current operations. They proclaim that while shareowners (and creditors) will prefer for firm's liquidation in the case when it remains no longer adequate with respect to cash flows, managers would perpetually opt for continuation of business operations.

Likewise, examining similar issues subject to conflicting interests of shareholders and creditors infer that smaller firms are more vulnerable. It is so because owners of smaller firms are usually the managers as well. Agency cost in this context is translated into zero or very low, however, debt providers may ask for additional collateral in such case ([Ang, 1992](#)). Accordingly, the pattern of firm's assets is studied in direct connection with the costs related to potential financial distress. Specifically, the implied costs retrieved due to financial distress will be lesser if a firm allocates its investment majorly among tangible assets (for instance, land and fixed assets), whereas the potential costs driven by financial distress will be higher in the case when a firm converges its investment mainly into intangible assets.

Further beheld aspect in empirical analysis is that conflicts between the interests of inside investors and those of outside investors of the firm determine the capital structure, for the reason that managers opt for investing all the internal finances on hand downgrading debt-based financing to a secondary role ([Stulz, 1990](#)). Subsequent advancements in the domain proclaimed explicitly that inter-agent conflicts arise due to a primary source which is the discrimination of management and finance, and of ownership and control respectively. A firm is viewed as a heterogeneous set of interests and taking this into account, the application of corporate governance mechanism in firm's operations influence greatly the capital structure of the firm. Despite the fact that majority of the research in this

domain subject to governance mechanism is carried out under conditions of developed economies, exploratory evidence has also been witnessed from developing economies and economies experiencing transition, in which governance mechanisms have usually been observed virtually non-existent.

2.5.2.4 Pecking Order Theory

The founder of the pecking order theory, [Donaldson \(2000\)](#), claim that precedence in the sequence of financing sources depend upon their weight. The claim, although, is established on the basis of comprehensive analysis of how US-based firms define their capital sources. The classical version of the theory is based on the presumption that deciding a target debt-value ratio is impracticable to any firm. In the explanation of this point, [Myers \(1984\)](#) embarks an expanded version where adverse costs of selection are attached to asymmetric information available to shareholders and management; and establishes the pecking order for injecting funds to the new projects.

Later on, the theory emerged as a substitute explanation to the trade-off theory ([Myers and Majluf, 1984](#)) . While the firms turn to self-financing on account of asymmetric information conditions, the precedence of internal sources of funds, succeeded by debt financing and issuance of equity as a last expedient option illustrates the “pecking order of financing” for new projects. The theory embeds a novel incorporation of asymmetric information into the framework, with a rationale that managers compared to outside investors contain privileged access to information on firm’s position. The theory is based on certain assumptions as follows: there are perfect capital markets; no transaction cost involved; the information available to the market defines share’s market values; firms seek for financing resources as they carry investment options in their course of action. Contingent on these assumptions, the theory asserts that a firm follows the precedence of internal sources of funds and that, should external sources be essential, it will opt for adequate financing options on the basis of risk level involved.

The research in sequential portrays that smaller firms experience higher costs of adverse selection than larger firms do, subject to the risk involved in debts ([Halov](#)

and Heider, 2011). Claiming that transparency level is less in smaller firms, Psilaki (1995) argue that they have an inclination towards facing higher costs based on asymmetric information. Furthermore, discussing the assumption that firm's size is established on the grounds of financial disclosure it files periodically, Pettit and Singer (1985) assert that smaller firms experience higher asymmetric information. In a late development, a "new pecking order theory" has been evolved with an empirical emphasis on developed countries, which narrates that firms while financing their investment options employ internal sources (in the form of retained earnings), followed by equity capital and long-run borrowing as a last resort.

A new dimension in the research has evolved with the stream of theories connecting capital structure of the firm and factor-product markets, such as participation of non-monetary stakeholders in establishing the corporate finance framework ("the stakeholder theory"), the concept of strategic management, and industrial organization. Istitieh and Rodríguez Fernández (2003) indicate the presence of a mutual relationship between firm's corporate financial decisions and the production factors. They identify further the existence of mutual influence between firm's financial structure and the level of industrial combination (viz. horizontal and vertical integration) and between financial structure of the firm and its competition plans. Conclusively, the studies in the field have highlighted the existence of a conflict of interest not only in case of insiders but also between outside members (for instance consumers and competitors).

2.5.2.5 Debt Overhang Cost Theory

Debt overhang as introduced by Myers (1977) is a firm's situation where risky debt upon maturity in the future time causes underinvestment today. The understanding developed in this proposition is that a portion of cash flows produced from investment are availed by debt holders at maturity; unluckily the shareholders who exercise the investment decisions will not be able to contain this benefit. The investment benefits, thus, can be deteriorated from contraction of cash flows (and implicit partitioning of them). Myers (1977) thereupon implies a resolve of

short-run debt to debt overhang problem, since the firm becomes able to undertake its investment decision as if an all-equity firm when the entire debt involved ripens prior to investment opportunities.

Debt overhang may influence the firms or bank that are embedded with excessive values of debt, yet are solvent units, in a manner that their assets' worth overweighs the value of their debt. It further curtails the firms to recover from their botherations that are classified as insolvent units, with the value of their assets lower than the value of their liabilities. In such situation, bankruptcy provided with the receivership or reorganization can act as a remedy to the issues of debt overhang for insolvent units. Bankruptcy reorganizations that are successful permit the firms to lower their debt layers and permit further the new private investors to avail enough the benefits from new investments that they will seek projects carrying positive estimated net present value (Krugman, 1988).

2.5.3 Dividend Payout Theories

The advancement in paying out dividends to stockholders is laced with the advancement of the corporate form itself. It is well established that corporate managers acknowledged the link between paying out dividends and shareholders' satisfaction quite early. They oftentimes applied dividends as a tool for signaling information to the market participants believing that reductions in the dividends may result in adverse effects on the share value. In addition, a considerable tie is deemed to exist due to the association of capital structure and the share price. It has been a debatable topic among finance researchers since 1950s that the dividend policy contains an impact on firm value and related issues. However, in continuation three theories developed in contradiction to the classical view of fundamental theory. Some perceive a direct relationship between dividend payouts and firm's value, whereas another perspective asserts that high dividend payments produce negative effects on the firm's value.

The third theoretical view reports that dividends are irrelevant and any effort put on dividend payout while adjusting related decisions is wasted. These perspectives

are encompassed in the three different theories of dividend policy: bird-in-the-hand theory (high dividends result into increased share price), tax-preference approach (low dividends result into increased share price), and dividend irrelevance hypothesis (dividends payouts do not affect share price). However, the debate on the subject of dividend payouts is not restricted to these approaches. The extended versions have displayed several views that in a consequence enhanced the complexity of the dividend puzzle. Amongst them, the more widespread approaches are embodied with signaling approach, the clientele effects, and the agency cost hypotheses. These views are conferred by turns as under thenceforth the dividend irrelevance hypothesis.

2.5.3.1 Dividend Irrelevance Hypothesis (DIH)

A prevailing belief was narrated with a notion that higher dividends result into higher firm's value before publication of seminal work on dividend policy by [Miller and Modigliani \(1961\)](#). This belief was reasoned majorly due to argument established in the "bird-in-the-hand" theory, which is in more detail shortly. For case in a point, [Graham and Dodd \(1934\)](#) assert that "the sole purpose for the existence of the corporation is to pay dividends", and firms offering high dividend payouts must seek for conditions suitable to issue shares at higher values ([Frankfurter and Wood Jr, 2002](#)). Even so, [Miller and Modigliani \(1961\)](#) contradicted with this argument by premising that under definite assumptions concerning perfect capital markets, dividend policy remains no more relevant, which then originated a new wave of finance in the 1960s. The market value of firm's securities and their cost of capital rest unaffected from dividend policy given the perfect market, and thus dividends and capital gains become mutually incoherent. A rationale behind this perspective is that earnings generated by the firm's investment decisions define the wealth of shareholders rather than how it is distributed, making thereby dividend decisions as irrelevant in MM's world.

Their assertion is grounded upon idealistic assumptions relating perfect capital market along with rational investors. The underlying assumptions are outlined as follows: a) taxes on dividends and capital gains remain indifferent; b) while

securities are traded, the transaction and flotation costs are unconsidered; c) information should be costless and symmetric to every participant; d) managers and security holders are exempted from agency problems, and e) market participants are embodied as price takers.

The literature subsequently considers this conviction as a logical extension that dividend policies remain not relevant as a neoclassical proposition of perfect competition into financial economics. The simpleness and dignity of this notion were affirmed by MM. Cite an instance, they framed it in their incipient paper as “Like many other propositions in economics, the irrelevance of dividend policy, given investment policy, is ‘obvious, once you think of it’”.

However, the issue of dividend policy turns more complex when MM’s world is departed and relaxed with few assumptions laid related to perfect capital markets. The moment it is recognized that capital markets contain imperfections, the irrelevance view of a dividend policy does not hold true. Importantly, when the relevance of dividends payout is affirmed, it may relate to other financial decisions undertaken by the firm concerning financing and investment. Said another way, there may plausibly be various reasons why dividend decisions matter.

2.5.3.2 Tax-Effect Hypothesis

The assumptions laid by MM in form of perfect capital market eliminate likely tax-effect. It is hypothesized in their framework that tax effect remains indifferent considering dividends and capital gains. Nevertheless, it is irrational practically to ignore the presence of taxes in the real world and their subsequent impact on the dividend decisions and share value of the firm. Generally, dividend policy and the capital gains contain a different response from firm’s tax treatment, and whereas investors in majority concerned more with the after-tax return, the taxes may equally influence their call for dividends. Likewise, by enhancing the retention ratio of income that managers do in response to tax priority while looking for maximizing the wealth of shareowners (or firm’s value), taxes may generate an impact on the supply of dividends.

The tax-effect postulate recommends that lesser the firm’s dividend payouts, lower

would the cost of capital but an increased share value. Simply put, these lesser dividend payouts play a part in maximizing the share value. This assertion is premised on the assumption that capital gains are taxed at lower rates compared to dividends. Additionally, while the taxation on capital gains is applied in a deferred way till the share is issued verily, the dividends are taxed promptly. Investors, thus, incline towards biases due to these tax benefits of capital gains compared to dividends, and such predispose investors to allot preference the firms in investment that hold the majority of their income in contrast with distributing them in the form of dividends. Moreover, they show a willingness to offer a premium for the firms engaged with low payout ratios. Notably, this assertion placed in the tax-effect hypothesis is so much in contrary to the hypothesis of BIH and definitely confronts it in a rigid fashion.

However, in several economies, a lesser tax rate is imposed on capital gains in contrast to the dividends. Thus, in order to hold shares having larger dividends rate, the investors may need larger pre-tax risk-adjusted returns being ranked in high tax brackets. Such association between dividend rates and the shares' pre-tax returns is the foundation to set forth a tax-effect hypothesis. In continuation to this association, [Brennan \(1970\)](#) analyzed the connection between dividend rate and tax risk-adjusted returns and established a post-tax return edition of the capital asset pricing model (CAPM). It is posited in Brennan's framework that shares' pre-tax returns affect the dividend yield and the related systematic risk linearly and in a positive direction. Higher before tax risk-adjusted returns have a significant connection with the dividend yield to offset the tax losses on these returns. This infers that *ceteris paribus*, due to tax disadvantages linked with the dividend yield the share with larger dividend payouts will be issued at a lesser value.

2.5.3.3 Signaling Hypothesis

One more hypothesis in an elucidation of why MM's DIH is inappropriate in financial market practice is the absence of symmetric information between insiders

(directors and managers) and outsiders (stockholders). It is presumed in the assertion of MM that insiders have a privilege over outsiders in way of costless, equal, and prompt access to the similar information in reference to firm's outlooks and performance. The managers who are responsible for firm's operations contain such information related to its current and future outlooks that are not in access to the outside participants. This situation may result in a case where a true firm's intrinsic value is inaccessible to the market. In an effort to narrow down this informational gap, managers may require distributing their knowledge with the participants in the market so they can more precisely comprehend the real firm's value. Historically, the cash flows generated by securities to the stockholder developed the foundation for their market valuation, mainly by virtue of inadequate, incomplete, and inaccurate information on hand (Baskin and Miranti Jr, 1999). Thus and so, managers utilized the dividends as a productive instrument to transfer firm's private information to the outside participants as investors used to apply actual (or visible) cash flows to equity as a tool for firm valuation. This view of dividends that they may deliver implicit information to the market concerning firm's outlooks is also supported by the several academics and financial practitioners. Even Miller and Modigliani (1961), in addition, indicate that stock values may be influenced from the changes in dividend payouts when the market conditions are taken as imperfect. To put it another way, dividend policy announcements may be viewed as assessing the potential of a firm with respect to future income. This postulation has since evolved as the signaling hypothesis (or the "information content of dividends"). Nonetheless, by premising that shareholders prefer dividends over net income of the firm through empirical witnesses, MM rejected plausibility of signaling proposition.

As specified in the signaling hypothesis, the stockholders are able to draw useful data regarding firm's future income by means of the signal tied with dividend policy announcements, in the form of persistence or changes in dividend payout one and the other. Even so, managers ought to contain the related private information foremost and possess inducements to transfer this information to the outside participants in order to keep this hypothesis valid. In the second place, a signal

is supposed to be true; in effect, a firm attached with miserable future outlooks should not be capable of imitating and sharing false signals to the outsiders through enhancing dividend payout ratios. The outside participants consequently must be dependent on the signal to discriminate various firms in their future prospects. A market should give a response in favor to the firm with policy announcements as a dividend increase and against otherwise (Ang, 1987; Koch and Shenoy, 1999). Despite the fact that the information content of dividends (signaling hypothesis) has been documented formerly, however, modeling of this hypothesis was not performed until the late 1970s and early 1980s. The dividend signaling models that are furthest quoted can be noted in Bhattacharya (1979), Miller and Rock (1985), and John and Williams (1985). Generally, all the mentioned models are premised on certain assumptions: a) corporate insiders and outsiders are asymmetric in firm's private information; b) firm's present and future cash flow information is reflected through dividends, and c) managers have privilege over such information and carry incentives to narrow down information gap. It is inferred from the model that dividend payouts declaration will be regarded as a positive news and bid up for the firm's stocks will be performed in accordance.

In like manner, the declaration suggesting any reduction in the dividend yield will be considered in the market as adverse news and will result in a decline in firm's stock value. Due to the inclusion of dissipative costs, dividend announcements are reflected as a reliable signaling instrument. By way of illustration, the model laid in Bhattacharya (1979) incorporates the transaction cost as the cost of signaling linked with financing through external markets. Considering Miller and Rock (1985), the deformity in the optimal investment decision is caused by the dissipative cost, while in John and Williams (1985) the tax charges assigned to dividends in comparison with capital gains are reasoned due to dissipative signaling cost.

Thus, firms with good earning quality (undervalued) can only utilize the dividend policy announcement to signal their future outlooks, whereas those with poor earning quality cannot imitate this through conveying a false signal to the outside participants due to the existence of costs in that activity. A key criticism directed to these models is why don't firms opt for fewer cost ways available to signal

their future prospects in the form of share repurchases instead of using dividend announcements [see for instance, ([Allen and Michaely, 2002](#))].

2.5.3.4 Life Cycle Model

More recently, a substitute description for corporate payout conduct is presented by [DeAngelo et al. \(2006\)](#) by proposing a life cycle theory. The theory asserts that it is the trade-off between holding and dispersal which determines the dividend payout decisions, and that develops across the phases of firm's life cycle as profits pile up and the investment opportunities turn down. This shift in firm's payout choices along the life cycle phases is predicted by this theory. In particular, during the beginning periods (years) firms experience relatively ample investment opportunities but possess limited financing, hence paying lower dividend amounts and hold more profits to overcome flotation and costs related to information for generating funds through external markets. In the later periods, firms incline to possess substantial financing but lesser winsome investment options, in consequence, they have better incitements to offer dividends in order to decline agency costs linked with free cash flows. Thus, the advantages of offering dividends exceed their costs involved as the firm develops to maturity periodically, leading to higher to offer dividends.

The idea based in this model is that firms are categorized in their capital infusion phase that is attached with relatively low net income as a ratio to total capital, while those are classified to be more mature that have relatively more net income in their capital. [DeAngelo et al. \(2006\)](#) determine that a firm's relative amount of earned quality defines its position that dividends will likely be paid regularly and significantly. They witness empirically a direct support to their notion of the life cycle model of dividends. This proposition has also been validated in international research conditions by [Brockman and Unlu \(2011\)](#). Furthermore, in several developed financial markets, the propensity to pay dividends is confirmed while analyzing under time-series and cross-sectional research setting. This evidence collected from several economies stamp doubts on the signaling, clientele

and catering explanations for dividend policy announcements, yet greatly upholds the agency cost-based life cycle theory.

2.6 Simultaneous Relationship among Investment, Financing, and Dividends

While ascertaining firm performance, corporate decisions in nature of finance, investment and dividend take in significant part as carried out by financial managers. Undoubtedly, the three corporate financial policies are vital to accomplishing the firm's objectives for maximization of shareholder wealth in the realm of financial management. Notwithstanding, how these decisions are independently conducted in a mechanism is yet debated far and wide in the extant literature. Whether the capital mix and dividend payout play an influential part in defining the firm's value is the first debated issue. The discussions in this regard pertain to irrelevant versus relevant propositions. Apart from it, the issue in second place embodies how a prediction of firm's value is determined by making use of theories related to the relevant proposition. Then again, the value of the firm as asserted by the irrelevant propositions is not dependent on its dividend and leverage status. The irrelevant proposition in the context of firms leveraging was first documented by [Modigliani and Miller \(1958\)](#). They posited that firm's market value is determined by utilizing its estimated return at the rate cost of capital (k) suitable to its category and is independent of its capital mix. On the contrary, a conventional explanation is cited from the theories founded on relevant propositions in estimating the impact of dividend and leverage on firm's investment options.

The theory over balancing perspective deals with the trade-off betwixt the debt tax benefits and bankruptcy cost ([DeAngelo and Masulis, 1980](#); [Kraus and Litzenberger, 1973](#); [Schneller, 1980](#)). In addition, agency theory posits that debt lowers the equity-based agency costs ([Harris and Raviv, 1988](#); [Jensen and Meckling, 1976](#)). Signaling theory bases its explanation that enhancing leverage of firm is a good signal ([Brealey et al., 1977](#)). Pecking order theory discloses that preference

of corporate managers grounds on capitalizing internal funds in place of external funds assignable to the costs involved in external financing (Myers, 1984; Myers and Majluf, 1984). Additionally, signaling theory portrays that dividend payouts are taken as a fair signal by market participants (Miller and Rock, 1985), even more, agency theory believes that under certain assumptions dividend mechanism lowers agency cost (Jensen, 1986).

Empirical evidence in this field witnesses mix outcomes. Certain work conforms balancing theory (Gardner and Trzcinka, 1992; Kale et al., 1991), whereas several studies sustain with the proposition laid in agency theory (Barton et al., 1989; Crutchley and Hansen, 1989). An alternate stream of studies validates pecking order theory (Baskin, 1989; Bayless and Diltz, 1994). Several studies identify the interdependence existing among the three corporate financial policies. Kalay (1982) asserts that there is two systems association in this context, designated as investment-finance-dividend relationship and debt-financed dividend relationship. However, in some of the empirical evidence, inconsistent findings are observed while seeking to draw the interdependence of corporate investment, dividend, and finance. Adedeji (1998) examined pecking order theory and observed inconsistent outcomes in comparison with Baskin (1989)'s analysis. Jensen et al. (1992) study simultaneous explanation of dividend announcement decisions, insider ownership, and the debt and confirm the hypothesis of pecking order theory.

The inconsistent findings developed in various empirical studies point out that no theory alone can explain the phenomenon of corporate financial policies universally. A capacity of a theory to justify this phenomenon is contingent on data fit, assumptions, and environmental setting. That being the case, this study aims at examining the capacity of corporate finance theories founded on related propositions while justifying the interdependence of corporate investment, dividend, and finance subject to uncertain market conditions.

2.7 Some Theoretical Arguments on Simultaneity of Corporate Decisions

An assertion that corporate investment, financing, and payout policies are interlinked under a flow-of-funds framework for corporate performance is premised in the flow-of-funds approach. This literary work ties back to [Dhrymes and Kurz \(1967\)](#). It adds a position that a firm experiences funds outflow indicated majorly through its fixed and variable costs, taxes and dividend payouts, conjointly with investment outlays. Concurrently, through revenue generated and the proceeds of several arrangements of external finance suchlike debt or issuance of equity, a firm depend on an inflow of funds.

Against this background, [Dhrymes and Kurz \(1967\)](#) state that while firms seek for generating funds from retained earnings, fresh loan and equity, and invest those accumulated funds and distribute dividends, they face major issues. In particular, it happens so where the overriding constraint is the flow-of-funds identity, i.e. sources of funds must equal uses of funds. It is established again that firms are inclined to experience strong dependence on internal sources and carry a marked aversion to employing funds from external capital markets when these markets are imperfect enough. Firms, under such case, need to assess the trade-off between outflows in the shape of dividends and capital investment, and their fund-raising alternatives adjoining their fund-spending choices. Thus, in a case where corporations are encircled with imperfect capital markets, their policy decisions suchlike investment, financing, and payouts must be analyzed within a framework of simultaneous equations system ([McCabe, 1979](#)). The constituents of financial decisions of a corporate entity, that are endogenous, are interdependent substantially upon one another if the assumptions regarding flow-of-funds about their association are relevant empirically [Dhrymes and Kurz \(1967\)](#).

[Dhrymes and Kurz \(1967\)](#)'s simultaneous three-equation model, in spite the fact that their uncomplicated notion of the flow-of-funds method emerges to be appealing, has been followed through critique for not being coherent to theoretical justification, and thereby fails through resolving the problem with respect to directions

of the interactions [Ravid \(1988\)](#). The subsequent studies loaded up with additional theoretical implications, in particular, information asymmetry and agency problems; assemble the matter at greater length.

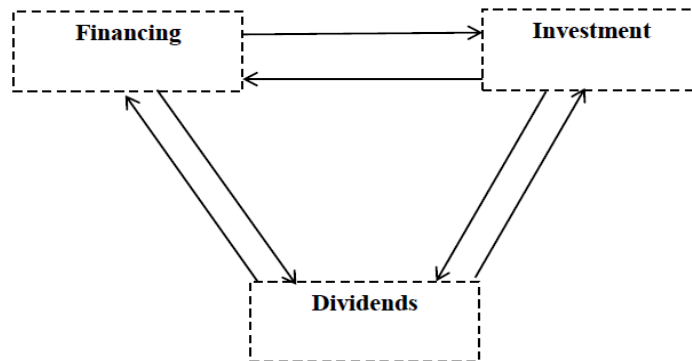


FIGURE 2.1: **Interdependence of Corporate Financial Triad**
Source: Flow of Funds Framework

An alternate favorable direction to justify the interdependencies among corporate investment, financing, and payout policies is laid by information economics while providing theoretical contributions. The intuitive philosophy in the background is that firms may face constrained investments due to asymmetric information between insiders and outsiders through a decline in the elastic supply of internal funds and bounded access to funds from external markets, therefore raising simultaneity in the corporate financial triad. The absence of information symmetry originates from an imperfectly elastic supply of finances from an internal source to meet the requirements of capital expenditure because of restrained access to retained earnings. In such situation, managers are embodied with the preferential position to use dividend policy as a signal to uncover certain private information related to firm's present and future prospects to the outside participants ([Miller and Rock, 1985](#)).

Managers are more averse to cut the dividend payouts, given the information content of dividends, to abstain the expected negative market response. Concurrently, unless they are certain that adequate future cash will flow in to back their outlays at higher levels, they are also found reluctant to generate dividends. Thus, the flexibility in generating finances for capital expenditures from internally raised

cash flows is reduced in presence of stickiness of dividends under information asymmetry.

Corporate investment inclines to be financially constrained internally since the fluctuation in capital expenditures cannot be supported freely by firm's retained earnings. As a consequence, firms may be constrained to give up proportionately investment options with low net present value or to generate further funds from external markets in order to uphold their dividend policy at the required levels. [Gugler \(2003\)](#) pinpoints from an empirical examination while comparing the investment in capital stock and dividends in context of funds that dividend payout policy should be deemed as a significant decision that influences the other corporate decisions, instead of as a mere residual, given the failures of the capital market. All told, the capacity of firms to generate internal funds considering their impact on dividends is constrained from information asymmetry and restricts their access to external markets in view of their impact on equity issuance. Thus, with complete acknowledgment of competing requirements for finances and alternate sources of finances, the corporate financial policies tend to be formulated systematically and simultaneously by managers.

The subsequently documented approach explaining the interdependence of corporate decisions is the tax approach. The assumptions of perfect market conditions are criticized laid in Modigliani-Miller's initial proposition mainly for failing to consider tax in their framework. In their revised proposition, [Modigliani and Miller \(1963\)](#) declare that managers may be in a position to enhance company value with debt financing since interest installments are handled diversely from dividends and capital gains regarding tax purposes. More particularly, debt financing provides a tax shield leading to enhance in current stockholders' wealth, considering that interest payments are tax deductible. Tax deductibility, nevertheless, is not uncommon to debt financing. Allowances in the form of depreciation occurred through firm's capital expenditures also yield tax benefit that equals the product of marginal tax rate and depreciation.

[Myers \(1974\)](#) asserts that while evaluating a project, a firm must comprehend the provision of tax benefit from it. From this perspective, an association might be

offered between corporate investment and financing policies due to taxes involved. Further, it is supported by an empirical evidence that both investment and debt financing bring on tax shields, as inferred by [DeAngelo and Masulis \(1980\)](#). It is possible also that some tax benefit may not be deductible when a corporation's income does not surpass the value of tax benefits, and therefore a substantial non-debt tax benefit may diminish the necessity of debt financing. Interpreted another way, if the interest based tax benefit becomes useless due to sufficient depreciation based tax benefit emerged from financing an investment, the debt financing may be significantly more expensive. In the same way, if a firm is not able to utilize depreciation based tax shields to their fullest then investment projects may notably be less profitable due to large deductions in case of interest payments ([Ravid, 1988](#)). In this connection, an innovative tax planning model given the exchangeability of depreciation based and interest based tax benefits arrives the inference that corporate investment and decisions related to debt financing must be established simultaneously, an accordingly larger portion of investment should be financed through lesser levels of debt, and contrariwise.

Tax considerations contain consequences for dividend policy withal. Paying larger dividends may produce more weight of personal taxation to stockholders, as income generated from dividends is more deductible to tax compared to capital gains. Furthermore, taxes on capital gains are not imposed until they are realized from the issuance of equity whereas taxes on dividends need to be paid instantaneously. Nonetheless, it must be pointed that tax considerations do not solely establish the corporate decisions, and thus the tax approach contributes only in offering a model to examine the associations among the decisions in that kind of a particular way.

As an alternative, using agency approach the corporate financial decisions may make sense in association with one another. Considering the modern setting of corporations, managers being functioning as the agents of stockholders are responsible to maximize their wealth. They, nevertheless, may be induced to maximize their individual wealth utilizing their position, operating as defective agents. Such

conflict of interests not only initiates agency problems but also creates deterioration in the corporate behavior.

Jensen (1986) affirms that in order to expand the resources under their command, managers hold an incentive to help their firms in growing beyond the optimal size. A firm may even face a problem of overinvestment if the managers deteriorate the corporate conduct in a way that they seek for building a larger empire in preference to paying out its free cash flows. The firms where free cash flow is piled up to a substantial level, the problem of overinvestment is highly probable. Therefore, in such conditions, the internal control mechanism and the market for corporate control are specifically critical to safeguarding the stockholders' interests. It is useful to arrange agency cost control system that imparts managers an incentive to perform as better agents. The extant literature on agency theory indicates that both debt financing and dividend announcement policy can be exercised as agency-cost control tools for encouraging managers to emit free cash flow to the investors as against investing it in the projects containing negative NPV (Jensen, 1986).

2.8 Hypothesis Development

2.8.1 Separate Effect of Fraud on Changes in Corporate Financing, Investment, and Dividend Payouts

Firms experience several legal and reputational charges after the revelation of their illegal activities from the corresponding markets through an increased level of information asymmetry and reputational indemnity (Gande and Lewis, 2009; Karpoff et al., 2008b). It is linked further with the operational uncertainty and damages of competitive position since the trade conditions in reference to customers and suppliers remain never the same that in turn originates incertitude related to firm's cash flows in future period and other related prospects (Dyck et al., 2010; Wang and Winton, 2012). External fund providers turn relatively

more cautious and watchful of furnished information by fraudulent firms and take into consideration additional prospects to probe firm performance, thereby enhancing the expectation of risk concerning growth in future (Graham et al., 2008). In consequence, the fund providers place fraud firms to surroundings of increased information asymmetry that sequentially may influence the accused corporations to reexamine their financial policies in order to cope with these contemporary surroundings.

Pertaining to financing, firms alleged with corporate misconduct may undergo troubles in securing finances through external sources which are attributable to increased external financing costs (Chen et al., 2011) and public dishonor (Anginer et al., 2011). By virtue to it, firms may face a decreased level of financing through the external market after the revelation of their financial misconduct. Such adverse aftermaths are documented in the contemporary literature in context of US firms, supporting the argument that in post fraud period they have relatively low and costly access to external financing [see for instance, (Chen et al., 2013; Hutton et al., 2014; Lin et al., 2012; Yuan and Zhang, 2016)]. Regarding investment, fraud firms may also experience a drop in investment levels. In conformity with Modigliani and Miller (1958), corporate decisions concerning financing and investment separate within a perfect capital market and the matter of preference between debt and equity become irrelevant. Notwithstanding, attributable to the wedge that endures between the costs related to external and internal finances, these corporate decisions become unrelated under the business situation where the perfect capital market does not exist (Johansen et al., 1994).

There are certain considerations to trust the presence of this wedge. First, the equity and debt from external market contain transaction costs. Second, the debt turns more expensive when the dead weight cost is linked with the bankruptcy. Such costs may be direct, in the form of legal fee and indirect, in the shape of the loss in accused firm's image. Outside debt holds a connected agency cost (Jensen and Meckling, 1976) since management and the stockholders secure an incentive to append riskier capital expenditures due to limited liability, for the reason that they will admire the investment returns with pay zero cost. Third, the cost in

terms of lemon premium is attached with the outside financing, in a case when a problem of information asymmetry exists in between insiders and the outsiders (Myers and Majluf, 1984). Following fraud revelation, investment projects face an increased hindrance rate due to increase in financing cost and information asymmetry (Sengupta and Dasgupta, 2003), and eventually, firms may come across with a trouble to finance all profitable investments. Thus, one may anticipate the total investment of firms alleged with corporate misconducts to fall after their revelation. Lastly, uncertainty in firm's future prospects like earnings and the future cash flows turn out to be prominent when its violations are revealed owing to the enhanced level of operational uncertainty and market examination of capital providers (Dyck et al., 2010; Graham et al., 2008; Wang and Winton, 2012).

Under the stipulation of financial constraint assignable to expensive external financing and to avert problems related to underinvestment, firms are evident to save more cash (Almeida et al., 2004; Chen and Wang, 2012; Faulkender and Wang, 2006; Lin et al., 2013; Opler et al., 1999). Mainstream wisdom implies that in such case firms will be not in a good position to distribute cash dividends because of inferior cash left-over. One more view relates the increase or decrease in the dividend payouts with the firm's earning quality. This is so because earning quality of a firm is deemed to be reflected by its dividends (DeAngelo et al., 2004). Hence firms charged with corporate fraud possess inferior quality of documented earnings compared with no-fraud firms (Caskey and Hanlon, 2005). For these reasons, given with inferior earning quality and less stable fictitious earnings, fraud firms are assumed to distribute lesser cash dividends (Dechow et al., 1996).

2.8.2 Fraud and Simultaneous Determination of Corporate Decisions

The study, in this section, follows certain pieces of empirical witnesses on the simultaneity of corporate financial decisions under various business circumstances. While, in context of frauds, there is no direct literature on the interdependence of

corporate financial decisions, the study seizes the support of literature that analyzes these decisions in a setting of information asymmetry. Therefore, in order to develop the comprehension of potential interdependencies of corporate decisions, the study believes that fraud declaration asserts a breach of the agent-principal relationship expectation. Furthermore, the announcement of fraud detection induces intense market imperfections and information asymmetry caused by impairments in firms' reputation. (Gande and Lewis, 2009; Karpoff et al., 2008a). Thus, the later discussion from the literature, out of several theoretical and empirical models, advances the understanding of interdependencies of corporate decisions by the means of perfect market hypothesis, agency theory, financial constraints models, the flow of fund model, and various others.

The framework laid by Modigliani and Miller (1958) claims that these corporate decisions are independent in presence of a perfect capital market. Despite that, as a result of the existence of agency conflict and costly monitoring of managers, the fund's providers from capital market review the estimation risk and demand larger returns (Jensen and Meckling, 1976). Several other studies indicate the issues regarding market imperfections driven by the absence of information symmetry in equity markets [see for instance, (Myers, 1984; Myers and Majluf, 1984)]. In addition, the literature expresses that the premium on the cost of external financing is enhanced owing to agency cost as the borrowers' net worth drops (Gertler, 1992; Gertler and Bernanke, 1989). In presence of such business course, the firm's sensitivity of investments to internal finances is increased since it leads to external financing in terms of cost advantage. Accordingly, this study examines the interdependence of investment with the options of external financing. Moreover, it extends this simultaneous analysis to all critical components of financial decisions along with inter-temporal effects.

Several studies, together with that, emphasize the criticalness of financial constraints in respect of these corporate financial decisions [see for example, (Cleary, 1999; Fazzari et al., 1987; Kaplan and Zingales, 1997; Lamont, 2000; Shen and Lin, 2016)]. Their inference declares that companies charged with fraudulent activity may fall into the financially constrained status and in such case, their investment

becomes sensitive to internally generated funds. Along the same line, [Aggarwal and Zong \(2006\)](#) conclude that financially constrained firms adhere to pecking order to fund the capital requirements. Further, [Guariglia \(2008\)](#) demonstrates that firms going through restrained access to external funds have greater sensitivity of investment-cash flows. By and large, these inferences highlight that in presence of information asymmetry and market imperfection, the study may examine the interaction between financing and investment decisions of firms.

Further down the line with dividends, [Miller and Modigliani \(1961\)](#) assert that there is no interdependence in between dividends and investment decisions. Nonetheless, while asymmetrical environment and market imperfections being existent, one may anticipate the dependence of investment-based decisions of firms upon their financing and payout decisions. The dividend signaling proposition infers that companies make application of dividend payouts as a signal to keep information asymmetry at minimum possible level ([Bhattacharya, 1979](#); [Li and Zhao, 2008](#); [Miller and Rock, 1985](#)). By way of illustration, [Akhigbe and Madura \(1996\)](#) add that in comparison to the firms that cut dividend payouts, the firms through dividend announcements gain a favorable impact on their stock value.

Following the study of [Dhrymes and Kurz \(1967\)](#) on corporate financial policies in simultaneity framework, a number of subsequent studies examine the interdependence of financing, investment, and dividends. [Sarig \(2004\)](#) reports that firm's investment policies direct the dividend payout policy. However, his findings fail to relationship contrariwise, i.e. impact of dividends on investment. [DeFusco et al. \(2007\)](#) find that there is a short-run interdependence evident between dividends and investment, whereas in the long-run their association becomes weaker. [DeAngelo et al. \(2004\)](#) conversely confirm empirically the relatedness of dividends and investment.

Viewing the relationship of dividends and financing, a well-documented witness prevails in conformity of positive relationship between them both in respect of theoretical and empirical literature. The pecking order theory assumes the positive connectivity between these two corporate decisions. [Baskin \(1989\)](#) and [Adedeji](#)

(1998) witness this positive association. In the like manner, a number of studies from US context, regarding financing and investment; confirm the existence of positive association [see for instance, (Baker and Wurgler, 2002; Hovakimian et al., 2001; Smith Jr and Watts, 1992)]. Capital rationing hypothesis expects that financing decision of the firms lead the investment decisions, in contrary to the suggestion of pecking order theory in another way round (Myers, 1984). The assertions made by Baskin (1989) and Adedeji (1998) furnish evidence in the confirmation of hypothesized relations laid in pecking order theory and capital rationing theory respectively.

Under the stipulation of the theoretical and empirical confirmation of the interdependencies of corporate financial decisions, few studies exist that observe an insignificant relationship between these decisions. As an illustration, Fama (1974) along with Pruitt and Gitman (1991) find an independence when examining an association between investment and dividend decisions. All-inclusive, mixed witnesses exist in the empirical analysis of possible simultaneity of financing, investment, and dividend payouts.

Pursuing Meng (2013), this study develops the flow of funds framework given with information asymmetry to determine the possible interaction of corporate financial triad. The rationale behind pursuing this model is due to the established fact from the extant literature that revelation of firm's financial misconduct originates information asymmetry. Therefore, founded on the flow of fund framework, the study assumes a negative association between investment and dividend decisions; a positive connection between investment and financing; and a similar positive association between financing and dividend announcement. Further, the study expects an increased level of these prescribed associations when examining the post-fraud period.

2.8.3 Factors Eliciting Fraudulent Behavior

2.8.3.1 Internal Antecedent Factors

These factors belong to the environment inside a firm, and their association between firms alleged with financial misconducts and those without any is determined. Considering the previous debate in the context of pressure emerging from firm's poor financial performance and related theories, in particular, agency theory, a theoretical support of these factors is established. In accordance with it, their relationship with the likelihood of fraud is hypothesized in addition.

i. Financial Performance

One aspect that could direct a firm to a deceitful conduct from its internal environment is that it is performing below the average in comparison with the industry in terms of earning profits. A firm's capacity to become a profitable unit reflects the primary objective supposed to be directing companies and is considered as the principal to social mobility in the course of firm's stratification (Vaughan, 1985). In addition, firms seeking for generating profits must position their direction in some measure that they can acquire the strategic resources required (Aldrich, 1979).

The agent (manager) is responsible to secure adequate levels of organization's profitability with reference to the industry and is driven by two motives mainly. The first surfaces from the viewpoint of managerial employment. The managers may be deemed as being inefficient which may influence their compensation and potential for future employment if the profitability under their control is unsatisfactory. Moreover, for the purpose to guarantee to minimize the likelihood of hostile takeover and stable employment, the entity imperatively is obligated to maintain the adequate level of profitability in comparison with the industry, insomuch as the improved earning quality enhances the firm's market value of stocks, in turn, pushing the acquisition cost up the scale to bidders outside (Macey, 1991). That being the case, the lowering accomplishments in financial parameters drive up the motivations for the agents to act as being opportunistic and indulge in fraudulent behavior (Clinard and Yeager, 1980; Clinard, 1983; Finney and Lesieur, 1982).

Variety of scales prevails for assessing the profitability of an entity in the literature (suchlike return on equity, return on assets, return on investment, profit margin ratio, among others). Additionally, this study in order to differentiate from several researched previously considers the relative performance with respect to its industry. The measures introduced by Bourgeois III (1981); Bourgeois III and Singh (1983) are followed in this study. The relative performance is measured by deducting the entity's profitability from the industry average, for each case.

Mixed empirical evidence exists previously in relation to the financial performance of corporate entities. While a number of studies have reported a significant association (Asch and Seneca, 1976; Lane, 2017; Staw and Sz wajkowski, 1975), others do not find the same (Baucus, 1988; Baucus and Near, 1991; Yeager, 1986). Hill et al. (1992) cite issues related to methodological working, whereas Daboub et al. (1995) cite the inadequacy in attempts to discriminate between environmental insufficiency inclined to poor performance in the sector and individual corporations with poor performance as being potential causes for such mixed evidence.

However, agency theory postulates that if the firm's performance relative to its industry is poor, the desire to indulge in a fraudulent activity by means of misstated financial disclosure is present. Thus, lesser the comparative performance measure, the larger would be potential of fraud commitment.

Therefore, the following hypothesis is tested.

H1: Financial performance of a firm experiencing fraud will be inferior to that of a non-fraud firm.

ii. Threat of Insolvency

Besides poor firm's performance, the threat of insolvency is, on the other hand, a factor that could direct a financial fraud. Kinney Jr and McDaniel (1989) present that during weak financial health; the firm's management is more probable to disguise what may or may not be a temporary problem. These financial problems may cause a firm to experience reputational loss (Anginer et al., 2011) and destruction of investor's confidence (Giannetti and Wang, 2016). Previous studies confirm that financially distressed entities are more prone to commit a fraud (Habib et al., 2013; Hasnan et al., 2012b; Liou, 2008; Spathis, 2002). Numerous

other findings report that evading punishments linked with debt violations carry incentives for firms to commit deceitful behavior (Sweeney, 1994). In addition, (Macey, 1991) reports that a radical shift in management's incentives when firms definite on the verge of insolvency. First, for the reason that shifting firm-specific investment for the managers is not possible, they possess an incentive to undertake immense risks to safeguard their investment. Second, the insolvent firms may bring a stigma for its managers in the job market and hence they find it complex to accomplish employment.

The previous studies employ Altman Z score in this context. Latham (1994) applies the score as a situation to encourage the conduct of management to misstate financial information. Stice (1991) employs the variable as an attribute of companies that might put a litigation risk to auditors. This study captures that variable by way of Altman Z score (Altman and McGough, 1974) for assessment of a firm as a going concern. A discriminant score, applying the Z score approach, up to 2.675 shows going concern issue, beyond 2.675 represents no going concern issue, whereas a score at intervals 1.81 to 2.99 exhibits a region of ignorance in which an error in categorization could be shaped.

Therefore, the following hypothesis is tested.

H2: The threat of insolvency will be greater in the case of a firm experiencing fraud to that of a non-fraud firm.

iii. Organizational Slack

Organizational slack portrays the surplus that stays once a firm disbursed its several inside and outside constituencies to sustain their participation (Baucus and Near, 1991). A fraudulent activity driven by management is established if the firm faces low organizational slack (Baucus and Near, 1991; Daboub et al., 1995). The theoretical rationale is along these lines: agents of the entities having adequate resources are possessed with more options to fraudulent behavior than those of the entities having less slack resources; the aforementioned are less probable to rely on a single product and more in a position to indulge in behavior to originate alternatives (Cyert and March, 1963). It is a common belief that the necessity of communication and coordination is reduced where resources are sufficient in

a firm (Galbraith, 1974), and therefore assist managing demands emerged from the outside surroundings (Pfeffer and Salancik, 1978). On the other hand, low organizational slack forces to make attempts to obtain extra resources or reduce costs. Thus, strategically less number of alternatives is to agents in firms with low organizational slack relative to the firms with sufficient resources (Chakravarthy, 1982), which could incur an opportunistic behavior by agents in firms having low organizational slack.

Organizational slack is obtained using a measure formulated by Bourgeois III (1981) and Bourgeois III and Singh (1983). In conformity with the previous studies, the quick ratio (cash, short-run marketable securities, and receivables in proportionate to net short-run liabilities), is applied to compute slack (Cheng and Kesner, 1988; Singh, 1986). In addition, whereas the degree of organizational slack may differ by industry; slack is computed by deducting an industry's average quick ratio out of firm's quick ratio: the difference shows the surplus resources with the firm in comparison with other firms in the industry. Thus, it infers as the lesser the quick ratio compared to the industry, the lesser the value of slack and the higher the likeliness of fraud.

Therefore, the following hypothesis is tested.

H3: Organizational slack of a firm experiencing fraud will be lower than that in a non-fraud firm.

iv. Organization Size

Organization size is concerned with the level of decentralization in the form of an internal antecedent factor. Agency theory explains the deficiency of incentives to supervise large organizations (Daboub et al., 1995; Macey, 1991). Rise in size, an array of activities, and decentralization incline to take place together in corporations (Pugh et al., 1963, 1968). By the enhancement in company's size, specific units based on functions are formed to handle the activities and frequency of decentralized decision making is also increased. This rise in decentralization and extra units amplifies possibilities for illegal activities (Vaughan, 1985). Even more, hierarchical and individual controls reduce as the firm undergoes expansion thus following with violations (Finney and Lesieur, 1982).

As explained in the agency theory, it is evident that by the increase in the size of a company, the incentives to supervise the agent (manager) decline. In respect of risk appetite, principals are more risk neutral and can transfer their risk by means of investing in a diversified portfolio of corporations. Macey (1991) reports that differences in the interests between agents and the principal are prone to move up as the size of a company's stock ownership increase. In spite of the difference, advantages to individual supervision go down as the number of stock owners goes up because the benefits drawn from supervision will drop considerably on a per capita basis. Thus, an expansion in the organization size may direct towards a higher likelihood of an illegal activity and a lower amount of monitoring.

Previous studies relating size to fraudulent behavior has had mixed findings. The studies in the foremost stream do not confirm the association (Clinard et al., 1979; Conklin, 1977). Recent literature has reported a positive association when size is related to the fraudulent behavior (Coram et al., 2006, 2008; Wells, 2017). The prior studies face a large criticism for deficiency of external validity since the existence of small sample size, and only single industry being analyzed. Moreover, prior studies have applied various distinct measures of size, comprising revenues, assets, and number of personnel. The current study captures size with these components. It is postulated that the bigger the size of a firm, the more is the likeliness of fraud occurrence.

Therefore, the following hypothesis is tested.

H4: An organization experiencing fraud will be larger in size than a non-fraud organization.

v. Tax Aggressiveness

Tax planning is deemed as a scheme to avert legal taxes and is authorized within the tax regulations in most of the developing economies (Noor and Fadzillah, 2010). The previous research exhibit varied inferences on the association between financial reporting aggressiveness and tax reporting aggressiveness (Frank et al., 2009; Heltzer et al., 2012; Lennox et al., 2013). This study in motivation to such prior research aims to examine whether aggressive tax reporting and fraudulent financial reporting are interlinked. Nevertheless, the outcomes of Lennox et al. (2013)

present that firms bearing tax aggressive approach are less prone to commit a violation. In a dissimilar setting, [Heltzer et al. \(2012\)](#) find no support in favor of the tie-in between aggressive financial reporting and tax reporting. Based on this mixed evidence, the study augments the previous research by testing the association between tax aggressiveness and fraud likeliness in Pakistan. Appertaining to argument laid by [Erickson et al. \(2004\)](#) that corporations make overpayments in their tax accounts to avert any distrust stimulating from regulatory agencies and investors, the study assumes the tax aggressiveness and the chances of fraud as being positively associated.

Therefore, the following hypothesis is tested.

H5: Other things being equal, there is a positive association between tax aggressiveness and corporate fraud.

vi. CEO Compensation

The structure forming executives' compensation within an organizational environment relates to internal antecedent factors, which has been regarded as an essential instrument to restrain agency problem ([Dalton and Daily, 2001](#); [Demsetz and Lehn, 1985](#); [Jensen and Meckling, 1976](#); [Shleifer and Vishny, 1997](#)). A number of studies in this domain appears examining whether equity-based incentives of CEOs carry an association with the firm's violations. Seemingly, managers are observed with myopic actions in consequence of equity-based incentives to keep income levels at artificially high possible grade in the temporary time frame. While the literature on this subject is progressive, by and large inference is mixed with little number documenting a positive association ([Bergstresser and Philippon, 2006](#); [Burns and Kedia, 2006](#); [Efendi et al., 2007](#); [Harris and Bromiley, 2007](#)), and rest discovering no such association ([Armstrong et al., 2010](#); [Baber et al., 2009](#); [Erickson et al., 2006](#)). Keeping in view that a large portion of Asian's executives possesses a large equity interest in a corporation, the study assumes a positive association of fraud commitment.

Therefore, the following hypothesis is tested.

H6: CEO's compensation is positively associated with the probability of committing fraud.

vii. Earning Management

Ball et al. (2003), Bhattacharya et al. (2003), and Leuz et al. (2003) imply that the custom of earnings management (EM) by means of aggressive financial reporting is common in Asian publicly listed companies. This is no less than an eye-opening fact for the reason that whilst EM activities may start minor, the subsequent pressure can afterward intensify these practices, resulting in a financial statement fraud (Powell et al., 2005). Dechow et al. (1996) report evidence implying that companies when experience through bounded options to undertake aggressive EM activities, they involve into illegal activities. Magrath and Weld (2002) impose that inappropriate EM acts once initiated, forces firms to carry it on for addressing the ever-growing sales objectives set internally and earnings expectations laid by the analysts. In due course, firms further involve in financial violations through crafting artificial reserves, understating withheld borrowings, applying creative accounting, or diversely falsifying GAAP to sustain fictionary firm's growth. The U.S. Securities and Exchange Commission's Accounting and Auditing Enforcement Releases (AAERs) report that inspections against such firms, an auditor, or an agent of presumed illegal act are unlikely to hold them accountable, rather they habitually respond in rapid restatements of the artificial financial statements to rectify the misstatements (Dechow et al., 2011; Reffett, 2010). However, in Pakistan, not only are the auditor and the management are not held accountable for financial violations, the restatements of financial reports for misstatements are not immediate either. Thus, earnings management can endure for long-term in such case.

Therefore, the following hypothesis is tested.

H7: Earning management practices increase the likelihood of fraudulent financial reporting.

viii. Prior Violations

The credibility and attitude of agents are not directly measurable. The study attempts to test this prospect by using a frequency of violations that a firm incurred in the due course. Management's credibility and accounting disclosure may be questioned if the firm contains more frequency in previous violations. The same

criteria have been evident from the prior research [for instance, (Baucus, 1994; Davidson et al., 1994)]. Also, the nature of firm's violations is expanding (Finney and Lesieur, 1982). In support of this argument, Pfeffer (1982) suggests that frequent use of practices turn to socially acceptable attitude. In addition, Geriash (2003) implies that entities engaged with the history of prior violations are criminal activities begin small which in consequent establish a culture that eventually leads to fraud. The study, hence, assumes a positive association between the history of prior violations and commitment of fraud.

H8: The firms with a prior history of violations are more inclined to commit fraud.

2.8.3.2 External Antecedent Factors

These factors pertain to the circumstances in the environment present outside a firm. Their association with the fraud and non-fraud entities is evaluated next. The theoretical justification of these factors is established by means of the previous discussion of agency theory mainly and managers' inducements attributable to self-interest assumption.

i. Dynamic Environment

Dynamism on the side of an agent, evolved from the surrounding outside an organization, could lead to a fraudulent act. Dynamism presents the observed persistence of variations in an industry (Zahra et al., 2007). Firms are contingent on numerous systems to adjust or direct dynamism, violent, or environments with quick variations (Emery and Trist, 1965). Dynamism in the external environment of a firm could lead to fraudulent behavior on the part of a manager. Dynamism indicates the perceived continuity of change in an industry (Zahra et al., 2005). Illegitimate act may originate out of such attempts (Finney and Lesieur, 1982; Gross, 1978). As an illustration, companies attempt in lowering environmental uncertainty in order to impose their standard operating procedures (SOPs) to handle regular matters. Application of SOPs become problematic in presence of dynamic environments, hence enhancing the probability of commitment to illegal activity will prevail if the companies run devoid of SOPs or impose faulty SOPs (Kriesberg,

1976). Functioning in absence of SOPs give the opportunity to the self-interested management to act in an illegal manner.

Previous research has worked with numerous variables to capture dynamism around business surroundings. These comprise of variations in value added (Aldrich, 1979), progress in value added (Simpson, 1986), changes in transportations value in an industry (Baucus and Near, 1991; Dess and Beard, 1984) and the proportionate variation in sales (Stice, 1991). In consistent with Stice (1991), this study computes firm's dynamism in the environment using the proxy of the percentage change in sales. The other proxies aforesaid relate to manufacturing concerns. The change in sales deems to be relatively more fitting measure since the sample of fraud firms in this study is not bounded to manufacturing concerns. The SOPs may not prolong during an interval of the prompt rise in firm's sales, whereas an internal force to enhance the level of sales during an interval of prompt fall in sales might result into an illegal activity.

The scale for dynamism, the percentage change in sales, is computed for the duration over against one year prior to the year in which firm's violations are declared where fraud is alleged to have occurred. It is expected that the proportionate variations in sales (sign not predicted), will tend to be larger in the case where fraud has been declared.

Therefore, the following hypothesis is tested.

H9: An entity experiencing fraud is characterized by a dynamic environment as compared to an entity where fraud was not detected.

ii. Hostile Environment

Hostility relates to the industrial variations that could influence unfavorably the functions and performance of a firm (Zahra et al., 2005). A fraudulent behavior on behalf of management can be resulted out of hostility present in the surrounding around a business. In addition, prompt product creativities and prompt operational processes are discouraged by hostility (Ettlie and Bridges, 1982; Hambrick and Lei, 1985), deteriorates profit margins, declines reserves usable for innovation and lower the company's stature (Zahra et al., 2005). Hostility, in effect, constitutes an environment which carries severe competition for little resources or growth

possibilities (Miller and Friesen, 1982). A manager may be induced to misstate financial reports due to these factors in order to highlight consistent performance where none prevails, to transmit a signal to external market for managerial labor to secure employment hereafter and the demanded compensation rate (Macey, 1991).

Corporations with the aim of earning global success require technological spending containing investment in Research and Development (R&D) which in turn influence all-around performance (Franko, 1989). The deficient R&D investments along with inadequate options to bring creativity in either processes or products lower the firm's ability to stay viable. One resolve to lessen the adverse impact of a hostile climate is through misstating firm's financial disclosure. The study computes it by using a proxy as R&D expenditure relative to sales. In addition, the industry average is deducted from the value of the individual company to obtain a measure in comparison with industry. It is assumed that the R&D measure will remain lower for the entities where a financial violation is alleged as opposed to the control sample where that is not the case.

Therefore, the following hypothesis is tested.

H10: An organization experiencing fraud is characterized by a hostile environment as compared with an organization where fraud was not detected.

iii. Heterogeneous Environment

Heterogeneity relates to the level of firm's similarity and dissimilarity relative to the individuals in the climate of it (Aldrich, 1979; Dess and Beard, 1984). The diverse climate is embodied with a larger degree of uncertainty and competitiveness. The management is compelled to handle numerous and diverse firms in the climate when they operate in a heterogeneous environment. It may contain multiple suppliers and/or administrative bodies. Baucus and Near (1991) allude to the allied uncertainty linked with a heterogeneous climate. In addition, a complex climate results in a difficult process to observe the behaviors of a manager. It further inserts a pressure on the mechanism of internal control that is arranged for a diverse

climate. Two empirical examinations have asserted that greatly diverse organizations pursue a great deal of quasi-autonomous divisions, that in turn compels top management to apply a “management by the numbers” approach (Hayes and Abernathy, 2007; Hill et al., 1992). Being understood the attention on numbers, management is obliged to win them or experience the deprivation of inducement compensation and likely deprivation of employment (Hill et al., 1992). These prospects of deprivation can in result lead to the behavior of related management to be in their self-interest, hence tend to the commitment to an illegal activity.

The proxy to capture a heterogeneous climate is analogous to the one applied in Baucus and Near (1991). It is expected that a number of certain industries where an alleged organization performs will be larger in more heterogeneous climates, as contrasted with when fraud is not alleged.

Therefore, the following hypothesis is tested.

H11: An organization experiencing fraud is characterized by greater heterogeneity as compared with a non-fraud organization.

iv. Industry Membership

Another factor to be studied against this background is industry membership. Certain industries are familiar to the likeliness of fraudulent activities (Baucus and Near, 1991; Simpson, 1986) and companies with specific industries carry corresponding rates of criminal acts (Cressey, 1976). A number of justifications has been related in previous studies associating fraudulent activities with industry membership. One justification relates to the particular business culture an industry possess that may incline to the occurrence of fraudulent acts (Baucus, 1990), as a consequence of shared values directing managers to indulge in misconduct. One more justification is that isomorphism with certain firms may result in wrongdoings (DiMaggio and Powell, 2000). Isomorphism indicates that firms, after observing the flourishing firms, structure themselves, implying that an activity of misconduct is educated from noticing and collaborating with other firms in the industry. A third justification is that by way of easy and tough entry or exit, nature of the product, among others may shape the design of an industry which is suitable for corporate crime. A fourth justification is that in terms of regulation, monitoring,

and opportunity the industries are attributed to discriminative vulnerability for a financial misconduct (Daboub et al., 1995). Thus, such disclosed factors above may be associated with industry membership and illegal activity.

On the premise that particular industries are more probable to wrongdoing, the proportion of misconducts occurred in a certain industry is contrasted with the proportion of companies in the industry. Chi-square analysis is applied for this comparison.

H12: There exists an association between industry membership and fraud.

v. Political Connections

Considering several developing countries, the existence of political connections between business and political leaders offers a prominent role (Bliss and Gul, 2012; How et al., 2014). Asian economies are amongst such countries that pulled the focus of researchers in this realm (Chaney et al., 2011; Faccio et al., 2006; Gomez and Jomo, 1999; Johnson and Mitton, 2003). Listed firms close to one-third in number are ascribed as politically connected (Faccio et al., 2006). Previous research implies that a poor financial performance in the accounting disclosures and the political connections carry a high association (Chen et al., 2010a), such firms hold inferior timely process of price discovery (Lim et al., 2014), and large amount in absence of information symmetry (Boubakri et al., 2012). Shelters provided by the government to connected companies (Chen et al., 2005; Faccio et al., 2006) along with execution of tariffs on rivals (Goldman et al., 2013) comes out opacity of alleged firms in a higher proportion (Bhattacharya et al., 2003). Firms seek to conceal their suspicious conducts and avert exploration from concerned regulators when their managers are confronted with these aforementioned conditions (Bushman et al., 2004; Walker et al., 2002). It is posited in this study that political connections may prone to enhance the likelihood of fraud commitment.

Therefore, the following hypothesis is tested.

H13: : Keeping other things equal, firms having political connections have a high probability to commit fraud.

2.8.3.3 Monitoring Variables

The stakeholders and management of a corporation retain an inducement to sign an agreement to oversee the conduct of agents. As after due completion of this contract, the agents are compelled to limit their self-interests and in turn, stakeholders benefit. Additionally, using price protection mechanism from the labor market, any resultant cost of managers' self-centered act is supported by them. Thus, the managers also hold an inducement to such agreement to have their conducts observed (Watts and Zimmerman, 1990). However, both the management and the stakeholders need to face diminishing marginal utility through furnishing resources athwart supervision. This coupled with information asymmetry may result in a weak supervision (Jensen and Meckling, 1976). Variables concerning monitoring role sure argued next, as in distinguishing the influence of them on fraud and control sample firms. Analogous to previously discussed factors, their theoretical reasoning is grounded on corporate financial theories, main relating to agency theory.

i. Institutional Investors

From prospects of emerging economies, the market for institutional investors is greatly commanded from the institutions led by concerned governments (Aswadi Abdul Wahab et al., 2009; Wahab et al., 2008, 2007). Literature in this domain points to assistance in lessening the earning management through monitoring system of institutional investors (Abdul Jalil and Abdul Rahman, 2010; Burns et al., 2010; Chen et al., 2010b; Cornett et al., 2008; Hsu and Koh, 2005; Koh, 2003), specifically in presence of their high stakes in firm's equity. It restrains management from the wrongdoings of earning management, as by an illustration they inflate or decline profit margins in contingent to their desires (Chung et al., 2002). Nevertheless, the pattern of investment is not alike across all the streams of institutional investors, when studied empirically and compared thereafter. Investors categorized in a horizon with prospect of long-run, viz. dedicated investors, are assumed to supervise target firms' decisions actively (Brickley et al., 1988; Bushee, 2001; Chen et al., 2007; Koh, 2007; Ramalingegowda and Yu, 2012; Sahut and Gharbi, 2010).

Such investors' active supervision may keep the managers restrained from conducting any self-centered act and in turn, may lower the likeliness of a wrongdoing. On the contrary, investors categorized in a horizon with the prospect of short-run, viz. transient investors, are less tend to oversee concerned managers since they are not worried beyond their returns. [Gaspar et al. \(2005\)](#) assert that transient investors even permit the management to undertake policies of value decreasing if any, in a way that harms the shareholders' benefits only. Moreover, the managers are encouraged to manipulate earnings when they find profound trading on earnings news from the transient investors mainly ([Koh, 2003](#)). It is posited that transient investors with their existence may likely enhance the fraud occurrence.

Therefore, the following hypotheses are tested.

H14: : The presence of institutional investors reduces the likelihood of the fraud.

H15: : Ceteris paribus, dedicated institutional ownership has a negative impact on the likelihood of fraud.

H16: : Ceteris paribus, transient institutional ownership has a positive impact on the likelihood of financial statement fraud.

ii. External Auditor

The likelihood of fraud has previously been connected with the quality of monitoring. For this reason, the integrity of audit firm is a constituent whose influence on the presence of fraud will be established in the current study. Previous studies have evident mixed findings. [Huss and Jacobs \(1991\)](#) examine the audit process through dichotomous variable and find considerable evidence in discriminant quality among the firms whether alleged or not with the commitment of fraud and highlighting possibly to their discriminant operations. Additionally, [Palmrose \(1988\)](#) identify certain audit firms to be seemingly different in their quality while linking their litigation rates with a corporate illegal activity. However, [Teoh and Wong \(1993\)](#) do not find sufficient support for this argument. It is posited that the better integrity of audit firm will be linked with lesser probability of occurrence of fraud.

Therefore, the following hypothesis is tested.

H17: The quality of the audit firm is better in entities where fraud is not present and worse where fraud is present.

iii. Number of Years Audited

Since the audit quality when observed in prior studies brings mixed results, another variable which relates to the monitoring quality is incorporated and the influence of that on the presence of fraud is established. The variable utilized to assess the monitoring quality presented by the audit company is a number of years an audit company previously has been engaged in their process of auditing to a target firm. It is assumed theoretically that since the number of years an audit company is hired by a firm enhances, to execute the function of an external audit, the audit quality increases therewith. It turns so by reason of an assertion that audit firms emphasize on probing the mechanism of internal control of target firm in the early years, during which managers may be induced more to indulge into a corporate misconduct. This study embeds the number of years an audit company has been hired by a firm is applied to establish its association with the commission of fraud. It is expected that the more the number of years a firm has been undergone an audit process, the lesser the likelihood of a violation is present.

Therefore, the following hypothesis is tested.

H18: The number of years an audit firm has audited an entity is inversely related to the existence of fraud.

iv. Active Audit Committee and Financial Expertise of Audit Committee

The prior studies empirically provide evidence in support of the notion that an audit committee plays a pivotal role in reporting quality (Klein, 2002; Lin et al., 2006; Vafeas, 2005). One attribute assignable to effective audit committee is being independent. Beasley (1996) infers that chances of a corporate misconduct are little wherein an independent audit committee is present. Nevertheless, the matter of this independence turns emphasizing less interest as stock exchange rules demand the committee members to be independent. Menon and Williams (1994) add that for an effective monitoring, independence alone does not meet all requirements. Prior research focus on the criticalness of audit committee's meetings

(Abbott et al., 2000; Johnston and Nowland, 2017; Owens-Jackson et al., 2009) along with financial expertise (DeFond et al., 2005; Ghafran and O'Sullivan, 2017; Yu et al., 2016) in an act of preconditions to form an effective audit committee. Abbott et al. (2000) point to the lesser probability of fraud given with the conditions of an audit committee to remain independent and conduct meeting with a frequency of two times, at least, in a year. In addition, DeFond et al. (2005) posit that response of the external market is evident positively to the firms with the presence of a financial expert in audit committee. It is posited in this study that an audit committee being independent, conducting meeting twice at least in a year and holds one financial expert minimum declines the chances of the commission of fraudulent activity.

Therefore, the following hypotheses are tested.

H19: An entity where fraud is present is characterized by no audit committee or an inactive committee.

H20: The presence of a financial expert in Audit Committee reduces the likelihood of fraud.

v. Family Ownership

Family ownership relates to corporations in which the founding partners are principal shareowners, directors and top managers (Anderson and Reeb, 2003; Bardhan et al., 2014; Chen et al., 2010b; Vazquez, 2016). Two matching assertions exist in relation to quality of financial disclosure of family corporations: alignment hypothesis and entrenchment hypothesis (Wang, 2010). Alignment hypothesis expects fewer chances of fraud commission in entities classified into family firms since founding family partners contribute immensely in the monitoring process. A number of studies confirm alignment effect as being present in such firms (Ali et al., 2007; Anderson and Reeb, 2003; Chen et al., 2010b; Ghosh and Tang, 2015). Contrarily, entrenchment hypothesis infers that in case of a conflict originated in between the family and minority shareowners imparts openings for former owners to expropriate the monetary rights of minority shareowners. A well-documented stream of the literature confirms this notion of entrenchment hypothesis [see for instance, (Bardhan et al., 2014; Burkart and Panunzi, 2006; Wang, 2006; Yoong

et al., 2015)]. On that premise based on empirical advocacy related to both competing notions, it may be posited that the likelihood of an illegal activity is influenced by these effects, as being existent.

Therefore, the following hypothesis is tested.

H21: Family ownership has an influence on the likelihood of fraudulent financial reporting.

vi. Outsiders on the Board of Directors

To affirm the earnings quality while equipping an eminent monitoring structure is, *ceteris paribus*, on the verge of embodying outsiders on the board of directors (Dimitropoulos and Asteriou, 2010; Klein, 2002; Peasnell et al., 2005). It is empirically developed that chances of earning management drop considerably by enabling independent outside directors on the board (Dechow and Dichev, 2002; Peasnell et al., 2000). Hashim and Devi (2008) discuss the involvement of Asian firms not fulfilling the requirements of independent board members as being one-third of the total. It highlights the possible deficiency of board independence in the context. Johari et al. (2009) indicate that such firms are less able to inhibit the occurrence of earnings manipulations. It is posited that chances of fraud commission are lesser in firms equipped with an independent board, as opposed to those who do not.

Therefore, the following hypothesis is tested.

H22: Probability of fraud commitment is higher in firms with lower board independence.

vii. Board Size

Board size is contingent on the attribute of board effectiveness (Gerald R. Jensen et al., 1992). It turns out that operations of the board can be influenced by board size, thus prospectively affecting firm's performance. The greater the board size, greater would be the functions of management to pursue monitoring mechanism. On the other hand, large board size may escort jointly experts out of several functional domains and thus assist in increasing value of the firm (Loderer and Peyer, 2002). If the effectiveness of a board is symbolized by the board size, in that case,

larger the number of members, lesser should be the probability of earnings manipulations. Eisenberg et al. (1998), Ebrahim (2007), and Xie et al. (2003) report that boards with greater size are linked with the lesser degree of discretionary accruals.

Despite that, managers can control the process involved with the large board that, in turn, lowers the efficiency of the board in terms of monitoring. Enlarged boards possibly might be inclined to initiate troubles in communication and integration, together with the process of decision-making (Eisenberg et al., 1998; Forbes and Milliken, 1999; Gertler, 1992). Hence, in the case when an expansion is identified in the board structure, agency problems arise, for instance through director-free riding, and eventually, they operate merely in a symbolic mean and overlook the obligations concerning supervision and control over management (Beiner et al., 2006). Yermack (1996) and Eisenberg et al. (1998) empirically point to the negative association of board size with the firm performance, by making an assertion that relatively larger boards are less effective as opposed to smaller boards. For this reason, shorter boards are probably more operative in supervising managerial conduct. Verifying this inference, Kao and Chen (2004) and Jaggi et al. (2007) indicate that earning manipulations are linked positively with the size of the board. Prior studies put together, indicate mixed results in respect of board's size and its influence on misstatements. It is posited that board size may adversely impact the credibility of financial reporting.

Therefore, the following hypothesis is tested.

H23: Larger board size increases the likelihood of fraudulent financial reporting.

viii. Female on Board

The significance of gender diversity on board is emphasized in the recent literature in different prospects [see for instance, (Campbell and Mínguez-Vera, 2008; Chapple and Humphrey, 2014; Erhardt et al., 2003; Low et al., 2015; Sun et al., 2011)]. One stream of prior research identifies absence of any gender diversity upon their ethical judgments (Arun et al., 2015; Darmadi, 2013; Gavius et al.,

2012), whereas the others report in lowering the misconduct of earning management and enhancing firm performance therewith, a considerable part is evident empirically with the presence of females on board (Broadbridge and Hearn, 2006; Campbell and Mínguez-Vera, 2008). In confirmation to it, Srinidhi et al. (2011) add that firms are observed to perform even better in terms of their earning quality while females being present on their board. They base their claim with an argument of diversification the females contribute in various aspects of decision-making, enabling thus a boardroom to contrive effective measures. Such measures then provide sufficient support in curtailing chances of wrongdoings. It is posited that presence of females on board offer a diversified boardroom which may support effective monitoring mechanism and thus reduce the probability of fraudulent activity.

Therefore, the following hypothesis is tested.

H24: There is a negative relation between the incidence of fraud and female board presence.

ix. Founder on the board

An authority figure has been reported in a number of financial scams instructing the lower management to execute manipulated financial disclosures. As an illustration, the chief financial officer (CFO) of WorldCom, Scott Sullivan, upon hearing in the court against fraudulent activities disclosed that he was commanded by the chief executive officer (CEO), Bernie Ebbers, hit the numbers, come what may (Latour and Young, 2005). Analogous to this case, the sub-level manager of HealthSouth alleged that he was endangered with loss of employment if he refuses to manipulate the accounting information (Stuart, 2005). These illustrations stand in compliance with Stanley (1974) wherein he details on obedience to authority and declares that above 60% of members obeyed instructions of figures allegedly to be unethical authorities.

It is not unique in developing economies to find family ownership and founding members of corporations' board. Evidence, in this connection, present that an organization develops a more homogeneous culture when finds a persistent presence of founders on the board (Davidson et al., 1994). Their presence may, in addition,

curtail a firm while establishing broad-based social values in its culture. Founders likely hold a more emotional commitment to their company, inconsiderate to their stakes of ownership. Such commitment might be so intensified to follow every direction, come what may, for ensuring the survival of their firm. For case in a point, they could indulge in financial fraudulent reporting and earnings manipulation by turning a blind eye to concerned managers. It is posited that presence of founder on the board may adversely influence the fair financial reporting.

Therefore, the following hypothesis is tested.

H25: Ceteris paribus, the presence of founder on the board increases the likelihood of fraudulent financial reporting.

x. CEO Duality

One more variable that relates to the likelihood of financial fraudulent reporting is the duality in power of CEO, in which a CEO performs as the chairman of the board of directors in addition. By functionalities, certain matters connected with CEO are laid under the authority of a chairman of the board, suchlike scheduling and operating board meetings along with monitoring CEO's selection, termination, assessment and compensation (Beasley, 1994). These functions do not fall under the power of CEO to decide it for self-interest (Jensen, 1993). The effectiveness of board is weakened in a way that its monitoring values associated with reviewing and balancing the authority of CEO are discarded when the board is governed by the same individual (Chaganti et al., 1985). Thus, these authorities must be segregated in order to install the effectiveness in boardroom measures (Jensen, 1993).

It is posited, on these premises, that a firm embeds a greater likelihood of financial fraudulent reporting if it holds an individual performing dually as CEO and also as being chairman of the board.

Therefore, the following hypothesis is tested.

H26: CEO is also chairman of the board of an entity where fraud is present as compared to an entity where fraud is not present.

xi. Average Tenure of the CEO

The capacity of management to execute its authority to override monitoring may

possibly influence the capacity of outside directors to monitor them productively (Beasley, 1994). It is deemed on a widespread that the tone of the board is fixed by the CEO by the reason that s/he holds the supreme voice in deciding who will minister to the board (Mace et al., 1971; Vancil, 1987). Besides, the tenure of the CEO may present the authority of an individual to override indirectly the board of directors. The issue intensifies when it comes to the emerging economies, bearing serious problems in governance mechanism (Hashim and Devi, 2008). In support of the argument, Hermalin and Weisbach (1988) highlight that a new CEO is not as strong in exercising dominance as opposed to an established CEO. Thus, it is posited that the power to overriding monitoring may be increased with the increase in tenure of the CEO, leading to the likelihood of fraud commission.

Therefore, the following hypothesis is tested.

H27: The tenure of the CEO is greater in an entity where fraud is present as compared to non-fraud firms.

xii. Insider Stock Ownership

Agency problem arises when managers being advantageous in private information benefit more as opposed to shareholders. It can be curtailed with inside managers who operate on the board of directors by enlarging their stock ownership. In all verity, the inside managers contribute in sharing the agency costs on large scale since their proportion of ownership develops, and as a result are supposed less probable to wipe out corporate wealth (Jensen and Meckling, 1976).

Jensen and Meckling (1976) assert that firms can lower the benefits which managers may realize against the shareholders through agency problem by increasing the percentage of stock holding of the inside managers who perform their services on the board of directors. This shall apply due to the fact that the managers pay greater part of the agency costs when their ownership percentage rises and therefore are deemed less probable to lose the corporate wealth. Beasley (1994) adds that commanding the actions of management can be substituted with the ownership of an organization. In addition, Weisbach (1988) identifies a negative association of shareholding of top management with the segment of outside directors, indicating thereby that they act as substitute provisions of control. It is

posited that given the increased degree of corporate shareholding of insider top management may cause the management's incentives to descend, making lower the chances of fraudulent activity.

Therefore, the following hypothesis is tested.

H28: The percentage of insider stock ownership is inversely related to the existence of fraud.

xiii. Change of Auditor

The quality of financial disclosure is satisfied with an indispensable monitoring structure by embodying independent external auditor. The auditor-management connection is important while establishing rationalization in an organization. An entity is more probably to engage in fraudulent activity when this connection remains not better. Even more, management could switch auditors to decline the chances of detection of their misconduct (Sorenson et al., 1983). This is reported by Loebbecke et al. (1989), where it is observed that around 36 percent of their study sample carry allegation of misconduct during the first two years of changing an auditor. Shu (2000) supports this argument by indicating a positive relation between chances of litigation and the resignation of auditors. It is posited that auditor change may be linked positively with the probability of fraud.

Therefore, the following hypothesis is tested.

H29: Ceteris paribus, the firms with high auditor switch have a high chance of committing fraud.

2.8.3.4 Summary of Study Hypotheses

Anticipated relationships derived from the extant literature discussed above are produced as under (see table 2.1).

TABLE 2.1: Summarized Hypotheses of Climate Factors

Variable	Hypothesis
Internal Antecedent Factors	
Financial Performance	H1: Financial performance of a firm experiencing fraud is inferior to that of a non-fraud firm.
Threat of Insolvency	H2: The threat of insolvency is greater in the case of a firm experiencing fraud to that of a non-fraud firm.
Organizational Slack	H3: Organizational slack of a firm experiencing fraud is lower than that in a non-fraud firm.
Organization Size	H4: An organization experiencing fraud is larger in size than a non-fraud organization.
Tax Aggressiveness	H5: Tax aggressiveness of a firm experiencing fraud is positively associated with fraud, other things being equal.
Chief Executive Officer Compensation	H6: CEO's compensation is positively associated with the probability of committing fraud.
Earning Management	H7: Earning management practices increase the likelihood of fraudulent financial reporting.
Prior Violations	H8: The firms with a prior history of violations are more inclined to commit fraud.
External Antecedent Factors	
Dynamic Environment	H9: An entity experiencing fraud is characterized by more dynamic environment as compared to an entity where fraud was not detected.
Hostile Environment	H10: An organization experiencing fraud is characterized by more hostile environment as compared with an organization where fraud was not detected.
Heterogeneous Environment	H11: An organization experiencing fraud is characterized by greater heterogeneity as compared with a non-fraud organization.
Industry Membership	H12: There exists an association between industry membership and fraud.
Political Connections	H13: Keeping other things equal, firms having political connections have a high probability to commit fraud.

Variable	Hypothesis
Monitoring Variables	
Institutional Investors Dedicated Investors	H14: The presence of institutional investors reduces the likelihood of the fraud. H15: Ceteris paribus, dedicated institutional ownership has a negative impact on the likelihood of fraud.
Transient Investors	H16: Ceteris paribus, transient institutional ownership has a positive impact on the likelihood of financial statement fraud.
External Auditor	H17: The quality of the audit firm is better in entities where fraud is not present and worse where management fraud is present.
Number of Years Audited	H18: The number of years an audit firm has audited an entity is inversely related to the existence of fraud.
Active Audit Committee	H19: An entity where fraud is present is characterized by no audit committee or an inactive committee.
Financial Expertise of Audit Committee	H20: The presence of a financial expert in Audit Committee reduces the likelihood of fraud.
Family Ownership	H21: Family ownership has a positive influence on the likelihood of fraudulent financial reporting.
Outsiders on the Board of Directors	H22: The proportion of outside directors on the board of directors is lower for firms in which fraud is detected as compared to non-fraud firms.
Board Size	H23: Larger board size increases the likelihood of fraudulent financial reporting.
Female on Board	H24: The firms with female(s) on their board have a lower probability to commit fraud.
Founder of the Board	H25: Ceteris paribus, the presence of founder on the board increases the likelihood of fraudulent financial reporting.
Chief Executive Officer Duality	H26: CEO is also chairman of the board of an entity where fraud is present as compared to an entity where fraud is not present.
Average Tenure of the Chief Executive Officer	H27: The tenure of the CEO is greater in an entity where fraud is present as compared to non-fraud firms.
Inside Stock Ownership	H28: The percentage of insider stock ownership is inversely related to the existence of management fraud.
Auditor Change	H29: Ceteris paribus, the firms with high auditor switching have a higher chance of committing fraud.

2.8.4 Fraud Influencing Corporate Financial Policies

The trinity of corporate financial policies has been spotlighted empirically for the period beyond five decades (Almeida and Campello, 2007; Denis and Osobov, 2008). The decisions of financing and investment are considered independent and the partiality surrounding debt and equity is assessed irrelevant in the theoretical account of Modigliani and Miller (1958). In the open up study of Modigliani and Miller (1958) and Miller and Modigliani (1961), it is asserted that while consistent to the assumption of the perfect market condition, the decision of optimal level of investment becomes irrelevant to the capital structure as both the internal and external sources of financing behave alternatively.

Talking about firm's decisions concerning financing, scandals companies go through the trouble of gaining funds from external sources (Hutton et al., 2014), because for such companies changed market conditions, compel larger financing prices (Chen et al., 2011) and terrible picture (Anginer et al., 2011). Consequently, company's aggregate outer financing including obligation and shareholding might diminish taking after the misrepresentation disclosure. On the other hand, over the diverse financing channels, this diminishing may not be identical. Shareholdings are touchier to data when contrasted with different choices, similar to public financing, retained earnings and financing through financial institutions (Bharath et al., 2009; Myers, 1984; Myers and Majluf, 1984). Premised on that, it may be posited that deceitful organization would undergo several alterations in its financing choices which are minimum delicate to information irregularity in the market. Discussing cash holding decisions, scam firms may choose to concentrate more on retained earnings in view of troublesome and higher costs associated with the issuance of equity or debt financing. Under such circumstances, the affected firms try to enhance their cash savings with the motive of handling unfavorable business circumstances to meet their post fraud financing needs (Bates et al., 2009; Boileau and Moyon, 2010; Gao and Grinstein, 2014; Han and Qiu, 2007).

Therefore, the study examines following hypotheses.

H1: Firm' interdependent and inter-temporal financial decisions have a significant influence on the cash flow sensitivities.

H2: Compared to constrained firms, unconstrained and partially constrained firms have a relatively low response to cash flow sensitivities.

H3: Cash reserves have a significant influence on cash flow sensitivities.

2.8.5 Market Consequences on Violations Announcement

Violations related to financial disclosure notify investors that the preceding financial statements carry material errors which could adversely influence the value of the firm, the perceived degree of information asymmetry, and mistrust related to the quality of future financial reports (Callen et al., 2006). In consequence, various firms go through CEO turnover after the announcement of financial violations (Desai et al., 2006). Palmrose et al. (2004) declare that market responds negatively to the announcement of violations while testing the change of stock price after violations. The prior literature portrays that compared to their counterparts; firms with adverse announcements are likely to be smaller, less in profits, and carry inferior growth. Such firms experience unqualified audit reports more frequently [see for instance, (Kinney Jr and McDaniel, 1989; Sennetti and Turner, 1999)]. The findings of prior literature, in general, confirm the notion that violations announcements force outside investors to reevaluate the firms and that the impact of these announcements will be adverse in market liquidities [for example, (Akhigbe et al., 2005; Anderson and Yohn, 2002)].

This negative effect of violations leads to information asymmetry. Anderson and Yohn (2002) uncover that announcements concerning earning manipulations cause an increase in information asymmetry. However, Wilson (2008) finds that information asymmetry is temporary in nature when tested with earnings responses coefficient. Further, violation announcements deteriorate earning quality instantly. Poor earning quality of financial disclosure brings information asymmetry and then lowers the market liquidity of firms' stocks. Thus, violation announcements

lead to vary liquidity status which the bid-ask spread widens to guard investors (Amihud and Mendelson, 1986; Leuz and Verrecchia, 2000).

Variation in liquidity is reported in the literature around various adverse financial announcements. Palmrose et al. (2004) find no variation in bid-ask spreads around the adverse announcement. Their evidence reflects that around the announcement of financially adverse events analyst expectations become more dispersed. Moreover, Kryzanowski and Zhang (2010) reveal an increase in proportional quoted and effective spreads around the violation announcement. They determine that fraudulent financial disclosure results in a decline in market liquidity. However, there is limited analysis in the extant literature to examine long-run market liquidity upon violations for investors. The study, thus, aims to test the market liquidities for firms' financial violations and the resultant information asymmetry.

In reference to particular liquidity of the market on a financial happening, Lee et al. (1993) analyze the bid-ask spread and bid-ask depth around the adverse earning revelation. They find deterioration in the liquidity measures i.e. spreads and depth instantly when compared to thirty-minute interval before earning violation announcement, whereas spreads are observed to keep on widening and depth backtracks to a normal degree within three hours after the announcement. Jain et al. (2008) reported corrosion in the quoted spread and effective spread as liquidity measures for a short period only while studying the financial scams in early 2002. This study performs an extension to the evidence of Jain et al. (2008) through analyzing the potential market response to violations declaration over the pre-violation time period, violation announcement day, and post-violation period employing five metrics of market liquidity: quoted, effective, proportional quoted, proportional effective spreads and depth.

It is also evident from the prior literature that outside investors are able to detect the quality of financial information by inspecting financial disclosure before and after the adverse event. Violations carrying material misstatements prove as an adverse event in the market and worsened information asymmetries. It forces investors to redefine their impression about information asymmetries of financial statements as well as the integrity of management of firms involved. Therefore,

the study expects that market liquidity is affected negatively by the violations announcement and examines the following hypotheses.

H1: Regardless of the regulatory environment, violation announcements affect negatively the market liquidity measures over the period.

H2: Negative impact of violation announcements is stronger for a post-violation period as opposed to pre-violation period.

2.8.6 Fraud and Firm's Governance Structure

Prior research documents that one of the prime element of corporate financial scandals points towards the presence of weak corporate governance (Beasley, 1996; Dechow et al., 1996). However, little is known with respect to how firms engage in actions to rehabilitate governance mechanism after when fraud is revealed, perhaps more importantly, in addition, how effectively these actions recover the trust of investors. In response to the greatly debated financial reporting frauds (for instance, Enron) theoretically and empirically, regulators are evident in appraising rules aimed to empower the governance mechanism and thus improving its quality. The quality of corporate governance, howbeit, and the trustworthy financial reporting are deemed essential. Some firms allegedly involved in financial misconduct are observed applying rehabilitation strategy which involves improvements in governance structure (Klein, 2003; Thompson, 2003). By way of illustration, Sorkin (2002) reports a press article in which the Tyco's CEO, Edward D. Breen commented on the situation of firm's poor quality of governance mechanism that the most crucial thing is to fix governance structure in order to recover its earnings, following fraudulent financial reporting.

It appears clear that firms would consider certain measures subject to governance structure, after the revelation of their corporate illegal activities, the most probable of which may relate to dismiss the culprits involved. But, it is not clear that such firms would consequently take actions to improve their governance mechanism, since they could handle it by merely exchanging the inside directors with new insiders, instead of replacing with outside directors, for instance. Therefore,

the study examines following hypotheses.

H1: Detection of financial reporting fraud has a significant association with the quality of firm's governance structure.

H2: Improvements in firm's governance structure has a significant influence on its share values.

Chapter 3

Data and Research Methods

This chapter is split into four sections. Each section covers the study objective in succession and details the procedures involved in sample construction and empirical testing.

3.1 Objective 1

This section details the appropriateness of Securities and Exchange Commission of Pakistan (SECP) database along with Beneish M-score and [Beasley \(1996\)](#) criteria as a source for sample selection, the sample selection process, data sources for both the dependent and the independent variables, the methodology used to match fraud and no-fraud firms and the time period of interest for the study. It further discusses the research methods used to analyze the data.

3.1.1 Sample Construction

This section details the process developed while deciding the sample of firms where fraud exists. As expressed previously, a corporate fraud is determined as an intentional misrepresentation of financial disclosures to deceive, manipulate or defraud ([Bologna and Lindquist, 1995](#)). Cases, where a formal complaint is filed by SECP

accusing deceitful financial reporting or a financial misconduct in business operations, originate population of firms for this study. More particularly, if SECP alleges firm with violations, it is established as a firm has committed financial misconduct. SECP monitors listed firms regularly and maintains the database subject to violations of any kind, and announces the cases publicly.

3.1.1.1 Fraud Sample

In spite of successful efforts to cop firms involved in fraudulent financial disclosure, various firms remain camouflaged from detection by the enforcement bodies (Chen et al., 2006a). It happens, as argued by Zhou and Kapoor (2011), due to fact that perpetrator possesses requisite resources to deceive the system and any detection structure to be greatly difficult that may lead to the identification of misconduct. It may take a year and a half to the public the financial statement fraud even upon its identification (Beneish et al., 2013). Additionally, the position of Securities Commission may possibly be selective in undertaking the cases against which share performance becomes unsatisfactory after the revelation of their manipulations and thus inflicts major losses to the shareholders (Dechow et al., 2011). Besides it, as per US Securities and Exchange Commission (2014), detection of such manipulations is a challenge for enforcement agencies when the aid of internal whistleblowers is absent in pinpointing the potentially fraudulent activity.

Nevertheless, whistleblowers brought out manipulations in notice only up to 40 percent during 2013 (Ethics Resource Center, 2013), which manifests that majority of possible financial statements fraud stay undisclosed. In addition, regulatory procedure applied in developing countries is not that efficient like the same imposed on developed economies, for instance, USA. Furthermore, media coverage of corporate fraud disclosure is not justifiably productive (Jordan and Majnoni, 2002), declaring more difficulties in fraud detection.

To resolve this problem, Beneish M-score model should be pursued for instant detection of possible manipulations in financial statements. The model issued by

[Beneish et al. \(2013\)](#) and [Beneish \(1999\)](#) considers the entire profile of firms' financial characteristics. Application of this model is tested in U.S. SEC's accounting enforcement actions and proven 76 percent in accurately discovering of public firms ([Beneish, 1999](#)) and 71 percent of the most eminent financial disclosure scandals using only accounting data, prior to revelation.

Using the database of firms related to U.S. SEC's accounting enforcement actions, [Dechow et al. \(2011\)](#) tested financial attributes of misstating corporations in forecasting misstatements. Their findings uncovered that the firms are embedded with low accrual quality and declined monetary and non-monetary scales of performance at the time of misstatement. In addition, financing from off-balance sheet appear to incur during misstatement years and managers also are appeared sensitive in decisions against firm's share price. The researchers, in order to detect the likeliness of misstatement, withal established a compound measure of likeliness of maneuvering (F-score) which is applied as a red flag in detection mechanism. F-score model was exercised subsequently in a holdout sample with 1999 until 2002 firm-years, which forecasted manipulations 51.4 percent accurately.

[Beneish et al. \(2013\)](#) attempted to prove the association between earnings misstatement and financial statement fraud with the application of similar M-score model and tested whether it is reliable to reveal the most eminent scandals subject to fraudulent financial disclosures. The goodness of M-score model from their results proves to be 71 percent in discovering both the earnings manipulations and financial reporting scandals.

M-score model, instead, has been applied widely in identification of earnings misstatements and evaluate the quality of financial disclosures as witnessed in texts and articles issued to certified fraud examiners, professional financiers, and auditors ([Beneish et al., 2013](#); [Gerson et al., 2006](#); [Golden et al., 2011](#); [Mantone, 2013](#); [Warshavsky, 2012](#)). The model has further been contributory towards witting signs in deceptive financial disclosures for certified fraud examiners (CFEs) ([Harrington, 2005](#)). That being so, [Beneish \(1999\)](#) and [Beneish et al. \(2013\)](#) are proven in previous studies being capable of identifying potential financial statement manipulation through M-score model with the high precision rate of 76 percent and

71 percent respectively.

The model termed Beneish M-score comprised of eight ratios to nab either distortion in financial reports caused by earnings manipulation or to capture tendency to involve in earnings manipulations, is expressed below.

$$\text{M-score} = -4.84 + 0.92\text{DSRI} + 0.528\text{GMI} + 0.404\text{AQI} + 0.892\text{SGI} + 0.115\text{DEPI} - 0.172\text{SGAI} + 4.679\text{TATA} - 0.327\text{LVGI}$$

The details of the eight variables in the form of indices based on [Beneish \(1999\)](#) are as stated below (see table 3.1).

However, a little adjustment was formed by [Beneish et al. \(2013\)](#) in the M-score model. It was made through replacement of Total Accruals Total Assets (TATA), a statement of financial position variable, with Accruals (Accruals), a cash flow statement variable. In addition, this adjustment occurred in order to be aligned with the progressed literature on accruals, and despite the fact that computation of both variables contains a minor difference, they yielded identical findings. The alternate variable, based on [Beneish et al. \(2013\)](#), substituting TATA is displayed below in the same table (table 3.1).

TABLE 3.1: M-score Variables' Description

This table displays the definitions, acronyms, and formulas of the related variables in Beneish M-score model.

Variable	Details	Formulas
DSRI	Days' Sales in Receivables Index. It captures the ratio of days' sales in receivables versus prior year as an indicator of revenue inflation.	$\frac{Receivables_{i,t}/Sales_{i,t}}{Receivables_{i,t-1}/Sales_{i,t-1}}$
GMI	Gross Margin Index. This is measured as the ratio of gross margin versus prior year. A firm with poorer prospects is more likely to manipulate earnings.	$\frac{(Sales_{i,t-1}-CostofGoodsSold_{i,t-1})/Sales_{i,t-1}}{(Sales_{i,t}-CostofGoodsSold_{i,t})/Sales_{i,t}}$
AQI	Asset Quality Index. Asset quality is measured as the ratio of non-current assets other than plant, property, and equipment to total assets, versus the prior year. It proposes to compute the risk propensity of a firm to capitalize cost.	$\frac{(1-CurrentAssets_{i,t}+PP\&E_{i,t})/TotalAssets_{i,t}}{(1-CurrentAssets_{i,t-1}+PP\&E_{i,t-1})/TotalAssets_{i,t-1}}$
SGI	Sales Growth Index. It captures the ratio of sales versus prior year. Though sales growth itself does not compute manipulation, the empirical affirmation suggests that firms in growth phase more probably commit manipulations due to pressure of keeping up their appearances.	$\frac{Sales_{i,t}}{Sales_{i,t-1}}$
DEPI	Depreciation Index. This is measured as the ratio of the rate of depreciation versus prior year. Depreciation charged at a slower rate may mean that the firm is revising useful asset life assumptions upwards or adopting a new method that is income friendly.	$\frac{Depreciation_{i,t-1}/(Depreciation_{i,t-1}+PP\&E_{i,t-1})}{Depreciation_{i,t}/(Depreciation_{i,t}+PP\&E_{i,t})}$
SGAI	Sales, General, and Administrative expenses Index. This measures the ratio of SGA expenses to the prior year. This is used on the assumption that analysts would interpret a disproportionate increase in sales as a negative signal about firms' future prospects.	$\frac{Sales, \text{ general and admin expense}_{i,t}/Sales_{i,t}}{Sales, \text{ general and admin expense}_{i,t-1}/Sales_{i,t-1}}$
LVGI	Leverage Index. This measures the ratio of total debt to total assets versus prior year. It is intended to capture debt covenants incentives for earnings manipulation.	$\frac{(LTD_{i,t}+Current Liabilities_{i,t})/TotalAssets_{i,t}}{(LTD_{i,t-1}+Current Liabilities_{i,t-1})/TotalAssets_{i,t-1}}$
ATA	Accruals to Total Assets. This measures component of accounting profit not contributed by cash profit during the current year.	$\frac{\Delta CA_{i,t}-\Delta Cash_{i,t}-\Delta CL_{i,t}-\Delta LTD_{i,t}-\Delta TaxPayable_{i,t}}{TotalAssets_{i,t}}$
Accruals	It captures the element of accounting profit not provided by cash profit during the present year.	$\frac{Income \text{ before extraordinary item}_{i,t}-CashFlow_{i,t}}{TotalAssets_{i,t}}$

The resultant score of the model suggests the degree of probability of financial reporting fraud and earnings manipulation. Based on the recommendations of [Mantone \(2013\)](#), [Warshavsky \(2012\)](#), [Omar et al. \(2014\)](#), and numerous other researchers, resulting score of model larger than -2.22 indicates the potential fraudulent financial reports and earnings manipulation. However, [Beneish \(1999\)](#) proposes either i) a total score above -1.89 with identification precision of 76 percent but likely miscategorization of 24 percent of perpetrators and 17.5 percent of non-perpetrators; or ii) a total score above -1.78 with identification precision of 74 percent, apart from potential miscategorization of 26 percent of perpetrators and 13.8 percent of non-perpetrators. Beneish M-score undertakes two continuous period's financial reports (fraud year and preceding fraud year) of potential manipulators. The study, thus, considers cut-off total scores above -2.22, -1.89, and -1.78 to assess implied fraud in financial reporting and practice of earnings manipulation of the firms examined.

The sample formulated based on M-score model comprises 77 firms, while considering the availability of data and firms being non-financial, and covers the time period from 2000 to 2016 in respect of cases identified. [Table 3.2](#) demonstrates the identification of sampled firms, classification of fraud and industrial segmentation.

TABLE 3.2: Identification of Fraud Sample

This table reports the total fraud cases identified and their classification with respect to related industries.

Panel A: Firms Identified through M-score Model	
Number of fraud firms identified initially	121
Incomplete data	-44
Total cases	77
Panel C: Industrial Classification	
Construction	12
Basic materials	8
Technology	13
Cement	2
Consumer goods	14
Consumer services	18
Oil & gas	2
General industrials	8

Source: SECP database

3.1.1.2 Control Sample

Each fraudulent company is matched with the non-fraudulent companies based on the various criteria, following the framework of [Beasley \(1996\)](#). First, non-fraudulent firms have the same industry as held by fraudulent firms. Second, the first year of fraud, year (t) for non-fraudulent firms, is defined by the fraudulent firms' first year of fraud. Third, the non-fraudulent firms are selected based on their similarity in size to the fraudulent firms. The study retains firms whose size is within a standard deviation of 30% of fraudulent firms. Several ways are used to measure a firm's size in extant literature, such as capturing market valuation, total assets, and market capitalization; this study uses total assets as the size measurement. Referring to the sample of non-fraudulent firms, all the selected firms are supposed to have no record of financial misconduct in the database of Securities Commission. In addition, the non-fraudulent firm must not be financially distressed (as per practice notes¹ of PSX). Distressed companies are excluded

¹The conditions where a firm is facing financial difficulty (or distress), and does not meet the PSX listing requirements. Such firms are referred as financially distressed companies.

because Securities Commissions consider that great proportion of loss suffered by such firms is due to unethical behavior, fraud, and mismanagement ([Anwar, 2006](#)).

3.1.2 Estimation Technique

When the latent variable is unobserved, or a binary dependent variable, the model cannot be estimated using ordinary least squares. In this situation, logit and probit models are widely used and are members of the family of generalized linear models. The existing studies extensively use a standard probit model to assess the occurrence of unethical behavior in companies ([Dechow et al., 2011](#)).

3.1.2.1 Selection between Logit and Probit

Because of the higher variance of the logit model, logit model has heavier tails due to a greater spread of the distribution curve. Generally, a logit model can be interpreted as modeling log odds ([Lewis-Beck, 1995](#)). Such modeling is usually applied to analyze complex multivariate contingency tables ([Agresti and Finlay, 1997](#)). The results from logit model cover a wide range of estimation by allowing the transformation of a dichotomous DV to a continuous variable. Unlike logit model, a probit model utilizes probabilities of an emerged cumulative distribution function in explaining the behavior of a dichotomous DV ([Lewis-Beck, 1995](#)). This function has resulted into the main difference between logit and probit models in which a logit model has slightly flatter tails (i.e. the probit curve approaches the axes more quickly than the logit curve).

Moreover, a logit model is better than probit model in larger sample size. This is so when a sample size increases, the probability of observes in tail increases therewith. This is the reason why logit model is better than probit model for large sample sizes [see for instance, ([Amemiya, 1981](#); [Maddala, 1983](#))]. The sample size in our study is 77 firms, which is considerably small compared to similar studies in the US which take the larger samples ([Anderson et al., 2015](#); [Dechow et al., 2011](#); [Erickson et al., 2004](#); [Feroz et al., 1991](#)). Furthermore, both these models produce

almost identical results (Park, 2003). Based on the arguments that probit can be used for smaller samples and logit and probit produces almost identical results with different magnitudes but similar marginal effects, the study opts for probit model to examine the influence of environmental fraud factor on the likelihood of fraud in sample firms.

3.1.2.2 Probit Models for Binary Response

In order to capture binary response in dependent variable, Linear Probability Model (LPM) is used in the old literature but it holds serious issues in its structure. For instance, i) estimated dependent variable may not fall within the support and ii) partial effects for all independent variables remain constant. The key concern in a binary response model relates to response probability.

$$Pr(y = 1|x) = Pr(y = 1|x_1, x_2, \dots, x_k) \quad (3.1)$$

The study tests the probability of fraud detection given with the environmental factors in contributing to fraud. With this supposition, y could be 1 if fraud reveals, and 0 otherwise. While x would involve firms' characteristics variables related to fraud and control factors.

The study assumes the equation as under, to address limitations of LPM.

$$Pr(y = 1|x) = F(\beta_0 + \beta_1x_1 + \beta_2x_2 + \dots + \beta_kx_k) \quad (3.2)$$

where $F(.)$ represents a linear function such that $F(x) = \int_{-\infty}^x \Phi(z)dz$. This study follows the probit function for $F(.)$. In probit model, a supposition is made that the function $F(.)$ considers a normal (cumulative) distribution².

$$F(x) = \Phi(x) = \int_{-\infty}^x \Phi(z)dz \quad (3.3)$$

²Logit model, on the contrary, follows a logistic (cumulative) distribution.

where $\Phi(z)$ represents the function of normal density.

$$\Phi(z) = \frac{\exp(-\frac{z^2}{2})}{\sqrt{2\pi}} \quad (3.4)$$

The derivation of probit model can be made from a latent variable model. Let y^* denotes latent (or unobserved) variable, expressed mathematically as.

$$y^* = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + \varepsilon \quad (3.5)$$

In above equation, observed variable y would take on a value of 1 if y^* is above 0 ($I(y^* > 0)$), and 0 otherwise, in which $I(\cdot)$ represents an indicator function, and considers the value 1 if the term shown in bracket holds true.

The study can derive the response probabilities now, provided with the assumptions on distribution functions and the conditions related to unobserved variables.

$$\begin{aligned} Pr(y = 1|x) &= Pr(y^* > 0|x) = Pr(\varepsilon > -\beta_0 - \beta_1 x_1 - \beta_2 x_2 - \dots - \beta_k x_k | x) \\ &= 1 - F(-\beta_0 - \beta_1 x_1 - \beta_2 x_2 - \dots - \beta_k x_k) \\ &= F(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k) \end{aligned} \quad (3.6)$$

It can be noted that the final equality in above equation is exactly what is required, as produced in equation (3.2). For the reason that y^* doesn't hold a measure that can be interpreted easily while testing the impact of explanatory variables, the study tests the same considering their impact on $Pr(y=1|x)$. In order to compute the partial impact of say variables x_j , following derivative equation imposed.

$$\frac{\partial F(x\beta)}{\partial x_j} = f(x\beta)\beta_j \quad (3.7)$$

where x_j is a continuous variable, $f(\cdot)$ represents density function, that if study supposes a normal distribution function, $F(\cdot)$ is exactly increasing and $f(\cdot) > 0 \forall x$, and thus the partial impact keeps the sign of the coefficient, β_j , always.

When x_j is a dichotomous (or binary) variable, the partial impact then becomes.

$$F(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_{j-1} x_{j-1} + \beta_j + \beta_{j+1} x_{j+1} + \dots + \beta_k x_k) - F(\beta_0 + \beta_1 x_1$$

$$+ \beta_2 x_2 + \dots + \beta_{j-1} x_{j-1} + \beta_j + \beta_{j+1} x_{j+1} + \dots + \beta_k x_k)$$

In most of the statistical designs, the measurement of above model is based on means. Despite that, a research work may experience a substantial number of dichotomous variables like this study. It is more appropriate to compute this partial impact for each category (or group) using the means of continuous variables related to the corresponding category. The above model contains a major difficulty in its scale factor, i.e. the function that the partial impact has a dependence on the explanatory variables, which as a result generates difficulty in interpretation of this partial impact. A common practice, to address this problem, is to undertake an average of partial impact on every observation. Thus, it is commonly referred as average partial impact.

Calculations for this average partial impact in case of continuous variables involve the following function.

$$n^{-1} \sum_{i=1}^n f(x_i \hat{\beta}) \hat{\beta}_j$$

In case even the explanatory variables involve dichotomous variables, through averaging the partial impact, weights of the partial impact can implicitly be deduced by the proportion of study observations with respect to their corresponding category. The average partial impact for dichotomous variables can be computed using following formula.

$$n^{-1} \sum_{i=1}^n (G(x_{-j} \hat{\beta}_{-j} + x_j \hat{\beta}_j) - G(x_{-j} \hat{\beta}_{-j}))$$

For the discrete variables when it increases by conventional unit measure, is captured using the formula below.

$$n^{-1} \sum_{i=1}^n (G(x_{-j} \hat{\beta}_{-j} + (x_{j+1} + 1) \hat{\beta}_j) - G(x_{-j} \hat{\beta}_{-j} + x_{j+1} \hat{\beta}_j))$$

where the subscript j demonstrates all variables with exception of that which is indexed using j .

There is no limitation in the model as to what type of functional form for the

explanatory variables that the stay can adopt, that is log values and quadratic values of the explanatory variables can be used in the regression equation. The difference between logistic and probit models lies in this assumption about the distribution of the errors. Logit uses the standard logistic distribution of errors, while probit uses a normal distribution of errors (Long, 2009).

$$\log \left[\frac{P(F_i = 1)}{1 - P(F_i = 1)} \right] = \sum_{k=0}^{k=n} \beta_k x_{i,k} \quad (3.8)$$

$$\Phi^{-1} P(F_i = 1) = \sum_{k=0}^{k=n} \beta_k x_{i,k} \quad (3.9)$$

Since F_j^* is unobserved, the variance of the errors cannot be estimated. In the probit model, it is assumed that $\text{Var}(\epsilon|x)=1$ and in the logit model that $\text{Var}(\epsilon|x)=\pi^2/3 \approx 3.29$. The Figure 3.1 shows the distribution of logistic and probit models.

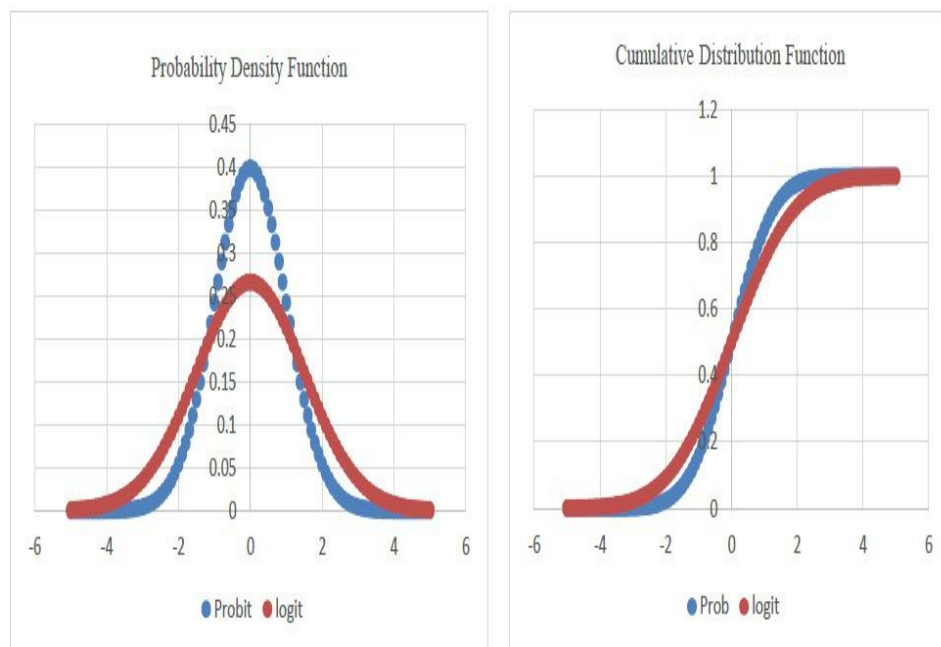


FIGURE 3.1: Distribution of logistic and probit models

3.1.3 Variables Measurement

Variables applied in the model, their measurement and acronym as cited from the literature are mentioned below in table 3.3.

TABLE 3.3: Variables Measurement

Variable	Acronym	Measurement	Prior Studies
Internal Antecedent Factors			
Financial Performance	FP	Multiple financial performance measures relative to the industry.	(Daboub et al., 1995)
Threat of Insolvency	TI	Altman Z-score	(Altman, 2000)
Organizational Slack	OSL	Quick Ratio of the firm, Quick Ratio of the industry.	(Beaver, 1966)
Organization Size	OS	Multiple measures of size.	(Stanwick and Stanwick, 1998)
Tax Aggressiveness (Cash Effective Tax Rate)	Ag-CETR	CETR is computed as the ratio of cash tax expense to pre-tax income	(Richardson and Lanis, 2007)
Chief Executive Officer Compensation	CEOC	Amount change in the value of a CEO's stock and options holdings that would come from a one percentage point increase in the company stock price.	(Boyd, 1994)

Earning management (Discretionary Accruals)	DACC	Discretionary Accruals (DACC) reflecting Earning Management using the Modified Jones Model with Book-to-Market and Cash Flow.	(Cohen et al., 2008)
Prior Violations	PRV	Dummy PRV, that takes the value of 1, if the firm has made some prior violations revealed by SECP, 0 otherwise.	(Geriesh, 2003)

External Antecedent Factors

Dynamic Environment	DE	Percentage change in sales from the period prior to the period in which fraud was alleged.	(Zahra et al., 2005)
Hostile Environment	HOE	Research & Development expense relative to sales.	(Huang and Thiruvadi, 2010)
Heterogeneous Environment	HEE	Operations in the number of particular industries.	(Zahra et al., 2005)
Industry Membership	IMD	Dummy variable is used to capture industry membership, wherein a firm alleged to fraud by 1, otherwise 0.	(Beasley et al., 2000)

Political Connections	PCD	PCD is an indicator variable that equals one if the insider (i.e. the CEO or chairman of the board) has political connections, and zero otherwise.	(Correia, 2014)
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Monitoring Variables

Institutional Investors	INS	Sum of a total number of shares held by Pension funds, government-managed unit trust funds (PNB) and government-managed pilgrims fund (LTH) to the total number of shares outstanding.	(McCahery et al., 2016)
Dedicated In- vestors	DED	Sum of a total number of shares held by Banks, private managed mutual funds, and insurance companies to a total number of shares outstanding.	(Chhaochharia et al., 2012)
Transient In- vestors	TRA	Auditor identity	(Chhaochharia et al., 2012)
Number of Years Audited	NYEAR	Number of years auditor employed.	(Uzun et al., 2004)

Active Audit Committee	AAUD	The presence of an audit committee that met at least once during the year taken as 1, otherwise 0.	(Abbott et al., 2000)
External Auditor	AUDD	The presence of Independent Non-Executive Directors in Audit Committee taken as 1, otherwise 0.	(Abbott et al., 2000)
Financial Expertise of Audit Committee	FEXP	Dummy Variable, coded 1, if the board has at least one director with a background of accounting, 0 otherwise.	(Abbott et al., 2004)
Family Ownership	FOWN	The percentage of family ownership among the top ten largest shareholders.	(Wang, 2006)
Outsiders on the Board of Directors	OUTDIR	Proportion of outside members on the Board of Directors.	(Beasley et al., 2000)
Board Size	BS	Total number of directors (executive and non-executive) currently serving on the board.	(Uzun et al., 2004)

Female on Board	FEOB	Indicator variable with the value of 1 if there is at least one female director on the board, 0 else.	(Abbott et al., 2004)
Founder on the Board	FOOB	Dummy variable, that takes the value of 1, if the founder is present on the board, 0 else.	(Beasley et al., 2000)
Chief Executive Officer Duality	CEOD	An Indicator variable with a value of 1 if the CEO is also the Chairman of the board, 0 else.	(Chen et al., 2006a)
Average Tenure of the Chief Executive Officer	CEOT	The average tenure of the CEO within the entity.	(Beasley, 1996; Uzun et al., 2004)
Inside Stock Ownership	INSTK	Insider stock ownership.	(Beasley, 1996; Chen et al., 2006a)
Auditor Change	ACH	ACH is equal to 1, if there is any change in auditor 2 years prior to fraud commission, 0 otherwise.	(Abbott et al., 2004)

3.2 Objective 2

This section details the appropriateness SECP database along with Shumway (2001), as main criteria and Cleary (1999), as robust criteria as a source for sample selection, the sample selection process, and data sources for both the dependent and the independent variables. It further elaborates the research methods used to analyze the data in accordance with the study interests.

3.2.1 Sample Construction

The study, in the primary classification model, applies bankruptcy probability. Multiple methods are used in literature to measure bankruptcy probability. Possibly the finest technique would apply a model like Merton that undertakes not only the volatility of firm's assets but also the capital structure of the firm (Merton, 1974). However, this technique is burdensome to execute over a large sample firm, as it generates issues in estimating asset volatility and in collecting comprehensive data related to the capital structure of individual firms. A substitute way is for models like Altman Z-score or Shumway (2001) hazard model, that measure bankruptcy probabilities adopting reduced form. Both the models are convenient to execute and offer justifiably accurate ratings of financial constraint. Shumway (2001) model has been compared with Merton asset-based model and results produced are alike (Bharath and Shumway, 2004). The study deploys Shumway (2001) hazard model to format sub-samples based on bankruptcy probabilities. The model is applied to 279 firms³ provided by SECP database that were detected and revealed with various monetary violations. The process (Shumway, 2001, table 6B, p. 122) to measure bankruptcy probabilities following Shumway (2001) are stated as under.

$$Pr = e^{[-13.3 - 11.9(NI/TA) + 3.5(TL/TA) - 0.45 \ln(Rel.Size) - 1.8(Ret_{i,t-1} - Ret.Mkt_{i,t-1}) + 5.7(\sigma)]} \quad (3.10)$$

³Firms being non-financial in nature and having availability of data required in the study analysis period.

where NI/TA represents net income divided by total assets, TL/TA shows total liabilities in division to total assets, Relative Size is the division of natural log of market capitalization to total market capitalization of the stock exchange, $Ret_{i,t-1} - Ret_{Market_{i,t-1}}$ shows the difference of equity return over the previous period (year) with market return over the previous period (year), and Sigma represents the standard deviation of estimates from model of firm returns on market return over the period (year).

For the purpose of establishing categories with respect to bankruptcy probability, across the full sample, a computation of the 25th and 75th percentiles of the forecasted bankruptcy probability is made. Accordingly, bankruptcy probability of firm-years with below 25th percentile characterize the firms as financially unconstrained, whereas the same with beyond 75th percentile are assumed to be constrained. Rest of all sample (firms) is considered partially constrained. Using precise scale of bankruptcy probability generated by [Shumway \(2001\)](#) is not crucial for this study since there is an ordinal structure of this classification system. For comparative analysis of the prior literature, the study model is regressed using a sample following selection criteria of [Cleary \(1999\)](#). Grouping of firms with respect to financial health is made based on opening period Financial Constraint Index (ZFC). Multiple discriminant analysis is performed to compute index, similar to the process followed in [Shumway \(2001\)](#) model or Altman's Z factor. Analogous to [Shumway \(2001\)](#), this approach carries an advantage of taking into account the entire profile of attributes shared by a specific firm and converts them into a univariate statistic. The process to measure bankruptcy probabilities following [Cleary \(1999\)](#) are stated as under.

$$Z_{FC} = \beta_1 Current + \beta_2 FCCov + \beta_3 SLACK/K + \beta_4 NI\% + \beta_5 SalesGrowth + \beta_6 Debt \quad (3.11)$$

where Current (i.e. current ratio), FCCov (i.e. fixed charge coverage), SLACK/K (i.e. slack/net fixed assets), NI (i.e. net income margin), Sales Growth, and Debt (i.e. debt ratio) are proxies representing firm liquidity, profitability, growth, and leverage respectively using beginning of the period balances.

Firms obtaining ZFC score on top one-third each period are classified as an unconstrained sample; those with next one-third score as partially constrained sample, and those with bottom one-third are categorized as a financially constrained sample. The study, based on this criterion, encompasses annual data covering 279 firms with the period ranging from 2000 to 2016 except for financial institutions and utilities. The firms are identified from the SECP database, which is detected and revealed with various violations. For the main analysis, three years post-violations are considered subject to each violation of the corresponding firm. In addition, for robust analysis, firms' data concerning pre-violations and post-violations for 3 years each are considered.

3.2.2 Estimation Technique

3.2.2.1 Estimation of Cash Flow Sensitivities

The responsibility of managers is to opt for optimal values for determinants of financing and investment decision, provided with the expected values of predetermined and exogenous factors. Table 4.6 reports the variables that are attached to this optimization problem using framework of [Gatchev et al. \(2010\)](#). The managers, while resolving this problem, experience ex-post constraint that sources and uses of funds should be equal.

$$\Delta\tilde{CASH}_{i,t} + \tilde{R}P_{i,t} + \tilde{D}IV_{i,t} + \tilde{A}C\tilde{Q}UIS_{i,t} - \Delta\tilde{L}\tilde{T}D_{i,t} - \Delta\tilde{S}\tilde{T}D_{i,t} - \tilde{E}Q\tilde{U}ISS_{i,t} - \tilde{A}S\tilde{A}LES_{i,t} = \tilde{C}F_{i,t} \quad (3.12)$$

where \sim portrays variables to be realized. The cash flow ($CF_{i,t}$) measure used in the study is determined in equation (3.13):

$$CF_{i,t} = EBITDA_{i,t} - INTEXP_{i,t} - TAX_{i,t} - \Delta NWC_{i,t} \quad (3.13)$$

where $EBITDA_{i,t}$ represents income before interest, taxes, and depreciation, $INTEXP_{i,t}$ represents interest expenses, $TAX_{i,t}$ represents taxes in cash, and $NWC_{i,t}$

represents a change in net working capital from the prior year (t-1) to current year (t). These variables coupled with $CF_{i,t}$ are presumed as exogenous, by the reason that they are established jointly through firms' past investment and consumers' present behavior. On the other hand, $CF_{i,t}$ reflects funds that are generated internally and are open to future investments or to pay stockholders and debt-holders. For the reason that sources/uses identity mentioned in equation (3.12) must be satisfied for ex-post quantities following a fundamental matter of accounting, it asserts little economic perspective. What is substantial by an economic standpoint is that managers' decisions are influenced from this constraint, based on conditions related to predictions of exogenous variables. This constraint reflecting ex-ante budget is described as:

$$\Delta CASH_{i,t} + RP_{i,t} + DIV_{i,t} + CAPX_{i,t} + ACQUIS_{i,t} - \Delta LTD_{i,t} - \Delta STD_{i,t} - EQUISS_{i,t} - ASALES_{i,t} = CF_{i,t} \quad (3.14)$$

where $CF_{i,t}$ serves as the exogenous variable, that should be predicted. Equation (3.14) infers that at the opening period (t) when financing and investment decisions are executed, the decision variables are assigned with budgeted (or planned) values in such a way that forecasted sources/uses constraint at the closing period is fulfilled. This suggests that either through business operations or financing options, a firm cannot plan to allot funds in excess or deficit of the balance it anticipates to produce during the current period.

Ex-ante values are planned quantities for all decision variables, established on the basis of given (or known) values at the opening period. Ex-post values drop randomly from their ex-ante correspondents, though the firm keeps precise control over ex-ante budgeted levels, mentioned as under:

$$\begin{bmatrix} C\tilde{A}PX_{i,t} \\ AC\tilde{Q}UIS_{i,t} \\ \vdots \\ \Delta\tilde{S}TD_{i,t} \\ \Delta C\tilde{A}SH_{i,t} \end{bmatrix} = \begin{bmatrix} CAPX_{i,t-1} \\ ACQUIS_{i,t-1} \\ \vdots \\ \Delta STD_{i,t-1} \\ \Delta CASH_{i,t-1} \end{bmatrix} + \begin{bmatrix} e_{CAPX,i,t} \\ e_{ACQUIS,i,t} \\ \vdots \\ e_{\Delta STD,i,t} \\ e_{\Delta CASH,i,t} \end{bmatrix} \quad (3.15)$$

The error terms related to nine variables under investment and financing decision are presented by $e_{CAPX,i,t} \dots e_{CASH,i,t}$ in equation (3.15), which reflect deflections of actual values from budgeted values. Likewise, $CF_{i,t}$ being ex-post exogenous source variable is equal to the expected $CF_{i,t}$ variable established at the opening period plus an expected error term ($e_{CF,i,t}$):

$$\tilde{C}F_{i,t} = CF_{i,t} + e_{CF,i,t} \quad (3.16)$$

In all, equations (3.12), (3.14), (3.15), and (3.16) indicate that the error terms are connected in the following form:

$$e_{\Delta CASH,i,t} + e_{RP,i,t} + e_{DIV,i,t} + e_{ACQUIS,i,t} - e_{\Delta LTD,i,t} - e_{\Delta STD,i,t} - e_{ECQUISS,i,t} - e_{ASALES,i,t} = e_{CF,i,t} \quad (3.17)$$

It is presumed that firms strive to accomplish the desired degree of the variables contingent on investment opportunities on hand while undertaking financing and investment decisions. The investment opportunities are measured through a ratio of market value of equity to book value of equity ($MB_{i,t}$). Additionally, in order to control for the likelihood that investment opportunities and access to funds from external capital market rely on firm size, the study incorporates firm size as an explanatory variable. Firm size ($SIZE_{i,t}$) is captured by taking the natural

logarithm of the assets' book value. The desired levels are accounted through:

$$\begin{bmatrix} -CAPX_{i,t}^* \\ -ACQUIS_{i,t}^* \\ \vdots \\ -\Delta STD_{i,t}^* \\ -\Delta CASH_{i,t}^* \end{bmatrix} = L \begin{bmatrix} CF_{i,t} \end{bmatrix} + M \begin{bmatrix} MB_{i,t} \\ SIZE_{i,t} \end{bmatrix} \quad (3.18)$$

The study presupposes that firms strive to keep the penalty function at a minimum level, which in fact is dependent on deflections of budgeted variables from their desired levels and on how quickly they make the adjustment from past levels. If these two penalties hold additive and quadratic characteristics in the penalty function, then linear equations would be produced for minimizing the penalty function in reference to budgeted levels of the variables conditional to the constraint that sources of funds must be equal to the uses of funds. The linear function equations that this study estimates are discussed in the empirical section. Furthermore, the study interprets the estimated equations as a reduced form, if the true penalty function takes a more complex form.

Subject to the constraint particularized in equation (3.14), the following system of nine equations for budgeted variables is derived, by executing financing and investment decisions for minimizing penalty of deflecting from desired levels:

$$\begin{bmatrix} -CAPX_{i,t} \\ -ACQUIS_{i,t} \\ \vdots \\ -\Delta STD_{i,t} \\ -\Delta CASH_{i,t} \end{bmatrix} = L \begin{bmatrix} CF_{i,t} \end{bmatrix} + K \begin{bmatrix} -CAPX_{i,t-1} \\ -ACQUIS_{i,t-1} \\ \vdots \\ -\Delta STD_{i,t-1} \\ -\Delta CASH_{i,t-1} \end{bmatrix} + M \begin{bmatrix} MB_{i,t} \\ SIZE_{i,t} \end{bmatrix} \quad (3.19)$$

where L, K, and M represent matrices of response estimates of size $\times 1$, 9×9 , and 9×2 respectively. Replacing equation (3.15) with equation (3.19) offers the system of equations to be regressed:

$$\begin{bmatrix} -C\tilde{A}PX_{i,t} \\ -AC\tilde{Q}UIS_{i,t} \\ AS\tilde{A}LE_{i,t} \\ EQ\tilde{U}ISS_{i,t} \\ -\tilde{R}P_{i,t} \\ -D\tilde{I}V_{i,t} \\ \Delta S\tilde{T}D_{i,t} \\ \Delta C\tilde{A}SH_{i,t} \\ -\Delta C\tilde{A}SH_{i,t} \end{bmatrix} = L \begin{bmatrix} CF_{i,t} \end{bmatrix} + K \begin{bmatrix} -CAPX_{i,t-1} \\ -ACQUIS_{i,t-1} \\ ASALE_{i,t-1} \\ EQUISS_{i,t-1} \\ -RP_{i,t-1} \\ -DIV_{i,t-1} \\ \Delta LTD_{i,t-1} \\ \Delta STD_{i,t-1} \\ -\Delta CASH_{i,t-1} \end{bmatrix} + M \begin{bmatrix} MB_{i,t} \\ SIZE_{i,t} \end{bmatrix} + \begin{bmatrix} -eCAPX_{i,t} \\ -eACQUIS_{i,t} \\ eASALE_{i,t} \\ eEQUISS_{i,t} \\ -eRF_{i,t} \\ -eDIV_{i,t} \\ e\Delta LTD_{i,t} \\ e\Delta STD_{i,t} \\ -e\Delta CASH_{i,t} \end{bmatrix} \quad (3.20)$$

As presented in the Appendix, the accounting identity constraint needs that the coefficient matrices fulfill:

$$i'L = -1, i'K = \begin{matrix} \emptyset \\ 1 \times 9 \end{matrix}, i'M = \begin{matrix} \emptyset \\ 1 \times 2 \end{matrix} \quad (3.21)$$

where i' represents a unit vector with proper matrix order and \emptyset shows zeros' vector with the mentioned proportions. Equation (3.21) can be interpreted as the net response of financing and investment variables moves in opposite direction to the shock sums up to one rupee (a currency unit), when there is a one rupee shock whether in a source or in a use variable. For instance, if $CF_{i,t}$ being source variable rises by one rupee, it must bring an equal decline of one rupee in other source variables, there must also be a one rupee rise in use variables or any mixture of both source and use variables giving the sum to one rupee. In addition, the net response of the system of equations must be zero, in a case where, instead of cash flow, the shock is generated by neither a source nor a use variable. The variables causing such shock are the lagged dependent variables or the exogenous variables, i.e. $MB_{i,t}$ and $SIZE_{i,t}$ in the system of equations. As an illustration, consider a scenario, in which the estimated parameter of $SIZE_{i,t}$ variable is 0.30 concerning capital expenditures equation. It implies that if there is an increase by one rupee in book value of assets, the capital expenditures will rise 30 cents. Because

capital expenditure belongs to use a variable, and since accounting identity constraint must be satisfied, either total source variables must also rise with 30 cents, other use variables should decline with 30 cents, or any mixture of both responses must become 30 cents in its aggregate. Consequently, the estimated parameters of $SIZE_{i,t}$ over the system of nine equations will aggregate to zero. Identical constraints hold in case of lagged dependent variables and investment opportunities ($MB_{i,t}$).

3.2.2.2 Variables Measurement

As the study implements some models that take into account the lagged variables and first differences instead of levels, the system-of-equations (nine equations) itemized in equation (3.20) is regressed over study analysis period. Variables' description, acronym, and the type are reported in table 3.4⁴. For forecasting exogenous variables, following the conventional literature practice, the perfect forecast model is used. The model considers realizations of cash flows at the end-of-period (ex-post) as an internally produced cash flow forecasts.

⁴Missing data is considered as zero to avert dropping observations. The study has regressed the model afresh while dropping the observations upon missing data. Findings, however, are not distinctive significantly for how missing data are.

TABLE 3.4: Sources and Uses of Investment and Financing Variables

The table determines the variables used to predict the system described by equation (3.20).

Sources of Funds					
Variable	Cash Flow	Long-term Debt	Short-term Debt	Equity Issues	Asset Sales
Acronym	CF	LTD	STD	EQI	ASALE
Description	Internally on-hand cash flow for financing and investment	Variation in long-term debt	Variation in short-term debt	Rupee value of equity issues	Rupee value of assets sold
Type	Financing/exogenous	Financing/endogenous	Financing/endogenous	Financing/endogenous	Investment/endogenous
Uses of Funds					
Variable	Share Repurchases	Dividends Payout	Capital Expenditures	Acquisitions	Cash
Acronym	SHR	DP	CAPX	ACQ	CASH
Description	Rupee value of shares repurchased	Rupee value of dividends paid	Rupee value of capital expenditures	Rupee value of acquisitions	Variation in cash
Type	Financing/endogenous	Financing/endogenous	Investment/endogenous	Investment/endogenous	Financing/endogenous
Other Variables					
Variable	Market-to-Book Ratio	Ra- Firm Size			
Acronym	MTB	LnA			
Description	Ratio of market value of equity to book value of equity	Natural logarithm of total assets in book			
Type	Exogenous	Exogenous			

3.2.2.3 Robustness Check of Cash Flow Sensitivities

i. Investments, Cash Flows, and Cash Holdings

A substantially practiced empirical model, established by Fazzari et al. (1988), is a reduced form regression for the purpose of examining the cash flows response on investment. The model controls for a firm's number of investment opportunities. The model specifically involves cash flows, capital expenditures, cash holdings, lagged capital expenditures, firm size, leverage, and investment opportunities (proxied for by Tobin's Q), in order to test the impact of cash holdings, persistence in investment, leverage on firm's investments. The augmented regression model is expressed below.

$$I_{i,t}/K_{i,t-1} = \alpha + \beta_1 CF_{i,t}/K_{i,t-1} + \beta_2 CH_{i,t}/K_{i,t-1} + \beta_3 Q_{i,t-1} + \beta_4 Size_{i,t-1} + \beta_5 Leverage_{i,t-1} + \beta_6 I_{i,t-1}/K_{i,t-2} + \sum Firm_i + \sum Year_t + \varepsilon_{i,t} \quad (3.22)$$

where $I_{i,t}/K_{i,t-1}$ represents a capital expenditure of the firm in period t (year) deflated by the capital stock at the opening period. $CF_{i,t}/K_{i,t-1}$ represents cash flows of the firm in period t scaled by capital stock at the opening period. In this proxy earnings prior to extraordinary items plus depreciation determine the cash flows. $CH_{i,t-1}/K_{i,t-1}$ represents cash holdings of the firm and short-run investments as the sum of cash and short-run investments deflated (or scaled) by the capital stock at the opening period. $Q_{i,t-1}$ represents Tobin's Q at the opening period and is determined as the ratio of asset's market value to asset's book value. $Size_{i,t-1}$ represents natural logarithm of the total assets at the opening period. $Leverage_{i,t-1}$ represents leverage of the firm at the opening period and is determined as long-run debt and current liabilities divided by net assets. $I_{i,t-1}/K_{i,t-2}$ represents capital expenditures in period t-1 scaled by capital stock at opening period t-1.

The study further incorporates lagged investment ($I_{i,t-1}/K_{i,t-2}$) as an independent variable for controlling effects of investment persistence. Other variables deployed in the corresponding models involve firm size, Tobin's Q, and leverage. Firm and year obtain firm and year effects, respectively.

ii. Investments, Cash Flows, Cash Holdings and Financial Constraints

The baseline model in study findings declares that investment-cash flow sensitivity remains insignificant. However, in the presence of financing frictions, this finding could be driven by two possibilities. First, a considerable number of firms in the sample are unconstrained. Second, financing friction could be relieved during the pre-violation periods. In order to address the first alternate explanation, the study forms a partition in the sample, based on common practice in extant literature, whereby sample splits into constrained, partially constrained and unconstrained firms. The sensitivity of investment decisions is estimated using augmented regression model, based on cash flows, investment opportunities, firm size, leverage, prior cash holdings and previous investments. To answer the second alternate explanation, the study estimates baseline model with post-violation sample, the results of which are discussed in the later sections.

iii. Cash Holdings, Debt Issuance, and Payouts

In continuation of the findings stemming out from the previous model, a linked question arises. If the firms prioritize cash holdings to cash flows as an internal source of financing while dealing with investment friction and adjustment costs, then how cash flows are assigned to sustain an ideal level of cash holdings is the subsequent research question to be answered. As recommended by the extant literature, decisions of sample firms concerning cash holdings and related cash outlay are examined by the study. For instance, [Almeida et al. \(2004\)](#) and [Han and Qiu \(2007\)](#) establish a model wherein they inspect how cash flows are associated with cash holdings for financially constrained firms. They infer that corporate need for precautionary cash holdings is positively connected to cash holdings for the said firms and that they keep on increasing level of cash holdings for the extent of cash flows becoming riskier with the time. Further, [Acharya et al. \(2007\)](#) suggest that debt levels should be added while analyzing the uncomplicated, proposing that cash may be readily used to pay back debts. [Gatchev et al. \(2010\)](#) and [Dasgupta et al. \(2011\)](#) recommend that payout policy should be incorporated, in the form of dividends and stock repurchases, while examining the cash flows as these payouts

are another source of cash outflows.

In wake of such empirical evidence, the study established and estimated a system of four simultaneous equations, following the specifications applied by Acharya et al. (2007). A system approach is thus determined to analyze cash flow decisions in relation to cash holdings coupled with cash outlays such as dividends, share repurchases, and debt. The system of simultaneous equations is mentioned below.

$$\begin{aligned} \Delta CH_{i,t} = & \alpha_0 + \alpha_1 CF_{i,t} + \alpha_2 Q_{i,t} + \alpha_3 Size_{i,t} + \alpha_4 CH_{i,t-1} + \alpha_5 Dividends_{i,t} \\ & + \alpha_6 \Delta Repurchase_{i,t} + \alpha_7 \Delta Debt_{i,t} + \sum Firm_i + \sum Year_t + \varepsilon_{i,t}^c \quad (3.23) \end{aligned}$$

$$\begin{aligned} \Delta Debt_{i,t} = & \beta_0 + \beta_1 CF_{i,t} + \beta_2 Q_{i,t} + \beta_3 Size_{i,t} + \beta_4 Leverage_{i,t-1} + \beta_5 CH_{i,t} \\ & + \beta_6 Dividends_{i,t} + \beta_7 \Delta Repurchase_{i,t} + \sum Firm_i + \sum Year_t + \varepsilon_{i,t}^d \quad (3.24) \end{aligned}$$

$$\begin{aligned} \Delta Dividends_{i,t} = & \gamma_0 + \gamma_1 CF_{i,t} + \gamma_2 Q_{i,t} + \gamma_3 Size_{i,t} + \gamma_4 Dividends_{i,t-1} + \gamma_5 CH_{i,t} \\ & + \gamma_6 Debt_{i,t} + \gamma_7 \Delta Repurchase_{i,t} + \sum Firm_i + \sum Year_t + \varepsilon_{i,t}^v \quad (3.25) \end{aligned}$$

$$\begin{aligned} \Delta Repurchase_{i,t} = & \delta_0 + \delta_1 CF_{i,t} + \delta_2 Q_{i,t} + \delta_3 Size_{i,t} + \delta_4 Repurchase_{i,t-1} + \delta_5 CH_{i,t} \\ & + \delta_6 Debt_{i,t} + \delta_7 \Delta Dividends_{i,t} + \sum Firm_i + \sum Year_t + \varepsilon_{i,t}^r \quad (3.26) \end{aligned}$$

where the dependent variables denoted by $\Delta CH_{i,t}$, $\Delta Debt_{i,t}$, $\Delta Dividend_{i,t}$, and $\Delta Repurchase_{i,t}$ represent a change in cash holdings, net issuance of long-run debt⁵, dividends and stock repurchases measured from capital stock respectively. Further, $CH_{i,t-1}$ symbolizes cash holding at the opening time period (year), $Leverage_{i,t-1}$

⁵Difference between long-run debt issuance and long-run debt reduction

determines leverage at the opening period, $Dividends_{i,t-1}$ shows dividend paid to common shareholders at the beginning, whereas $Repurchase_{i,t-1}$ reflects net stock repurchase at opening period captured through capital stock.

Prior studies provide evidence in support of an argument that motive to save cash as a precautionary instrument differs across cross-sections depending on the financial constraint status of the firm. [Almeida et al. \(2004\)](#), for instance, conclude that unlike the unconstrained firms, financially constrained units perform systematic approach in order to save cash from cash flows. In the same manner, payout policy is strongly connected to the status of firms being financially constrained. While buying shares, as noted by [Dittmar \(2000\)](#) and [Stephens and Weisbach \(1998\)](#), firms spend cash flows and generate more debt. Repurchase of shares by the constrained firm can lower the equity value due to a decrease in corporate liquidity and rise of firm's risk of getting into financial distress ([Chen and Wang, 2012](#)). In order to adjust the cross-sectional variations in cash flow decisions, jointly determined by the firms' constraint status with matching specifications as those applied in chapter 4, equations (3.23) through (3.26) are estimated and the results produced are reported in the forthcoming chapter (see tables [4.17](#) and [4.20](#)).

3.2.2.4 Variables Measurement

The key variables of interest in this study comprise cash flows, cash holdings, and the investments. In pursuance to the empirical extant literature, cash flows ($CF_{i,t}/K_{i,t-1}$) are determined as earnings prior to extraordinary items plus depreciation scaled by capital stock at the opening period (total value of property, plant and equipment). Cash holdings ($CH_{i,t}/K_{i,t-1}$) are described as sum of cash and short-run investments deflated by the capital stock at the opening period. Investments ($I_{i,t}/K_{i,t-1}$), in addition, are established as capital expenditures scaled by capital stock at the opening period. The study further incorporates lagged investment ($I_{i,t-1}/K_{i,t-2}$) as an independent variable for controlling effects of investment persistence. Other variables deployed in the corresponding models involve firm size, Tobin's Q, and leverage.

TABLE 3.5: Variables' Definition

Variable	Definition
Cash (CH)	Cash plus short-run investments.
Tobin's Q (Q)	Ratio of asset's market value to asset's book value, or [total assets + equity's market value - equity's book value - deferred taxes] / net assets.
Leverage	The aggregate of long-run and short-run debt deflated by net assets.
Size	Natural logarithm of net assets.
Cash Flow (CF)	Earnings before extraordinary items plus depreciation.
Investment (I)	Firm's capital expenditures.
Net debt change (Δ Debt)	Long-run debt issued, net of long-run debt reduction.
Dividend	Dividend paid to common stocks.
Capital stock (K)	Total value of property, plant and equipment.
Repurchase	Stock repurchase, net of issuance of common and preferred shares.

3.3 Objective 3

This section details the sample selection process and data sources for the dependent and the independent variables. It further elaborates the research methods used to analyze the data in accordance with the study interests.

3.3.1 Sample Construction

The study follows the framework based on 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 one, 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.

In order to compute liquidity measures, transaction data pertaining sample shares, the quote data, bid price, ask price, bid-depth, ask-depth, timestamp, and ticker

symbols are acquired from trades and quotes database (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 after market closing, and if they are non-sequential or hold an error they are eliminated.

Apart from these filters, the stocks are necessitated to carry minimum two trades per day and hold 100 trading days when considering benchmark period (mentioned in study's methodology). 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.

3.3.2 Estimation Technique

3.3.2.1 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.

$$\text{Quoted spread} = \text{ask price} - \text{bid price} \quad (3.27)$$

$$\text{Effective spread} = (\text{transaction price} - \text{quote midpoint}) \times 2 \quad (3.28)$$

$$\text{Percentage(relative/proportional)quoted spread} = \text{quoted spread}/\text{quote midpoint} \quad (3.29)$$

$$\text{Percentage(relative/proportional)effective spread} = \text{effective spread}/\text{quote midpoint} \quad (3.30)$$

$$\text{Depth} = \text{depth at ask} + \text{depth at bid} \quad (3.31)$$

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 (Amihud and Mendelson, 1986; Brennan and Subrahmanyam, 1998). The actual cost of trading, on the contrary, is computed through effective spread. It generally exhibits the high frequency of trades taking place inside the quoted spread (Chordia et al., 2000b). The higher the value of spreads is, the less liquid the stock is. However, for depth, a high depth value represents improved liquidity. 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 into 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 can not 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 spread is supplemented by a decrease in the 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. This direction is determined only either employing spreads or the depth. The proxy of this measure is determined below.

Depth/Spread ratio = depth/quoted spread

The study splits the whole analysis period into the three sub-periods, in order to frame the event study. The three sub-periods comprise the pre-event (or pre-violation) period, the event period and the post-event (or post-violation) period. In particular, the event period is comprised of five days ranging from the day -2 to day +2 i.e. two days prior to and after the violation announcement respectively.

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 calculated by averaging the cross-sectional daily means. 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, a t-test for a grand mean (i.e. hypothesized mean) is performed for each day and for each liquidity measure. The study, further, applies a system of equations to regress the impact of deteriorated liquidity measures on cumulative abnormal return.

3.3.2.2 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 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.

$$\Delta S_{i,t} = \alpha_0 Violation_{i,t} + \alpha_1 \Delta \log P_{i,t} + \alpha_2 VAR_{i,t} + \alpha_3 \Delta \log V_{i,t} + \alpha_4 \Delta \log MV_{i,t} \quad (3.32)$$

$$Car_{i,t} = \beta_0 + \beta_1 \Delta S_{i,t} \quad (3.33)$$

A notable trading-cost estimation model formulated by [Stoll \(2000\)](#), that analyzes the association between spread and a firm's trading attributes, is used by the 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

impact of other variables being controlled. The “i” in subscript symbolizes a sample firm. The change in the proportional quoted spread is represented by $\Delta S_{i,t}$ 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 $\Delta Car_{i,t}$ 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 in line window. Change in market capitalization is applied to compute market value. The change is calculated by taking the difference of 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 (3.33), Capital Asset Pricing Model (CAPM) is applied on a 248-day window (-250 to -3) to measure the predicted returns for individual sample stock.

$$R_{i,t} = \alpha_{i,t} + \beta_i R_{m,t} \quad (3.34)$$

In equation (3.34), $R_{i,t}$ and $R_{m,t}$ represent the sample stock return and market return on day t respectively. The study follows 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 ($Car_{i,t}$) is measured by taking the difference of predicted returns and the daily raw returns (deducting the predicted returns from the raw returns) and summing their difference (daily). Eventually, the $\Delta S_{i,t}$ with the actual values of explanatory variables is regressed first using a two-stage least square (2SLS) model. Thereafter, the resultant estimated value becomes part of equation (3.33). The implementation of the expected change in quoted spread (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.

3.4 Objective 4

This section details the sample selection process and data sources for the dependent and the independent variables. It further elaborates the empirical techniques followed to analyze the data in accordance with the study interests.

3.4.1 Sample Construction

The study follows the framework based on Beneish M score model, as a source of sampling criteria for fraud firms' selection, to study the association between the revelation of violations and subsequent governance changes. Previous literature (for instance, (Dechow et al., 2011, 1996) and this study displays clustering by industry among fraudulent firms. Thus, testing changes in governance mechanism around the fraud transformations in the industry compared to fraud revelation. The study, in order to control for this likelihood, applies a matched-pair framework to examine variations in corporate governance structure after detection of fraud. The study, following the mentioned previous literature, in particular Beasley (1996), chooses a control firm for each fraud firm carrying same industry, with net sales (log), total assets (log) and age (log) of the firm within 30 percent of the net sales of fraud firm for one year prior to fraud revelation. The likely control firm is added in the final sample of matched firms if there is found no violation to their part from regulatory body's (SECP) database in the two years prior and three years post to the revelation year corresponding with fraud firm. The sample populated 77 listed firms on the basis of Beneish M score model and Beasley (1996), the details of which are stated in sample construction of study's first objective.

Initially, the governance structure of sample firms one year before violations' revelation is examined and compared with the subsequent changes in quality of governance mechanism. In addition, as a second sub-objective, the study tests whether developments in governance structure help fraud firms in recovering reputations

with informed members of capital market and restoring stock values. The study involves, thus, three subsequent years to examine these objectives.

3.4.2 Estimation Technique

3.4.2.1 Univariate Analysis

The analysis presents differences between fraud firms and control firms applying tests of significance. The study examines whether the firms considered as fraud sample possess governance structure identical to those undertaken in previous studies. It further analyzes the forecasts made concerning governance variables.

Responses to Governance Changes and Stock Returns

It is obscure how to explain the economic significance of findings obtained from the univariate analysis. The study aims to distinguish these results and analyze whether there is an association between improvements in governance characteristics and the reactions of the stock market. Negative abnormal returns are reported in the previous research using a three-day window around the declaration date of fraud [see for instance, (Dechow et al., 1996; Feroz et al., 1991)]. It is expected that if improvements in governance characteristics are regarded as integrity signals, then the cost of equity capital should decline to result a positive effect on firm value. However, there are several hurdles (for instance, missing forecasts) in estimating the variations directly in the cost of equity capital related to improvements in governance characteristics. The study, therefore, follows an indirect technique analogous to that applied in Dechow et al. (1996) and proxy for it employing a buy and hold abnormal returns (BHAR). In other words, a decrease in cost of equity capital would remain parallel to an increase in returns since returns have a direct impact on the cost of equity capital.

To examine whether the governance improvements are connected with future returns, the study makes a comparison in variations (in magnitude) of these variables with the succeeding variations in buy and hold abnormal returns while applying

corresponding stock exchange index (PSX) for the three years after the fraud detection. It is noted, from the study results reported in a later section, that the number of outside directors have a likelihood of possessing higher correlation with the percentage of outside directors. Apart from that, the number of outside directors contain a minimal and lesser influence on the future returns when compared with the percentage of outside directors. The study, thus, retains only the the percentage of outside directors from these two in the model below. Further, the regression model stated as under examines whether the the relation of rehabilitation in quality of board of directors along with the audit committee activity are associated with the ex-post abnormal returns.

$$BHAR_{i,t} = \alpha + \beta_1 \Delta OutsideDir\%_{i,t} + \beta_2 \Delta \#AudComMeet_{i,t} + \beta_3 \Delta ROA_{i,t} + \beta_4 BMV_{i,t} + \beta_5 MVE_{i,t} + e_{i,t} \quad (3.35)$$

where:

BHAR = buy-and-hold abnormal return for firm i at time t;

$\Delta OutsideDir\%$ = lagged change in outside director percentage from year prior to fraud detection to the subsequent third year for firm i at time t;

$\Delta \#AudComMeet$ = lagged change in the number of audit committee meetings from year prior to fraud detection to the subsequent third year for firm i at time t;

ΔROA = variation in net income scaled by total assets over the three years post-fraud;

BMV = book value per share divided by the market value per share for firm i at time t. These values are computed as of the end of the year previous to the analysis year;

MVE = log of the market value of equity for firm i at time t. Market value is calculated as of the end of the year prior to the analysis year; and

e = the residual for firm i at time t.

The study measures long-term buy and hold abnormal return (BHAR) for fraud

firms “i” and control firms “m” as below.

$$R_{i,t} = \prod_{t=2}^4 (1 + r_{i,t}) - 1 \quad (3.36)$$

$$R_{m,t} = \prod_{t=2}^4 (1 + r_{m,t}) - 1 \quad (3.37)$$

where $r_{i,t}$ and $r_{m,t}$ represent returns on annual basis for the fraud sample i and matched control sample m respectively on date t. The BHAR concerning all fraud firms is calculated using the difference between buy and hold abnormal returns of the fraud firm and its corresponding control firm.

$$BHAR_{i,t} = R_{i,t} - R_{m,t} \quad (3.38)$$

The above-mentioned BHARs are measured with reference to Pakistan stock exchange (PSX). In addition to that, only those firms are incorporated for whom the data were available for the three years post fraud in the computation of BHAR.

Chapter 4

Results and Discussion

This chapter is split into four sections. Each section covers the study objective in succession and details the results and discussion subject to corresponding descriptive and inferential empirical analysis.

4.1 Objective 1

This section details the results and discussion of testing study hypotheses when analyzing the environmental factors involved in fraud commitment.

4.1.1 Estimation Model

Multivariate probit regression analysis is used to test hypothesized relationships. In parallel with prevailing literature (Beasley, 1996; Uzun et al., 2004), three models are executed to explain in spite of predicting the relationships. To overcome functional constraints in probit regression analysis, multiple models are employed in accordance with the variables classified. Model 1 & 2 are the primitive models that incorporate antecedent factors (internal and external) and monitoring variables respectively. The third model is formulated after obtaining the outcomes of primitive models. The model performs as an integrated model considering only

significant variables resulting from the primitive models. The models applied in three distinct compositions, based on possible computation, are stated mathematically as under.

$$\begin{aligned} \text{Fraud}_{i,t} = & \beta_0 + \beta_1 FP_{i,t-1} + \beta_2 TI_{i,t-1} + \beta_3 OSL_{i,t-1} + \beta_4 OS_{i,t-1} + \beta_5 CETR_{i,t-1} \\ & + \beta_6 CEOC_{i,t-1} + \beta_7 DACC_{i,t-1} + \beta_8 PRV_{i,t-1} + \beta_9 DE_{i,t-1} + \beta_{10} HOE_{i,t-1} \\ & + \beta_{11} HEE_{i,t-1} + \beta_{12} IMD_{i,t-1} + \beta_{13} PCD_{i,t-1} + \varepsilon_{i,t-1} \end{aligned} \quad (4.1)$$

$$\begin{aligned} \text{Fraud}_{i,t} = & \beta_0 + \beta_1 INS_{i,t-1} + \beta_2 DED_{i,t-1} + \beta_3 TRA_{i,t-1} + \beta_4 AUDD_{i,t-1} \\ & + \beta_5 NYEAR_{i,t-1} + \beta_6 AAUD_{i,t-1} + \beta_7 FEXP_{i,t-1} + \beta_8 FOWN_{i,t-1} \\ & + \beta_9 OUTDIR_{i,t-1} + \beta_{10} BS_{i,t-1} + \beta_{11} FEOB_{i,t-1} + \beta_{12} FOOB_{i,t-1} \\ & + \beta_{13} CEOD_{i,t-1} + \beta_{14} CEOT_{i,t-1} + \beta_{15} INSTK_{i,t-1} \\ & + \beta_{16} ACH_{i,t-1} + \varepsilon_{i,t-1} \end{aligned} \quad (4.2)$$

$$\begin{aligned} \text{Fraud}_{i,t} = & \beta_0 + \beta_1 FP_{i,t-1} + \beta_2 OSL_{i,t-1} + \beta_3 OS_{i,t-1} + \beta_4 CETR_{i,t-1} + \beta_5 CEOC_{i,t-1} \\ & + \beta_6 DACC_{i,t-1} + \beta_7 PRV_{i,t-1} + \beta_8 DE_{i,t-1} + \beta_9 IMD_{i,t-1} + \beta_{10} PCD_{i,t-1} + \\ & \beta_{11} OUTDIR_{i,t-1} + \beta_{12} BS_{i,t-1} + \beta_{13} TRA_{i,t-1} + \beta_{14} CEOT_{i,t-1} + \beta_{15} INSTK_{i,t-1} \\ & + \beta_{16} ACH_{i,t-1} + \varepsilon_{i,t-1} \end{aligned} \quad (4.3)$$

where fraud is a dummy variable in the above equations (4.1, 4.2, and 4.3), taking the value of 1 in case of fraud firms and 0 for no-fraud firms. The acronyms reflecting internal antecedent factors, external antecedent factors and monitoring variables are stated in previous chapter (see table 3.3).

4.1.2 Descriptive Statistics and Univariate Analysis

Table 4.1 presents the descriptive statistics along with a univariate analysis of a set of environmental factors categorized into internal antecedent factors, external

antecedent factors, and monitoring variables. On average, financial performance for fraud firms is higher than no-fraud firms. The means of threat of insolvency, organizational slack, chief executive officer compensation, discretionary accruals reflecting earning management, prior violations, political connections, female on board, founder on board and chief executive officer duality in case of fraud firms are found also higher than those in no-fraud firms. For the rest of all environmental factors, no-fraud firms possess larger average.

The univariate comparison shows that among the variables proxied under internal antecedent factors, the means of firm performance, organization size, tax aggressiveness, chief executive officer compensation and a prior violation for fraudulent firms and non-fraudulent firms differ statistically. Nevertheless, means of threat of insolvency, organizational slack and earning management are insignificantly different in two groups. Comparing the same in external antecedent factors illustrates that means of a hostile environment and political connections only are significantly different for fraud firms relative to a matched sample of no-fraud firms. Monitoring variables, while undergoing from the univariate comparison, demonstrates that means of family ownership and inside stock ownership exclusively are not significantly different in both groups of firms.

TABLE 4.1: Descriptive Statistics and Univariate Analysis

This table reports variables' description using means of fraud and no-fraud firms, and univariate analysis capturing the significant differences between both.

Variable	Fraud Mean	No-Fraud Mean	Difference	t-value	p-value
Internal Antecedent Factors					
FP	2.7139	11.8987	-9.1848	-8.885	0
TI	15.4127	13.7741	1.6386	0.98	0.328
OSL	-0.2128	-0.2274	0.0146	0.477	0.634
OS	0.2667	0.4211	-0.1544	-8.15	0
CETR	0.2172	0.4114	-0.1942	-8.349	0
CEOC	2.8415	0.7619	2.0796	5.788	0
DACC	0.0267	0.0127	0.014	1.372	0.171
PRV	0.1299	0	0.1299	5.859	0
External Antecedent Factors					
DE	0.039	0.2152	-0.1762	-0.173	0.863
HOE	0.0546	0.0733	-0.0186	-14.078	0
HEE	0.0331	0.0438	-0.0107	-1.254	0.211
IMD	0.8571	0.987	-0.1299	-0.769	0.442
PCD	0.2727	0.026	0.2468	-5.355	0
Monitoring Variables					
INS	0.0807	0.4528	-0.3721	7.913	0
DED	0.0291	0.3125	-0.2834	-36.499	0
TRA	0.0486	0.0913	-0.0427	-29.042	0
NYEAR	2.3519	4.1866	-1.8346	-12.548	0
AAUD	0.8918	1	-0.1082	-7.839	0
AUDD	0.5714	0.987	-0.4156	-5.283	0
FEXP	1	1	0	-12.415	0
FOWN	17.7718	19.2178	-1.4461	-1.114	0.266
OUTDIR	45.8196	71.5366	-25.717	-45.061	0
BS	7.4069	10.3766	-2.9697	-27.946	0
FEOB	0.3333	0.1212	0.2121	5.611	0
FOOB	0.6926	0	0.6926	22.766	0
CEOD	0.6407	0.1082	0.5325	14.128	0
CEOT	2.3671	4.1052	-1.7381	-19.937	0
INSTK	17.7718	19.2178	-1.4461	-1.114	0.266
ACH	0.53	0.03	0.481	13.79	0
Observations	231	231			

4.1.3 Probit Regression Estimates

Results obtained from probit regression analysis of primitive model-1 are reported in table 4.2. Estimates depict the likelihood of fraud detection becomes evident when observed the environmental factors namely, firm performance, organizational slack, organizational size, cash effective tax ratio reflecting tax aggressiveness, chief executive officer compensation, discretionary accruals reflecting earning management, prior violations, dynamic environment, industry membership and political connections.

TABLE 4.2: **Probit Regression Model 1**

This table reports the probit regression results when estimating equation (4.1). Marginal effects of the related variables are also accompanied by the findings.

		Probit		Marginal effect	
	Expected sign	Parameter estimate	t statistics	Parameter estimate	t statistics
_cons		2.707	(5.65)***		
FP	-	-0.052	(4.62)***	-0.00946	(-5.01)***
TI	+	0.003	-0.51	0.00045	-0.63
OSL	-	-0.832	(2.79)**	0.15067	(-2.87)**
OS	+	-2.659	(5.47)***	-0.48136	(-6.06)***
CETR	+	-0.93	(4.08)***	-0.16835	(-4.18)***
CEOC	+	0.225	(3.07)**	0.04066	(3.19)**
DACC	+	0.557	(1.99)**	0.10079	(2.06)**
PRV	+	0.811	(2.73)**	0.00753	(2.81)**
DE	+	-4.964	(7.85)***	-0.89856	(-10.48)***
HOE	+	-0.452	-0.85	-0.0819	(-0.85)
HEE	+	-0.16	-(0.28)	-0.02905	(-0.28)
IMD	+	-0.846	(-2.04)**	-0.15326	(-2.07)**
PCD	+	1.431	(4.09)***	0.25912	(4.39)***
Model χ^2		321.14			
p-value		0			
Pseudo		0.5381			
R^2					
N		462			

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

Table 4.3 demonstrates the results obtained from primitive model-2. The findings reveal that monitoring variables namely transient institutional investors, outsiders

on board of directors, board size, chief executive officer tenure, inside stock ownership and auditor change formulate a favorable environment for fraud commitment when processed alone.

TABLE 4.3: **Probit Regression Model 2**

This table reports the results of probit regression when estimating equation (4.2). Marginal effects of the related variables are also accompanied by the findings.

	Expected sign	Probit		Marginal effect	
		Parameter estimate	t statistics	Parameter estimate	t statistics
_cons		20.346	(2.88)**		
INS	-	-5.812	-(1.76)*	-0.00869	(-1.81)*
DED	-	-3.927	-(0.83)	-0.0068	(-0.94)
TRA	+	-23.548	(2.82)**	-0.04333	(-2.96)**
NYEAR	-	-0.773	-(1.77)*	-0.00328	(-1.85)*
AAUD	-	0.003	-(0.51)	0.00046	-(0.66)
AUDD	-	-2.693	-(0.94)	-0.00949	(-1.07)
FEXP	-	-0.816	-(0.89)	0.00021	-(0.92)
FOWN	+	-0.031	-(1.11)	-0.00003	(-1.32)
OUTDIR	-	-0.225	(2.84)**	-0.00086	(-3.64)***
BS	-	-2.577	(2.54)**	-0.00359	(-3.53)***
FEOB	-	-2.15	-(1.37)	0.00469	(-1.37)
FOOB	+	0.013	-(0.61)	0.00032	-(0.6)1
CEOD	+	0.861	-(0.96)	-0.0173	(-1.13)
CEOT	+	-1.811	(2.73)**	-0.00754	(-3.32)***
INSTK	-	0.084	(2.09)**	0.03802	(2.47)**
ACH	+	4.167	(2.74)**	0.00528	(3.04)**
Model χ^2		310.05			
p-value		0			
Pseudo		0.9413			
R ²					
N		462			

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

Results obtained from integrated model-3 are demonstrated in table 4.4. The model incorporates all significant outcome variables retrieved from primitive models 1 and 2. Firm performance influences negatively, reflecting fraudulent firms exhibit low financial performance before fraud revelation. Their probability to commit fraud is inversely related to financial performance, consistent with [Dunn \(2004\)](#), [O'Connor et al. \(2006\)](#), and [Skousen et al. \(2009\)](#). Organizational slack,

capturing excess that remains once firms have paid out its internal and external operational needs (Baucus and Near, 1991), is found negatively related to fraud happening. The result is consistent with Ferris et al. (2003) and Saksena (2001). Organization size is negatively associated with forming a favorable environment for the firms prone to commit financial fraud. It seconds the finding of Bishop et al. (2017) and Yang et al. (2017). Particularly, in case of similar ownership structure sampled in China (Yang et al., 2017), firms carry lower size relatively in their resources before committing financial misstatements.

Fraudulent firms are observed as low tax aggressive comparatively in reporting financial statements. It supports the finding reported by (Lennox et al., 2013). Executive compensation, in this case, is found positively associated with the likelihood of fraud, as consistent with (Efendi et al., 2007; Ge et al., 2017; Harris and Bromiley, 2007; Huang et al., 2017). Dynamic environment played a negative role in chances of fraud commitment. The firms found to manipulate their statements in stable business conditions prevailing around. This finding uncovers the intent of committing fraud for serving the motives that are not translated by the dynamic business environment. It goes against the recent finding reported in concentrated ownership structure (Shi et al., 2017). One of the possible explanations may be a difference of ownership structure as reasoned by Chen et al. (2006b). The intimate ties between business elite and political leaders enhance the chances of fraud occurrence (Faccio, 2006). The same is evident in this case and is consistent with the recent studies reported (for instance, (Liedong and Rajwani, 2017).

Transient institutional investors, against the hypothesized relationship, are observed to impact negatively on the likelihood of fraud. Putting differently in this case, when firms are found increasing shares of all institutional investors over the time, the environment becomes less favorable to the commitment of fraud. Presence of outsiders on board of directors is observed as creating an environment that is not conducive of happening of financial misappropriation. It strengthens the internal control system (Cohen et al., 2017; Judge and Talaulicar, 2017; Padachi et al., 2017), thereby lowering the likelihood of firms to cook the books. Board size, on the contrary, is found in establishing a negative significant relationship

with the detection of fraud. Smaller the board size, greater is the probability of firms engagement into illegal activity. A possible explanation of such relationship can be associated with the weak board structures. In the context of the developing economy, smaller boards may have more possibility of possessing weak board characteristics, assisting consequently to the happening of fraud (Kaur Virk and Kaur Virk, 2017).

It is also observed that tenure of a chief executive officer for the sampled firms is negatively associated with the likelihood of fraud. Expressly, the environment becomes favorable for fraud when firms are found engaging with a variety of executives in their course of action over time. Changing executives and board of directors frequently may breed out any illegal activity (Rezaee, 2005). Change of auditor, on the other hand, is found directly connected with the detection of fraud. Frequent change of auditor is considered as one of the relevant factors involved in constructing a conducive environment for firms to play with their financials (Agrawal and Cooper, 2017; Avci et al., 2017; Klein, 2002; Yang et al., 2017).

Computing marginal effects for the same model, results reveal that organizational slack, organization size, dynamic environment, political connections, transient institutional investors and auditor change carry relatively stronger connection with the detection of fraud. On the other contrary, firm performance, board size, chief executive officer compensation and an outsider on board of directors hold weaker association, whereas tax aggressiveness and tenure of chief executive officer possess relatively moderate relationship as a climate factor to happening of financial fraud.

TABLE 4.4: **Probit Regression Model 3**

This table reports the probit regression when estimating equation (4.3). Marginal effects of the related variables are also accompanied by the findings.

	Expected sign	Probit		Marginal effect	
		Parameter estimate	t statistics	Parameter estimate	t statistics
_cons		3.171	(4.85)***		
FP	-	-0.051	(-3.90)***	-0.0067	(-4.12)***
OSL	-	-0.826	(-2.38)***	0.10887	(-2.43)***
OS	+	-2.761	(-4.84)***	-0.36382	(-5.23)***
CETR	+	-0.495	(-2.03)**	-0.06529	(-2.04)**
CEOC	+	0.154	(1.96)**	0.02032	(2.00)**
DACC	+	1.718	(0.77)	0.22629	(0.81)
PRV	+	0.203	-0.63	0.0114	-0.78
DE	+	-4.132	(-5.92)***	-0.54441	(-6.86)***
IMD	+	-0.565	(-1.10)	-0.07448	(-1.11)
PCD	+	1.557	(3.37)***	0.20514	(3.53)***
TRA	+	-16.751	(-5.11)***	-2.20716	(-5.69)***
OUTDIR	-	-0.251	(-5.09)***	-0.00449	(-5.87)***
BS	-	-2.235	(-5.26)***	-0.0748	(-9.02)***
CEOT	+	-1.352	(-7.36)***	-0.08968	(-10.73)***
INSTK	-	-0.008	(-1.14)	-0.00768	(-1.14)
ACH	+	1.3732	(4.71)***	0.18092	(5.27)***
Model χ^2		393.83			
p-value		0			
Pseudo		0.6599			
R^2					
N		462			

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

4.2 Objective 2

This section is divided into two parts. The first part details the results and discussion of the testing main objective of the study while testing the hypotheses for analyzing cash flow sensitivities in presence of financial constraints. The second part details the same as a robust analysis.

4.2.1 Main Estimation of Cash Flow Sensitivities

4.2.1.1 Single-Equation Cash Flow Sensitivities

Equation 2.1 is estimated in numerous previous studies, which conclude generally into a positive association between investment and cash flow. The table 4.5 reports estimated coefficients from prior studies, which are ranged between 0.10 and 0.25 commonly. The findings of this study follow the similar trend. Equation 2.1 is processed using study sample, and study obtains coefficient estimates of cash flow as 0.12 (p-value of 0.01). Conventionally, the result suggests that a one rupee decline in cash flows brings 0.12 rupees reduction in investments (capital expenditures) and vice versa.

TABLE 4.5: **Single-Equation Cash Flow Sensitivities**

The table presents results from [Fazzari et al. \(1988\)](#). For comparison, similar analyses labeled “study estimates” are presented where a sample of 279 firms is used. The estimation is processed by the following equation. $\frac{CAPX_t}{K_t} = \beta_1 \frac{CF_t}{K_t} + \beta_2 MB_t + \sigma$, where $CAPX_t$ represents capital expenditures for the period (year) t , K_t reflects total fixed assets at the opening time period, CF_t is the period t cash flow, and MB_t is the ratio capturing market value of assets to the book value of assets. The t -statistics in the model controls for firm-level clustering.

	β_1	β_2	Adj. R^2	n (firm-years)	Sample period
Fazzari et al. (1988) ¹	0.23 (23.00)	0 (6.70)	0.19	5,010	1970-1984
Cleary (1999)	0.10 (29.70)	0.02 (12.30)	0.12	9,219	1987-1994
Study estimates	0.12 (5.96)	0.05 (9.03)	0.15	837	2000-2016

4.2.1.2 Summary of Data

Presented in table 4.6 are the means and standard deviations of all variables, expressed in percentage of mean assets (with exception of size and market-to-book value). Following [Shumway \(2001\)](#) bankruptcy probabilities, summary statistics in the form of firm-years is presented for the three sub-samples, in spite of the full sample. The probability score is used to establish a proxy for financial health of

the firms. It incorporates firm-years with below 25th percentile bankruptcy probability as unconstrained, whereas the same with beyond 75th percentile bankruptcy probability to be constrained. Rest of all firms is considered partially constrained. Dividing the sample in this manner leads to an unequal number of firms across the three sub-samples. The sub-sample for partially constrained firms undertakes around twice the number of sub-samples subject to constrained and unconstrained firms. An advantage of applying this model is that it generates a larger gap between constrained and unconstrained firms.

Results, as reported in table 4.6, exhibit that average cash flows (expressed in percentage to mean assets) enhances monotonically along with the constraint status. The average cash flow is nearly 9.1 percent of assets in case of the unconstrained firms. It is around twice in amount to the firms with partially constraint status, whereas the average cash flow of these firms is 3.9 percent of assets. The constrained firms on the other hand have the smallest proportion of average cash flows to the assets (3.1 percent). In like manner, the results appear in a monotonic relation in case of financial constraint status and dividends. The same nature of relationship is noted between financial constraint status and changes in cash balance. Unconstrained firms increase cash balances and offer dividends larger than constrained firms. Dependence on asset sales on the other hand enhances monotonically when there is a decline in the financial health. Relying on short- and long-run borrowings is notably high for the partially constrained firms while equity issues are largest for financially constrained firms. In order to capture investment opportunities, market-to-book value ratio is applied in the regression models. Subject to this measure, unconstrained firms carry the largest investment opportunities. Acquisitions are approximately same across all the sub-samples. Lastly, a monotonic relation is noted between firm size and financial health in a way that unconstrained firms, as in customary, are larger in size while the constrained firms tend to be smaller.

TABLE 4.6: Summary of Data

The table exhibits a summary of the 279 firms' data used in the empirical examination. Except for ratio of market-to-book value and firm size, all values are presented in the proportion of firm assets. Firm size is captured using natural logarithm of book assets calculated in millions of rupees. Shumway (2001) hazard model is deployed to format sub-samples based on bankruptcy probabilities. The study incorporates firm-years with below 25th percentile bankruptcy probability as unconstrained, whereas the same with beyond 75th percentile bankruptcy probability to be constrained. Rest of all firms is considered partially constrained.

	Full Sample		Unconstrained Sample		Partially Constrained Sample		Constrained Sample	
	837 Firm-Years		201 Firm-Years		419 Firm-Years		217 Firm-Years	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Cash Flow	0.059	0.398	0.091	0.292	0.039	0.381	0.031	0.579
Long-term Debt	0.021	0.196	0.02	0.208	0.019	0.304	-0.003	0.794
Short-term Debt	0.008	0.307	0.006	0.204	0.009	0.297	0.007	0.602
Equity Issues	0.01	0.071	0.014	0.048	0.007	0.059	0.014	0.129
Asset Sales	0.006	0.052	0.008	0.034	0.005	0.057	0.011	0.153
Share Repurchases	0.008	0.067	0.009	0.056	0.003	0.048	0.006	0.081
Dividends	0.017	0.078	0.014	0.066	0.007	0.052	0.005	0.11
Capital Expenditures	0.047	0.258	0.064	0.234	0.033	0.177	0.05	0.419
Acquisitions	0.014	0.205	0.012	0.131	0.011	0.141	0.015	0.321
Cash Balances	0.007	0.221	0.01	0.126	0.009	0.238	-0.003	0.318
Market-to-Book	1.693	1.73	2.019	1.955	1.568	1.501	1.639	1.96
Firm Size	5.553	2.691	6.497	3.462	5.773	3.006	4.078	2.43

4.2.1.3 Lagged Dependent Variables and Estimates of Cash Flow Sensitivities

Table 4.7 outlays estimated coefficients of cash flows using various models and differences in estimates. Column 1 shows the estimation of cash flow sensitivities accomplished by processing the single equation regression apart from taking lagged dependent variables. For instance, in case of capital expenditures when regressed over cash flows, market-to-book value, firm's size, the coefficient of cash flow observed is 0.41. It, in conventional terms, suggests that when there is rise in cash flow by 1 rupee, the capital expenditures enhance by 0.41 rupees. Likewise, subject to acquisitions when regressed on same explanatory variables, the cash flow estimate is 0.06. It implies that when a cash flows is realized by 1 rupee, acquisitions of the firms also increase by 0.06 rupee. The regression models specified above is replicated in column 2 of table 4.7 but is augmented with the lagged dependent variable as an explanatory variable. The difference between column-2 and 1 is displayed in column 5. This difference can be characterized to the inter-temporal impact containing lagged dependent variables by considering that both classes of coefficients are accomplished from single-equation models. These models incorporate identical conventional regressors (viz. cash flow, size, and market-to-book value) and lack the application of interdependencies of firms' financial decisions. Results presented in column 5 explore the differences in numerous ways. First, the investment and payout equations are embedded with omitted variable bias. The variables included in which are capital expenditures, acquisitions, asset sales, equity issues, share repurchases and dividends. Besides the statistical existence of this bias in all the models, on an economic standpoint, it seems to be more noticeable in the capital structure equation. The equation that prior studies depend on to establish whether firms experience capital market frictions. The cash flow sensitivity reveals to be 4 times lesser when lagged capital expenditures are involved as regressors (0.41 versus 0.10)². With that said, it shows that firms with a cash flow shortfall of 1 rupee bring a decrease in capital structure by 0.10 rupees

²As reported in table 4.9 (forthcoming), the residuals turn into even lesser, when examining persistence in the equation by enabling first differences and surrender to be significant statistically.

instead of 0.41 rupees, once the persistence in the capital structure is considered in the model. Lagged capital expenditures bear a coefficient of 0.684 having p-value of 0.02 (not tabulated for brevity). It reflects that the capital expenditures possess a significant persistence. On the same note, larger persistence is observed in dividends (0.903, significant at 0.01), asset sales (0.748, significant at 0.01), and share repurchases (0.492, significant at 0.01). By the same token, acquisitions show an element of persistence, albeit to a lower level (0.214, at 0.01 level).

Second, notwithstanding the fact, from column-1, 2 and 5 that debt issuance and cash holdings (conventional sources of financing) are considerably high and significant statistically, they are unchanged by the involvement of own lagged dependent variables. Therewith, coefficient estimates of lagged dependent variables of all three variables are lesser (lower than 0.03) and are insignificant statistically implying minute persistence in financing variables. Among all financing variables, the sensitivity of equity issues to cash flows is noted only significant statistically. Despite that, both the magnitude of the estimated coefficient in cash flow sensitivity in the two columns (around 0.02) and their difference (0.0069) are lower. Contrary to other financing variables, the sensitivity of equity issues to the cash flows reflects persistence (coefficient on average as 0.12, significant at 0.01).

In sum, the notion that adjusting real assets carries more cost compared to adjusting financial obligations is beheld. In particular from results, adjusting investments has comparatively a high cost while adjusting short-run borrowing carries a comparably low cost. Therefrom, real assets (on levels) attribute to larger persistence and significant omitted variable biases can emerge if their lags are not incorporated in the cash flow sensitivity models.

4.2.1.4 Single-Equation versus Constrained System of Equations Estimates

Apart from persistence, interdependence of financial variables can also influence the cash flow sensitivity. The study, in this part, contrasts the results from regressing system of equations (and constrained) and single equation models (unconstrained). Given that, the study estimates the nine equation model specified

on equations (3.20) and (3.21), in which all equations contain the similar 12 independent variables -cash flow, size and growth and the nine lagged explained (dependent) variables. Lagged explained variables control for a full pattern of system dynamics effects in all equations. Contemporaneous capital expenditures, for instance, may be linked with the previous capital expenditures along with previous financing decisions.

Estimation of the model is performed subject to conditions of a constraint. According to which cash flow coefficient estimates sum to one and rest sum to zero across all equations. Column 4 of table 4.7 presents the cash flow coefficients determined from this process. The study reports a comparison in column 2 of table 4.7. The difference involves the cash flow estimates acquired from the full system and those obtained from single equation models. Differences obtained are displayed in column 6. Lags are added in both cases to control for the possible persistence of the dependent variables. There is only one lagged variable added as an explanatory variable since the results reported in column 2 are acquired from applying single equation models. Conversely, entire set of lagged variables (nine in number) are added to respective system equation while considering estimation of a system of equations. As in both cases, an element of persistence is considered and as both models contain the identical three non-lagged dependent variables, their difference is measured and reported in column 6. This difference ponders how endorsing the interdependence of financial decisions (investment and financing decisions) effects coefficient estimates.

Appertaining to single equation findings as explained formerly (column 2 of table 4.7), the use variables in a cumulative response to a 1 rupee increase in cash flow are also increased by 0.38 rupee whereas the source variables are declined by 0.08 rupee and vice versa. Eventually, both the uses and sources in their increase and decrease respectively attribute to only 0.46 rupees and 0.54 rupees are left unaccounted for. Column 4 of table 4.7 reflects the constraint that sources of cash equal uses of cash. Considering the findings reported in this column, a 1 rupee increase in cash flow, brings 0.50 rupees increase in uses of cash and a 0.50 rupees,

which in turn fully specifies for the 1 rupee change in cash flow³.

Evidently, the largest difference between findings based on the single equation and the same based on a constrained system of equation is the increase in financing variables. In particular, the leverage variables have an estimate of 0.26 rupees in column 2 whereas the same are noted 0.82 rupees in column 4⁴. These findings reflect that sensitivities of financing to cash flow dominate the sensitivities of investment to cash flow. The total of estimated coefficients of cash flow for the difference between short- and long-run loans and change in cash balances (loans-cash balances) reduces by 0.82 rupees when cash flow increases by 1 rupee. However, there is only an increase of 0.13 rupees in case of investment in cash flow sensitivities (i.e. capital expenditures and acquisitions minus asset sales). The overall inference of these findings is that, as adjustment cost relative to investment and payout is higher than the same relative to financing. To put it another way, cash flow changes are very likely to influence the financing variables. Firms enhance the debt levels and lower cash balances when they undergo from lower cash flows. In the same manner, they pay out debt and increase cash balances in response to higher cash flows.

The findings related to single equation framework reported in column 2 of table 4.7, as discussed in previous, indicate regression models in which only the lagged dependent variable is added in the form of an explanatory variable. Compared to it, column 3 reports the findings where entire set of dependent variables is processed in the lagged form are incorporated as explanatory variables. In so doing, it enables to segregate the impact of the constraint of accounting identity. In other words, both the columns-3 and 4 show nearly same regressions, the only difference being that constraint is not applied in column 3 as imposed in column 4. In line with the previous conclusions, the prime impact of the constraint is on financing

³Cash uses obtained rise with 0.0878 (capital expenditures), 0.0460 (acquisitions), 0.0301 (share repurchases), 0.0147 (dividends), and 0.3170 (cash balances). Cash sources include - 0.0030 (asset sales), - 0.0018 (equity issues), - 0.1467 (variation in long-run debt), and - 0.3529 (variation in short-run debt). The sources estimates sum to - 0.5044, whereas that of uses in sum equals 0.4956. Accumulating decline in sources estimates and rise in use estimates becomes equal to 1.00 (= 0.5044 + 0.4956).

⁴Sum of cash flow estimated coefficients for short-run debt (- 0.1564) and long-run debt (0.0552) minus change in cash balances (0.1597) from column-2 equals - 0.2609, while the same from column-4 equals 0.8166 [= - 0.3529 + (- 0.1467) - 0.3170].

variables indicating that they respond as a buffer to uncommonly high or low cash flows.

Conjointly, endorsing the inter-temporal attribute of financial decisions and considering the nature of financial variables being interdependent, both carries out the inference that firms do not face any considerable capital market friction. In case of investment to cash flow sensitivity, adding persistence in decision variables gives very lower and statistically insignificant estimates (at the 0.05 level). However, acknowledging financial variables only interdependent and controlling the impact of intertemporalness, indicates dominance of financing-to-cash flow sensitivities over investment-to-cash flow sensitivities.

TABLE 4.7: Cash Flow Sensitivities: Effects of Lagged Dependent Variables and Constraints

The table outlays estimated coefficients of cash flows using various models and differences in estimates. The study contains 837 firm-year observations in the sample covering 2000 to 2016 subject to corresponding violation period. As regressors, model-1 applies to cash flows, model-2 employs cash flow and lagged dependent variable, model-3 uses cash flows and all lagged dependent variables; whereas model-4 expands model-3 by determining jointly the accounting identity viz. sources of funds equal uses of funds. Each model embeds control variables such as market-to-book value and firm size.

Dependent Variable	Cash Flow _{<i>i,t</i>}	Cash Flow _{<i>i,t</i>}	Cash Flow _{<i>i,t</i>}	Cash Flow _{<i>i,t</i>}	Difference in Cash Flow _{<i>i,t</i>}	Difference in Cash Flow _{<i>i,t</i>}	Difference in Cash Flow _{<i>i,t</i>}
	(unconstrained; without lagged dependent variable)	(unconstrained; own lagged dependent variable only)	(unconstrained; all lagged dependent variables)	(constrained; all lagged dependent variables)			
	(1)	(2)	(3)	(4)	(2) - (1)	(4) - (2)	(4) - (3)
					(5)	(6)	(7)
Capital Expenditures _{<i>i,t</i>}	0.413	0.1015	0.0723	0.0878	-0.3115	-0.0137	0.0155
Acquisitions _{<i>i,t</i>}	(0.0001) 0.0639	(0.0564) 0.0615	(0.0224) 0.0152	(0.0007) 0.046	(0.0007) -0.0024	(0.7354) -0.0155	(0.0304) 0.0308
Asset Sales _{<i>i,t</i>}	(0.0002) 0.0151	(0.0001) 0.0049	(0.9337) 0.0061	(0.0021) -0.003	(0.0015) -0.0102	(0.9024) -0.0079	(0.0017) -0.0091
Equity Issues _{<i>i,t</i>}	(0.0001) 0.0255	(0.0031) 0.0186	(0.8275) 0.0047	(0.0405) -0.0018	(0.0001) -0.0069	(0.0009) -0.0204	(0.0023) -0.0065
Share Repurchases _{<i>i,t</i>}	(0.0002) 0.0398	(0.0001) 0.0331	(0.0316) 0.0168	(0.4314) 0.0301	(0.0001) -0.0067	(0.0024) -0.003	(0.0009) 0.0133
Dividends _{<i>i,t</i>}	(0.0001) 0.1106	(0.0001) 0.0263	(0.0001) 0.0135	(0.0001) 0.0147	(0.0001) -0.0843	(0.6387) -0.0116	(0.0001) 0.0012
Δ Long-term Debt _{<i>i,t</i>}	(0.0001) 0.0487	(0.0001) 0.0552	(0.0001) -0.0076	(0.0001) -0.1467	(0.0001) 0.0017	(0.1154) -0.2019	(0.0023) -0.1391
Δ Short-term Debt _{<i>i,t</i>}	(0.0112) -0.1904	(0.0108) -0.1564	(0.7449) -0.2048	(0.0003) -0.3529	(0.6310) 0.0005	(0.0002) -0.1965	(0.0004) -0.1481
Δ Cash Balances _{<i>i,t</i>}	(0.0003) 0.1766	(0.0003) 0.1597	(0.0001) 0.2604	(0.0001) 0.317	(0.9321) 0.0007	(0.0001) 0.1573	(0.0001) 0.0566
Δ Uses _{<i>i,t</i>} + Δ Sources _{<i>i,t</i>}	(0.0001) 0.905	(0.0001) 0.4598	(0.0001) 0.5798	(0.0001) 1	(0.7104)	(0.0001)	(0.0001)

4.2.1.5 Estimates of the Other Explanatory Variables

The complete form of estimated coefficients for equation (3.20) concerning restriction mentioned in equation (3.21) are presented in table 4.8, through panels A and B. Panel A reports the estimates of each endogenous financing and investment variable to firm size and ratio of market-to-book value. Previously reported results of cash flow are also involved for wholeness. The ratio of market-to-book value and size of the firm portray neither sources nor uses of funds, and so the innovations in these variables are responded by the system as the sum to zero. Findings obtained reflect that firms more possibly contain high capital expenditures and are more dynamic in capital markets (both equity and debt) which are having higher market-to-book ratios. High market-to-book ratio firms, however, depend more on share repurchases and fewer on dividends while distributing cash to stockholders. The results generally confirm the theoretical expectation from the firms with considerable growth opportunities. Firm size is also tested with decisions of financing, investment, and payout. By and large, because of carrying larger levels of capital expenditures and acquisitions, bigger firms are supposed to have more prominent investment programs. Bigger firms, from the study results, are found more operational in financial markets when determining the estimates in the equations for equity issues, share repurchases, and both short- and long-run issuance of debt.

Panel B reports the estimated coefficients for the lagged endogenous variables (coefficients of matrix K in equation 3.20). The estimates of the matrix determine how contemporaneous financing and investment variables rely on lagged financing and investment variables. As the lagged dependent variable(s) is neither part of sources nor part of uses of funds in the current time period (a year here), the coefficients for these variables sum to zero. The diagonal components of K can be roughly translated as own adjustment rates—the lesser the j^{th} diagonal coefficient the smaller inertia is revealed in the adjustment of the j^{th} variable. Referring study results, higher inertia is evident in case of dividends, capital expenditures, asset sales and share repurchases with lagged coefficient estimates of 0.78, 0.71, 0.63 and 0.51 respectively. A sticky nature of dividends is observed, to a smaller degree, and

the same nature for share repurchases while looking into payout estimates. Since share repurchases are irregular in nature, the persistence found in table 4.10 (panel B) is somewhat unexpected. Despite that, various share repurchase schemes are implemented over multiple periods (years), possibly giving positive serial correlation in this case. The estimates related to investment indicate the series of annual replacement of prevailing investments and potentially the multi-period (year) nature of new projects. But then, loans (both short- and long run) exhibit very less inertia. It implies that these variables adjust promptly to the cash flow shocks. Further, leverage variables react intensely to lagged capital expenditures (both in view of strength and significance) in the current time period. It suggests that firms utilize debt and cash reserves (balances) to finance capital expenditure plans.

The components placed off-diagonal exhibit confirmation that changes in both short- and long-run borrowing along with cash balances respond as shock absorbers in the structure. By and large, highest off-diagonal components (in the absolute term) are noted across the rows related to three leverage variables, suggesting that cash holdings of the contemporaneous period and debt issues react intensely to previous changes in other system variables⁵. On the contrary, off-diagonal coefficients attached to leverage variables are observed lowest suggesting that lagged changes in the said variables do not have an impact on the rest of the system in the current period. In a nutshell, in view of relative sizes (having absolute term) of the off-diagonal rows and columns, it can be inferred that leverage variables do not transfer shocks to the rest of system but do absorb them.

From the correlation of residuals across all system equations, through panel C, it is noted that dividends and capital expenditures are insignificantly correlated, whereas rest of all pairs are significant at the 0.01 level. The strongest levels of associations are i) between changes in long-run borrowing and acquisitions (0.41), and ii) between short-run borrowing and cash (0.38). The study further observes that capital expenditure estimates have a significant association with estimates of asset sales (0.21), long-run borrowing estimates (0.17), short-run borrowing estimates (0.13), and equity issue estimates (0.10). Acquisitions, on the other hand,

⁵Besides leverage variables, lagged asset sales, dividends and equity issues contain comparably high estimates in the capital expenditure equation.

are strongly associated with changes in equity (0.18) and with changes in short-run borrowing (0.12). On the whole, a notion that firms generate investments with the current issuance of debt and equity, and utilize short-run debt to meet cash requirements is confirmed by the correlation results among all residuals.

TABLE 4.8: Full Sample Estimates

The table portrays estimated output of the system of equations characterized in equation (3.20) and subject to the constraints prescribed in equation (3.21). Panel A refers to model estimates including cash flow, ratio of market-to-book value, firm size and R-square. Panel B represents the model estimates related to system dynamics matrix, including dependent variables in lagged forms as explanatory variables. Specifically, from the j^{th} row it is noted that how variations in past j^{th} sources and uses elements influence the present j^{th} sources and uses portfolio. Likewise, j^{th} column reflects the adjustment of present sources and uses structure caused by a variation in j^{th} element previous period. The items in diagonal form exhibit the adjustment rates in their “own”. A low inertia is interpreted in the rearrangement of j^{th} sources and uses item when the the j^{th} diagonal item is lesser. To lagged dependent variables, the total response of the sources and uses items is taken as zero in the presence of constraint because lagged dependent variables are not part of these sources/uses variables. Panel C depicts the correlation results of the estimates from all equations.

Panel A: Cash Flow, M/B, and Size Coefficients				
Dependent Variable	Cash Flow	Size	Market-to-Book	R²
Capital Expenditures _{<i>i,t</i>}	0.0878	4.2541	2.1427	0.78
Acquisitions _{<i>i,t</i>}	(0.0007) 0.0460	(0.0009) 1.0835	(0.0020) -0.3170	0.08
Asset Sales _{<i>i,t</i>}	(0.0021) -0.0030	(0.0001) 0.0172	(0.2307) -0.1537	0.41
Equity Issues _{<i>i,t</i>}	(0.0405) -0.0018	(0.8317) 0.6486	(0.0004) 0.5329	0.13
Share Repurchases _{<i>i,t</i>}	(0.4314) 0.0301	(0.0001) 0.1359	(0.0001) 0.2014	0.28
Dividends _{<i>i,t</i>}	(0.0001) 0.0147	(0.0413) 0.0736	(0.0002) -0.0688	0.83
ΔLong-term Debt _{<i>i,t</i>}	(0.0001) -0.1467	(0.4413) 1.6773	(0.2514) -0.8937	0.04
ΔShort-term Debt _{<i>i,t</i>}	(0.0003) -0.3529	(0.0051) 3.9610	(0.0073) 1.7632	0.17
ΔCash Balances _{<i>i,t</i>}	(0.0001) 0.3170	(0.0001) 0.9379	(0.0024) -0.5507	0.21
	(0.0001)	(0.0952)	(0.4250)	

Panel B: Coefficient Estimates for the System Dynamics Matrix

Dependent Variable	Capital Expenditure _{<i>i,t-1</i>}	Acquisitions _{<i>i,t-1</i>}	Asset Sales _{<i>i,t-1</i>}	Equity Issues _{<i>i,t-1</i>}	Share Repurchases _{<i>i,t-1</i>}	Dividends _{<i>i,t-1</i>}	Δ Long-term Debt _{<i>i,t-1</i>}	Δ Short-term Debt _{<i>i,t-1</i>}	Δ Cash Balances _{<i>i,t-1</i>}
Capital Expenditures _{<i>i,t</i>}	0.7083 (0.0001)	0.0796 (0.0524)	0.4125 (0.0381)	-0.5043 (0.0796)	0.0051 (0.9365)	0.5348 (0.0121)	-0.0127 (0.5011)	-0.0036 (0.6748)	0.0399 (0.0106)
Acquisitions _{<i>i,t</i>}	-0.0187 (0.4135)	0.0944 (0.0021)	0.0729 (0.2430)	0.0307 (0.6069)	0.3244 (0.0215)	0.2675 (0.0014)	-0.0214 (0.2141)	0.0052 (0.6251)	0.0412 (0.0083)
Asset Sales _{<i>i,t</i>}	0.023 (0.0053)	0.0011 (0.8873)	0.6304 (0.0001)	-0.0009 (0.9175)	0.0058 (0.4031)	0.0006 (0.7651)	0.0038 (0.3458)	-0.0031 (0.4538)	-0.0028 (0.3012)
Equity Issues _{<i>i,t</i>}	0.0087 (0.5376)	0.0761 (0.0071)	0.1067 (0.1123)	0.1325 (0.0064)	0.0531 (0.0092)	0.1348 (0.0017)	0.0053 (0.5228)	-0.0028 (0.5864)	-0.0043 (0.7962)
Share Repurchases _{<i>i,t</i>}	-0.0227 (0.0081)	0.0018 (0.8573)	0.0416 (0.0528)	0.0651 (0.0238)	0.5137 (0.0001)	0.1324 (0.0021)	-0.0071 (0.0946)	-0.0049 (0.1294)	0.0144 (0.0031)
Dividends _{<i>i,t</i>}	0.0318 (0.0047)	0.0066 (0.1451)	-0.0202 (0.3462)	0.0082 (0.6148)	0.0459 (0.0130)	0.7842 (0.0001)	-0.0043 (0.2379)	-0.0017 (0.8781)	0.0105 (0.0021)
Δ Long-term Debt _{<i>i,t</i>}	0.2165 (0.0004)	-0.0625 (0.3146)	-0.0325 (0.9781)	-0.0814 (0.8317)	0.4791 (0.0015)	0.3917 (0.0007)	-0.0527 (0.2174)	0.1352 (0.0002)	-0.0417 (0.3701)
Δ Short-term Debt _{<i>i,t</i>}	0.2466 (0.0001)	0.0139 (0.8417)	-0.2341 (0.2463)	-0.2118 (0.0391)	0.1973 (0.0017)	0.7501 (0.0001)	0.1115 (0.0003)	-0.0594 (0.2013)	0.0243 (0.6232)
Δ Cash Balances _{<i>i,t</i>}	-0.2136 (0.0001)	-0.1487 (0.0001)	0.1247 (0.1954)	0.2346 (0.0271)	-0.2346 (0.0001)	-0.5379 (0.0001)	0.0776 (0.0001)	0.0281 (0.0734)	-0.1227 (0.0054)

Panel C: Correlation of Residuals Across Equations

	Capital Expenditures $_{i,t}$	Acquisitions $_{i,t}$	Asset Sales $_{i,t}$	Equity Issues $_{i,t}$	Share Repurchases $_{i,t}$	Dividends $_{i,t}$	Δ Long- term Debt $_{i,t}$	Δ Short- term Debt $_{i,t}$	Δ Cash Balances $_{i,t}$
Capital Expenditures $_{i,t}$	1	0.0732	0.2165	0.1027	0.0153	0.1138	0.1741	0.1317	-0.0633
		(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.8735)	(0.0001)	(0.0001)	(0.0001)
Acquisitions $_{i,t}$		1	0.0214	0.1781	0.0108	-0.0001	0.4125	0.1243	-0.0341
			(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Asset Sales $_{i,t}$			1	0.0388	0.0324	-0.0416	0.0338	-0.0071	0.0216
				(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Equity Issues $_{i,t}$				1	0.0794	0.0397	0.0843	0.0215	0.0532
					(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Share Repurchases $_{i,t}$					1	0.0845	0.0161	0.0751	-0.0365
						(0.0001)	(0.0001)	(0.0001)	(0.0001)
Dividends $_{i,t}$						1	0.0819	0.1039	-0.0079
							(0.0001)	(0.0001)	(0.0001)
Δ Long-term Debt $_{i,t}$							1	0.0413	0.0324
								(0.0001)	(0.0001)
Δ Short-term Debt $_{i,t}$								1	0.3768
									(0.0001)
Δ Cash Balances $_{i,t}$									1

4.2.1.6 Model Estimation Using First Differences and Cleary's Sample Selection

Persistence existing in the variables across different levels may influence the coefficient estimates. In order to generate a more robust perspective regarding interdependence of financial variables, the study creates a transformation of an entire set of variables from levels to first differences. The study, as did before, controls for firm clustering and demean all observations at the yearly level. However, the model in the first differences should necessarily fulfill the accounting identity constraint, viz. change in sources of cash equal change in uses of cash⁶. Presented in table 4.9 are the findings applying first differences on the full sample firms. For brevity, only estimates of cash flows and model explanatory power (R^2) are tabulated. For comparative analysis of the prior literature, the second model is regressed considering levels of all variables and using a sample following selection criteria of Cleary (1999).

In both the models, with few exceptions, cash flow estimates are noted highly significant and carrying a sign according to expectation. Applying first difference, from the first model, coefficient estimates exhibit that firms change the financing variables instead of investment variables in response to cash flow shocks. The estimated coefficient concerning cash flows in the equation of capital expenditures is 0.01 applying first differences versus 0.03 when estimating them in levels⁷. Leverage variables (viz. short- and long-run loans minus the change in cash balances), provided with lower response in investment and incorporating financial constraint, become even more dominant under first differences as opposed to levels (0.85 rupees versus 0.77 rupees). Conventionally, a decrease in cash flows by one rupee brings an increase in short-run and long-run debt by 0.37 rupees and 0.19 rupees respectively, and a decrease in cash balance by 0.29 rupees. Further, as found

⁶In Cleary (1999), variables are converted by subtracting firm and year means instead of being implemented using first differences. However, deducting means in place of measuring changes yields identical results (not reported).

⁷The study analyzed also the impact of investment in a wider definition, by taking research and development expenses and advertisement expenses in the model, along with capital expenditures. However, the results show an economically less and statistically insignificant response of these investment variables.

in estimates based on levels, acquisitions and share repurchases enhance whereas asset sales decrease. Principally, the results, in general, imply that firms respond negative cash flow shocks by enhancing levels of debt, but not cutting down capital expenditures⁸.

Lastly, results presented in table 4.9 do not rely on how the date is calculated (levels versus difference), or the sample period employed (1987-94 time period applied by Cleary (1999) against 2000-16 time period applied in this study). The results produced vigorously recommend that inferences made in various prior studies, that frictions present in the capital market restrict firms in investment, are deceitful. The underlying logic is that those studies ignore the inter-temporal and independent nature of financing and investment policies.

⁸Firms are also grouped with respect to ratio of market-to-book value, in order to examine whether firms' reaction vary on the basis of growth opportunities. The residuals obtained for low market-to-book value, medium market-to-book value and high market-to-book value sub-samples are 0.0093, 0.01241 and -0.0335 respectively, while testing estimates for investment-cash flow sensitivity. Moreover, for these three sub-samples financing variables show a strong and highly significant impact and overshadow the investment reaction. Besides that, the study has tested the model by adding industry dummy to observe whether financing and investment decision variables are industry specific.

TABLE 4.9: Cash Flow Sensitivities: First Differences and Cleary's Sample

The table reports estimated output of the system of equations characterized in equation (3.20) and subject to the constraints prescribed in equation (3.21). The first model exhibits findings for the full sample while applying first differences on 279 firms with their corresponding periods. The second model reflects the results applying criteria prescribed in [Cleary \(1999\)](#) for levels of variables.

Dependent Variable	Cash Flow Coefficients Using First Differences (Full Sample)	R ²	Cash Flow Coefficients Using Levels (Cleary's Sample)	R ²
Capital Expenditures _{<i>i,t</i>}	0.0127 (0.0543)	0.52	0.0324 (0.0080)	0.87
Acquisitions _{<i>i,t</i>}	0.0425 (0.0227)	0.19	0.0297 (0.5143)	0.07
Asset Sales _{<i>i,t</i>}	-0.0021 (0.1354)	0.16	-0.0053 (0.1677)	0.29
Equity Issues _{<i>i,t</i>}	-0.0055 (0.2031)	0.42	-0.0081 (0.1634)	0.16
Share Repurchases _{<i>i,t</i>}	0.0183 (0.0001)	0.18	0.0249 (0.0003)	0.26
Dividends _{<i>i,t</i>}	0.0063 (0.0001)	0.15	0.0354 (0.0001)	0.68
Δ Long-term Debt _{<i>i,t</i>}	-0.1862 (0.0003)	0.22	-0.1236 (0.0654)	0.05
Δ Short-term Debt _{<i>i,t</i>}	-0.3672 (0.0001)	0.37	-0.4043 (0.0001)	0.17
Δ Cash Balances _{<i>i,t</i>}	0.2934 (0.0001)	0.4	0.2441 (0.0001)	0.31
Observations	837		861	

4.2.1.7 Effects of Capital Constraints

Numerous studies from the literature spotlight whether financial constraints in approaching external capital influence investment decisions. The results, as reported in tables 4.8 and 4.9, provide little support to the inference that capital market constraints change the investment decisions for the broad sample. Despite that, this impact could not be present for most of the firms but might still prevail for financially constrained firms. A traditional approach in previous studies is based on segmenting the sample against the status of financial health and then establishes whether there prevails an association between financial health and investment to cash flow sensitivity. In their original paper, Fazzari et al. (1988) divided the firms with respect to dividend payout ratios. Firms that offered no dividend were categorized as constrained financially. Firms that offered low dividends compared to their level of net income were classified to be partially constrained, whereas the firms that offered moderate to large dividends compared to their net income were assumed as financially unconstrained. Various succeeding studies then questioned the validity of taking simply dividends as a determinant of financial constraint and in place of it employed a variety of financial variables to categorize status of financial constraint. For instance, Kaplan and Zingales (1997) applied financial constraints according to their perceived levels and then established an ordered logit model to connect financial variables to their classification of financial constraint status.

4.2.1.8 Results Based on Bankruptcy Probability

The system of equation characterized by equation (3.20) is estimated based on the constraint in equation (3.21) for all classes of firms (constrained, partially constrained and unconstrained), in order to establish whether investment to cash flow sensitivities relies on capital market frictions. Considering the first differences, equation (3.20) is regressed.

The study emphasizes on estimating the sensitivities of all of investment and financing variables to cash flow shocks separately, instead of displaying estimates

for all variables in together. Results pertaining to all sub-samples are reported in table 4.10 panel A. For the convenience in comparison, results of the complete sample from table 4.9 are presented again. Considering panel A, results reveal that majority of the estimated coefficients (32 out of 36) contain the expected sign when regressed over the full sample and the sub-samples. On an economic standpoint, it implies that in response to positive cash flow shock, the use variables rise whereas the source variables decline. In addition to it, 24 out of 30 estimated coefficients with the right sign are noted significant statistically (at the level of 0.01).

In conformity with the results obtained from a full sample, firms respond to change in cash flow by one rupee by changing the level of financial leverage, regardless of the status of financial constraint. Results, further, reflect that sensitivities of financing to cash flows (viz. 0.25 rupees, 0.95 rupees, and 0.91 rupees for financially unconstrained, partially financially constrained and financially constrained sub-samples, respectively) dominate the investment to cash flow sensitivities (i.e. 0.08 rupees, 0.04 rupees, and 0.06 rupees for unconstrained, partially constrained and constrained firms respectively) in every category. From these findings, there is little support noted for the argument that firms forcefully sacrifice the investments with positive net present value because they are not fit in accessing capital market. Moreover, sensitivities of investment to cash flow are little in intensity and insignificant statistically, as opposed to prior studies that regularly report positive and significant investment to cash flow sensitivities⁹.

On the other hand, panel B investigates the differences in estimates over the sub-samples reported in panel A. A high likelihood is observed between firms across the three sub-samples. A few differences (9 out of 27) are noted significant statistically at the 0.05 level. In addition, some of the significant pairwise differences do not support the notion that financially constrained firms possess larger hurdles in financing funds when compared to financially unconstrained firms. For instance, differences in unconstrained versus partially constrained firms reveal the same in the equation of capital structure.

⁹Prior studies conclude that irrespective of the financial constraint status, there is positive investment-cash flow sensitivities and the firms face hurdles in accessing external capital market for funds. On the contrary, panel A in table 4.10 reflects results otherwise, suggesting that even financially constrained firms are able to generate funding from capital markets.

TABLE 4.10: Reactions to Cash Flow Changes and the Effects of Financial Constraints

The table presents estimates for cash flow characterized in equation 10, based on constraints mentioned in equation (3.21). Reported results are established for the full sample and for sub-samples using Shumway (2001) hazard model. The study incorporates firm-years with below 25th percentile bankruptcy probability as financially unconstrained, whereas the same with beyond 75th percentile bankruptcy probability to be constrained. Rest of all firms is considered partially constrained. The first level differencing is considered while applying regression model. Panel A covers the estimated coefficients, the frequency of firm-years and number of clusters for all sub-samples. The p-values of each estimate are mentioned in parentheses. Panel B presents differences between coefficients in sub-samples.

Panel A: Coefficient Estimates				
Dependent Variable	Full Sample	Financially Unconstrained	Partially Constrained	Financially Constrained
Capital Expenditures _{<i>i,t</i>}	0.0127 (0.0543)	0.0188 (0.0742)	-0.0023 (0.9403)	0.0018 (0.8547)
Acquisitions _{<i>i,t</i>}	0.0425 (0.0227)	0.0598 (0.0546)	0.0316 (0.0297)	0.0439 (0.0149)
Asset Sales _{<i>i,t</i>}	-0.0021 (0.1354)	-0.0007 (0.7663)	-0.0043 (0.0036)	-0.0127 (0.0881)
Net Change in Investments	0.0573	0.0793	0.0382	0.0584
Equity Issues _{<i>i,t</i>}	-0.0055 (0.2031)	-0.0047 (0.0541)	-0.0103 (0.0468)	0.0021 (0.8352)
Share Repurchases _{<i>i,t</i>}	0.0183 (0.0001)	0.0208 (0.0120)	0.0113 (0.0084)	0.0107 (0.0013)
Dividends _{<i>i,t</i>}	0.0063 (0.0001)	0.0082 (0.0068)	0.0031 (0.0304)	-0.0058 (0.0254)
Net Shareholder Distributions	0.0301	0.0337	0.0247	0.0186
Δ Long-term Debt _{<i>i,t</i>}	-0.1862 (0.0003)	-0.1974 (0.0008)	-0.113 (0.0352)	-0.2786 (0.0017)
Δ Short-term Debt _{<i>i,t</i>}	-0.3672 (0.0001)	0.3107 (0.0013)	-0.5369 (0.0001)	-0.3127 (0.0003)
Δ Cash Balances _{<i>i,t</i>}	0.2934 (0.0001)	0.3664 (0.0001)	0.2985 (0.0001)	0.3177 (0.0001)
Change in Leverage	0.8468	0.2531	0.9484	0.909
Firm-Years	837	201	419	217

Panel B: Differences in Coefficient Estimates			
Dependent Variable	Unconstrained -Constrained	Unconstrained- Partially Constrained	Partially Constrained-Constrained
Capital Expenditures _{<i>i,t</i>}	0.0235 (0.5168)	0.0187 (0.0231)	-0.0105 (0.9867)
Acquisitions _{<i>i,t</i>}	0.0227 (0.9761)	0.0496 (0.1351)	-0.0316 (0.2783)
Asset Sales _{<i>i,t</i>}	0.0188 (0.0104)	0.0027 (0.3476)	0.0105 (0.0078)
Equity Issues _{<i>i,t</i>}	-0.0045 (0.6328)	0.0113 (0.8312)	-0.0164 (0.1354)
Share Repurchases _{<i>i,t</i>}	0.0098 (0.0094)	0.0154 (0.0316)	0.0024 (0.6049)
Dividends _{<i>i,t</i>}	0.0178 (0.8846)	0.0076 (0.1561)	-0.0043 (0.3762)
Δ Long-term Debt _{<i>i,t</i>}	0.1041 (0.7579)	-0.0974 (0.0227)	0.1994 (0.0212)
Δ Short-term Debt _{<i>i,t</i>}	0.0136 (0.9341)	0.2081 (0.0053)	-0.2454 (0.2132)
Δ Cash Balances _{<i>i,t</i>}	0.0553 (0.0032)	0.0368 (0.6347)	0.0137 (0.9376)

4.2.1.9 Sensitivity of Results to Sub-sample Segmentation Criteria

The study, as a means to confirming that the results obtained, are not a keepsake and artifact of the [Shumway \(2001\)](#) based segmentation methodology, reproduces the analysis on the basis of classifying the sample applying [Cleary \(1999\)](#) sampling discriminant process. Coupled with Shumway based findings, results obtained against alternate criteria are reported in table [4.11](#). The results suggest no evidence in support of a significant association between investment and cash flow sensitivities while taking into account both classification methods. However, financing variables provide an economically significant response to the change in cash flow. Firms carry the ability to take loans and this factor is noted robust in reference to classification methodology applied. On the other hand, results indicate that there is found no support for the monotonic relation between levels of financial constraint and the firms' ability to take loans.

TABLE 4.11: Determination of Financial Constraint Category

Dependent Variable	Shumway-based Breakpoints			Cleary-based Breakpoints		
	Un-constrained	Partially Constrained	Constrained	Un-constrained	Partially Constrained	Constrained
Capital Expenditures _{<i>i,t</i>}	0.0188 (0.0742)	-0.0023 (0.9403)	0.0018 (0.8547)	-0.0041 (0.3364)	0.0093 (0.7651)	0.0605 (0.0067)
Acquisitions _{<i>i,t</i>}	0.0598 (0.0546)	0.0316 (0.0297)	0.0439 (0.0149)	0.0198 (0.0813)	0.0684 (0.0240)	-0.0324 (0.9531)
Asset Sales _{<i>i,t</i>}	-0.0007 (0.7663)	-0.0043 (0.0036)	-0.0127 (0.0881)	0.0013 (0.0315)	-0.0224 (0.8894)	-0.0389 (0.0813)
Equity Issues _{<i>i,t</i>}	-0.0047 (0.0541)	-0.0103 (0.0468)	0.0021 (0.8352)	0.0038 (0.4160)	-0.0095 (0.1543)	-0.0612 (0.0027)
Share Repurchases _{<i>i,t</i>}	0.0208 (0.0120)	0.0113 (0.0084)	0.0107 (0.0013)	0.0072 (0.0007)	0.0314 (0.0045)	0.0072 (0.4168)
Dividends _{<i>i,t</i>}	0.0082 (0.0068)	0.0031 (0.0304)	-0.0058 (0.0254)	0.0055 (0.1564)	0.0081 (0.0008)	0.0043 (0.1341)
Δ Long-term Debt _{<i>i,t</i>}	-0.1974 (0.0008)	-0.113 (0.0352)	-0.2786 (0.0017)	0.0027 (0.8856)	-0.3102 (0.0004)	-0.5134 (0.0007)
Δ Short-term Debt _{<i>i,t</i>}	0.3107 (0.0013)	-0.5369 (0.0001)	-0.3127 (0.0003)	-0.6133 (0.0001)	-0.3104 (0.0001)	-0.2011 (0.0561)
Δ Cash Balances _{<i>i,t</i>}	0.3664 (0.0001)	0.2985 (0.0001)	0.3177 (0.0001)	0.4297 (0.0001)	0.3309 (0.0001)	0.2238 (0.0001)
Firm-Years	201	419	217	241	413	207

The above table displays estimates of cash flow described in equation (3.20), based on the constraints characterized in equation (3.21) while applying three different techniques for specifying firm-years as per levels of financial constraints. The first level differencing is considered while applying regression model. Shumway's hazard model is presented in the first three columns to describe breakpoints among financially constrained, partially constrained and unconstrained firms. Cleary's sampling technique for estimating financial constraints is presented in the second set of three columns. Panel B presents differences between coefficients in subsamples.

4.2.1.10 Positive and Negative Cash Flow Shocks

The results obtained heretofore assume symmetry that firms' response to positive cash flow shocks is supposed to be equal in intensity but opposite to their response to negative cash flow shocks. This supposition may create potential problems in study inferences, in a view that bearing the capital constraints on investment has more influence to the firm's ability to generate funds from external sources when experienced with negative cash flows shocks as compared to retiring capital in reaction to positive cash flow variations. The study, in this section, attempts to analyze the symmetry of investment to cash flow sensitivities and financing to cash flow sensitivities. For the purpose, equation (3.20) is estimated, where an interaction term is added equal to product form of changes in cash flow and a dummy variable that considers the value one when the change in cash flow becomes positive and zero otherwise. The key reason to process this examination is to observe how firms respond in financial markets when they experience cash flow declines¹⁰. Table 4.12 displays the results, according to which there is an evidence of large symmetry in firms' response to changes in cash flows. While experiencing a negative cash flow change with one rupee, the amount of debt and equity issuance by firms is identical to the amount of debt and equity they retire when there is a one rupee increase in cash flows. For instance, the coefficients for variables of

¹⁰The study, in addition, examined these models applying levels of variables instead of differences and produced identical results.

positive cash flow and negative cash flow are -0.405 and -0.431 respectively in case of short-run debt equation for the full sample (see panel A). It, conventionally, suggests that when firms face a positive cash flow shock by one rupee, they write off their short-run debt by 0.41 rupees. Oppositely, a negative change in cash flow by one rupee brings firms borrow for short-run an extra 0.43 rupees. The difference (0.026) between short-run debt to positive cash flow sensitivities and short-run debt to negative cash flow sensitivities is not statistically significant on the p-value of 0.27. Firms, in case of long-run debt issues, are noted possessing a capacity to take a loan of 0.17 rupees when they face a one rupee decline in their cash flows and write off the loan by 0.22 rupees when there is an increase in cash flow by one rupee. Like the short-run debt, the difference, in this case, is not significant.

In sum, of the nine variables examined, asymmetry is witnessed in four of them (viz. capital expenditures, change in cash balances and the two payout variables). Despite that, there is no evidence of economically meaningful asymmetry in capital expenditures and cash reserves. Apart from statistical significance, there is observed no decline in the capital expenditures whether the cash flow variations are positive or negative in nature. The coefficients suggest that capital expenditures are enhanced by 0.018 rupees with a p-value of 0.0775 in response to one rupee increase in cash flow and in the same way they enhance their capital expenditures by insignificant 0.001 rupees against one rupee decline in cash flow. With that said, a significant difference (p-value of 0.0142) is observed between investments to cash flow estimates based on if there is a positive or negative cash flow variation. Economically, this implies that capital expenditures and short-run cash flows are entirely separated from each. A significant asymmetric relation between dividends and cash flows asserts that on average firms enhance dividend payouts following rises in cash flows and keep dividend payouts unaltered in response to cash flow drop. In the same manner, share repurchases carry an asymmetric reaction; implying firms enhance share repurchases in more level while responding positive cash flow changes as compared to the degree of repurchases increase following negative cash flow changes.

On the whole, results concerning sub-samples classified in accordance with financial constraint status imply that firms show a symmetric response to positive and negative cash flow shocks (see panel B). A few numbers of asymmetric responses are noted (9 out of 27) from the tests of symmetry. Virtually the findings bear no witness to a situation where firms respond distinctly to changes in positive and negative cash flow. That being the case, for the full sample and for three sub-samples, only two estimates exhibit asymmetric behavior both in the equity issues equations at a p-value of 0.05 out of 12¹¹ estimates which portray equity issues, variations in short-run borrowing, and variations in long-run borrowing. Findings also provide an evidence that following cash flow declines, even the financially constrained firms are capable of availing loans from the market both in short and long-run. Investment variables (viz. capital expenditures, asset sales, and acquisitions) are insensitive to the sign of cash flow variations. The findings oppose the conventional literature notion that firms waive off investments because of constraints prevailing in the capital market.

It is evident further that presence or absence of financial market frictions is not that strong in firms' response to positive cash flow variations as compared to their reaction to negative cash flow variations. The finding may straighten out inferences on the issue in this regard. Firms can utilize the extra funds related to rising in cash flow in three courses. First, firms can enhance the level of investment; second, they can lower their leverage level by writing off the loans and enhancing cash reserves; third, they can expand their distributions. In a case where firms sacrifice investments based on positive net present value because of the frictional effect to not generating funds from the external market before they experience any positive cash flow variation, it is expected that their investment reaction may dominate the other two reactions. Nevertheless, findings reveal that investments are enhanced in a relatively lower economic fraction when firms find a rise in their cash flow. Thus far, only the financing variables have the largest response. Firms decline the leverage ranging from 0.90 rupees and 0.99 rupees against rupee positive cash flow of one. Conclusively, the results infer that firms respond with retiring capital and

¹¹As mentioned in the discussion, four asymmetric cases belongs to panel A and eight asymmetric cases bear on panel B.

not with enhancing investments when they face cash flow increases, which in turn confirms the argument that they have not gone through ineptitude to generate capital for financing their investment programs.

TABLE 4.12: **Testing for Symmetry of Positive and Negative Cash Flow Shocks**

This table exhibits estimates of cash flows as characterized in the equation (3.20), based on constraints mentioned in equation (3.21). The first level differencing is considered while applying regression model. The system of equation (3.20) is processed while incorporating an interaction term equal to change in Cash Flow*Dummy, where Dummy equals 1 if a change in cash flow is positive and zero otherwise. The Dummy variable is incorporated in the regression model. Panel A displays the coefficients of the full sample, whereas panel B involves the estimates for sub-samples subject to financial constraint status. Panel B presents differences between coefficients in sub-samples.

Panel A: Full Sample				
Dependent Variable	Positive Cash Flow Shocks_{<i>i,t</i>}	Negative Cash Flow Shocks_{<i>i,t</i>}	Positive – Negative Cash Flow Shocks_{<i>i,t</i>}	R²
Capital Expenditures _{<i>i,t</i>}	0.0183 (0.0775)	– 0.0008 (0.8534)	0.0191 (0.0142)	0.41
Acquisitions _{<i>i,t</i>}	0.0423 (0.0295)	0.0368 (0.0314)	0.0055 (0.6651)	0.26
Asset Sales _{<i>i,t</i>}	0.0011 (0.8126)	– 0.0029 (0.0007)	0.004 (0.0642)	0.15
Equity Issues _{<i>i,t</i>}	0.0007 (0.8587)	– 0.0101 (0.0213)	0.0108 (0.1163)	0.43
Share Repurchases _{<i>i,t</i>}	0.0233 (0.0001)	0.0107 (0.0036)	0.0126 (0.0341)	0.17
Dividends _{<i>i,t</i>}	0.0148 (0.0001)	– 0.0011 (0.4378)	0.0159 (0.0003)	0.14
ΔLong-term Debt _{<i>i,t</i>}	– 0.2198 (0.0001)	– 0.1679 (0.0028)	– 0.0519 (0.3173)	0.22
ΔShort-term Debt _{<i>i,t</i>}	– 0.4051 (0.0001)	– 0.4306 (0.0001)	0.0255 (0.0001)	0.38
ΔCash Balances _{<i>i,t</i>}	– 0.0001 0.2994 (0.0001)	– 0.0001 0.3387 (0.0001)	– 0.3692 – 0.0393 (0.0001)	0.37

Panel B: Sub-samples

	Positive Cash Flow Shocks _{<i>i,t</i>}			Negative Cash Flow Shocks _{<i>i,t</i>}			Positive-Negative Cash Flow Shocks _{<i>i,t</i>}		
Dependent Variable	Un-constrained	Partially Constrained	Constrained	Un-constrained	Partially Constrained	Constrained	Un-constrained	Partially Constrained	Constrained
Capital Expenditures _{<i>i,t</i>}	0.0297	0.0018	-0.0031	0.0091	-0.0052	0.0067	0.0206	0.007	-0.0098
	(0.0772)	(0.8754)	(0.8399)	(0.4973)	(0.7102)	(0.8275)	(0.2953)	(0.5341)	(0.7669)
Acquisitions _{<i>i,t</i>}	0.0685	0.0215	0.0119	0.0489	0.0332	0.0931	0.0196	-0.0117	-0.0812
	(0.0621)	(0.1973)	(0.6365)	(0.1386)	(0.0431)	(0.0214)	(0.4873)	(0.5436)	(0.1141)
Asset Sales _{<i>i,t</i>}	-0.0016	-0.0011	-0.0029	0.0008	-0.0053	-0.0214	-0.0024	0.0042	0.0185
	(0.5874)	(0.6148)	(0.1823)	(0.8143)	(0.0113)	(0.0975)	(0.5762)	(0.2134)	(0.1639)
Equity Issues _{<i>i,t</i>}	0.0021	-0.0016	-0.0078	-0.0094	-0.0127	0.0093	0.0115	0.0111	-0.0171
	(0.9246)	(0.8371)	(0.0468)	(0.1386)	(0.0299)	(0.2041)	(0.4147)	(0.0397)	(0.0307)
Share Repurchases _{<i>i,t</i>}	0.0287	0.0217	0.0039	0.0072	0.0103	0.0117	0.0215	0.0114	-0.0078
	(0.0029)	(0.0832)	(0.0687)	(0.2976)	(0.0009)	(0.0051)	(0.0204)	(0.0542)	(0.1225)
Dividends _{<i>i,t</i>}	0.0213	0.0071	0.0062	-0.0023	-0.0021	0.0057	0.0236	0.0092	0.0005
	(0.0014)	(0.0045)	(0.0687)	(0.3688)	(0.4007)	(0.1287)	(0.0018)	(0.0069)	(0.8564)
ΔLong-term Debt _{<i>i,t</i>}	-0.2016	-0.1273	-0.4402	-0.3012	-0.0787	-0.1952	0.0996	-0.0486	-0.245
	(0.0385)	(0.0053)	(0.0001)	(0.0001)	(0.2107)	(0.1957)	(0.0765)	(0.2875)	(0.1613)
ΔShort-term Debt _{<i>i,t</i>}	-0.3223	-0.5017	-0.3486	-0.2614	-0.6103	-0.2553	-0.0609	0.1086	-0.0933
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0552)	(0.2216)	(0.2984)	(0.4413)
ΔCash Balances _{<i>i,t</i>}	0.3764	0.3521	0.2031	0.4104	0.2872	0.4425	-0.034	0.0649	-0.2394
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0043)	(0.0001)	(0.0001)
Firm-Years	201	419	217						

4.2.2 Robustness Check of Cash Flow Sensitivities

4.2.2.1 Summary Statistics

Table 4.13 describes the summary statistics of all the related variables. Winsorization is performed for an entire set of variables at 1% and 99%. Panel A reports summary statistics of the full sample, panel B declares the same for the pre-violation sample, panel C involves post-violation sample and panel D reports a mean comparison of variables of interest between pre- and post-violation samples. Various points in this output are noteworthy. After the declaration of violations, cash flows, cash holdings, and capital expenditures reduce to a certain extent. However, the degree of this decline varies. Average cash flows reduce significantly from 0.161 to 0.076 after the revelation of violation, a decline of over 50%. Average capital expenditures, on the other hand, also decline significantly from 0.387 to 0.270, showing a moderate drop of 30%. Average investment opportunities (as proxied by Q) slump from 1.778 to 1.223; by dropping on a moderate level of 31%. Average cash holdings go down from 0.173 to 0.142; by dropping 17% makes this factor least influenced by the four. Contrary to others, average leverage escalates from 0.383 to 0.403 after the violation announced publicly. It implies that firms rose more debt-based financing to overcome cash flows reduction.

Examining the correlation between key variables, in table 4.14, it is evident that correlation between cash flows and investments is lower than the same between cash holdings and investment. It can be inferred, thus, that investments are closely linked to cash holdings when compared to cash flows and investments. Results declare that cash flows, cash holdings, capital expenditure and Tobin's Q are not highly correlated. It, thus, mitigates the presence of multicollinearity among these key variables.

TABLE 4.13: Summary Statistics

Results presented in this table indicate the mean and standard deviation for all the variables concerned. The full sample covers 279 firms within the calendar years from 2000 to 2016 subject to the corresponding violation period, whereas the data collected are in context to violation year of the corresponding firm. Pre-violation and post-violation sample carry three calendar years before and after the violation year respectively. The definitions regarding each variable are displayed in the table previously. Cash flows, cash holding, and capital expenditures are scaled by the opening time period, whereas capital stock as in net balances of property, plant, and equipment.

Panel A: Full Sample					
	Mean	Std. Dev.	5th	50th	95th
Cash Flow	0.161	0.322	-0.466	0.113	0.622
Capital Expen- diture	0.327	0.449	0.029	0.278	1.262
Tobin's Q	1.532	1.377	0.795	1.468	3.829
Cash Holding	0.156	0.438	0.017	0.048	0.842
Leverage	0.391	0.229	0	0.26	0.74
Size	6.178	2.131	2.591	6.221	7.574
Panel B: Pre-violation					
Cash Flow	0.193	0.387	-0.511	0.223	0.72
Capital Expen- diture	0.387	0.511	0.034	0.314	1.373
Q	1.778	1.332	0.921	1.608	4.486
Cash Holding	0.173	0.487	0.013	0.049	0.912
Leverage	0.383	0.239	0	0.263	0.704
Size	5.933	2.106	2.524	5.981	9.689
Panel C: Post- violation					
Cash Flow	0.076	0.318	-0.428	0.133	0.529
Capital Expen- diture	0.27	0.304	0.023	0.196	0.964
Q	1.223	1.399	0.676	1.272	3.464
Cash Holding	0.142	0.491	0.007	0.035	0.701
Leverage	0.403	0.233	0	0.271	0.783
Size	6.566	2.164	2.698	6.666	7.914
Panel D: Mean Comparison (Pre vs. post-violation)					
Cash Flow	0.133***				
Capital Expen- diture	0.148***				
Cash Holding	0.029**				
Leverage	0.021**				
The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.					

TABLE 4.14: Correlation Matrix

This table reports correlation matrix of the study main variables for the pre-violation period. Variables' definitions are displayed in the appendix. The variables of interest, i.e. cash flows, capital expenditures, and cash holdings are deflated by opening period's capital stock (as in the total value of property, plant, and equipment).

Variables	Cash Flow	Capital Expenditure	Expen- diture	Tobin's Q	Cash Holding	Leverage	Size
Cash Flow	1						
Capital Expenditure	0.047	1					
Tobin's Q	-0.054		0.04	1			
Cash Holding	0.077		0.113	0.01	1		
Leverage	-0.06		-0.039	0.069	-0.004	1	
Size	0.411		0.423	-0.371	0.378	-0.382	1

4.2.2.2 Investments, Cash Flows and Cash Holdings for Pre-Violation Period

The OLS results of equation 3.22 with various dimensions are reported in Table 4.15. Conventional reduced form regression results are reported in column 1 of table 4.15 with cash flows and Q as explanatory variables on capital expenditures. The coefficient of $CF_{i,t}/K_{i,t-1}$ is found statistically insignificant at 0.141 and at 0.147, whereas $Q_{i,t-1}$ coefficient is significant at 1% level. It suggests that cash flows do not influence investments significantly and that investments are more linked to investment opportunities (as proxied by Q). Columns 2 through 5 contain results from auxiliary regression function having peculiar regression specifications. Coefficients of $CF_{i,t}/K_{i,t-1}$ like in reduced form previously, still remain insignificant and lowers up to 0.027 when more control variables are added to the model specifications. The coefficient of $Q_{i,t-1}$ is observed significant and positive with

the values from 0.113 to 0.172, suggesting that investment opportunities of the previous period (year) influence the current period's investment decision. However, positively significant coefficients of $CH_{i,t}/K_{i,t-1}$ are noted with the values from 0.397 to 0.475, implying that investments of firms are more sensitive to the cash holdings at the opening period than their current cash flows.

The $I_{i,t-1}/K_{i,t-2}$ coefficient, on the other hand, at 0.442 is statistically significant. It implies that lagged investments carry a strong impact on current investments, confirming inter-temporal and persistent characteristics in investment decisions. The finding is in line with the notion that investment friction translates firms' financial decisions concerning the internal source of funds for investments. Elaborating more in the view of economic standpoint, if investments are steady and possess high adjustment costs, firms will not rely on the current cash flows rather they will utilize cash holdings at the beginning of the period. The underlying logic is that cash holdings are a more reliable source of internal funds than the uncertain cash flows of the subsequent year.

The literature abundantly provides a support to the argument that while taking financial decisions, say regarding cash flows and cash holdings, investment frictions do play a role. Such financial constraints may also be present in the sampled fraud firms. However, the baseline results reflect a different scenario, showing most of the firms are financially unconstrained if investment-cash flow sensitivity is a valid tool for measuring financial constraints status. To avert this alternate explanation, the study makes a partition of sample into pre-violation and post-violation periods following [Shumway \(2001\)](#). This partition is based further on the financial constraint status. The study estimates equation 3.22 with the pre-violation sample for constrained, partially constrained and unconstrained firms, results of which are reported in table [4.16](#).

TABLE 4.15: **Investments, Cash Flows and Cash Holdings for Pre-Violation Period**

This table exhibits OLS regression output of Equation (3.22) for pre-violation sampled firms. Model's dependent variable is $I_{i,t}/K_{i,t-1}$, which is determined as capital expenditure of the firm in period t (year) deflated by the capital stock at the opening period. $CF_{i,t}/K_{i,t-1}$ is determined as cash flows of the firm in period t scaled by capital stock at the opening period. $CH_{i,t}/K_{i,t-1}$ is determined as cash holdings of the firm and short-run investments as sum of cash and short-run investments deflated by the capital stock at the opening period. $Q_{i,t-1}$ is determined as the ratio of asset's market value to asset's book value. $Size_{i,t-1}$ is determined as natural logarithm of the total assets at opening period. $Leverage_{i,t-1}$ is determined as long-run debt and current liabilities divided by net assets. $I_{i,t-1}/K_{i,t-2}$ is determined as capital expenditures in period $t-1$ scaled by capital stock at opening period $t-1$. Heteroskedasticity-robust t -stats are in parentheses and clustered at the firm level.

	(1)	(2)	(3)	(4)	(5)
$CF_{i,t}/K_{i,t-1}$	0.141 (-0.92)	0.068 (-0.74)	0.063 (-0.58)	0.034 (-0.31)	0.027 (-0.38)
$Q_{i,t-1}$	0.147*** (-3.38)	0.106** (-2.07)	0.113** (-2.16)	0.172** (-2.21)	0.120** (-2.4)
$CH_{i,t}/K_{i,t-1}$		0.397*** (-2.7)	0.461*** (-2.81)	0.475*** (-2.68)	0.464*** (-2.62)
$Size_{i,t-1}$			-0.259** (-2.47)	-0.243*** (-2.94)	-0.231*** (-2.85)
$Leverage_{i,t-1}$				-0.428** (-2.41)	-0.433** (-2.50)
$I_{i,t-1}/K_{i,t-2}$					0.442** (-2.31)
Year Effect	Yes	Yes	Yes	Yes	Yes
Firm Effect	Yes	Yes	Yes	Yes	Yes
R-square	0.53	0.62	0.67	0.68	0.75
N	837	837	837	837	837

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

4.2.2.3 Investments, Cash Flows, Cash Holdings and Financial Constraints for Pre-Violation Period

Columns-1 through 3 of table 4.16 report the OLS results of equation (3.22) of pre-violation sample firms, with a partition based on their financial constraints. The coefficients of cash flows-capital expenditures in all cases are found insignificant. It suggests, from the economic standpoint, that investments are not sensitive to cash flows inconsiderate to the status of financial constraints. Investment opportunities for the prior period are found significant and positive in case of unconstrained firms only. As found in baseline results, the coefficient of $CH_{i,t}/K_{i,t-1}$ is significant and positive in entire specifications, declaring that investments are positively linked to previous (lagged) cash holdings. Further, the same coefficient is noted larger in weight than that of partially constrained and unconstrained firms. It suggests that investment decisions undertaken by constrained firms are more sensitive to cash holdings when compared with partially constrained and unconstrained firms. Cash holdings, putting in other words, become more critical to constrained firms provided with the reason that such firms rely more on their internal funds for the investments eventually. Reliance on internal funds can further be justified as such firms are reluctant to alter their investment plan due to adjustment costs, so their investments do not fluctuate with contemporaneous cash flows.

Results declare that lagged capital expenditures have a positive and significant impact on current capital expenditures. The positive impact suggests that investments are persistent and carry inter-temporal features [as in (Lamont, 2000; Tsyplakov, 2008)]. It is consistent with the notion that real investment decisions are often based on investment frictions, like investment time lags and long investment horizons [as in (Whited and Wu, 2006)]. In addition, investments have potentially high adjustment costs, particularly if investment decisions are irreversible [as in (Cooper and Haltiwanger, 2006)]. It can thus be inferred that when the firms undertake inter-temporal investment decisions, their priority would base on investing with realized cash holdings instead of uncertain prevalent cash flows. This makes sense in economic view that firms try to avoid potential investment

adjustment costs that could be experienced when uncertain cash flows from the coming period are invested in.

TABLE 4.16: Investments and Financial Constraint for Pre-Violation Period

This table exhibits OLS regression output of Equation (3.22) for pre-violation sampled firms. Model's dependent variable is $I_{i,t}/K_{i,t-1}$, which is determined as capital expenditure of the firm in period t (year) deflated by the capital stock at the opening period. $CF_{i,t}/K_{i,t-1}$ is determined as cash flows of the firm in period t scaled by capital stock at the opening period. $CH_{i,t}/K_{i,t-1}$ is determined as cash holdings of the firm and short-run investments as sum of cash and short-run investments deflated by the capital stock at the opening period. $Q_{i,t-1}$ is determined as the ratio of asset's market value to asset's book value. $Size_{i,t-1}$ is determined as natural logarithm of the total assets at opening period. $Leverage_{i,t-1}$ is determined as long-run debt and current liabilities divided by net assets. $I_{i,t-1}/K_{i,t-2}$ is determined as capital expenditures in period $t-1$ scaled by capital stock at opening period $t-1$. Heteroskedasticity-robust t-stats are in parentheses and clustered at the firm level.

	Constrained	Partially Con- strained	Unconstrained
	(1)	(2)	(3)
$CF_{i,t}/K_{i,t-1}$	-0.091 (-0.92)	0.058 -0.63	0.044 -0.59
$Q_{i,t-1}$	0.11 -0.96	0.201 -1.3	0.071** -2.01
$CH_{i,t}/K_{i,t-1}$	0.512** -2.57	0.391** -2.46	0.170** -2.31
$Size_{i,t-1}$	-0.297** (-2.06)	-0.290** (-2.03)	-0.260*** (-3.54)
$Leverage_{i,t-1}$	-0.513* (-1.83)	-0.492** (-2.56)	-0.243** (-2.16)
$I_{i,t-1}/K_{i,t-2}$	0.431** -2.49	0.516** -3.01	0.440** -2.57
Year Effect	Yes	Yes	Yes
Firm Effect	Yes	Yes	Yes
R-square	0.71	0.68	0.83
N	837	837	837

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

4.2.2.4 Cash Holdings, Debt Issuance, and Payouts for Pre-Violation Period

Panel A through D in table 4.17 describes the multiple regressions output of equations (3.23) through (3.26) respectively. Based on potential constraint levels, each panel shows regression results of the system of equations for the sample of the pre-violation period. From panel A, it is evident that financially constrained firms consider accumulating cash from their cash flows, as the coefficient of CF is observed significantly positive. In case of partially constrained firms, the coefficient resulted is also significant and positive but carries lesser magnitude when compared to constrained firms. In contrast, for unconstrained firms, the coefficient is lesser and statistically insignificant with a different sign, implying such firms does not save cash in an organized effort. The underlying logic is connected to the economic standpoint that constrained firms, due to higher costs charged with external financing, are forced to save cash reserves for investment opportunities. Facing lesser difficulty in access to external financing and availing relatively lower costs, unconstrained firms do not prioritize accumulation of cash reserves in their normal course of action. Unconstrained firms, until their cash flow variation remains positive, it is not the dire need to raise extra funds for investment. However, these firms may raise extra cash from external financing in case of deficit level of cash in operations, which would be costly.

Constrained firms, on the other hand, when they acquire positive cash flows in the current period, they may transfer the accumulated cash reserve to the possible period of low cash flows in future in order to neutralize the fluctuation effect. On the same line, firms with the status of partial constraints save cash reserves out of positive streams of current cash flows, but the intensity to perform this operation as an organized activity is lesser. The finding confirms the prior studies, for instance, conducted by Almeida et al. (2004), Acharya et al. (2007) and others. Cash holdings of previous period are significant and negative to the current net cash holdings regardless of the constraint status. Justifiably to explain this, potentially constrained firms prefer to utilize cash holdings in the current period in order to avert financing frictions. The left out level of cash reserve from the

previous cash holding lowers the need to reach a threshold level for cash accumulation in the contemporaneous cash holdings. However, unconstrained firms, usually enforce cash holdings in order to pay back the debts or repurchase shares. Irrespective of the motive to accumulate cash reserves, unconstrained firms experience the similar relationship in this context.

While considering panel B of debt capacity regression, CF coefficients are noted significant and negative for financially unconstrained and partially constrained firms. It recommends that the firms utilize cash flows for repayment of debts. Same coefficients for the constrained firms are found significantly negative but their magnitude is negligible relatively. The findings reflect that repayment of debts through cash flows is a dominant outlay in consideration of unconstrained and partially constrained firms. The reason fundamentally attached to it is the presence of less financing frictions in the environment for unconstrained and partially constrained firms. They can conveniently arrange cash reserves from external sources when required. During the period of positive cash flow variation, these firms repay the debts when they have achieved the required level of cash holdings. The finding is in conformity with the debt overhang cost theory. When a firm finds positive cash flow shock, it may decide to lower debt overhang costs linked with future investments optimally. Putting in other words, it reduces the debt in the current period in motive to enhancing investment in succeeding periods.

Panel C incorporates the cash flows effect on dividend payouts. None of the coefficients related to CF are found significant in the relationship in both cases. The findings advocate that variation in dividends is not sensitive to the cash flow in the same period and are in accordance with [Dasgupta et al. \(2011\)](#). A notion narrating that dividends incline to be sticky and firms commonly smooth their dividends to retain them stable disregarding conditions of cash flows in operations ([Allen and Michaely, 2003](#)), is not evident in these findings. An alternative explanation to this finding can potentially be linked with the characteristic of inconsistency and reluctance in paying out dividends on regular basis, considering the factors of growth opportunities [for instance, ([Khan and Shamim, 2017](#); [Roomi et al., 2011](#))].

Impact of cash flows on share repurchases is reported in panel D. Only unconstrained firms are found to make share repurchases in the results. It reflects that in a situation when firms have positive cash flow sensitivity, unconstrained firms would opt to payout their stockholders provided with the level of cash reserves beyond financing requirements (for instance, debt and cash holdings). Through repurchasing decision, they reduce problems related to free cash flows and alleviate conflicts of interest between stockholders and management. On the contrary, constrained firms do not opt for repurchasing as they prefer accumulating cash holdings out of present cash flows.

Taken together, this section imparts the policies concerning cash flows of all firms (viz. constrained, partially constrained and unconstrained) with respect to cash holdings, issuance of debt and payouts during the pre-violation sample period. Considering results of previous two sections (i.e. 4.2.2.3 and 4.2.2.4), it appears that there is a presence of pecking order with respect to cash flows. Constrained firms facing high costs in raising external funds are required to build up cash holdings from the cash flows for future investments. Thus, whenever there exists a positive cash flow variation, these firms accumulate cash reserves on first priority. Relatively easy access to external sources of financing ensures unconstrained firms to preserve threshold level of cash holdings based on their future investment. When there is a surplus situation in cash flows, these firms optimally payback the debts in order to enhance the capacity of financing funds in future, and grant payouts to stockholders via share repurchases.

Veritably, cash flow policies of these firms are impartial. When firms are not performing sufficiently, market conditions becoming adverse and the pressure to satisfy shareholders, compel the firms to save cash and lower debts whenever they get positive cash flow shocks.

TABLE 4.17: **Cash Holdings, Debt Issuance and Payout Policy for Pre-Violation Period**

This table reports the OLS estimates of system-of-equations i.e. equations (3.23) through (3.26). Models' dependent variables are $\Delta CH_{i,t}$, $\Delta Debt_{i,t}$, $\Delta Dividend_{i,t}$ and $\Delta Repurchase_{i,t}$ which represent change in cash holdings, net issuance of long-run debt, dividends and stock repurchases measured from capital stock respectively. Heteroskedasticity-robust t-stats are in parentheses and clustered at the firm level.

Panel A	Constrained	Partially Constrained	Unconstrained
	(1)	(2)	(3)
$\Delta CH_{i,t}$			
$CF_{i,t}$	0.063*** -2.61	0.011*** -2.38	-0.03 (-0.35)
$Q_{i,t}$	0.006 -0.93	0.014 -1.06	0.003 -0.44
$Size_{i,t}$	0.025 -0.52	-0.039 (-0.18)	-0.001 (-0.22)
$CH_{i,t-1}$	-0.308*** (-2.70)	-0.187*** (-2.33)	-0.261*** (-4.19)
$\Delta Debt_{i,t}$	-0.458 (-0.89)	-0.221 (-0.30)	-0.195 (-1.20)
$\Delta Div_{i,t}$	0.011 -0.68	0.087 -0.12	-0.241 (-0.29)
$\Delta Repurchase_{i,t}$	-0.092 (-0.36)	0.004 -0.29	0.039 -0.54
R-square	0.13	0.16	0.11
Panel B	Constrained	Partially Constrained	Unconstrained
	(1)	(2)	(3)
$\Delta Debt_{i,t}$			
$CF_{i,t}$	-0.024** (-2.02)	-0.374*** (-3.66)	-0.407*** (-3.83)
$Q_{i,t}$	0.001 -0.62	0.004 -0.47	-0.015 (-1.37)
$Size_{i,t}$	0.013 -1.53	-0.003 (-1.32)	-0.012* (-1.65)
$Leverage_{i,t-1}$	0.013 -1	0.041 -0.87	-0.110** (-2.41)
$\Delta CH_{i,t}$	0.034 -0.34	0.079 -0.2	-0.168 (-1.09)
$\Delta Div_{i,t}$	0.815 -1.22	0.396 -0.97	-0.833** (-2.08)
$\Delta Repurchase_{i,t}$	-0.014 (-0.20)	-0.008 (-0.35)	0.01 -0.06
R-square	0.14	0.14	0.15

Panel C	Constrained	Partially Con- strained	Unconstrained
$\Delta\text{Div}_{i,t}$	(1)	(2)	(3)
$\text{CF}_{i,t}$	0.001 -0.06	0.023 -0.12	0.014 -0.59
$Q_{i,t}$	0.001 -0.41	0.014 -0.25	0.006*** -2.77
Size _t	0.002 -0.24	0.019*** -2.11	0.004*** -2.73
$\text{Div}_{i,t-1}$	-0.473*** (-4.94)	-0.401*** (-5.15)	-0.328*** (-4.95)
$\Delta\text{CH}_{i,t}$	-0.01 (-1.59)	-0.031 (-1.11)	0.057 -0.9
$\Delta\text{Debt}_{i,t}$	-0.027 (-0.42)	-0.103 (-0.27)	0.064 -1.12
$\Delta\text{Repurchase}_{i,t}$	0.004 -0.93	-0.015 (-0.88)	-0.037* (-1.89)
R-square	0.14	0.16	0.18
Panel D	Constrained	Partially Constrained	Unconstrained
$\Delta\text{Repurchase}_{i,t}$	(1)	(2)	(3)
$\text{CF}_{i,t}$	0.01 -0.074	0.229 -0.032	0.443** -2.24
$Q_{i,t}$	-0.007 (-1.29)	-0.013 (-0.99)	-0.008 (-0.51)
Size _{i,t}	-0.034 (-0.94)	-0.011 (-0.53)	-0.008 (-0.76)
$\text{Repurchase}_{i,t-1}$	-0.478*** (-5.24)	-0.394*** (-4.49)	-0.487*** (-5.60)
$\Delta\text{CH}_{i,t}$	0.077 -0.27	-0.476 -0.87	-0.68 (-1.13)
$\Delta\text{Debt}_{i,t}$	-0.019 (-0.39)	-0.118 (-0.75)	-0.328 (-0.64)
$\Delta\text{Div}_{i,t}$	0.391 -1.3	0.452 -0.94	0.912** -2.16
R-square	0.11	0.1	0.14
N	837	837	837

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

4.2.2.5 Investments, Cash Flows and Cash Holdings for Post-Violation Period

After the announcement of violation publicly, conditions become more adverse to the constrained firms. It will be interesting to inspect how these firms utilize their internal funds when facing negative cash flow shocks compared to others. The study estimates the relationships under this section, which are reported in table 4.18. Columns 1 through 5 of the said table express the regression output for equation (3.22) applied with different characteristics for the post-violation period. The results, in general, are matched with those of the pre-violation period. Investments are noted not responsive to cash flows with various specifications, while they are associated with the cash holdings significantly and positively. In furtherance of it, coefficients of lagged cash holdings are observed higher in extent after the violations revelation. The coefficients range from 0.680 to 0.772 in the post-violation period contrary to a range of 0.397 to 0.475 in the pre-violation period. Coefficients change range from 0.283 to 0.297 (with p-value < 0.01), highlighting that the firms are more reliable on their cash holdings for future spending after the violation revelation than they were before.

TABLE 4.18: **Investments, Cash Flows and Cash Holdings for Post-Violation Period**

This table exhibits OLS regression output of Equation (3.22) for post-violation sampled firms. Model's dependent variable is $I_{i,t}/K_{i,t-1}$, which is determined as capital expenditure of the firm in period t (year) deflated by the capital stock at the opening period. $CF_{i,t}/K_{i,t-1}$ is determined as cash flows of the firm in period t scaled by capital stock at the opening period. $CH_{i,t}/K_{i,t-1}$ is determined as cash holdings of the firm and short-run investments as sum of cash and short-run investments deflated by the capital stock at the opening period. $Q_{i,t-1}$ is determined as the ratio of asset's market value to asset's book value. $Size_{i,t-1}$ is determined as natural logarithm of the total assets at opening period. $Leverage_{i,t-1}$ is determined as long-run debt and current liabilities divided by net assets. $I_{i,t-1}/K_{i,t-2}$ is determined as capital expenditures in period $t-1$ scaled by capital stock at opening period $t-1$. Heteroskedasticity-robust t -stats are in parentheses and clustered at the firm level.

	(1)	(2)	(3)	(4)	(5)
$CF_{i,t}/K_{i,t-1}$	0.091	0.069	0.083	0.061	0.054
	-0.55	-0.71	-0.43	-0.34	-0.28
$Q_{i,t-1}$	0.129**	0.138**	0.115**	0.102**	0.111*
	-2.39	-2.48	-2.41	-2.3	-2.33
$CH_{i,t}/K_{i,t-1}$		0.680***	0.731***	0.772***	0.702***
		-8.09	-7.27	-7.43	-7.86
$Size_{i,t-1}$			-0.139**	-0.118*	-0.134*
			(-2.31)	(-1.91)	(-1.97)
$Leverage_{i,t-1}$				-0.271**	-0.301**
				(-1.97)	(-2.04)
$I_{i,t-1}/K_{i,t-2}$					0.391**
					-2.41
Year Effect	Yes	Yes	Yes	Yes	Yes
Firm Effect	Yes	Yes	Yes	Yes	Yes
R-square	0.64	0.71	0.73	0.78	0.81
N	837	837	837	837	837

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

4.2.2.6 Investments, Cash Flows, Cash Holdings and Financial Constraints for Post-Violation Period

Further, the study extends examining firms' investments through internal sources in presence of various financial constraints. An analogous approach as that in section 4.2.2.4 is applied by estimating equation (3.22) with a post-violation sample of financial constraint status. Results obtained from the estimation are reported in

table 4.19. All-embracing, results are in accordance with theoretical expectations. Disregarding status of financial constraint, cash flows do not possess a significant relationship with investment, whereas capital expenditures are observed positively affected by lagged cash holdings for every firm. In addition, coefficients of lagged cash holdings are larger in case of constrained firms comparatively. The difference in coefficient ranges from 0.446 to 0.537 (with p-value < 0.01) when compared constrained coefficient with partially constrained and unconstrained coefficient respectively, reflecting that dependence over cash holdings endures more in case of constrained firms than unconstrained firms. With one accord in sections 4.2.2.3 and 4.2.2.4, results, in general, demonstrate that preference of using cash holdings over cash flows for investments is made in order to avert adjustment costs when firms confront to investment frictions, like investment persistence and investment time lags. It is evident also that when levels of cash flows follow a downturn, the relationship between investment and cash holdings becomes more strong.

TABLE 4.19: Investments and Financial Constraint for Post-Violation Period

This table exhibits OLS regression output of Equation (3.22) for post-violation sampled firms. Model's dependent variable is $I_{i,t}/K_{i,t-1}$, which is determined as capital expenditure of the firm in period t (year) deflated by the capital stock at the opening period. $CF_{i,t}/K_{i,t-1}$ is determined as cash flows of the firm in period t scaled by capital stock at the opening period. $CH_{i,t}/K_{i,t-1}$ is determined as cash holdings of the firm and short-run investments as sum of cash and short-run investments deflated by the capital stock at the opening period. $Q_{i,t-1}$ is determined as the ratio of asset's market value to asset's book value. $Size_{i,t-1}$ is determined as natural logarithm of the total assets at opening period. $Leverage_{i,t-1}$ is determined as long-run debt and current liabilities divided by net assets. $I_{i,t-1}/K_{i,t-2}$ is determined as capital expenditures in period $t-1$ scaled by capital stock at opening period $t-1$. Heteroskedasticity-robust t-stats are in parentheses and clustered at the firm level.

	Constrained	Partially Constrained	Unconstrained
	(1)	(2)	(3)
$CF_{i,t}/K_{i,t-1}$	0.092 -0.32	-0.034 (-0.79)	-0.06 (-1.14)
$Q_{i,t-1}$	0.094**	0.189**	0.198**
$CH_{i,t}/K_{i,t-1}$	-1.98 0.753***	-2.51 0.307**	-2.3 0.216**
$Size_{i,t-1}$	-7.85 -0.255**	-2.45 -0.092	-2.56 -0.077
$Leverage_{i,t-1}$	(-2.12) -0.382	(-1.61) -0.631***	(-1.61) -0.578***
$I_{i,t-1}/K_{i,t-2}$	(-1.17) 0.354**	(-3.21) 0.362**	(-2.85) 0.397**
	-2.12	2.23	-2.26
Year Effect	Yes	Yes	Yes
Firm Effect	Yes	Yes	Yes
R-square	0.86	0.81	0.84
N	837	837	837

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

4.2.2.7 Cash Holdings, Debt Issuance, and Payouts for Post-Violation Period

The preceding section, viz. section 4.2.2.5 revealed that firms may be practicing pecking order in respect of cash flow outlays during the pre-violation period, suggesting firms would choose to accumulate cash reserves from cash flows through business operations when they are financially constrained. On contrary, unconstrained firms would utilize cash flows to pay back their debts and repurchase shares. The revelation of violations by the regulator not only reduces the cash flows of constrained firms but also worsens financing frictions. This section accounts for examining cash flow policies during the post-violation period. An identical approach is applied as that employed in section 4.2.2.5 with a system of equations involving equations (3.23) through (3.26) based on the financial constraint status. Results of this estimation are reported in panel A through D (see table 4.20). Variable specifications are identical with that of the model used in pre-violation period.

The study emphasizes the results that differ from those while considering pre-violation sample. First, unconstrained firms also accumulate cash reserves from their cash flows during the post-violation period. The coefficient of cash flows on cash holdings is noted significant and positive for these firms. The possible reason behind this act, can be determined as a reduction in cash flows from operations, and worsen financing frictions. Second, unconstrained firms do not impose share repurchase decision. Only one coefficient of cash flows on share repurchase is observed significant but at 10% level of significance, reflecting that reduction in cash flows in the post-violation period, restrained firms to payout stockholders through share repurchases. The policies related to debt and dividends payout stays same as observed in the pre-violation period. For unconstrained firms, the cash flows have a negative impact on the issuance of debt, which shows that they will attempt to generate more debt when found lower cash flows than the threshold level of cash holdings. However, this relationship is found statistically insignificant for constrained and partially constrained firms, confirming that access to external funds become more difficult and adjustment costs turn too high. Dividend policies, in

the same vein, are noted not responsive to cash flow changes, which in turn verify the sticky behavior of dividends.

In sum, the results from this section indicate that cash flow policies of the constrained and partially constrained firms are affected after the revelation of violations, with respect to cash reserves. The findings verify the implications of pecking order theory. In case of lower cash flows, constrained firms would react in saving cash from operational cash flows, and prevent payouts to stockholders. Unconstrained firms, conversely, can still generate debt financing from external sources and at relatively lower cost. Liquidity constraints make the conditions worsen for constrained firms with high rate and for partially constrained firms with the relatively lower rate.

TABLE 4.20: **Cash Holdings, Debt Issuance and Payout Policy for Post-Violation Period**

This table reports the OLS estimates of system-of-equations i.e. equations (3.23) through (3.26). Models' dependent variables are $\Delta CH_{i,t}$, $\Delta Debt_{i,t}$, $\Delta Dividend_{i,t}$ and $\Delta Repurchase_{i,t}$ which represent change in cash holdings, net issuance of long-run debt, dividends and stock repurchases measured from capital stock respectively. Heteroskedasticity-robust t-stats are in parentheses and clustered at the firm level.

Panel A	Constrained	Partially Constrained	Unconstrained
$\Delta CH_{i,t}$	(1)	(2)	(3)
$CF_{i,t}$	0.481** -2.61	0.296*** -2.31	0.211** -2.43
$Q_{i,t}$	-0.205 (-0.23)	-0.018 (-0.23)	0.003 -0.11
$Size_{i,t}$	0.902 -0.94	0.051 -0.17	-0.021 (-0.13)
$CH_{i,t-1}$	-0.412** (-0.24)	-0.696** (-2.46)	-0.154** (-2.51)
$\Delta Debt_{i,t}$	-0.21 (-0.17)	-0.793 (-0.47)	-0.304* (-1.84)
$\Delta Div_{i,t}$	0.12 -1.01	0.098 -0.91	0.235 -1.43
$\Delta Repurchase_{i,t}$	-0.242 (-0.24)	-0.403 (-0.63)	-0.137 -0.78
R-square	0.15	0.19	0.16

Panel B	Constrained	Partially Constrained	Unconstrained
	(1)	(2)	(3)
$\Delta\text{Debt}_{i,t}$			
$\text{CF}_{i,t}$	-0.034* (-1.85)	0.068* -1.83	-0.721** (-2.42)
$\text{Q}_{i,t}$	0.021 -0.79	-0.051 (-1.17)	-0.136 (-0.31)
$\text{Size}_{i,t}$	-0.016 (-1.23)	0.036 -0.15	-0.013 (-0.14)
$\text{Leverage}_{i,t-1}$	-0.032 (-0.17)	-0.645* (-1.85)	-0.214* (-1.87)
$\Delta\text{CH}_{i,t}$	0.105 -0.67	-0.793 (-0.49)	-0.713 (-0.31)
$\Delta\text{Div}_{i,t}$	-0.691 (-1.61)	-0.869 (-0.24)	-0.579 (-0.30)
$\Delta\text{Repurchase}_{i,t}$	0.221 -0.64	-0.227 (-0.39)	-0.147 -0.81
R-square	0.13	0.16	0.15
Panel C	Constrained	Partially Constrained	Unconstrained
	(1)	(2)	(3)
$\Delta\text{Div}_{i,t}$			
$\text{CF}_{i,t}$	-0.017 (-0.19)	0.031 -0.68	0.024 -1.31
$\text{Q}_{i,t}$	0.009 -0.71	0.001 -0.11	0.007 -0.38
$\text{Size}_{i,t}$	-0.003 (-0.17)	-0.016 (-0.73)	-0.019 (-0.11)
$\text{Div}_{i,t-1}$	-0.081 (-0.31)	-0.043 (-0.46)	-0.024 (-0.51)
$\Delta\text{CH}_{i,t}$	0.015 -0.77	-0.013 (-0.13)	0.054 -1.08
$\Delta\text{Debt}_{i,t}$	-0.072 (-0.23)	0.042 -1.65	0.04 -0.87
$\Delta\text{Repurchase}_{i,t}$	0.014 -0.31	0.014 -0.37	0.008 -0.37
R-square	0.14	0.15	0.17

Panel D	Constrained	Partially Constrained	Unconstrained
$\Delta\text{Repurchase}_{i,t}$	(1)	(2)	(3)
$\text{CF}_{i,t}$	-0.091 (-0.13)	0.291 -0.15	0.142* -0.51
$\text{Q}_{i,t}$	0.006 -0.15	-0.053 (-0.07)	-0.071* (-1.91)
$\text{Size}_{i,t}$	-0.073 (-0.14)	-0.121 (-0.15)	0.025* -1.97
$\text{Repurchase}_{i,t-1}$	-0.981** (-2.21)	-0.301** (-2.17)	-0.710** (-2.71)
$\Delta\text{CH}_{i,t}$	0.153 -0.16	0.473 -0.11	-0.119 (-0.94)
$\Delta\text{Debt}_{i,t}$	-0.71 (-0.18)	0.931 -0.16	-0.983* (-1.97)
$\Delta\text{Div}_{i,t}$	-0.352 (-0.51)	0.275 -0.17	0.61 -0.24
R-square	0.12	0.13	0.15
N	837	837	837

The symbols *, **, *** denote statistical significance at level 10%, 5% and 1% respectively.

4.2.3 Summary of Main Analysis and Robustness Check

Results evidenced from both of the analyses indicate conformity to the argument that financial decisions in the corporate trilogy are jointly determined and have persistence (inter-temporal in nature). When tested with the context of financial health status, investment options remain unresponsive to cash flows. The main analysis justifies this position by arguing that firms alter their net debt from cash flow changes and protect their capital expenditures. When there is a shortfall in cash flows, firms respond by lowering debt and enhancing cash reserves. In case of a cash flow rise, firms lower the debt and enhance cash reserves. On the other side, the robust analysis rationalizes it with the reason that firms prefer using cash holdings over cash flows. Capital expenditures turn more responsive to cash holdings during the post-violation period. Both reject the notion that firms make investment sub-optimally following the difficulty faced in generating external capital.

4.3 Objective 3

This section details the results and discussion of testing study hypotheses when analyzing the impact of violations on liquidity measures, as a market response and its subsequent translation into cumulative abnormal returns.

4.3.1 Summary Statistics of Liquidity Measures

In table 4.21, the study reports summary statistics of the liquidity measures, DS ratio, volume and return. Computation of each variable is made with the daily data for the benchmark duration of 248 days by averaging over 63 firms. 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, a one cent rise in the quoted spread on average causes a corresponding rise in the depth of around 1,100 shares.

TABLE 4.21: Summary Statistics of Liquidity Measures

This table reports the average values computed by each firm for the five liquidity measures, DS ratio, volume and return with the daily data for the benchmark period of 248 days. QSPRD represents quoted spread which equals to ask minus bid price; RQSPRD stands for relative spread which equals the quoted spread divided by quote midpoint (i.e. ask + bid/2); ESPRD represents effective spread which is calculated by taking the difference of trade price and quote midpoint and multiplying the resultant value with 2; RESPRD exhibits relative effective spread which is measured by dividing the effective spread with the trade price; DEP stands for depth.

	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

4.3.2 Univariate Analysis

The study tests whether the liquidity measures on average are significantly different from the benchmark values for sample period in table 4.22. The results obtained support the hypothesis of reduction in liquidity, partially (in terms of significance), in the days surrounding violations in the context of quoted and effective spread. These measures of liquidity are deteriorated on average during the event dates that range from the day -2 to 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, it is observed that there is price improvement (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 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 counterpart of quoted and effective spread. Notwithstanding, these percentage measures remain indifferent statistically from the benchmark for intermediate and long-run effects. However, the percentage spreads during the event dates (except intermediate and long-term effects) are observed to rise, implying that liquidity conditions are worsening in the market. The spreads in cents, confirming the prediction of [Easley and O'hara \(1992\)](#) that volume shocks are 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 rise in depth size and the movement in volume series are correlated around the event dates, confirming the inference of market liquidity direction as discussed in [Lee et al. \(1993\)](#). In addition, the abnormally low volume of trading displays an inverse relation with the liquidity measures as predicted by [Easley and O'hara \(1992\)](#).

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, progress in intermediate and long-term effects relative to the benchmark might indicate a high degree of information asymmetry prior to violations' announcement and the succeeding abated informational surrounding after the violations' announcement.

TABLE 4.22: The Results for the Scandal Period

The table reports a statistical comparison of the average level of each liquidity measure based on daily data with the corresponding benchmark, considering previous 248 trading days. QSPRD represents quoted spread which equals to ask minus bid price; RQSPRD stands for relative spread which equals the quoted spread divided by quote midpoint (i.e. ask + bid/2); ESPRD represents effective spread which is calculated by taking the difference of trade price (or execution price) and quote midpoint and multiplying the resultant value with 2; RESPRD exhibits relative effective spread which is measured by dividing the effective spread with the trade price; DEP stands for depth; DS ratio represents ratio of depth to quoted spread; Volume shows rupee transactions in concerned securities; Return exhibits change in rupee value over an investment expressed in percentage.

		Benchmark	day -2	day -1	day 0	day +1	day +2	Intermediate	Long-term
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	1.1	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 %)	-0.031	-0.201	-0.24*	-0.538***	-0.577***	-0.584	-0.07	0.108
	t-value		-1.4	-1.9	-2.92	-2.61	-0.86	-0.4	1.19

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

4.3.3 Multivariate Analysis

Table 4.23 reports the findings obtained from estimating the simultaneous system of equation with which the study examines the impact of deteriorated liquidity on stock returns surrounding the day of violations' announcement. For the reason that there is a distinguishing level of liquidity drop between in the sample firms in the pre-violation duration and in the post-violation duration, 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 related to the impact of violations on the change in the spread are also provided in the support to study inferences. Change in price contains an unfavorable impact 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. There is a stronger effect of price on the spread in the post-violation than the pre-violation period. A similar influence is observed in case of variance return. The estimate of trading activity through rupee volume in post-violation further implies that a decline in the activity leads to liquidity deterioration. 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.

The coefficient of CAR equation by incorporating the estimated value of the change in spread, referring equation (3.33), is reported in panel B. The study finds negative variations in the spread seemingly influence the abnormal return, which implies an additional return over the market. In addition, the 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 expected spread. By and large, univariate analysis and multivariate analysis recommends a decline in liquidity after the violations announcements. Information asymmetry originated through financial violations is diminished in the long-term. The changes in the informational environment could assist in lowering the information asymmetry (between informed and uninformed investors).

TABLE 4.23: The Results of 2SLS

This table exhibits results generated through a system of equation in which the impact of liquidity (worsened) on the stock return is examined around the day of violations announcement. For predicted value of change in spread, estimated coefficients are presented in panel A, which in turn is undertaken as the explanatory variable in panel B. The difference of average values for twenty days before and after the violation announcement (i.e. former average value minus latter average value) is presented in panel A. ΔP , ΔVAR , ΔV , and ΔMV exhibit a change in mean price, in variance of return, in rupee volume, and market capitalization respectively. To address the robustness issues of splitting the sample period, the study divided the sample into two parts: pre-violations and post-violations. The same test for the accumulated period is executed.

Panel A: Dependent variable is ΔS						
	(1)		(2)		(3)	
Variable	Entire Period		Pre-violation		Post-violation	
	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value
Intercept (Violation)	-0.017**	-2.16	0.068***	3.11	-0.021**	-2.09
ΔP	-0.794***	-8.43	-0.37**	-2.13	-0.983***	-7.185
ΔVAR	1.063*	1.84	-2.24	-0.44	1.129***	5.14
ΔV	-0.054	-0.9	-0.216*	-1.85	-0.12**	-2.04
ΔMV	0.007	0.13	-0.011	-0.21	-0.003	-0.06
Adj_Rsquare	0.164		0.234		0.205	
Panel B: Dependent variable is ΔCAR						
Variable	Entire Period		Pre-violation		Post- violation	
	Estimate	t-Value	Estimate	t-Value	Estimate	t-Value
Intercept	-0.002***	-11.34	0.005***	10.78	0.003***	9.66
ΔS	-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.

4.4 Objective 4

This section details the results and discussion of testing study hypotheses into two sub-objectives. Initially, the governance structure of sample firms one year before violations' revelation is examined and compared with the subsequent changes in quality of governance mechanism. In addition, as a second sub-objective, the study tests whether developments in governance structure help fraud firms in recovering reputations with informed members of capital market and restoring stock values. The study involves, thus, three subsequent years to examine these objectives.

4.4.1 Summary Statistics for Fraud and Control Firms

Table 4.24 reports matching statistics for fraud and control firms. It is indicated that both samples do not differ significantly based on their net sales and book value of assets.

TABLE 4.24: Matching Statistics for Fraud and Control Firms

The table reports descriptive statistics of the fraud firms along with control firms based on year and net sales. The means difference of the two samples is captured by t-statistics. Wilcoxon signed rank test is used to compute p-values.

	Fraud Firm	Control Firm		Fraud Firm	Control Firm	
Variable	Mean (in millions)	Mean (in millions)	t-statistic	Median (in millions)	Median (in millions)	p-value
Log(Sales)	0.063	0.071	0.81	0.03	0.037	0.27
Log(Assets)	0.11	0.098	0.38	0.002	0.053	0.19
Total	77	77		77	77	

4.4.2 Univariate Analysis

Table 4.25 presents differences between fraud firms and control firms applying tests of significance. The study examines whether the firms considered as fraud sample possess governance structure identical to those undertaken in previous studies. It

further analyzes the forecasts made concerning governance variables. The findings reported in panel A indicate that in the year prior to fraud detection (Initial) for fraud firms, the average OutsideDir% is 44 percent whereas the same for control firms is 57 percent. This difference (13 percent) is observed statistically significant ($t = -2.63$) and confirms the findings of [Beasley \(1996\)](#) and [Dechow et al. \(1996\)](#). #OutsideDir, on the other hand, in Initial is found 3.78 for fraud firms in contrast to 4.96 for control firms bearing the difference (0.8) as statistically significant ($t = -2.21$). However, in the year 1 through 3, fraud firms are noted to vary OutsideDir% more, suggesting thereby in conformity to the hypothesis that they enlarge percentage of outside directors greater than control firms after the fraud is detected. Considering the entire study period, #OutsideDir change is noted more in case of fraud firms. Despite that, the difference in #OutsideDir change is statistically significant after year 2. In case of a change in #Directors, the difference remains insignificant over the duration of analysis except for the year 1, where fraud firms show greater drop compared to control firms ($t = -2.39$). Nevertheless, a decline in a number of directors explains fragment of this result, it implies that fraud firms reform their reputational capital with the inclusion of outside directors (both in number and proportion). Results further exhibit that the average #AudComMeet in case of fraud sample in Initial (1.58) is statistically lesser in contrast to the control sample (2.03, $t = -1.51$). This finding contradicts to what reported in [Beasley \(1996\)](#) and potentially procures by the virtue of more power in study tests.

Panel B reports the aggregate change in #AudComMeet in Initial from year 1 through year 3 afterward. While considering a change in average #AudComMeet over the entire duration of analysis, it is found larger for fraud firms than control firms. It supports the hypothesis that a number of audit committee meetings is more frequent in fraud firms comparatively. The average #AudComMeet at Final is also noted large in case of fraud firms (2.97 versus 2.40). This difference in the two means is significant (one-tailed, at 10 percent level). On the whole, there is 87 percent increase in #AudComMeet from the year preceding fraud detection to the third year afterward. It implies in some measure that concerning detection

of fraud the audit committee is asserting more consideration to the financial reporting procedure. In addition to it, results reveal that #FinlExperts in Initial are significantly lesser for fraud firms (0.51 for fraud firms versus 0.76 for control firms, $t = -2.38$). This difference endures, nevertheless, at the end of study period. The greater part of the #Aud_OS is observed in the year prior to fraud detection for the fraud firms. However, when considering the Initial or the period through the third year afterward, fraud firms and control firms do not differentiate.

The fraud firms, overall from these results, experienced less number of meetings adhered in Initial. It may be inferred reasonably that besides possessing a certain degree of financial expertise and comprising appropriate outsiders in audit committee, it seems that they didn't take notice substantially of financial reporting procedure. Therefrom, seemingly number of audit committee meetings appears to be more related to determining the likeliness of fraud occurrence.

While looking into panel C, results demonstrate that in Initial, the proportion of CEO-COB is noted 89 percent in case of firms in contrast to 83 percent for control firms, the difference being statistically significant between the two proportions ($t = 2.83$). This finding confirms the [Dechow et al. \(1996\)](#) in which one year before fraud detection, fraud firms carry joint position of CEO and COB with 86 percent against 74 percent of control firms in the pre-fraud year. The study pinpoints from the results that at the end of the analysis period, there is not enough support for the difference in this variable between the two samples. It is noted, in addition to it, that BLK% is significantly lesser for fraud firms in Initial ($t = -2.13$) when contrasted with control firms. The finding is steady when compared with that in [Dechow et al. \(1996\)](#). However, this difference remains no more at the end of analysis duration, implying that holdings in the fraud firms are enhanced with the block-holders. The study further finds fraud firms and control firms remain indifferent in InstOwn% both in Initial and at the analysis period end, whereas in case of InstOwn% fraud firms undergo a larger decline throughout the duration of analysis. Lastly, the study finds no discrimination in InsideOwn% between fraud and control firms throughout the analysis period.

In a nutshell, study observes in the pre-fraud period that weak governance dimensions prevail in fraud firms in terms of outside director percentage, the number of audit committee meetings, the outside directors' number, frequency of audit committee meetings, count of financial experts on audit committees, the proportion of combined CEO-COB position, and the portion of block-holder ownership. A noticeable finding is observed in the results which portray that after the third year following fraud detection, fraud and control firms remain unchanged in outside director percentage and the combined CEO-COB position's proportion. More interestingly, fraud firms undergo from a higher number of audit committee meetings compared to control firms. All inclusive, the results support the study hypothesis and possibly reflect that fraud firms strive for financial information integrity in their reporting. From these results, the study examines next the issues whether fraud firms are able to revive their reputation with the stock market.

TABLE 4.25: **Univariate Comparisons of Board of Director, Audit Committee, and Other Corporate Governance Variables**

The table presents univariate comparisons of board of directors, audit committee and other variables involved related to corporate governance. The related variables are described as under. OutsideDir% exhibits outside director percentage; #OutsideDir represents number of outside directors; #Directors shows number of directors; #AudComMeet represents number of audit committee meetings; #AudComMbrs exhibits number of audit committee members; #Aud_OS shows number of outside directors on audit committee; #FinExp exhibits number of financial experts on audit committee; CEO_COB depicts proportion of firms with the combined CEO/COB position; BLK% exhibits percentage of shares held by 5% blockholders; InstOwn% exhibits the percentage of shares held by institutions; and InsideOwn% represents the percentage of shares held by management and directors.

Panel A: Board of Director Characteristics

Variable	Firm	Year				
		Initial	1	2	3	Final
OutsideDir%	Fraud	44.02	2.96	3.47	6.64	54.68
	Control	56.71	-1.08	-1.33	-1.91	57.03
	(t-stat)	(-2.63)***	(2.21)**	(1.59)*	(2.95)***	(-0.17)
#OutsideDir	Fraud	3.78	0.04	0.11	0.28	4.12
	Control	4.96	-0.03	-0.16	-0.23	4.85
	(t-stat)	(-2.21)**	-0.41	-1.08	(1.91)**	(-0.68)
#Directors	Fraud	7.03	-0.38	-0.44	-0.46	5.96
	Control	6.64	0.07	-0.19	-0.3	6.27
	(t-stat)	(-1.22)	(-2.39)**	(-0.91)	(-0.67)	(-0.98)

Panel B: Audit Committee Characteristics

Variable	Firm	Year				
		Initial	1	2	3	Final
#AudComMeet	Fraud	1.58	0.91	1.41	1.35	2.97
	Control	2.03	0.11	0.2	0.46	2.4
	(t-stat)	(-1.51)*	(2.82)**	(3.64)**	(1.81)**	(1.49)*
#AudComMbrs	Fraud	2.41	0.07	-0.05	0.1	2.94
	Control	2.33	0.03	0.06	0.25	2.75
	(t-stat)	-0.38	(-0.14)	(-0.28)	(-0.65)	-0.96
#Aud_OS	Fraud	2.48	-0.18	-0.3	-0.14	2.79
	Control	2.27	-0.14	-0.13	-0.03	2.65
	(t-stat)	(-0.21)	(-1.36)	(-1.51)	(-0.26)	-0.72
#FinExp	Fraud	0.51	0.04	0.06	0.05	0.54
	Control	0.76	-0.03	-0.05	-0.04	0.81
	(t-stat)	(-2.38)***	-0.03	-0.51	-1.7	(-1.88)**

Panel C: Other Governance Variables						
Variable	Firm	Year				
		Initial	1	2	3	Final
CEO_COB	Fraud	0.89	-0.04	-0.06	-0.14	0.74
	Control	0.83	0.01	0.03	0.03	0.88
	(t-stat)	(2.83)***	(-1.93)**	(-2.38)***	(3.47)***	(-0.95)
BLK%	Fraud	7.85	3.01	4.36	6.13	16.77
	Control	12.79	-2.63	-0.48	1.21	14.81
	(t-stat)	(-2.13)**	(2.41)**	(2.16)**	(1.83)*	-1.06
InstOwn%	Fraud	0.04	-0.002	-0.004	-0.005	0.05
	Control	0.07	0.001	0.003	0.001	0.06
	(t-stat)	-1.28	(-2.04)*	(-2.24)**	(-2.46)**	(-0.29)
InsideOwn%	Fraud	17.3	-6.03	-2.77	-1.72	14.9
	Control	20.53	-1.68	-3.91	-0.62	16.79
	(t-stat)	(-0.37)	(-1.51)	-0.53	(-0.47)	(-0.07)

*, **, *** represent significant at the 10%, 5%, and 1% levels, respectively, based on one-tailed tests, except for BLK% and INST%, for which no directional predictions are made.

Initial and Final represent the first (pre-fraud detection) and last years of the analysis period, respectively; the variables for these years are measured in levels.

Years 1, 2, and 3 represent years relative to the pre-fraud detection year (Initial); the variables for these years are measured as changes from Initial.

4.4.3 Descriptive Statistics and Pearson Pairwise Correlations

Panel A of table 4.26 presents the descriptive statistics of fraud and control firms, and stock exchange index in respect of these mentioned variables and the raw returns for the three years after fraud revelation. The results depict that mean (median) raw return of fraud sample is -22 percent (-32 percent) in contrast to that for control sample and stock exchange index as 37 percent (0.04 percent) and 33 percent (22 percent) respectively. The findings imply that during the analysis period when fraud firms face negative abnormal returns, they take negative raw returns as well.

Panel B, on the other hand, reports the correlations (Pearson pairwise) for returns, change in net income, governance changes and control variables for fraud firms over three years after fraud revelation. From this panel, it is evident that BHAR carries

positive correlation with $\Delta\text{OutsideDir}\%$ (23.1 percent), BMV (19.7 percent), and Fraud_Return (87.9 percent) at 1 percent level. Besides BHAR, $\Delta\text{OutsideDir}\%$ has a positive correlation with Fraud_Return (28.6 percent) at 10 percent level. $\Delta\#\text{AudComMeet}$ likewise is correlated positively with BMV (31.4 percent) at 1 percent level. Albeit these associations, the ΔROA , $\Delta\#\text{AudComMeet}$, and MVE do not possess correlation with BHAR. On the whole, these pairwise correlations look rational and appear not sufficiently high to originate multicollinearity issues in the regression model reported in table 4.26.

TABLE 4.26: Descriptive Statistics and Pearson Pairwise Correlations for Returns, Change in Net Income, Governance Changes, and Control Variables for Fraud Firms for the Three-Year Period following Fraud Detection

The table contains the model variables as BHAR = the buy-and-hold abnormal return for the three years after fraud revelation applying the PSX index; Fraud_Return = the fraud firms' raw buy-and-hold return for the three years after fraud revelation; Control_Return = the control firms' raw buy-and-hold return for the three years after fraud revelation; Mktr_PSX = the PSX index return for the three years after fraud revelation; ΔROA = the change in net income scaled by total assets for the three years after fraud revelation; $\Delta\text{OutsideDir}\%$ = the lagged variation in outside director percentage for entire analysis period; $\Delta\#\text{AudComMeet}$ = the lagged change in the number of audit committee meetings for entire analysis period; BMV = the book value per share divided by the market value per share; and MVE = the natural logarithm of the market value of equity.

Panel A: Descriptive Statistics of Return, Governance Variables, and Control Variables

Variable	Mean	Std. Dev.	Median	First Quartile	Third Quartile
BHAR	-0.47	0.67	-0.78	-0.87	0.03
Fraud_Return	-0.19	0.71	-0.26	-0.66	0.44
Control_Return	0.37	1.29	0.04	-0.37	0.61
Mktr_PSX	0.33	0.26	0.22	0.09	0.46
ΔROA	-0.13	0.57	0.04	-0.06	0.13
$\Delta\text{OutsideDir}\%$	7.04	13.45	4.85	0.01	13.24
BMV	9.14	49.74	0.06	0.03	0.11
MVE	3.54	2.14	3.94	2.85	4.75

Panel B: Pearson Pairwise Correlations for Returns, Change in Net Income, Governance Changes, and Control Variables

	BHAR	ΔROA	ΔOutsideDir%	Δ#AudComMeet	BMV	MVE	Fraud_Return
BHAR	100%	13.70%	23.1%***	8.30%	19.7%***	7.80%	87.9%***
Δ ROA		100%	19.60%	5.50%	14.30%	6.50%	9.30%
Δ OutsideDir%			100%	8.90%	-1.30%	-7.40%	28.6%*
Δ #AudComMeet				100%	31.4%***	10.20%	-13.40%
BMV					100%	-45.4%***	17.30%
MVE						100%	12.60%
Fraud_Return							100%

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

4.4.4 Regression Estimates of BHAR

The results concerning regression analysis of the buy and hold abnormal returns on the set of independent variables in equation 3.35 are reported in table 4.27. Buy and hold an abnormal return (BHAR) is the dependent variable based on PSX index for the fraud sample over the three years after detection of fraud. The study applies lagged form of governance variables since the majority of the variations in governance variables incur from the second year-end after the revelation of fraud (see table 4.25). Results, from table 4.27, support the notion that improvements in outside director percentage are critical in defining abnormal returns. From model 1, the estimated coefficient of $\Delta\text{OutsideDir}\%$ is observed significantly and positively affecting the BHAR at 5 percent level ($t = 2.27$), while in case of $\Delta\#\text{AudComMeet}$ it is negative but statistically insignificant. It suggests on economic standpoint that an increase in board independence cause rise in market values. This finding is in line with the findings of [Rosenstein and Wyatt \(1990\)](#), even so, is ten times the economic significance compared to their results. The estimated value of $\Delta\text{OutsideDir}\%$ is 0.018 and conventionally it suggests that a 1.8 percent rise in BHAR is linked with one percent rise in outside director percentage (economically significant). On the other hand, estimates of BMV and MVE are noted statistically insignificant. More interestingly, model 1 presents adjusted R^2 to be 19.06 percent. Reasonably this inflated adjusted R^2 prevails due to $\Delta\text{OutsideDir}\%$ being applied in place of changes in earnings.

Thus, in model 2 the study examines the significance of ΔROA in determining returns. The findings reveal that the estimate of ΔROA is statistically insignificant, having the value of R^2 as 0.08 percent. In wake of these results, the study, therefore, examines the accumulative explanatory value of $\Delta\text{OutsideDir}\%$ over ΔROA in model 3. The estimate observed carries a slightly lower level of significance at 5 percent ($t = 2.13$) compared to model 1 but is considered statistically significant again. Further, the findings declare that being positive in sign; the estimate of ΔROA is yet statistically insignificant. The explanatory power related to model 3 is marginally lesser than that obtained from model 1, with adjusted R^2 being 14.77 percent. On the whole, the results from this part support the impression

that improvements in outside director percentage after the revelation of fraud are connected vigorously to the returns of the same period. Furthermore, the relation between changes in net income and the returns exhibit only peripheral explanatory value.

However, it is likely that the findings emitted from models 1 and 3 carry survivorship bias from the correlated omitted variables. Arguably, if the poorly performing firms are more possibly to depart from the analysis and if they hold the smallest change in governance characteristics in the group, then the findings are possible to be overstated compared to better performing firms. In order to examine this likelihood, the study executes binomial proportions test. It probes whether the firms in a group with the most increase in the outside director percentage and those in the group with least such increase are different in their survivorship rate. The study splits the fraud firms into three equal groups using frequency distribution in outside director percentage considering the whole analysis period. It is observed in the results (untabulated) that fraud firms carrying a largest increase in the outside director percentage are dropped out by 28.17 percent compared to those carrying least such increase by 24.95 percent. The difference remains statistically insignificant ($t = 0.37$, $p = 0.73$).

Besides that, the study examines for the differentiation based on a change in outside director percentage and abnormal returns between the surviving firms and those that are dropped out. The difference again is noted statistically insignificant in outside director percentage and abnormal returns ($t = -0.49$, $p = 0.57$ and $t = 0.27$ and $p = 0.81$ respectively). The study succinctly supports the notion that the corresponding firms obtain economic gains, for instance, the large abnormal returns, when they improve outside director percentage on the board.

TABLE 4.27: Regressions of Fraud Firms' Long-Run Buy-and-Hold Abnormal Returns for the Three Years after Fraud Detection on Governance Changes from the Year Prior to Fraud Detection to the Third Year Afterward

The table contains the model variables as BHAR = the buy-and-hold abnormal return for the three years after fraud revelation applying the PSX index; Fraud_Return = the fraud firms' raw buy-and-hold return for the three years after fraud revelation; Control_Return = the control firms' raw buy-and-hold return for the three years after fraud revelation; Mkt_PSX = the PSX index return for the three years after fraud revelation; Δ ROA = the change in net income scaled by total assets for the three years after fraud revelation; Δ OutsideDir% = the lagged variation in outside director percentage for entire analysis period; Δ #AudComMeet = the lagged change in the number of audit committee meetings for entire analysis period; BMV = the book value per share divided by the market value per share; and MVE = the natural logarithm of the market value of equity.

Dependent Variable: BHAR			
	(t-statistic)		
Variable	(1)	(2)	(3)
Intercept	-0.86 (-2.63)**	-1.13 (-2.31)**	-0.95 (-2.26)**
Δ OutsideDir%	0.018 (2.27)**		0.015 (2.13)**
Δ #AudComMeet	-0.13 (-1.51)		-0.04 (-1.36)
Δ ROA		0.08 -0.51	0.07 -0.18
BMV	0.92 (0.71)	2.04 (1.26)	0.76 (0.54)
MVE	0.08 (1.24)	0.11 (1.06)	0.08 (1.31)
Adj. R ²	19.06%	0.08%	14.77%

** Significant at the level of 5 percent, based on two-tailed tests

Chapter 5

Conclusion, Implications and Limitations

This chapter details the conclusions, implications, and limitations of study.

5.1 Conclusion

The study aimed to uncover the environmental factors that contribute to happening of financial fraud at the corporate level. The theories along with recent extant of literature were used to develop twenty-nine hypotheses in three classes. The classes were internal antecedent factors, external antecedent factors, and monitoring variables (see table 4.1). Cases of fraudulent activity were defined as instances where a breach of concerned laws is observed and declared thereafter by SECP, and they originate population of firms for this study. Next data were gathered for the variables of interest for three years before the detection or commitment of fraud from 2000 to 2016 following framework of (Beasley, 1996). Seventy-seven listed firms that were found fraudulent were taken into study sample along with the same number of no-fraud firms. Univariate analysis, probit regression analysis, and marginal effect analysis were employed to settle on the relationship between twenty-nine environmental factors and firm's fraud.

Three models were constructed capturing internal and external antecedent factors, monitoring variables and both. The first primitive model incorporated internal and external antecedent factors; the second involved monitoring variables whereas the third contained significant variables resulting from the two primitive models. Results reveal that there is strong support for the theory and how the variables relate to firm's fraud. The overall findings disclose that corporate financial fraud symbolizes complex behavior on the part of an entity. Numerous factors were found as playing a significant role in constituting an environment conducive to the happening of fraud.

The integrated model, in the end, revealed twelve factors in this regard that are observed relevant in the context of this study. Out of twelve, five climate factors belong to internal antecedent factors, namely firm performance, organizational slack, organization size, tax aggressiveness and chief executive officer compensation. Two climate factors, i.e. dynamic environment and political connections belong to the category of external antecedent factors, whereas five factors are classified under monitoring variables, named as transient institutional investors, an outsider on board of directors, board size, the tenure of chief executive officer and auditor change.

The primary contribution of this study is to have empirically tested fraud triangle model, agency theory framework and literature on corporate illegal activity. On practical milieu, it contributes in designing fraud deterrence strategies in the local context. It furthermore advances understanding of the role executives play in financial fraud and suggests managerial, governance and strategic implications.

Furthermore, policies concerning firms' investment, financing and distribution are studied isolated as a conventional approach while employing static single equation models. Methods that do not take into consideration the inter-temporal element in financial decisions and the interdependent nature of decision variables are inadequate and mislead the inferences potentially. Estimates obtained through these methods may endure the omitted variable bias. Resultant coefficients may also contain inefficient standard errors. That being so, may mislead towards inaccurate conclusion concerning determinants of firms' financial decisions.

The study, with a focus on addressing these problems, analyses whether firms experience hurdles in raising funds from external capital markets and face an underinvestment eventually. For the purpose, it incorporates data for three years post-violations subject to the 279 firms identified. At the outset, these problems are analyzed by concentrating on investment to cash flow sensitivities in an indirect way and in separation following a static structured model. Abundant of work has been developed in the extant literature for examining investment to cash flow relation and commonly evidenced contrary findings. There is a consensus in the literature for a conventional firm a positive and significant relation exists in investment/cash flow sensitivity. Despite that, inferences differ across prior studies with respect to a test whether this positive and significant relation is associated with the status of financial constraint.

It is displayed in the study results, that in investment decision and payout decision variables the inter-temporal nature prevails which is likely to create an omitted variable bias. From previous studies, sensitivities of investment to cash flow relation carry a range from 0.10 to 0.25, implying that firms respond in enhancing investments when cash flow increases and they lower the investments against a cash flow decline. This study while implementing the static single equation framework as practiced in the extant literature acquires analogous results with investment to cash flow sensitivity between 0.12 and 0.41¹. Conversely, implementing a model that adds the lagged decision variables in the equation and also takes into account the interdependence nature of decision variables shows that positive relationship between investment and cash flow vanishes.

In fact, no relationship exists, on average, between investment and cash flow while considering the financial constraint status of sample firms. They alter their net debt from cash flow changes and protect their capital expenditures. On the occasion where prevails a shortfall in cash flows, firms respond by lowering debt and enhancing cash reserves. In case of a cash flow rise, firms lower the debt and enhance cash reserves. The study rejects the notion that firms make investment

¹The mentioned values are seized from table-4.5 and 4.7 (column-1 each).

sub-optimally following the difficulty faced in generating external capital and confirms [Modigliani and Miller \(1958\)](#).

The findings are intuitive considering the costs of adjustment relatively linked with investment and financing decisions. Capital expenditures are improbable to be influenced by short-run cash flow shocks and characteristically represent the long-run investments. Comparatively, there is notably less adjustment cost in case of financing variables, the reason why they offer less expensive options to address the changes in cash flows. This intuition, that sensitivities of financing to cash flow are considerably higher relative to sensitivities of investment to cash flow irrespective of the degree of financial constraint, is verified in the key results of this study.

The study, although, demonstrates inferences for investment-cash flow relation literature, but more notably it implicates that implementing the static framework and in segregation can develop misleading findings while analyzing empirically the corporate financial policies. Rather, the methodologies undertaken ought to acknowledge inter-temporal characteristic of these policies, incorporate their persistence or reversals, and permit the concerned identities of financial statement that are kept with every firm and prevail at all times (for instance, cash sources must equal cash uses and the like).

Apart from that, through robustness check, examination of firms' investments financed with internal sources is made employing a sample of 279 listed firms from SECP violations' database, before and after the violation periods while obtaining the required data for 3 years each. Evidence from the study exhibits that firm when going through investment frictions will prefer using cash holdings over cash flows. The firms in case of cash flows fluctuations can avert costly investment adjustments by investing in cash holdings at the opening of the period (year) rather in contemporaneous cash flows. The study extends its investigation on estimating cash flow policies with respect to cash reserves, net issuance of debt, dividend payouts to stockholders and shares repurchase. To all appearances, pecking order is involved concerning how firms use their cash flows. Priority of using cash flows for constrained and partially constrained firms is to expand levels of cash reserves,

whereas in the sort of unconstrained firms cash flows are utilized in paying back debts and buying back shares when present are the positive cash flow fluctuations. Although the intensity to accumulate cash reserves is noted more dominant in constrained firms when compared to partially constrained firms.

The decrease in cash flows and application of liquidity constraints after the violations announcement impact the firms' investment based on internal sources along with cash flow policies. Capital expenditures turn more responsive to cash holdings during the post-violation period. Apart from it, unconstrained firms in order to meet the decline in cash flows, save cash holdings, generate more debt, and prevent share repurchases. The study contributes to advancing an understanding of how firms impose investment decisions when they face various financial frictions and how their cash flows are utilized in reaction to cash flow shocks.

In addition to the aforementioned, this study examines the response of violations announcements on the market liquidity of corresponding 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 the quoted and effective spread in cents identify the deterioration status of liquidity on days subsequent to the announcement of violations. It is inferred that violations announcements contain a negative effect on the measures of market liquidity only on the surrounding days (+1, +2) in the analysis period. Low market liquidity as demonstrated by broader bid-ask spreads and lower depths subsequent to violation announcement are observed. It confirms the study hypothesis that violation announcements carry a negative influence 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 announcement and the subsequent day (day +1). Estimating the simultaneous system of equation, the study examines the impact of deteriorated liquidity on stock returns 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.

The study, in the latter part, aims to yield evidence on the relation between the credibility of the financial reporting system and the quality of governance characteristics for the firms with financial violations. It tests the variations in governance characteristics and the corresponding financial effects of such variations for the period after fraud detection. A sample of 77 firms, as identified by Beneish M-score model, is selected for analysis which is found maneuvering their financial statements. The findings suggest, in conformity to prior research, that fraud firms are possessed with poor governance mechanism compared to control firms in the pre-fraud year. In particular, fraud firms are categorized with carrying lesser number and percentage of outside board members on the board, lesser financial experts, lesser in frequency for audit committee meetings, and a larger proportion of CEO and COB joint positions.

Despite that, it is evident from results that following fraud detection the fraud firms perform corrective measures to revive better governance. Interestingly, three years after fraud revelation, they become similar to control firms in terms of certain governance mechanisms viz. the number and percentage of outside members and surpass the control firms in a number of audit committee meetings. The study, further, tests whether improved governance characteristics affect their performance in the stock market. The results imply that improved governance mechanism brings foremost performance in stock price while controlling for earnings performance.

The study embeds contribution to the accounting literature by adding to the knowledge of relation between the integrity of financial reporting mechanism and the standard of governance dynamics in extension to the work on sources and outcomes of financial reporting failure, in general [See for instance, ([Agrawal et al., 1999](#); [Beasley, 1996](#); [Beneish, 1999](#); [Dechow et al., 1996](#))].

In particular, the study extends the work to study sample while implementing the notion that governance characteristics in the firms with concentrated ownership structure are contrasting in various terms to those attached with dispersed ownership structure ([Coffee, 2005](#)). The developing economies, by and large, in his framework are characterized under concentrated ownership structure whereas the developed economies, in general, are specified to disperse structure. The study

sample being part of developing economy offers additional insight. It provides an understanding of how fraud firms rehabilitate their governance strategies and accrue financial benefits after the fraud detection. Lastly, the study sheds light on agency problem by enabling an uncommon setting that gives a limited opportunity to examine related agency costs directly and to observe the firms' actions in governance mechanisms in an effort to lower these costs.

5.2 Study Limitations and Future Directions

It is worth considering that this dissertation endures various limitations. First, mentioning the first objective, the selection of variables is arbitrary with an aim to accomplish a possible parsimonious group of variables. Second, the sample size undertaken in this study is low when matched with similar studies in developed markets, US par example. [Wang \(2011\)](#), in case in a point, studied 688 firms as a sample based on the US. This study comparatively establishes a sample which is 11 percent to the size he used. It stems from the fact that enforcement in Pakistan is weak in contrast with the US. [Gunasegaram \(2007\)](#), reports that numerous fraud cases remain unattended owing to the poor judicial mechanism, inferior investor protection, superfluous intervention by the state, political connections, and inadequate expedients held by the prosecutor. Third, fraud being binary indicator proxied by a dichotomous measure is not applicable to capture the depth and size of fraud. SECP, for settled cases, seals the arrangements of resolutions and do not publicize, thus making it troublesome to obtain the amount of settlement.

Referring to the second objective, this study does not seek to test financial policies independently based on their underlying theories. Rather, the study focuses examining these decisions as interdependent and inter-temporal converged to cash flow sensitivities and in presence of fundamental principle of accounting identity and financial constraints. Therefore, conventional theoretical issues concerning corporate finance are not aimed in this dissertation.

In respect of the third objective, the study honestly believes that the sample size is low in the investigation. A possible explanation to this fact is the application of

filters from microstructure literature [for instance, (Huang and Stoll, 1996, 1997)] to attain appropriate trades and quotes while capturing the influence of violations' announcement on firms' liquidity measures. Apart from these filters, the stocks are required to carry minimum two trades per day and hold 100 trading days when considering benchmark period. These sampling conditions incurred a loss to the sample size.

Lastly, touching on the fourth objective, the study selects an arbitrary set of variables following the contemporary literature of corporate illegal activity with respect to governance mechanism. Keeping in view the difficulty in collecting data concerning corporate governance (CG) variables and the objective constraints, the study does not develop a model based on every CG determinant.

With reference to each of the limitation discussed above, several research questions can emerge requiring future research. For instance, instead of using a dichotomous variable to identify the occurrence of fraud, the use of a continuous variable can provide useful insight into this domain i.e. depth and fraud size. Moreover, the dichotomous nature of the fraud variable restricted the inclusion of a detailed set of explanatory variables in the estimation model. The development of a continuous fraud variable would allow the researchers to explore a variety of factors associated with fraudulent activity. Furthermore, the data limitations with respect to fraud revelations and variables pertaining to corporate governance has confined the generalizability of this study. A future effort to extend the analysis to a broader sample using a continuous fraud variable would be a fruitful contribution towards the fraud literature.

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Appendix-A

5.3 Constraints Derivation

The appendix exhibits that the constrained specified in equation (3.21) of methodology section are essential and adequate, and thus unique, subject to accounting identity of sources/uses to hold.

Let,

$$Y'_{9 \times N} = \begin{bmatrix} -C\tilde{A}PX_{i,t} \\ -AC\tilde{Q}UIS_{i,t} \\ \vdots \\ \Delta\tilde{S}TD_{i,t} \\ -\Delta C\tilde{A}SH_{i,t} \end{bmatrix}, X'_{1 \times N} = [CF_{i,t}], Z'_{11 \times N} = \begin{bmatrix} -CAPX_{i,t-1} \\ -ACQUIS_{i,t-1} \\ \vdots \\ \Delta STD_{i,t-1} \\ -\Delta CASH_{i,t-1} \\ MB_t \\ SIZE_t \end{bmatrix}, W'_{12 \times N} = [X'Z']$$

$$, \text{ and } e'_{9 \times N} = \begin{bmatrix} -e_{CAPX,i,t} \\ -e_{ACQUIS,i,t} \\ \vdots \\ e_{\Delta STD,i,t} \\ -e_{\Delta CASH,i,t} \end{bmatrix}$$

This accounting identity could be expressed as $i'Y' = -X' - e'_{CF}$ where i' is a vector of ones with order 1×9 and e'_{CF} shows vector of expected errors related to cash flows with the order $1 \times N$. Mathematically this could be expressed as:

$$i'Y' = -X' + \underset{1 \times 11}{\emptyset} Z' - e'_{CF} = \begin{bmatrix} -1 & \emptyset \\ & 1 \times 11 \end{bmatrix} W' - e'_{CF} \tag{5.1}$$

where \emptyset represents zeros' vector given with particular proportions. Stating it in more general terms let the accounting identity be $i'Y' = aX' + bZ' + ce'$ $= \begin{bmatrix} a & b \end{bmatrix} W' + ce'$. It is known that $\begin{bmatrix} -1 & \emptyset \\ & 1 \times 11 \end{bmatrix} W' - e'_{CF} = \begin{bmatrix} a & b \end{bmatrix} W' + ce'$. Applying post-multiplication on both sides by W , the obtained form is:

$$\begin{bmatrix} -1 & \emptyset \\ & 1 \times 11 \end{bmatrix} W'W - e'_{CF}W = \begin{bmatrix} a & b \end{bmatrix} W'W + ce'W \tag{5.2}$$

In as much as $W'W$ remains invertible i.e. no linear relationship exists within explanatory variables of W and $ce'W(W'W)^{-1} = \underset{9 \times 11}{\emptyset}$ (i.e. random error terms are not linearly associated with explanatory variables in estimation) then there is a unique solution, $\begin{bmatrix} a & b \end{bmatrix} = \begin{bmatrix} -1 & \emptyset \\ & 1 \times 11 \end{bmatrix}$, fulfilling the accounting identity constraint. It can be noted that subject to equation (3.17) $e'_{CF} = -i'e'$ and thus $e'_{CF}W(W'W)^{-1} = -i'e'W(W'W)^{-1} = -i' \underset{9 \times 11}{\emptyset} = \underset{1 \times 12}{\emptyset}$. The accounting identity can be expressed uniquely as:

$$i'Y' = \begin{bmatrix} -1 & \emptyset \\ & 1 \times 11 \end{bmatrix} W' - e'_{CF} \tag{5.3}$$

The parameters in the equation (3.20) follow the model as:

$$Y' = \begin{bmatrix} L & K & M \end{bmatrix} W' + e' \tag{5.4}$$

where L , K , and M represent the corresponding parameter matrices. Applying pre-multiplication to expression (equation 5.4) with i' entirely and substituting to equation (5.3):

$$\begin{bmatrix} i'L & i'K & i'M \end{bmatrix} W' + i'e' = \begin{bmatrix} -1 & \emptyset \\ & 1 \times 11 \end{bmatrix} W' - e'_{CF} \tag{5.5}$$

Applying post-multiplication throughout with W and adopting that $W'W$ is invertible and that $e'W(W'W)^{-1} = \underset{9 \times 11}{\emptyset}$, and $e'_{CF}W(W'W)^{-1} = \underset{1 \times 11}{\emptyset}$, the resultant equation obtained is:

$$\begin{bmatrix} i'L & i'K & i'M \end{bmatrix} = \begin{bmatrix} -1 & \underset{1 \times 11}{\emptyset} \end{bmatrix} \quad (5.6)$$

Applying decomposition to above equation (5.6), the constraints retrieved from equation (3.21) are:

$$i'L = 1, i'K = \underset{1 \times 9}{\emptyset}, i'M = \underset{1 \times 2}{\emptyset} \quad (5.7)$$