CASHFLOW VOLATILITY, LEVERAGE DEVIATION, CORPORATE INVESTMENTS AND VALUE OF NONFINANCIAL FIRMS LISTED AT THE NAIROBI SECURITIES EXCHANGE

BY

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DECLARATION

I hereby declare that this thesis is my original work and has not been presented for a degree to any other University.

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To my heavenly Father and my loving parents, Dr. Symon Warui and Mrs. Priscillah Njuguna

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LIST OF ABBREVIATIONS

ADF- Augmented Dickey-Fuller

BV – Book Value

CEO - Chief Executive Officer

CFV – Cashflow Volatility

FCF- Free Cashflow

FE - Fixed Effects

GARCH – General Autoregressive Conditional Heteroskedasticity

GLM – Generalised Linear Model

GMM - Generalised Method of Moment

LDEV - Leverage Deviation

MBVA – Market to Book Value of Assets

MBVE - Market to Book Value of Equity

MM – Modigliani and Miller

MV – Market Value

NPV – Net Present Value

NSE – Nairobi Securities Exchange

OLS – Ordinary Least Squares

Q – Tobin Q

R & D – Research and Development

RE - Random Effects

ROA – Return on Assets

ROE – Return on Equity

Tang - Tangibility

USA - United States of America

ABSTRACT

Volatility of corporate cashflows exacerbates reduction in investments, increases external cost of finance and causes a deviation of leverage from the target leading to adverse effects on firm value. There is a dearth of studies on cashflow volatility and its impact on leverage, corporate investment, and firm value. Furthermore, extant literature on the relations presents mixed findings and majority of the studies are from developed economies which are culturally and economically different from developing economies. This study sought to examine the interrelationships among cashflow volatility, corporate investments, leverage deviation and value of nonfinancial companies listed at the Nairobi Securities Exchange. It seeks to evaluate whether investors price smooth cashflows. Specifically, the study analysed the impact of cashflow volatility on corporate value, the mediating effect of leverage deviation and corporate investments on the cashflow volatility and firm value link and the joint effect of cashflow volatility, leverage deviation, corporate investments on firm value. The study was anchored on the theory of information asymmetry which explains the interrelations among the four study variables by linking signalling effect of corporate financial information on firm value. Dynamic trade off theory, free cashflow theory and underinvestment theory were also applied in the study and a positivist philosophy used to evaluate research hypotheses. A census was conducted on a population of 42 nonfinancial companies listed at the NSE for the period 2002 to 2019 and data collected from 36 companies which had consistent listing for at least three consecutive years. Descriptive longitudinal research design was applied to analyse the secondary data and descriptive analysis including mean, standard deviation, minimum and maximum were carried out to visualize the distribution of data, detect outliers and identify associations among variables. Correlation test was conducted to examine the intensity and direction of relationships among the study variables. Diagnostic tests of normality, multicollinearity, heteroskedasticity, stationarity, and autocorrelation were conducted prior to carrying out inferential analysis. Furthermore, panel specification tests indicated that random effects model was the most suitable for the study. To cater for non-normality log transformation of variables was done and robust standard errors applied as a remedial measure for heteroskedasticity and autocorrelation. Results from hypothesis testing showed an inverse and statistically significant correlation between cashflow volatility and corporate value. Secondly, results from a four-step mediation analysis provided evidence that leverage deviation does not mediate the cashflow volatility and firm value relationship however, it was observed that corporate investment has a mediating effect. Finally, the study findings provided evidence of a joint effect of cashflow volatility, leverage deviation, corporate investments on value of nonfinancial companies listed at the NSE. Thus, findings contribute to literature by reducing controversy on cashflow volatility and firm value link by introducing leverage deviation as an alternative measure of financial risk and providing evidence against optimal capital structure theory. The study cautions management to monitor closely their operational costs and enhance risk management measures to minimize cashflow volatility which impacts negatively on investments and firm value. The study recommends future research on antecedents of cashflow volatility and leverage deviation to obtain a holistic view of the effects of cashflow uncertainty on corporate value.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Cashflow volatility increases incidences in which firms have shortfalls in internal cash resulting in delays in debt repayments, postponement of corporate investments or diversion of management's focus from productive work (Minton & Schrand, 1999). Volatile cashflows exacerbate information asymmetry which directly impacts on firm value. High cashflow volatility sends negative signals to investors leading to a rise in the cost of external finance (Iyer & Harper, 2017; Minton & Schrand, 1999). Moreover, increase in finance cost prevents firms from operating at optimal leverage level, leading to a deviation from the target, which impacts on firm value. Firms derive their value primarily from operating and investing activities (Campbell & Rodgers, 2018). Thus, volatility in cashflows may adversely impact corporate investments as firms prefer to preserve cash during uncertainty. A reduction in corporate investments on the other hand may reduce firm value due to a decrease in positive net present value investments and adverse investors perception.

Cashflow volatility (CFV) is an indicator of business risk which is driven by a range of factors such as changes in economic climate, government regulations, fluctuations in sales volume, selling price or operating costs (Shahid, 2018). A company with high business risk ought to maintain low leverage levels to ensure it meets its financial obligations as they fall due. Business risk is associated with CFV in that when the risk is high, the cashflows are highly volatile and when business risk is low, the cashflows tend to be stable. Investors are construed to shun investing in firms with high business risk and prefer firms with smooth cashflows (Rountree et al., 2008). This

study examined whether investors value smooth cashflows by analysing the association between CFV and corporate value.

Persistence in CFV adversely affects the cost of accessing capital due to imperfections in capital markets such as information asymmetry. Analyst for instance, are less likely to pursue firms with high CFV implying that there will be more information asymmetry and increased cost of equity (Minton & Shrand, 1999). Furthermore, firms with high CFV prefer short term debt to cover the cash short fall, which is more costly (Keefe & Yaghoubi, 2016; Memon et al., 2018). Inflated cost of accessing external funds is associated with deviation of leverage from its target level as firms may not be able to adjust their capital structure regularly to maintain an optimal debt level. Thus, CFV is anticipated to drive deviation of leverage from its target level leading to adverse effect on firm value.

CFV is associated with lower corporate investments including annual capital expenditure, research and development expenditure and advertising expense (Minton & Schrand, 1999). In order to finance corporate investments, firms rely on external finance provided by financial markets or internal finance from their cashflows. When the cost of external finance is too high, firms resort to internal financing as it has cost advantage over the external equity. Thus, investment spending may display excessive sensitivity to cashflow fluctuations (Fazzari, Hubbard & Petersen, 1987). Management grows shareholders' value by undertaking positive net present value investments leading to growth in firm value. Furthermore, potential investors bid up the value of firms that undertake capital investment as it signifies higher returns in the future. Thus, high CFV has potential to adversely impact firm value through reduction in the level of corporate investments.

This study is premised on the theory of information asymmetry which contends that market imperfections arise due to discrepancies in information between economic agents engaged in a

transaction leading to adverse selection and moral hazard. Asymmetry of information creates an opportunity for economic agents to undermine the value of a commodity or securities in the financial markets which would otherwise realize a competitive price (Akerlof, 1970). When evaluating potential stocks to buy, investors analyse the financial information provided by the firms. Thus, managers can influence the investors decision through earnings management. This can be achieved through earnings smoothing to minimize volatility of earnings which investors abhor and pay less for firms with higher earnings volatility (Goel & Thakor, 2003).

The theory of information asymmetry is significant to the current study as it explains the linkages between the four study variables, CFV, leverage deviation, corporate investments, and firm value. Investment analysts rely on financial reports to evaluate firm performance and make decisions on potential stocks to invest, and lenders use the financial reports to evaluate the financial stability prior to extending credit to the firms. Thus, high CFV sends negative signals to investors, due to the uncertainty, leading to adverse effect on firm value. Secondly, high CFV prevents firms from attaining an optimal capital structure as the cost of external funds rises with increased volatility, due to information asymmetry between lenders and management. Thirdly, high CFV results into a reduction in corporate investment, to safeguard cash, leading to an adverse impact on firm value due to the negative signal perceived by the investors.

Dynamic trade off theory, free cashflow theory and underinvestment theory have also been applied in the current study to explain linkages between the study variables. Trade off theory was advanced by Kraus and Litzenberger in 1973. It proposes that firms maximize their value by maintaining an optimal mix of debt and equity. The optimal mix is obtained through offsetting gains and costs of debt which implies that firms should operate at a target leverage level to maximise firm value. Dynamic trade off theory further posits that the debt equity mix is not static, it varies depending

on recapitalisation cost. Thus, firms are constantly adjusting their capital structure to minimise deviation of leverage from the target level (Fischer et al., 1989). Therefore, the theory is significant to the current study as it offers the link between the study variables, leverage deviation and firm value. It suggests that as leverage deviates from its target level, firm value decreases.

The free cashflow theory was proposed by Jensen in 1976. He contends that excessive free cashflow in a firm creates agency problems between shareholders and management which adversely affects firm value. The proponents of the theory argue that when there is excessive free cashflow, managers tend to overinvest in projects whose present value of cash inflows is less than present value of cost. Furthermore, the projects undertaken favour the interest of managers over the shareholders' interest. These results in reduced shareholder returns which negatively affects firm value. Therefore, the free cashflow theory is relevant to the current study as it provides the link between CFV, corporate investments, and firm value.

Underinvestment theory was proposed by Myers in 1977. He argued that risky debt may stimulate management to reject positive net present value (NPV) projects leading to low firm value since shareholders would not be willing to finance the profitable investments, thereby incurring cost that would benefit debt investors. Underinvestment theory was built on the concept of asset substitution as suggested by Jensen and Meckling (1976) who argued that lenders increase interest rates and impose restrictive bond covenants to curb the inappropriate behaviour of asset substitution by managers. However, the action by lenders results to underinvestment since shareholders reject profitable investments due to the excessive cost of financing. Myers and Majluf (1984) further contend that firms may bypass valuable investments to avoid issuing external equity because of inflated cost of finance brought about by information asymmetry between existing and prospective

shareholders. Underinvestment theory is significant to the present study as it describes the link between corporate investments and firm value.

Listed firms manifest significant cashflow fluctuations due to shocks in the market. Cashflow risk is priced by investors especially during economic downturns. In the year 2020, the Nairobi Securities Exchange (NSE) encountered severe volatility due to the Covid 19 pandemic. The stock market indices and market capitalisation declined as investors fled to safety. Sinagl (2020) observed that during the Covid-19 pandemic, cashflow risk predicted in industries resulted to inverted equity term structure and decrease in market expectations on dividend yield thereby adversely impacting on asset prices. This implies that investors price cashflow risk especially in the presence of large economic shocks.

In the period 2016 to 2019, the NSE encountered shocks both from domestic and external sources including introduction of interest rate capping, uncertainty due to general elections and post-election violence and droughts that led to counters linked to agricultural sector drop in prices. At the international front, there was increased protectionism that culminated to the Brexit referendum and the United States of America presidential elections (Financial Sector Regulators, 2020). These shocks translated into volatility of cashflows which impacted corporate performance at the NSE. Furthermore, the performance of several nonfinancial firms was affected by high debt burden. Unlike financial companies, the debt-equity mix of nonfinancial firms is not stipulated by the regulators thus providing a leeway for the firms to accumulate high debt levels (Financial Sector Regulators 2021).

1.1.1 Cashflow Volatility

Cashflow volatility (CFV) is referred to as variability of cashflows from operations of a firm for a given number of years prior to the sample period (Minton & Schrand, 1999). Rountree, Weston, and Allayannis (2008) defined CFV as fluctuations of future operating cashflows after the sample period while Shipe (2015) defined CFV as the variability of cash holdings. Gryglewicz et al. (2021) define cashflow risk as a firm's exposure to permanent shocks, short term shocks and the interrelationship between the shocks. They decomposed operating cashflows into permanent (long-lived non-stationary shock) and transitory (short-lived) shock and suggest that transitory shock affects current cashflows but are not informative about the expected profitability. In contrast, permanent shock affects a firm's current profitability and cashflows as well as future productivity and cashflows.

CFV is the degree of spread of cashflows or the extent of distribution of a company's operating cashflows (Elzy & Chusnah, 2020). The variability of cashflows from operations emanates from the uncertainty in the operating environment of a business due to changes in economic factors, political factors, government policies and regulations or consumer preferences. Cashflow variability may also be caused by internal business factors such as operational efficiency and managerial decisions. Operating cashflow is a key determinant of a firm's policies such as external financing and the retention ratio. When a firm has high cashflows from operations, it may use the funds to finance corporate investments internally without reliance on external debt or equity. Conversely, low levels of operating cashflows may necessitate a firm to issue external equity or debt.

High CFV increases uncertainty in a firm's capability to cover its obligations and might be construed negatively by investors. A business that has high CFV is likely to rely on debt rather than equity finance (Harris & Roark, 2019). CFV is extremely unpopular for firms that depend on external finance as it increases cost of capital thereby adversely impacting both investment and financing choice (Froot, Scharfstein, & Stein, 1993). Furthermore, adverse cashflow conditions may deter firms from moving towards target leverage thereby impacting on value (Faulkender et al., 2012). Traditional asset valuation methods interpret volatility as risk which decreases firm value (Sharpe, 1964; Lintner, 1965). On the other hand, the option pricing theory argues that volatility enhances the equity value of a firm (Black & Scholes, 1973; Merton, 1974).

Cashflow volatility has been measured using different approaches. Minton and Schrand (1999) estimated CFV as a coefficient of variation, measured as volatility of cashflows from operations on quarterly data for six years preceding the sample period divided by absolute mean value over a similar period. Similarly, Rountree, Weston and Allayannis (2008) measured CFV using standard deviation but used future quarterly operating cashflows, observed after the sample period. Shipe (2015) measured CFV as standard deviation of cash holdings. CFV is estimated using cashflows from operations which is a better indicator of operating risk compared to using earnings that can be smoothed through discretionary accruals and are subject to potential manipulation and measurement error to influence firm value (Rountree, Weston & Allayannis, 2008; Mäkelä, 2012)

Pae et al. (2018) measured CFV using DuPont components that is net profit margin, return on equity, equity multiplier and asset turnover. They contend that the components provide detailed information on how a firm's operational activities, asset management and financing activities contribute to firm performance. Dudley and James (2015) on the other hand computed cashflow volatility by applying the Generalized Autoregressive Conditional Heteroskedasticity (GARCH)

approach. They contend that the GARCH approach provides more accurate predictions of innovations in volatility than the rolling standard deviation approach which changes very slowly and assigns equal weights to all past variations. The current study has however applied the rolling-window standard deviation approach as it is easier to implement and allows for easy extension in the incorporation of more data points. Furthermore, the current research focus is on the influence of historical volatility on corporate value rather than forecasting volatility.

1.1.2 Leverage Deviation

Leverage is a ratio that indicates the share of debt in a company's capital structure while leverage deviation is the divergence of observed debt from the optimal level (Zhou et al., 2016; Ilgaz, 2012). Drobetz and Wanzenried (2006) denote leverage deviation as the distance from the observed to the optimal leverage while Kraus and Litzenberger (1973) defined optimal leverage as the level where the gains of debt (tax advantage), offsets the costs (bankruptcy and agency costs). The phrase 'target leverage' is used interchangeably with optimal leverage and is referred to as the desired percentage of debt capital or the long-run mean of debt (Ippolito, Steri & Tebaldi, 2012). Target leverage is derived from various firm characteristics which denote the cost and benefits of debt, such as firm size, profitability, asset tangibility, firm uniqueness, non-debt tax shield and investment opportunity.

High CFV leads to a rise in external costs of capital which intensifies the deviation of leverage from its target. A wide leverage deviation implies that a firm is not maintaining an optimal leverage level to maximize firm value. Leverage deviation arises due to adjustment costs, which comprise of transaction costs incurred by firms in the capital markets to restore leverage to a target level (Fischer, Heinkel & Zechner, 1989). If adjustment costs were non-existent, firms could constantly

rebalance their leverage towards a target level. However, the presence of these `costs causes a variation of debt from target since the costs of rebalancing outweighs the benefits (Myers, 1984). Estimation of financial risk using leverage deviation instead of observed leverage provides more accurate results since deviation captures the effect of heterogeneity inherent in the target leverage (Zhou et al., 2016). Thus, firms with similar observed debt level but differing target debt levels, are likely to have varied risk profiles (Ippolito, Steri & Tebaldi, 2012).

Early studies on capital structure failed to capture its dynamic nature. Whereas trade-off theory explained the variations in optimal debt ratio across companies, empirical studies applied a static approach where observed debt ratio was used as a proxy for optimal debt ratio for instance, Titman and Wessels (1988) and Zingales and Rangan (1995). Frank and Goyal (2007) noted that initial literature on dynamic capital structure implicitly assumed that capital structure adjustment is costless and that firms continuously adjust their leverage to a target level. However, due to adjustment costs, it might be cheaper for firms not to fully adjust to the target leverage even if they establish that they are not operating at an optimal level. Therefore, the wide variation observed in debt ratios may be explained by large adjustment costs.

Leverage deviation is measured as the disparity from observed to target leverage, whereby a positive deviation implies over-leverage and negative deviation under-leverage (Zhou et al., 2016; Ippolito, Steri & Tebaldi, 2012). Target leverage is a function of various firm attributes. Titman and Wessels (1988) and Rajan and Zingales (1995) estimated target leverage by regressing certain firm attributes including firm size, tangibility, growth prospects, profitability, variance of earnings, non-debt tax-shield and uniqueness against financial leverage. In contrast, observed leverage is the value of debt obtained from financial reports of a firm. Ilgaz (2012) regressed the leverage

deviation of previous years among other capital structure determinants and concluded that it is the most significant in predicting a firm's capital structure.

Rangan and Zingales (1995) argued that the most significant measure of leverage applied depends on the aim of the analysis. For instance, when analysing debt related agency problems, the ratio of debt in relation to firm value would be the most suitable ratio. On the other hand, when a firm is economically distressed and issues of transferring control from shareholders to debt holders arise, the critical issue is whether the firm can meet its debt obligations and therefore a relevant flow measure of leverage is the interest coverage ratio. However, Banerjee et al. (2000) argues that interest coverage is an indicator of risk that a firm may not be able to cover interest obligations but not a relevant measure of leverage.

Banerjee et al. (2000) provided a debate on suitability of using book values (BV) over market values (MV) when measuring target leverage. They pointed out that the ratio of MV of debt to MV of equity may not be a suitable measure of target leverage as the optimal debt equity mix is a function of benefits and cost of debt. The benefit of debt is interest tax-shield which has no relation with MV of debt. Moreover, in a case of bankruptcy, the relevant measure of leverage is book value as the assumption of going concern no longer holds and the expected cost of financial distress is closely related to the book value.

Previous studies (Rangan & Zingales, 1995; Titman & Wessels, 1988; Banerjee et al., 2000) used both book values and market value measures to determine target leverage. On the other hand, Flannery and Rangan (2006) measured target leverage using MV as the proportion of BV of a firm's total debt divided by the summation of BV of total debt and MV of equity. Proponents of BV argue that managers think in terms of book leverage. Furthermore, the strongest persuasion for using book leverage is the relative ease and accuracy with which leverage is measured. However,

proponents of MV measure contend that the real value of a company is measured by its market value. Moreover, they argue that firms may have negative book values but positive market values indicated expected future cashflows despite the loss making history of the firm (Banerjee et al., 2000).

1.1.3 Corporate Investments

Corporate investment is an important firm characteristic that has an enormous influence on the way the firm is perceived by investors, lenders, shareholders, and managers. In an environment that has no market frictions, corporate investment would be a determinant of company's investment opportunity set (Modigliani & Miller, 1958). Corporate investment is defined as expenditure comprising of capital expenses, R&D expenses, acquisitions and advertisement expenses (Minton & Schrand, 1999; Cohen, 2014; Panagiotidis & Printzis, 2021). Kallapur and Trombley (2001) defined investment opportunity as capital expenditure incurred to launch a new product or to enlarge the production of an existing product. They distinguished investment opportunity from growth, whereby growth is defined as the capability of a firm to become bigger in size while investment opportunity is an option to invest in profitable projects.

Corporate investment is related to both firm value and cashflow volatility because as firms invest in positive valued projects, their market value increases and by undertaking profitable investments, firms generate more cash thereby minimising volatility of cashflows. The debate on the effect of uncertainty on corporate investment has been ongoing in finance literature. Some studies contend that higher uncertainty is correlated with lower investment in discretionary expenditure (Minton & Shrand, 1999), research and development expenditure (Beladi et al., 2021) and investments among small firms (Panagiotidis & Printzis, 2021) while other studies suggest that uncertainty is

associated with higher investments (Baum et a., 2010; Cohen, 2014 Kimaiyo, 2017). Cohen (2014) contend that corporate investments increase firm value if the firms have a substantial amount of cash holdings while Baum et al. (2010) classified uncertainty into firm specific and market specific and argued that firm specific uncertainty stimulates investments while market specific uncertainty has a dampening effect on investment expenditure.

A myriad of measures have been used to estimate corporate investments. Minton and Schrand (1999) measure investments as the amount of capital expenses, advertising expenses and research and development cost scaled by total assets. Panagiotidis and Printzis (2021) measure capital expenditure as net value of fixed assets plus the year's depreciation. Cohen (2014) and Richardson (2006) on the other hand measured corporate investments as the total of capital expense, R&D and acquisitions minus depreciation and amortization and earnings from the disposal of fixed assets. Amortisation and depreciation expenses are considered as investment necessary to maintain assets in place. Park and Jang (2013) noted that in some service industries, like restaurants, the role of R&D to generate cashflows is better played by advertisement expenditure thus factored it in when calculating investment expenditure. Kimaiyo (2017) estimated corporate investment as the sum of the changes in annual capital stock and depreciation.

Investment opportunity is measured using noisy proxies as the details required to measure investment cashflows and distribution of payoffs, are not readily available. Kallapur and Trombley (2001) outlined three categories of measures used in literature to proxy investment opportunities including: price-based measures, variance-based measures, and investment-based measures. Price based measures assume that growth firms will have larger values in relation to assets in place. They comprise of Tobin's Q, ratio of MV to BV of equity, BV to MV of assets, price to earnings ratio, ratio of fixed assets to corporate value and the ratio of depreciation to corporate value.

Variance based measures, variance of returns and asset beta, are based on the notion that investment options increase in value as volatility of returns of underlying assets rise. Investment based measures are based on the notion that higher levels of investment activity is directly associated to investment opportunities. They include research and development expense to assets, R&D expense to sales and R&D expense to corporate value and ratio of capital expenses to firm value. Investment based measures are adopted in the current study as they are associated with the research objective of evaluating the influence of corporate investment on firm value and the measure is not highly correlated with firm value compared to price-based measures.

1.1.4 Firm Value

Practitioners and academicians widely accept that the fundamental goal of a corporation is to maximize value. Setiadharma and Machali (2017) define firm value as investors' view of the success of a firm, commonly associated with the stock prices, whereby higher prices translates to higher corporate value. They further indicate that firm value is influenced by management's ability to fulfil shareholder's needs. Vracheva and Mason (2015) define firm value as the market capitalization of a company obtained by multiplication of stock price by the number of stocks issued. Bacidore et al. (1997) define firm value as the total of physical assets value and the NPV of current and potential investment opportunities. Belo et al. (2021) provided empirical evidence to support models with various capital inputs as the main drivers of firm value. They contend that physical capital contributes 30 - 40% of firms' market value while fixed labour force contributes 14 - 22%, knowledge capital contributes 20 - 43% and brand capital contributes 6 - 25%.

Firms strive to maximize their value as it results in maximization of shareholder wealth. Firm value is affected by CFV, corporate investments and the level of firm leverage. Firm value tends to

decrease when cashflow volatility intensifies as investors shy away from stocks with high uncertainty (Goel & Thakor, 2003). In addition, high cashflow volatility leads to increased cost of external funds because of information asymmetry amongst the issuers of fund and investors leading to underinvestment problem (Myers & Majluf, 1984). Furthermore, high CFV affects the ability of firms to maintain optimal leverage due to increased cost of debt. This leads to wider leverage deviation, increases bankruptcy risk, and reduces debt capacity. Thus, firms actively rebalance their capital structure towards a certain target in order to maximize value. Chi and Su (2017) contends that cashflow volatility of young and small-sized firms that are yet to invest in their growth opportunities, is inversely related to firm value.

Firm value reflects the effectiveness of an organization's management and indicates the long-term growth prospects of the organization. Internal and external factors have been used to determine firm value. External factors include macroeconomic indicators such as the rate of inflation, growth of economy and prevailing interest rates while internal factors include firm attributes such as size, profitability, growth, capital structure and liquidity. Investors look at internal factors to evaluate individual firm performance as they provide signals of potential earnings in a company. Firms that have a larger size, high profitability, sales growth and high liquidity signal effective management and high earnings potential thus investors bid for the stocks leading to increased firm value. On the contrary, high debt level in firm's capital composition may adversely affect the value of a firm as it indicates high financial risk (Nguyen et. al., 2021).

Tobin Q, determined as the proportion of MV to BV of a company's assets, is widely applied in literature to evaluate firm value (Chi & Su, 2017; Rountree, Weston & Allayannis, 2008; Mäkelä, 2012 and Kodongo et al., 2014). Dybvig and Warachka (2015) contend that Tobin Q is not a suitable indicator of firm performance as it is inflated by underinvestment. However, Tobin Q is a

popular measure since it is directly comparable across firms without the need for normalization or risk adjustment. Other proxies used to measure firm value include market value (Gworo, 2019), future operating cashflow (Minton, Schrand & Walther, 2002), stock returns (Cai & Zhang, 2006). Market value and stock returns provide information about a company's future prospects, however, these measures are driven by factors beyond management's control resulting into a lot of randomness and noise (Bacidore et al., 1997). Moreover, they are subject to manipulation by management when they have superior information to investors (Hax, 2003).

1.1.5 Nonfinancial Companies Listed at Nairobi Securities Exchange

The Nairobi Securities Exchange (NSE) is the primary market in Kenya which offers an avenue for listing various financial assets and secondary trading. It was formed in 1920 where informal trading of shares began without a trading floor and was officially registered in 1954 as an association of stockbrokers (NSE, 2018). NSE is the biggest securities market in East Africa and one of the most developed Securities Exchange in Africa, with a long history of a distinguished trading facility in Africa. The NSE All Share Index (NASI) is the main equity index that tracks all the listed companies and is supplemented by other indices including the NSE 20 Share Index, FTSE NSE Kenya 15 Index (Schiereck et al., 2018). The core business of NSE is to facilitate a market for raising capital and secondary trading of equities and bonds. In 2014, NSE demutualized, self-listing its shares through an initial public offer. This increased the core mandate of the company to include the creation of wealth for its shareholders (Kestrel Capital, 2014). As of December 2019, a total of sixty-five firms were listed at the exchange.

The NSE has three market segments, the main investment segment, the alternative investment, and the growth enterprise market segment. The securities listed on the NSE are classified into thirteen

sectors including: Agricultural sector, Automobiles and Accessories, Banking, Commercial and Services, Construction and Allied, Energy and Petroleum, Insurance, Investment, Investment Services, Manufacturing and Allied Telecommunications, Real Estate Investment Trust (REITs) and Exchange Traded Funds (ETF). The current study focused on the nonfinancial sectors which excludes the banking, insurance, investment, and investment services sectors because their capital structure is determined by regulatory rules such as minimum capital requirement, the complexities of their capital structure nature and the difference in their financial strategies compared to nonfinancial firms. This implies that nonfinancial firms have the liberty to apply the capital structure they prefer, which predisposes them to excessive leverage.

Nonfinancial companies listed at the NSE experience cashflow volatility which is attributed to uncertainty, due to political and economic instabilities such as the Bank Amendment Act 2016 leading to interest rate capping, post-election uncertainty, Brexit and US presidential elections leading to a number of exits by foreign investors (Financial Sector Regulators, 2020). During the year 2020, performance of firms was severely affected by the Covid-19 pandemic leading to a decline in the market capitalisation, the NSE 20 and NSE All Share Index (NASI). The decline in stock market indices was compared to historical lows of 2008 as foreign and local investors exited the market. The fall in stock prices was observed mostly among the financial, transport, agriculture, energy, and manufacturing sectors. Conversely, the technology and telecommunication sector experienced price gains (Financial Sector Regulators 2021).

Financial leverage among nonfinancial firms has grown over time where most firms rely on bank financing. A report by Cytonn Investments (2019) indicates that businesses in Kenya source up to 95% of funding from banks and only 5% from the capital markets. Kodongo et al. (2014) observed that debt financing has grown over the years among NSE listed firms however, most firms shy

away from corporate bonds preferring to use expensive forms of debt finance such as bank loans. They further noted that unlike financial firms, the debt equity mix of nonfinancial firms is not controlled by the regulators implying that they have the potential of increasing debt finance to levels that may be detrimental to firm value. A study conducted by the Capital Markets Authority (2018) indicated that there was a low uptake of the capital market products at NSE with only five new listings during the period 2013 to 2017, suggesting that firms are more reliant on bank financing. This is despite stable growth in gross domestic product rate averaging 5%, low inflation rates and improvement in Kenya's Global Ease of Doing Business ranking from position 129/185 to 80/190 in the period 2013 to 2017. The study indicated that during the same period, cost of listing ranged between 1.85% and 10.62% and Treasury bond rates ranged between 11.63% and 13.44%, both of which were significantly lower than the bank lending rates which ranged between 13.63% and 18.3%.

Corporate investments among nonfinancial companies listed at the NSE have increased gradually in the period 2000 to 2016 despite some temporal variations (Kimaiyo, 2017). The Ministry of Trade, Industry, and Cooperatives (2019) pointed out that Kenya is regarded as a "hotbed" of investment opportunities since it is the leading economy in East Africa and has a rapidly growing consumer market with remarkable wide market access. Moreover, the country has a strategic geographic position that makes the gateway to the East Africa Community and eases connectivity with other economies globally, hence opening it up to investors. However, capital markets in Kenya, like other developing countries, are young and lack the capacity to fulfil the financial needs of firms and entrepreneurs, hence, financial institutions are the main source of financing.

1.2 Research Problem

A critical role for managers is to create value for shareholders using existing resources in a firm. To achieve this objective, firms require adequate cash and appropriate capital structure. Cashflow is essential in creating shareholder value as it provides liquidity for the firm to meet its day-to-day needs. It also enables firms to fulfil their debt obligations and pay shareholders dividends (Sawalqa, 2021). Firms strive to maximize shareholder's value by selecting appropriate level of leverage to achieve an optimal capital composition, the point of trade-off between the gains and cost of leverage (Kraus & Litzenberger, 1973). Furthermore, the nature of investments undertaken by a company can enhance firm value and act as a hedge against adverse effects of volatile cashflows.

Cashflow volatility intensifies incidences of internal cash deficits resulting in postponement of capital expenditure, delay in debt repayments or diversion of management attention from productive work (Minton & Shrand, 1999). High cashflow volatility sends negative signals to investors leading to a rise in external finance costs and deviation of leverage from its target, resulting in adverse effects on firm value (Iyer & Harper, 2017). Moreover, CFV, dampens investment in capital expenditure as firms preserve cash during the uncertainty. Cashflow uncertainty may arise due to macroeconomic disturbances such as volatile exchange rates, political uncertainty, regulatory changes, and adverse weather conditions (Vengesai & Kwenda, 2018).

During the period 2020 to 2021, performance of NSE listed firms was severely affected by the Covid-19 pandemic leading to a decline in the market capitalisation (Financial Sector Regulators 2021). In the year 2016, eleven companies listed at the NSE released profit warnings, rising to twelve in 2017, fifteen in 2018 and seventeen in 2019. The firms cited low business activity

following prolonged electioneering period, poor weather conditions and low private sector credit growth due to interest rate capping. The profit warnings led to negative investor sentiments resulting in a decline in share prices and dampening of overall performance in the stock market (Cytonn Investments, 2018; Financial Sector Regulators, 2020). Furthermore, in the period 2015 to 2016 there was a rapid increase in corporate leveraging among nonfinancial companies listed at NSE; the average debt to equity ratio grew from 57% to 69% (Financial Sector Regulators, 2020). Consequently, several NSE listed nonfinancial companies including Mumias Sugar Company, Uchumi Supermarkets, East African Portland Cement, Kenya Power, and Lighting Company, TransCentury, East African Cables, and Kenya Airways sunk into debt and become technically insolvent thereby facing difficulty in paying their suppliers and employees (Guguyu, 2019).

An empirical review of literature indicates conflicting findings on the effect of CFV on corporate value. Rountree, Weston and Allayannis (2008), Mäkelä (2012) and Altuntas et al. (2017) observed an inverse association whereas Sawalqa (2021), Gworo (2019) Shipe (2015) and Chi and Su (2017) observed a positive association. Rountree, Weston and Allayannis (2008) contend that companies with low CFV are priced at a premium compared to those with high volatility due to information asymmetry. Similarly, Minton, Schrand and Walther (2002) contend that CFV has a negative relation with future firm performance due to underinvestment problem: a situation where firms financed with risky debt shun valuable investment opportunities because debt holders stand to benefit more than shareholders (Myers, 1977). On the contrary, Chi and Su (2017) postulate that CFV is directly related to firm value because as firms grow, they progressively invest in their growth opportunities and their book value grows faster than market value thus Tobin Q as well as cashflow volatility decreases due to diversified investments.

Minton and Schrand (1999) observed that CFV raises the possibility of financial distress and bankruptcy for levered firms which increases external finance costs as equity and debt investors perceive increased risk. There is a concurrence in literature that CFV is inversely related to leverage especially long-term debt (Dudley & James, 2015; Keefe & Yaghoubi, 2016; Memon et al., 2018). However, contradictory findings have been observed on leverage and firm value relations. Some studies (Sawalqa, 2021; Chong & Kim, 2019; Cai & Zhang, 2006) observed an inverse association whereas Park and Jang (2016) found a direct link. Furthermore, Kodongo et al. (2014) conducted a study locally and observed that leverage is inversely related to profitability, but no effect was observed on firm value. Mixed findings on leverage and firm value association necessitate the use of a different measure of leverage. Ippolito et al. (2012) contend that leverage deviation provides a more precise indicator of the association between leverage and firm value as it accounts for firm heterogeneity and incorporates the risk attitude of investors. This study proposed that the CFV to firm value link is mediated by leverage deviation. As the volatility increases, the ability of firms to achieve their target leverage decreases due to increased cost of external finance resulting in a wider leverage deviation. Thus, there is a need to analyse the influence of leverage deviation, on the CFV and firm value link.

A review of literature indicates mixed evidence of the effect of uncertainty on investments. Some studies (Minton & Schrand, 1999; Beladi et al., 2021; Rashid et al., 2021) suggest a negative effect while others (Kimaiyo, 2017; Cohen, 2014) suggest a positive effect. Minton and Schrand (1999) observed that CFV is inversely related to investment expenditure because firms forego investment opportunities without exploring the option of external finance. Conversely, Cohen (2014) noted that CFV is positively related to corporate investments given some amount of cash holdings. Chortareas et al. (2021) suggest that the association depends on market power and competition in

the industry. Modgiliani and Miller (1958) contend that undertaking profitable investments results into growth in the net worth of a firm. Existing studies have assessed the relations between CFV, investments and firm value separately. The current study opines that corporate investment may explain the correlation between CFV and firm value. Thus, there is need to establish the influence of corporate investment on the CFV and firm value association.

Empirical studies have employed cross sectional regression models to examine the link between CFV and firm value (Minton et al., 2002; Rountree et al., 2008; Huang, 2009; Gworo, 2019). However, this approach does not control for unobserved heterogeneity thus if variables are misspecified, the findings may be biased. The current study aims to bridge the gap by analysing data using panel regression model. Panel regression allows for the use of broad data set which grant blended characteristics of cross section and time series data and provides comprehensive data with more degrees of freedom, efficiency and flexibility and less multicollinearity amongst predictor variables (Baltagi, 2005).

The interrelationships among CFV, leverage deviation, corporate investments and firm value have been individually examined in prior studies with contradictory findings being reported. These components are closely related, and a joint examination is needed to determine their interrelations. Furthermore, there is a dearth of studies on CFV and firm value link; the studies conducted are in developed markets which are culturally and economically different from the local context. This study examines whether firms with low CFV are priced at a premium. Secondly, the study examines the effects of leverage deviation and corporate investments on the relationship between CFV and firm value. Therefore, this study sought to respond to the research question: What are the interrelations among cashflow volatility, leverage deviation, corporate investments, and firm value among nonfinancial firms listed at the Nairobi Securities Exchange?

1.3 Research Objectives

The overall research objective was to examine the interrelationships among cashflow volatility, leverage deviation, corporate investments and value of nonfinancial companies listed at the Nairobi Securities Exchange.

The specific objectives include:

i. To determine the relationship between cashflow volatility and value of nonfinancial corporations listed at the Nairobi Securities Exchange
ii. To establish the effect of leverage deviation on the relationship between cashflow volatility and value of nonfinancial corporations listed at the Nairobi Securities Exchange
iii. To examine the influence of corporate investments on the relationship between cashflow volatility and value of nonfinancial corporations listed at the Nairobi Securities Exchange
iv. To determine the joint effect of cashflow volatility, leverage deviation and corporate investments on the value of nonfinancial corporations listed at the Nairobi Securities Exchange.

1.4 Value of the Study

The study purposed to contribute to theoretical literature, policy formulation and managerial practice. From a theoretical perspective, the study sought to extend the debate on cashflow volatility and firm value link by introducing leverage deviation and corporate investments thereby enhancing the scholarly rigor. The research sought to explain the mediating role of leverage deviation and corporate investment on the association between CFV and corporate value. The research further sought to contribute to the discussion on the optimal debt equity mix by

demonstrating the significance of CFV on a firm's capacity to attain target leverage. Thus, the research findings are anticipated to benefit future researchers and theoretical literature by shedding more light on the inconclusive debates.

The results of the research are expected to help managers understand the effects of CFV on firm performance and act as a trigger for management to keenly examine their operating cashflows and develop proper risk management framework to keep volatility in check. Secondly, the results of the study are anticipated to sensitize management on the need to critically examine their leverage levels and motivate them to intentionally direct their firms towards target leverage by adjusting the firm-specific factors that are within their control. Thirdly, the results of the research are anticipated to sensitize managers to appreciate the impact of their investment and financing policies on firm value.

The research findings are anticipated to provide a point of reference to sensitize government on the consequence of volatility on firm performance. It is anticipated that the findings of the research will motivate government to draw policies on macroeconomic factors such as taxes, interest rates and exchange rates that affect firms' cashflows, corporate investments, and leverage levels. Furthermore, it is anticipated that the findings will sensitize the government on the implications of political uncertainty thus act as a point of reference in formulating policies that provide a favourable working environment.

1.5 Organisation of the Study

The first chapter provides the background of the study, defines the research problem, research objectives and significance of the research. The second chapter provides a discussion of the theoretical foundation, empirical literature review, summary and research gaps and a description of the proposed conceptual framework. Four theories, theory of information asymmetry , dynamic trade-off theory, free cash flow theory and underinvestment theory have been discussed in detail. The theories explain the linkages between the variables in the current study. Empirical review of literature was based on relationships between research variables. The chapter culminated with the proposed research hypothesis.

Chapter three of the study describes methodology applied to conduct the research including data collection and analysis, operationalisation and measurement of variables and the approach of data analysis. Chapter four presents the results of the data analysis. It portrays the descriptive statistics, correlational analysis of the variables, the diagnostic tests and preliminary analysis to estimate a mediator variable. Chapter five presents the results and discussions of the inferential analysis. Chapter six summarises the findings and conclusions of the study, contribution of the research findings to knowledge, practice and policy. The chapter winds with a discussion of the limitations to the study and suggestions for further research.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter entails a discussion of literature around the study variables, cashflow volatility, leverage deviation, corporate investments, and firm value. It comprises of the theoretical framework which entails an appraisal of theories on which the study is premised, a review of empirical research around the core variables, a summary of key studies and description of literature gaps, a presentation of the study's conceptual model and an outline of the research hypotheses.

2.2 Theoretical Framework

This research is premised on four theories which explain the interrelationship among the study variables: theory of information asymmetry, free cashflow theory, trade-off theory and underinvestment theory. The theory of information asymmetry is the anchor theory as it explains the interrelationship among the four study variables. It suggests that discrepancy of information between market participants leads to inefficient allocation of resources hence mispricing of securities. Dynamic trade-off theory contends that companies adjust their capital structure constantly to an optimal debt level to maximize firm value; it describes the correlation between leverage deviation and firm value. Free cashflow theory contends that existence of free cashflows provides room for investing in suboptimal projects which leads to agency problems between shareholders and management and undermines firm value. Thus, the free cashflow theory explains the link among cashflow volatility (CFV), corporate investments, and firm value. Underinvestment theory contends that existing shareholders of a firm may reject viable investments when they perceive that the benefits will accrue to debtholders and potential shareholders. This theory describes the correlation between corporate investments and corporate value.

2.2.1 Theory of Information Asymmetry

The concept of information asymmetry has been in existence since the seventeenth century however, it is the Nobel Laureates Akerlof, Spence and Stiglitz who are recognized as the progenitors of the theory due to their seminal contributions on the analysis of markets with information asymmetry. In his seminal paper, the market for lemons, Akerlof (1970) noted that second-hand car sellers often know more than buyers leading to the existence of information asymmetry. Buyers presume that used cars have a high probability of being low quality thus bidding down the prices. Consequently, sellers of high-quality second-hand cars withdraw their vehicles from the market leaving only low-quality cars, the "lemons." Akerlof (1970), however, noted that the situation can be resolved through repeat sales and reputation.

In his study of signalling in the labour markets, Spence (1973) examined information asymmetry between employers and potential employees. He observed that potential employees bear prohibitive cost of education to signal their skills to employers. Spence distinguished between passive response signals and active response signals. He noted that the former involved receivers simply reading the signals based on past market experience. This would lead to inefficiencies due to the tendency to over invest in the signals. Rothschild and Stiglitz (1976) introduced the concept of screening and applied it in insurance market which is rampant with information asymmetry resulting in adverse selection and moral hazard. Information asymmetry theory transformed economic thinking from the neo-classical assumption of perfect information suggesting that markets are imperfect and there exist inefficiencies in allocation of resources.

Myres and Majiluf (1984) examined how information asymmetry affects a firm's financing and investment decisions. They noted that managers of firms with risky debt would rather forego

profitable investment opportunities than issue equity to fund an investment as the decision to issue equity is viewed negatively by potential investors who discount the offer price for the shares. Chiappori and Salanie (2001) tested the presence of asymmetric information in contractual relations using data on contracts and accidents of automobile insurance in the French market. They found no evidence of information asymmetry in the automobile market implying that insurance companies and their clients have the same knowledge set about the client risk.

Okuyan (2014) tested whether asymmetric information is influential on credit markets of Turkish banking sector. Specifically, the study examined whether non-performing loans led to credit rationing among Turkish banks. Results confirmed that asymmetric information was present in the Turkish Banking sector and contributed to credit rationing especially during periods of uncertainty. Kurlat and Stroebel (2014) tested whether information asymmetry exists in real estate markets where sellers and buyers have superior information over their peers. They observed that more informed sellers and those with larger supply elasticity better forecast the demographic changes and decline in house prices in their neighbourhood. Pratiwi (2021) empirically tested the effect of information asymmetry on cost of equity among mining companies in the Indonesian Stock Exchange. Results indicated a positive impact of information asymmetry on cost of equity.

The theory of information asymmetry is relatable to the current study as it depicts the interrelations among cashflow volatility, leverage deviation, corporate investments, and firm value. High cashflow volatility sends negative signals to investors as it connotes high business risk and dissuades investors from buying the stocks of such firms resulting to a decrease in firm value. Volatility of cashflows also deters firms from achieving an optimal capital structure and maximizing firm value as it leads to increased cost of external funds due information asymmetry between issuers of fund and the borrowers. Moreover, cashflow volatility has an adverse effect on

corporate investment which subsequently impacts firm value due to the adverse signal relayed to investors by the company undertaking the investment.

2.2.2 Dynamic Trade-off Theory

The dynamic trade-off theory was advanced by Fischer, Heinkel and Zechner (1989) proposing that as a result of transaction costs, firms allow their leverage to fluctuate most of the time however, when the leverage drifts too far, they rebalance their capital structure while trade-off theory was promulgated by Kraus and Litzenberger in 1973. The trade-off theory was developed from Modigliani and Miller (1963)'s proposal that to maximize value, a firm needs to maximize use of leverage since interest expense shields income from taxes. To avoid the extreme utilization of leverage, Kraus and Litzenberger (1973) contend that the optimal debt to equity mix is obtained through a trade-off of gains and costs of leverage. Trade-off theory factors in tax benefit brought about by leverage versus the future distress cost when the leverage is excessive. Kraus and Litzenberger (1973) contend that the ideal debt-equity structure is attained when marginal gains of leverage, equals the marginal cost.

To empirically test the trade-off theory, Bradley, Jarrell, and Kim (1984) modelled Kraus and Litzenberger's (1973) proposition of balancing the gains and costs of debt to obtain optimal leverage. The model captured state of the art propositions on optimal capital structure including debt agency cost arguments by Jensen and Meckling (1976), impact of non-debt tax shield by DeAngelo and Masulis (1980), personal tax rates differences on stocks and bonds' returns by Miller (1977). Bradley et al. (1984) observed that optimal debt-equity mix is obtained through a balance of costs and benefits of leverage. Furthermore, Titman and Wessles (1988) and Ragan and Zingales (1995) identified a set of firm characteristics that determine optimal debt-equity mix

including profitability, company size, uniqueness, growth prospects, earnings variability, asset tangibility and non-debt tax shield.

Trade-off theory suggests that market imperfections, such as transaction and bankruptcy cost, explains the relation between leverage deviation and corporate value and justifies the actions firms take to offset variations from the target leverage. Early studies on debt-equity mix failed to capture the dynamic nature of the capital mix; whereas trade-off theory explained the variations in optimal leverage across firms, empirical studies adopted a static framework where observed debt-equity mix was used as a proxy for optimal leverage for instance, Titman and Wessels (1988) and Zingales and Rangan (1995). Myers (1984) argued that firms take "extended excursions away from their target leverage" due to large adjustment costs.

Fischer, Heinkel and Zechner (1989) developed the dynamic capital composition model to capture recapitalization costs suggested by Myers (1984). They defined optimal capital structure as a range over which a firm allows debt to vary. The duration it takes for a firm to bridge the gap between observed and target leverage is measured as the capital structure adjustment speed. Similarly, Jalilvand and Harris (1984) suggested that financial conduct of firms is considered as partial adjustments to long-run financial target due to costs and imperfections inherent in the market. They used individual firm data to observe speed of adjustment by company and over time.

Further developments on dynamic trade-off theory were carried out by Flannery and Rangan (2006) and Drobetz and Wanzenried (2006) who applied dynamic panel adjustment models to determine target debt and the speed of adjustment. Ippolito, Steri and Tebaldi (2012) suggested that leverage deviation provides more accurate results in determining firm performance, compared to the absolute observed leverage, as deviation captures the effect of heterogeneity inherent in the target leverage. Frank and Goyal (2007) noted that initial studies on dynamic capital composition

implicitly assumed that capital structure adjustment is costless and that companies continuously alter their capital composition to a target level. However, due to adjustment costs, it would be more economical for firms not to completely adjust to the target level even if they note that they are not operating at an optimal level. They contend that the wide variation observed in debt ratios may be explained by large adjustment costs.

DeAngelo and Roll (2015) sought to examine capital structure stability over long horizon. They observed that leverage cross-sections vary significantly with the variation rising each year without reverting or normalizing. This observation was contrary to Lemmon, Robert and Zender (2008) who observed that leverage trends remain stable for more than twenty years and that time-varying determinants are not likely justifications of leverage heterogeneity. Campbell and Rodgers (2018) examined the capital structure of European companies and confirmed that not all firms maintain a stable capital structure. They opined that companies cannot select their optimal policies for debt, cash balances and equity pay-out simultaneously; firms may choose to pursue optimal policy of equity and cash balances and accept high volatility in debt. Furthermore, firms with tight capital structure have low variability in cash from operating and investing activities and any changes in cash is covered by adjustments in cash holding and equity pay-outs to maintain stable leverage.

Dynamic trade-off theory is significant to the current study as it explains the link between leverage deviation and firm value. As cashflow volatility intensifies, the cost of external finance rises, and this affects the capacity of firms to rebalance their capital structure and retain an optimal leverage level. As the leverage deviates from its target level, Kraus and Litzenberger (1973) suggests that firms fail to maximize their value. Thus, dynamic trade-off theory explains the linkage between the study variables, leverage deviation and firm value which is maximized at an optimal capital structure.

2.2.3 Free Cashflow Theory

Free cashflow (FCF) theory was propounded by Jensen in 1986. It contends that companies with huge amount of free cashflow tend to undertake suboptimal projects which exacerbate the agency conflict between management and shareholders and undermines firm value. According to Jensen (1986), free cashflows, the amount more than that required to finance positive NPV projects, tend to be wasted by managers through investing in projects whose returns are lower than the cost of capital. Free cashflow theory proposes debt creation to lower the agency cost of free cashflow. It further suggests that debt is a better substitute of dividends in reducing the resources available to managers, as they are bound by debt obligations as opposed to dividends where they still have control over the firm's future FCF and can undertake a dividend cut at the expense of shareholders.

Empirical studies show consistent evidence for the FCF theory. Vogt (1994) examined the impact of cashflow-investment link on company value and observed that FCF theory is evident among large firms that pay low dividends and invest in tangible assets. Similarly, Richardson (2006) studied firms investment decisions in the presence of free cashflows using accounting-based measures. The study examined firms over the period 1988 to 2002 and found a positive association between overinvestment and free cashflows for companies with excessive cashflows. Park and Jang (2013) observed that FCF deteriorates performance of firms in restaurant industry due to overinvestment. Kadioglu and Yilmaz (2017) examined the relation between FCF and leverage as well as dividends among 227 companies traded on Borsa Istanbul in the years 2008 to 2014 using panel regression model. Findings indicate a negative and statistically significant relation between leverage and FCF as well as dividends and FCF thereby providing evidence for the free cashflow hypothesis among firms in Turkey.

In Nigeria, Yero and Hamman (2014) assessed the impact of FCF and leverage on agency cost among listed food and beverage firms. Results revealed that FCF has a statistically significant and a direct effect on agency cost while leverage has a significantly negative effect. Lai et al. (2020) surveyed the effect of FCF on the performance of Malaysian companies and moderated the correlation using various industries. They observed that FCF is significant and inversely related to financial performance indicated by return on assets and firm value as indicated by Tobin Q. The findings therefore provide evidence for free cashflow among Malaysian firms.

The theory of free cashflows was further supported by Dogru et al. (2020) who assessed the influence of FCF on returns of franchising firms in the restaurant industry. They observed that firms with high FCF gain lower returns compared to firms with lower FCF. Moreover, availability of FCF among franchising firms exacerbates overinvestments leading to negative abnormal returns from acquisitions. Similarly, Kwon et al. (2021) investigated the effect of shareholder intervention on overinvestment of free cashflows by overconfident CEOs. They found a negative correlation between overinvestment and voting premium implying that shareholder intervention is effective at mitigating overinvestment hence providing evidence for the FCF theory.

The FCF theory is significant to the present study as it explains the link between cashflows, investment, and firm value. It shows that excessive cashflows in a firm is value destructing as managers tend to overinvest in suboptimal projects. The more the FCF in a firm, the higher the likelihood that directors will invest in investment projects that elevate their profile at the expense of shareholders. Such projects are not competitive, and the present value of their returns is likely to be less than present value of cost. This implies that shareholder's value and thus firm value is reduced by such investments.

2.2.4 Underinvestment Theory

Underinvestment theory emanates from agency relationships between shareholders and bondholders as well as existing versus prospective shareholders. Myers (1977) was the first to point out the underinvestment problem by arguing that risky debt may stimulate managers, who represent shareholders, to reject positive net present value (NPV) investments leading to low firm value since shareholders would not be willing to finance the positive NPV projects, thereby taking on the cost that would benefit debtholders. The contention by Myers (1977) is centred on the idea that a firm's value constitutes of the existing assets and growth prospects which leads to future valuable investments. The value of the growth opportunities is equated to options whose present value emanates from the projected cashflows and the managers discretion to exercise the options. Myers (1977) demonstrated that at times, the benefit of undertaking discretionary investment could accrue to bondholders to an extent that shareholders may be worse off than if the investment had not been undertaken. Thus, managers are incentivized to reject positive NPV projects whenever the present value of the investment opportunities is lower than the value of debt issued.

According to Jensen and Meckling (1976), information asymmetry between debtholders and shareholders may lead to asset substitution, an agency problem which is reasoned to precede the underinvestment problem. Jensen and Meckling (1976) contend that given their limited liability, equity investors are motivated to undertake highly risky investments beyond the level defined by their loan contracts, as risky investments are anticipated to yield higher returns and in the event of losses, bondholders bear the burden. However, the post-contract information asymmetry induces costs for the equity investors since debtholders discount the potential asset substitution by increasing interest rates, credit rationing or restrictive bond covenants on investment and

financing. Thus, managers fail to undertake the profitable investments due to the prohibitive costs implying that asset substitution is one of the mechanisms leading to underinvestment.

Conversely, Myers and Majluf (1984) highlighted the effect of precontract asymmetric information among existing and future equity investors on underinvestment. They argued that firms may bypass profitable investment opportunities due to the inflated cost of external finance caused by asymmetry of information between management, representing the interest of existing equity investors, and prospective equity investors. The potential investors could reduce the price they are willing to pay for stocks issued by management leading to increased cost of financing which may make a positive net present value project to cease to be profitable. Moreover, the firm may choose not to raise the external finance therefore pass up a positive NPV projects leading to adverse effects on firm value.

Graham and Harvey (2001) carried out a survey amongst 392 finance executives and investigated whether they are concerned about information asymmetry and asset substitution. They found a weak support for underinvestment and asset substitution. Particularly, they found evidence that directors issue short-term debt to lessen under investment and asset substitution problem. On the contrary, Morgado and Pindado (2003) found evidence for underinvestment and overinvestment hypothesis and observed a quadratic relation between firm value and investment suggesting that there is an optimal investment level that is, the point where positive net present value projects are exhausted. They argued that firms' manifest underinvestment when they invest below the optimal level due to information asymmetry between shareholders and bondholders as well as existing and prospective shareholders.

Similarly, Pour (2017) studied the effect of underinvestment and information asymmetry on a firms' choice to issue its inaugural bond publicly among firms in United Kingdom between 2007

to 2011. They observed that the agency cost of underinvestment delayed firms from accessing the public bonds market. Moreover, they noted that private firms are more likely to access the public bonds market prior to issuing equity through an initial public offer. Pellicani and Kalatzis (2019) examined whether the investment to cashflows behaviour among Brazilian firms is caused by underinvestment problem during the period 1997 to 2007. They observed that firms with financial constraints and higher investment prospects, exhibit underinvestment. Moreover, underinvestment problem is associated with the existence of the leading shareholder on the board as a director.

Underinvestment theory is valuable to the current study as it describes the link between corporate investments and corporate value. The theory suggests that when firm fails to invest in positive NPV projects due to excessive cost of external financing, caused by information asymmetry between management and issuers of funds, it leads to underinvestment problem which undermines firm value. Thus, as the level of corporate investments reduces due to underinvestment, firm value declines.

2.3 Empirical Review

This subsection examines empirical studies that explain the interrelationships between the study variables. It highlights research gaps from prior studies that culminate in the proposed research hypotheses.

2.3.1 Cashflow Volatility and Firm Value

Mixed findings have been observed among empirical studies assessing the link between cashflow volatility (CFV) and firm value. Rountree, Weston and Allayannis (2008), Mäkelä (2012) and Altuntas et al. (2017) observed an inverse association whereas Sawalqa (2021), Gworo (2019) and Shipe (2015) observed a positive association. Rountree et al. (2008) examined the effects of

earnings and CFV on value among US nonfinancial firms from 1987 to 2002 using OLS regression model. They found a strong negative effect despite controlling for leverage, firm size, sales growth, profitability, and investment expenditure. Similarly, Mäkelä (2012) determined the effect of CFV and earnings volatility on corporate value by examining 778 European firms from 2000 to 2010 and observed that earnings and CFV adversely impact firm value even after accounting for size, debt level, investment opportunities and profitability. The findings by Mäkelä (2012) and Rountree et. al (2008) are based on a measure, CFV per share, which creates a mechanical negative linkage between CFV, and corporate value as measured by Tobin Q. This is because larger firms tend to have larger per share CFV, larger per share size and smaller Tobin Q. Moreover, they applied ordinary least squares (OLS) regression approach which fails to account for firm fixed effects thus may result in misleading inferences.

Shipe (2015) examined the correlation between CFV and firm value across different firm types. The study opines that firms should regularly adjust their cash holding to an optimal cash level to reduce overinvestment, cash hoarding and to smooth effects of economic cycles and enable the firm to withstand harsh economic times. The adjustment of cash holdings results in increased volatility of cashflows which enhances firm value. CFV was measured as quarterly standard deviation of cash holdings and firm value using Tobin Q. Empirical testing of the relation provided evidence for the propositions of a positive association between CFV and firm value. Furthermore, the findings infer that the volatility is higher among younger and smaller firms which require constant adjustment of cash holding to the optimal level as they have limited access to external funding and low profitability.

Pastor and Veronesi (2003) contend that uncertainty results in higher valuation of the firms and the valuation declines over time as the investors learn about the firms' profitability. They

developed a model to value stocks in the presence of learning about their profitability using panel data from 1963 to 2000 obtained from CRSP/CompStat database. They noted that investors are faced with uncertainty about the future profitability of newly listed firms. Empirical results confirmed that MBV ratio rises with uncertainty especially among firms that pay no dividends. The MBV ratio declines over the firm's life and the decline is steeper among young firms. The study further indicated that the volatility of returns is higher among young firms and companies that have zero dividends.

The proposition by Pastor and Veronesi (2003) that profit uncertainty increases its stock valuation was examined by Cremers and Yan (2016) who extended the study by testing both stock and bonds market using multiple proxies of uncertainty instead of firm age only and controlling for volatility. Results support the positive association between uncertainty and stock valuation while the bonds valuation is negatively associated with uncertainty. Results further indicate that high leverage intensifies the positive association between uncertainty and valuation. The study used data from 1994 to 2006 obtained from centre for research and CompStat database.

Altuntas et al. (2017) contend that CFV is the mechanism through which derivative usage impacts firm value. They interacted CFV and hedging variable to analyse the influence of hedging on firm value of publicly traded life insurers. Results indicated that derivative hedging is inversely associated with firm value and performance of life insurers. However, when the impact of hedging was considered on CFV, firm value was less sensitive to CFV compared to non-hedgers. This study was an extension of Froot, Scharfstein, and Stein's (1993) model of the interrelations among hedging, cashflows, and corporate value. Corporate value was measured using Tobin Q, CFV using variance of operating cashflows for the past five years scaled by total assets. Firm size and investment opportunities were included as control variables. This study evaluates an approach to

defuse the impact of CFV on firm value. The current study will examine the mechanism through which uncertainty is intensified, hence impacting firm value.

The significance of financial reporting in the African context, was examined by Mostafa (2016). The study specifically examined the significance of operating cashflows, earnings and book value using pooled regression for 51 firms over the years 2003 to 2008 in Egypt. Results showed that earnings are significantly related with stock returns although, operating cashflows and book values had no significance. These results imply that income statement is preferred by investors compared to cashflow statement and balance sheet in firm valuation. This study however measures the effect of earning and cashflow fluctuations using percentage changes instead of volatility. CFV captures succinctly the riskiness of the business which is anticipated to impact on firm value.

In the Kenyan context, Gworo (2019) examined the correlation between earnings volatility and firm value among 30 NSE listed firms from 2011 to 2015. He observed a weak positive link even after controlling for pay-out ratio, firm size, and profitability. This study is however limited to a five-year duration, which is short to observe volatility especially using annual data. Secondly, the use of earnings to measure volatility is subject to bias since earnings can easily be manipulated and smoothed through discretionary accruals. Thirdly, using market value alone to measure firm value may present biased results as the share price is influenced by several unobservable factors. Furthermore, this study used a cross-sectional regression approach which is unable to account for unobserved heterogeneity thus may lead to incorrect estimates.

2.3.2 Cashflow Volatility, Leverage Deviation and Firm Value

There is a general consensus among findings in literature on the adverse effect of CFV and uncertainty on firm leverage (Dudley & James, 2015; Keefe & Yaghoubi, 2016; Memon et al.,

2018; Le et al., 2021). However, contradictory observations have been made on the behaviour of firm leverage. Some studies observed that leverage tend to remain stable over an extended period and variations arise because of time invariant factors (Lemmon, Robert & Zender, 2008; Frank & Goyal, 2008); other studies observed that leverage varies over time (DeAngelo & Roll, 2015; Chong & Kim, 2019). Similarly, conflicting findings have been observed on the effects of leverage on corporate value with some finding an inverse effect (Sawalqa, 2021; Chong & Kim, 2019; Cai & Zhang, 2006) whereas Park and Jang (2013) observed a positive effect.

A study on the effect of operating cashflows, investing cashflows , financing cashflows and capital structure on shareholder's value was carried out among Jordanian listed banks and insurance companies for the period 2011 to 2019. Panel fixed effects model with robust standard error was applied to test the interrelations. Results indicated that operating cashflows per share had a direct and statistically significant impact on firm value. However, cashflows from investing and financing activities were observed to have an inverse and insignificant impact on shareholder's value. Furthermore, results indicated an inverse and insignificant influence of capital structure on shareholder's value. Results also indicated a direct and significant correlation between the control variable, dividend per share and shareholder's value (Sawalqa, 2021).

The impact of political and economic uncertainty on corporate capital structure was carried out among manufacturing organizations listed in the Vietnamese Stock Exchange from 2010 to 2019. Vietnam is an emerging economy which relies on debt financing mostly in form of bank loans. It is also characterized by high information asymmetry and agency costs like other emerging economies which hinders supply of credit especially during periods of uncertainty. Fixed effects model was applied to assess the correlation between the uncertainty index and firm leverage. Results indicated that when economic and political uncertainty increases, firm leverage reduces

significantly, and the results were robust when system GMM approach was applied. Additionally, findings indicated that the negative correlation between political and economic uncertainty is only evident when firms are small. Lastly, the findings indicated that firms reduced their leverage during uncertainty to prevent reduction in firm investments. The study applied firm size, profitability, cash ratio and GDP growth as control variables (Le et al., 2021).

A study on the impact of CFV on trade credit offered by firms in Asian economies was carried out by Harris et al. (2019) for the period 1987 to 2015 and found inverse association. The study further analysed the influence of firm size and financial crisis on the association between CFV and trade credit and noted that smaller firms have less access to external resources. Moreover, they noted that during a financial crisis, firms lower trade credit investment when faced with CFV. This is useful in asserting the effect of volatility to credit access for small and large firms as well as during financial crisis. The current study however focused on long term credit facilities.

In the US market, Dudley and James (2015) applied OLS and instrument variable regressions models on quarterly US data from 1980 to 2005 to determine the correlation between CFV and capital structure. They measured volatility using GARCH approach arguing that use of rolling window method produces volatility that is slow to reflect latest information and allocates equal weights to recent and past innovations. Findings indicated that CFV is inversely related to leverage especially for firms that are constrained financially as they use cashflows from operations to repay existing debt instead of equity proceeds when volatility is high. This study measured volatility using industry level cashflows to alleviate reverse causality between volatility and leverage at the company level. However, the use of industry level data conceals the firm level effects of volatility.

Similarly, Keefe and Yaghoubi (2016) applied various measures of volatility to analyse the association between CFV and capital structure using a generalised linear model (GLM) on annual

US data from 1987 to 2012. They observed a weak and negative influence of volatility on long-term debt even after controlling for various firm attributes. These findings were similar to Memon et al. (2018) who observed an inverse association between CFV and long-term debt using GLM approach among Chinese nonfinancial firms listed from 1997 to 2015. Furthermore, Memon et al. (2018) noted that firms facing high volatility choose short-term debt causing a reduction in long-term leverage. These studies imply that CFV is negatively priced by lenders. Therefore, there is a need to investigate whether these relations translate to an inverse CFV to firm value link.

A review of literature indicates mixed findings on the association between leverage and firm value. Chong and Kim (2019) analysed the influence of capital structure volatility on stock returns of Korean listed firms using monthly data from the year 2004 to 2017. Cross sectional and time series tests were conducted to evaluate the relations. Results indicated that capital structure is not stable over time as assumed in literature. They further observed an inverse correlation between capital structure volatility and stock returns. Cai and Zhang (2006) investigated the association between leverage variation and portfolio returns among US public firms from 1975 to 2002 and observed a significant negative effect especially among firms with high leverage. They further controlled for firm characteristics and found significant negative relations. However, this study measured returns of a portfolio rather than individual firms' returns which may influence the findings due to the mean effect.

In contrast, Park and Jang (2013) examined 308 US firms from 1995 to 2008 and observed that leverage has a direct impact on Tobin Q. This study however centred on the consequence of corporate diversification on performance. Ippolito et al. (2017) argued that previous findings of studies on leverage and firm value relations presented mixed results due to the use of observed leverage. They examined the connection between leverage and equity returns by using relative

leverage instead of observed leverage. They contend that equity returns of firms with the same observed leverage but different target leverage bear different risk exposure and are therefore priced differently. Thus, they suggest that firm specific heterogeneity should be removed before establishing the relation between leverage and returns. Relative leverage was estimated by deducting target leverage from observed leverage. Results indicated that relative leverage is positively and highly related to equity returns.

Furthermore, Ilgaz (2012) contends that leverage deviation is the most important determinant of a firms leverage ratio. He regressed the leverage deviation of the prior years among other capital structure determinants including growth prospects, profitability, earnings volatility, tangibility, product uniqueness, firm size, and marginal tax. The study used CompStat data from 1985 to 2010. Results indicate that the addition of leverage deviation as a control variable doubles the explanatory power of the model. Furthermore, the findings were robust to models using variations in leverage levels or leverage as the dependent variable.

In the Kenyan context, Kodongo et al. (2014) used panel regression models to examine how changes in capital composition affect the performance of NSE listed firms from 2002 to 2011. They reported findings for both fixed and random-effects models. Results indicated a significant inverse impact on profitability however no effects were observed on the firm value. The study controlled for variables that affect firm performance including asset tangibility, sales growth and firm size and noted that they are all important determinants of firm profitability. Asset tangibility was observed to have an inverse association with profitability. Although an inverse association was established between leverage and profitability, there is still a need to assess the effects of leverage variations on corporate value.

The studies above present separate and contradictory findings on the interrelations among CFV, leverage and firm value indicating an inconclusive debate. Moreover, most of the studies examined US firms where the economic and regulatory environment is significantly different from the local context. Therefore, there is a need to conduct a study that investigates the joint effect of CFV and leverage on corporate value. Furthermore, the use of observed leverage to examine the interrelations may have contributed to the mixed findings. Thus, the current study will use a relative measure, leverage deviation, to describe the correlation between CFV and corporate value.

2.3.3 Cashflow Volatility, Corporate Investments and Firm Value

The interaction between cashflow, investments and corporate value is underpinned in the free cashflow theory which suggest that elevated level of free cashflow adversely impacts firm value due to suboptimal investments undertaken by management (Jensen, 1976). Conversely, Myers (1984) suggest that firms are better off using internally generated cash to fund investments as external financiers undervalue favourable investments due to information asymmetry. Empirical studies provide conflicting evidence on the correlations among CFV, investments and corporate value. Minton and Schrand (1999) examined the effects of CFV on discretionary investments, cost of equity and debt finance. They observed that CFV is inversely related to investments indicating that firms forego capital investments rather than use external markets to cover cash shortfall. They further observed that CFV is correlated with higher costs of external capital implying higher sensitivity of investments to volatility hence lower firm value. The study applied cross-sectional OLS regression analysis using US firm data for the period 1989 to 1995. However, this duration is short and could result in sampling bias. Furthermore, cross-sectional regression analysis may result to misleading inferences if variables are not correctly specified as it does not capture unobserved heterogeneity.

Cohen (2014) challenged Minton and Schrand (1999)'s findings, contending that the effect of CFV on corporate investments is pegged on cash holdings. Cohen (2014) observed that higher cash holdings offer a buffer against volatility. Although Cohen's finding is beneficial in the CFV to investment debate, it may not stand in the event a firm's cash holding arises from long term borrowings or if debt covenants restrict the use of the cash holdings. Hence, this study can be extended to analyse the mediating effects of corporate investments on the CFV to firm value association. Beladi et al. (2021) studied the effect of cashflow uncertainty on research and development investments among Chinese listed firms in Shanghai and Shenzhen between 2005 to 2016. They further evaluated the moderating effect of financial constraints on the connection between cashflow uncertainty and research and development (R&D) investments. Results indicated that R&D investments tend to be conservative in the presence of cashflow risk. Furthermore, financial constraints further intensify the adverse impact of cashflow uncertainty on research and development investments. The study also found that strategic cash holding can help mitigate the effects of cashflow uncertainty.

Using panel data of 25000 Greek firms, Panagiotidis and Printzis (2021) sought to examine investments under uncertainty covering all sectors and firm sizes. A panel quantile estimation framework was applied to obtain a comprehensive picture of the heterogeneous effect of uncertainty. The study applied a dynamic factor model to proxy uncertainty. Results indicate a negative effect of uncertainty on investments. Firms that invest more face more amplified uncertainty whereas firms with lower investments face lower vulnerability to uncertainty. Furthermore, results indicate that the magnitude of the negative uncertainty varies across and within sectors. Rashid et al. (2021) studied the influence of firm specific, macroeconomic, and political risk on firms' investment decision in Pakistan. The study further examined the uncertainty

effects on investments for different firm sizes and across industries. Unbalanced panel data of 468 nonfinancial companies at the Pakistan Exchange for the period 2000 to 2018 was applied. Uncertainty index was developed for firm specific, macroeconomic, and political uncertainty. Results provided compelling evidence of the detrimental effect of all the uncertainty types on investments. Political and macroeconomic uncertainty have more adverse effect on investments. Furthermore, the adverse effect of all the uncertainty types is more severe among smaller firms.

In South Africa, Chortareas et al. (2021) examined the impact of market power in influencing the relation between corporate risk and investment decisions among 177 firms listed in Johannesburg Stock Exchange from 1995 to 2017. Uncertainty was measured as annual variability of daily stock returns and variability of monthly distinctive returns which is computed as the standard deviation of the residuals from the excess returns model. Results indicated a positive correlation between volatility and investment for companies with low market power while companies with superior market power can defer investments in the event of uncertainty. Furthermore, results indicate that competition enhance risk uptake in firm investment decisions in South Africa. For robustness, the study applied pooled OLS, panel FE and dynamic panel GMM estimator to examine the interrelations.

In the Kenyan context, Kimaiyo (2017) examined the effects of uncertainty on corporate investment using panel data of nonfinancial companies listed at the NSE for the period 2000 to 2016. The study sought to determine whether uncertainty accelerates investments as purported by real options and strategic growth theories. Uncertainty was measured by volatility of daily stock market prices using GARCH model. Annual standard deviation was also applied for robustness. Data was analysed using random effects and fixed effects panel regression models. Results indicated that uncertainty has a positive effect on investments.

Studies analysing the association between corporate investments and firm value suggest positive relations. Del Brio et al. (2003) contend that the effect of investment announcements on firm value is associated with efficient market hypothesis, free cashflow (FCF) theory or asymmetric information. Del Brio et al. (2003) studied the effect of investment announcements on share prices among Spanish firms for the period 1991 to 1997 on 114 corporate investment disclosures using panel data analysis. The study further tested the effect of information asymmetry, the level of FCF. Results collaborate the FCF theory as the market responds favourably to investment announcement if the FCF are low. However, high FCF is rewarded when firms announce increase in capital expenditure and the investment opportunity is profitable.

Dushnitsky and Lenox (2006) studied the influence of corporate venture capital investment on the value of the investing firm. The study analysed a panel of US public firms in the 1990s and found that corporate venture capital investment is correlated with firm value creation, although, the results were subject to sectoral and firm specific factors. They concluded that corporate venture capital is valuable in industries where entrepreneurial enterprises are a vital source of innovation. Kim et al. (2018) examined the association between R&D investments and firm value among 563 Chinese listed companies from the year 2005 to 2013. Results indicated an inverted u-shaped curve implying that when R&D investment increases, firm value rises to a certain level then declines. The inverted u-shaped curve is evident among companies with high growth opportunities while those with low opportunities demonstrate a u-shaped pattern. Similarly, Mousa et al. (2021) assessed the effect of investment in marketing among Arabic emerging economies for the period 2010 to 2019, using panel regression models. They observed that increasing marketing investment had a favourable effect on firm value.

The studies above provide mixed evidence of the effect of uncertainty on investments. Some studies (Minton & Schrand, 1999; Beladi et al., 2021; Rashid et al., 2021) suggest an adverse effect of uncertainty hence CFV on investments while Kimaiyo (2017) suggest a positive effect. Cohen (2014) suggest that the correlation between CFV and investment depends on factors such as level of cash holding while Chortareas et al. (2021) suggest that it depends on market power and competition in the industry. Existing studies have assessed the interrelations among CFV, corporate investments and firm value separately. Thus, there is need to analyse the mediating effect of corporate investments on the CFV to firm value link.

2.3.4 Cashflow Volatility, Leverage Deviation, Corporate Investments and Firm Value

Minton et al. (2002) hypothesized that high CFV limits the ability of firms to undertake desired investments hence resulting in a reduction in the expected future cashflows. They further argued that CFV is associated with underinvestment problem, which is brought about by market imperfections, where external funds are more expensive than internal funds. Empirical analysis of US firms for the period 1983 to 1997 confirmed these predictions. Minton et al. (2002) therefore concluded that investors can enhance the accuracy of predictions of future cashflows and thus firm valuation if they incorporate the effect of volatility on investment. Although this paper alludes to the effects of volatility on the external cost of capital thus leading to undervaluation, it does not explicitly measure the influence of leverage on the predictive ability of CFV on corporate value.

Chi and Su (2017) postulate that CFV is directly related to firm value (Tobin Q), because as firms grow and progressively invest in their growth opportunities, their book value grows faster than market value thus Tobin Q decreases as well as CFV due to diversified investments. They examined the moderating effect of growth opportunities by interacting growth proxies (sales

growth, R&D capital, and patents number) with CFV and observed a more positive CFV to Tobin Q association with increased growth opportunities. They further examined the impact of leverage on the association between CFV and Tobin Q by dividing the sample into firms with no debt and those with high debt levels each year and observed a direct association between company size and Tobin Q in both subsamples. The study applied the fixed effects regression model which is rigorous in estimation of the correlation between variables, however, the use of absolute leverage measure fails to capture the risk profile of investors thus the impact on corporate value may be distorted. Prior studies examined the interrelations between cashflow volatility, leverage, firm characteristics, and firm value individually with contradictory findings being reported. These components are closely related, and a joint examination is needed to determine the interrelations among them.

2.3.5 Control Variables

Several control variables believed to influence firm value were introduced in the study. They include asset tangibility, profitability, and growth opportunity. Asset tangibility (henceforth referred to as tangibility) is referred to as the proportion of fixed assets to total assets in a firm. High tangibility increases the earnings potential of a firm and lowers the cost of financial distress. The earnings potential of firms increases with increased tangibility as the firms can exploit the fixed assets to generate more output and hence earnings (Chi & Sue, 2017; Kondongo et al., 2014) Furthermore, high asset tangibility provides collateral that firms can use to enhance their debt capacity and lower cost of debt. Thus, tangibility is projected to be positively associated with firm value. On the contrary, tangibility may not be valuable for firms in the service and retail sectors as

they are not involved in actual production. Moreover, high tangibility in service and retail sector ties up capital which leads to negative returns and firm value. Thus, the direction of the relation between tangibility and firm value depends on the category of firms that dominate the sample (Kodongo et al., 2014). In a study assessing the association between CFV and firm value, Chi and Sue (2017) controlled for asset tangibility and observed a positive correlation between tangibility and firm value while Kodongo et al. (2014) observed an inverse correlation between tangibility and corporate value.

Profitability is one of the main drivers of corporate value. When a company makes favourable profit, it attracts potential investors and existing shareholders to buy its shares thus driving up firm value. Thus, profitability is positively associated with firm value. Various profitability ratios have been used in literature to evaluate a firm's performance including return on equity, return on assets, earnings per share (Kodongo et al., 2014; Shahid, 2018, Rountree et al., 2008). Shahid (2018) and Rountree et al. (2008) controlled for profitability using return on assets (ROA) when examining CFV and firm value link and found a positive association between profitability and firm value. The current study uses ROA estimated as the proportion of earnings before interest and tax to total assets. This ratio is useful in evaluating how efficient management has been in generating revenue and managing costs. It also evaluates firm performance prior to including tax and finance costs which may be beyond the control of managers.

Growth opportunity is anticipated to drive value because when firms invest in those opportunities, shareholders' wealth increases. Chi and Sue (2017) hypothesised that as a firm grows it invests in its growth prospects leading to a fall in CFV and Tobin Q, a proxy of firm value. They controlled for growth opportunities when examining CFV and firm value association and observed a positive correlation with firm value. Chi and Sue (2017) proxied growth opportunity using R&D capital,

annualised sales growth, and number of patents. Similarly, Rountree et al. (2008) controlled for sales growth as a proxy of growth prospects in the study of CFV and firm value link. Kodongo et al. (2014) proxied growth opportunity using GDP growth rate. However, the rate of GDP growth may not precisely capture the influence of growth at a firm level. Thus, the current study proxied growth opportunity using market to book value of equity, estimated as the proportion of MV of equity in relation total shareholder's equity. MBVE was adopted as it captures the investors perception of growth in a firm. It is anticipated that the higher the growth prospect of a firm, the higher the MV of equity compared to its BV. High MBVE may however indicate an over valuation of a firm.

2.4 Summary of Empirical Literature Review and Research Gaps

This section provides a summary of empirical studies examining the interrelations the main study variables, organized in a chronological order. Table 2.1 below highlights key empirical studies and identifies the authors, focus of the study, research methodology applied, the research findings, the corresponding knowledge gaps, and a description of how the gaps were addressed.

Table 2.1 Summary of Empirical Literature and Knowledge Gaps

Author	Focus of the Study	Methodology	Findings	Knowledge Gaps	Addressing the Research Gaps
Minton and Shrand (1999)	Impact of CFV on investments, cost of debt and equity finance	Cross-sectional, OLS regression analysis using US data from 1989 to 1995	CFV is inversely related with investments in capital expenditure, R&D, and advertising CFV is directly related with cost of external finance	Six-year data which is short to observe the impact of volatility impact firm value. Cross-section regression may lead to misleading inferences if variables are not specified correctly. The study assumes that volatility affects firm value via investments and costs of finance	The current study applied panel regression model for 15 years duration Tobin Q was applied to estimate the effects of volatility on corporate value
Minton, Schrand, and Walther (2002)	The effect of volatility on corporate investments and firm performance	Cross-sectional regression analysis using US data for the period 1983 to 1997	Study found an inverse correlation between CFV and future operating cashflow and operating income (thus firm value) despite controlling for firm characteristics, investment, historical cashflows and operating income.	Study was conducted in a developed economy which is characterized by different economic, cultural, and regulatory environment. Pooled regression model does not control for firm fixed effects thus may lead to inefficient coefficients if model is mis specified	The current study focuses on the local environment This study utilized panel regression model that accounts for firm fixed effects

Author	Focus of the Study	Methodology	Findings	Knowledge Gaps	Addressing the Research Gaps
Cai and Zhang (2006)	Effect of leverage change on a firm's stock returns	Time-series and cross-sectional regressions using US public firm data for the period 1975-2002	Study documented significant negative effect of leverage variations on stock returns even after controlling for ROE, growth, size, and past returns. The effect is stronger for firms with higher leverage. Leverage deviation has no effect on stock returns	This study observed portfolio returns and quarterly average leverage of the portfolios instead of individual stocks. Using average values tend to neutralize individual firm effects.	This study utilized firm-level data to estimate its variables.
Rountree, Weston and Allayannis (2008)	Earnings volatility, CFV and firm value	OLS regression model using US data from 1987 to 2002	CFV is significant and inversely related with Tobin Q. However, earnings volatility did not affect firm value	Measurement of volatility using future operating cashflows ignores the value of historical volatility on firm value. The study controlled for observed leverage which does not succinctly capture the risk profile of investors.	This study measured volatility using historical operating cashflows. This study used leverage deviation instead of observed leverage
Huang (2009)	CFV and expected stock return	Cross-sectional regression model using US data from 1973 to 2004	Study established a strong inverse correlation between historical CFV and ex-post returns	Cross-section regression approach fails to capture firm fixed effects and can lead to incorrect inferences if model is mis specified.	Study applied the panel regression model which takes care of firm fixed effects

Author	Focus of the Study	Methodology	Findings	Knowledge Gaps	Addressing the Research Gaps
Mäkelä (2012)	CFV, earnings volatility and firm value	OLS regression analysis using 778 European firms for the period 2000 to 2010	Earnings volatility and CFV are inversely related to firm value. Diversification results in smooth earnings but discounts firm value.	Cross-sectional regression model is limited in controlling for firm fixed effects Study was conducted in developed economies which are economically and culturally different from the local context	This study used panel regression model. The current study was conducted in the local context (Kenya)
Kodongo et al. (2014)	Capital structure and corporate performance	Panel regression model on NSE firms in Kenya from 2002 - 2011	There is a significant inverse effect of capital structure on ROE and ROA. However, no effect was observed on company value (Tobin Q).	Study used absolute leverage measure Although the study controlled for various firm characteristics, it failed to incorporate the effect of growth and investment opportunities in its model.	This study extended the research by using relative leverage measure and including CFV as an explanatory factor of firm value and control for growth, profitability, and tangibility.
Cohen (2014)	CFV and corporate investment	Univariate and pooled regression model using US data from 1980 to 2012	Firms with higher cash holdings raise investment expenditure during uncertainty. Firms with lower cashflow holdings decrease their investment expenditure	Study was conducted in a developed economy which is characterized by different economic and cultural environment. Pooled regression model does not control for firm fixed effects thus may lead to inefficient coefficients if mis specified.	The current study focused on the local environment. This study utilized panel regression model that accounts for firm fixed effects

Author	Focus of the Study	Methodology	Findings	Knowledge Gaps	Addressing the Research Gaps
Dudley and James (2015)	CFV and capital structure choice	GARCH to measure volatility. Ordinary least squares and instrument variables regression model to measure the effect of volatility on leverage	Results indicate that volatility shock is among financially constrained firms whose leverage choice is negatively related to volatility and is more pronounced during easy credit conditions	Study used industry level cashflows to measure volatility instead of firm level volatility thus not capturing firm level innovations. Study measured leverage using observed debt ratio which may fail to show heterogeneity in risk attitude of the investors	This study measured firm level volatility using panel regression model This study applied leverage deviation instead of observed leverage.
Shipe (2015)	Volatility of cash holding and firm value	Panel regressions on Publicly traded firms for years 1992 to2013	Study documents a direct effect of volatility of cash holding on firm value. Volatility is higher among younger and smaller firms as they require constant adjustments of cashflows to attain an optimal level.	The study examines volatility of cash holding which may vary depending on a firm's financing policy and ability to attract funds but may not be indicative of market shocks.	The current study examined volatility of operating cashflows.
Mostafa (2016)	Significance of operating cashflows, earnings, and book value	Pooled regression for 51 firms over the period 2003 to 2008	Earnings are significantly associated with stock returns. However, operating cashflows and book values had no significance.	This study measures the effect of earning and cashflow fluctuations using percentage changes instead of volatility.	The current study measured cashflows fluctuations using standard deviation.

Author	Focus of the Study	Methodology	Findings	Knowledge Gaps	Addressing the Research Gaps
Chi and Su (2017)	Cashflow volatility (CFV) dynamics and firm value (CFV, growth opportunities, firm size, and Tobin Q)	Firm fixed effects and pooled OLS regression models using US data from 1991 to 2012.	Positive correlation between CFV and firm value. CFV and Q decline in firm age and size. As firms grow and progressively invest in their growth opportunities, their book value grows more rapidly than market value thus Tobin Q decreases as well as CFV due to diversified investments	The study is premised on the assumption that BV grows faster than MV as firms invest, thus decline in Tobin Q. However, this depends on investor perception and the market efficiency. The study examined the impact of leverage on CFV- Q relation but uses the absolute leverage value which fails to capture risk profiles of investors	The current study was conducted in a local context whose capital market is not advanced. The current study used leverage deviation to assess the effect of leverage on corporate value
Memon et al. (2018)	Impact of CFV on leverage and debt maturity structure	Generalized linear model (GLM) and Ordered Probit regression among Chinese listed firms	High volatility results into lower long-term leverage levels and firms facing high volatility choose debt with short maturity period	The study examined the effect of CFV on leverage only. The study measured observed leverage which may not capture the risk profile of investors.	The current study measured the influence of CFV on corporate value and included a mediating factor, leverage deviation.

Author	Focus of the Study	Methodology	Findings	Knowledge Gaps	Addressing the Research Gaps
Gworo (2019)	Earnings volatility and market value of firms	Cross sectional design via multiple linear regression model on NSE data from 2011 to 2015	Weak positive correlation between earnings volatility and corporate value. Control variable, payout ratio, is positively related to corporate value	This study is restricted by use of cross-sectional design which if mis specified, fails to address the 'missing variable' problem leading to misleading inferences. Moreover, the study used annual data for only five years which is quite brief and may result to the sample bias. Firm value was estimated using only one measure, market value.	The current study used panel regression models to capture unobserved heterogeneity and cover eighteen years duration. Tobin Q was used to measure firm value.
Sawalqa (2021)	Effects of cashflows from operations, investing and financing activities on shareholder's value	Panel Fixed Effects Model robust for standard errors Jordanian banks and insurance companies listed in the Amman Stock Exchange from 2011 to 2019.	Cashflows from operating activities are directly and significantly associated with shareholder's value where cashflows from financing and investing activities have an inverse and insignificant effect. Negative and insignificant association between leverage and shareholder's value.	The study examined the effect of absolute value of cashflow from the cashflow statements on shareholder value. Investors are sensitive to the fluctuations of the cashflows thus volatility would be a preferable measure.	Current study measured the fluctuations of operating cashflows using standard deviation

Author	Focus of the Study	Methodology	Findings	Knowledge Gaps	Addressing the Research Gaps
Lee et al. (2021)	Impact of uncertainty on leverage.	Manufacturing companies listed in Vietnamese stock market from 2010 to 2019. Fixed effects model and System GMM approach were applied	Increase in political and economic uncertainty results into significant reduction in the firms' leverage level. The negative effect of uncertainty on leverage level was only observable among small firms.	Uncertainty was measured using political and economic risk indices. These are broader measures of risk and may not succinctly explain the effect on firm level performance.	Current study measured uncertainty using cashflow volatility. This is a firm specific measure that can be directly attributed to firm performance.
Beladi et al. (2021)	Effect of cashflow uncertainty on R&D and moderating influence of financial constraints on the relation	Regression model on Chinese listed firms in Shanghai and Shenzhen between 2005 to 2016	R&D investments tend to be conservative in the presence of uncertainty which is not favourable for innovation. Financial constraints aggravate the negative effect of uncertainty on R&D investments Strategic cash holding may mitigate the effect of uncertainty.	The study terminates at examining the association between cashflow risk and R&D investment. Investment is restricted to only research and development expenditure	Present study extended the study to measure the correlation between CFV, investments and firm value. Investment constitutes R&D, capital expenditure and advertisement expenditure.

Source: Author, 2022

2.5 Conceptual Framework

This study sought to assess the relationship between the explanatory variable cashflow volatility (CFV) and the response variable, firm value. High CFV increases the periods in which firms have shortfalls in internal cashflows thereby sending negative signals to investors and impacting on firm value. Increased frequency of cashflow shortfall raises the cost of external finance due to information asymmetry and debt covenants (Minton & Schrand, 1999). Hence, Rountree et al. (2008) suggest that CFV is negatively valued by investors. CFV is calculated as the standard deviation of operating cashflows divided by total assets. The dependent variable, firm value, is estimated using Tobin Q which is calculated as the summation of equity market value and book value of debt scaled by the total value of assets.

CFV is inversely related to leverage as firms opt to maintain low debt levels when cashflows are uncertain due to increased risk of financial distress (Keefe & Yaghoubi, 2016). Leverage deviation, measured as the divergence of observed (actual) leverage from the target, is anticipated to increase with increase in CFV. As the volatility increases, the firm's ability to achieve the optimal leverage declines because the benefit of debt tax shield decreases and financial distress cost increases (Dudley & James, 2015). Moreover, trade-off theory suggests that as firms close the leverage gap, their value increases. Thus, it is anticipated that as leverage deviation intensifies due to cashflow volatility, firm value declines.

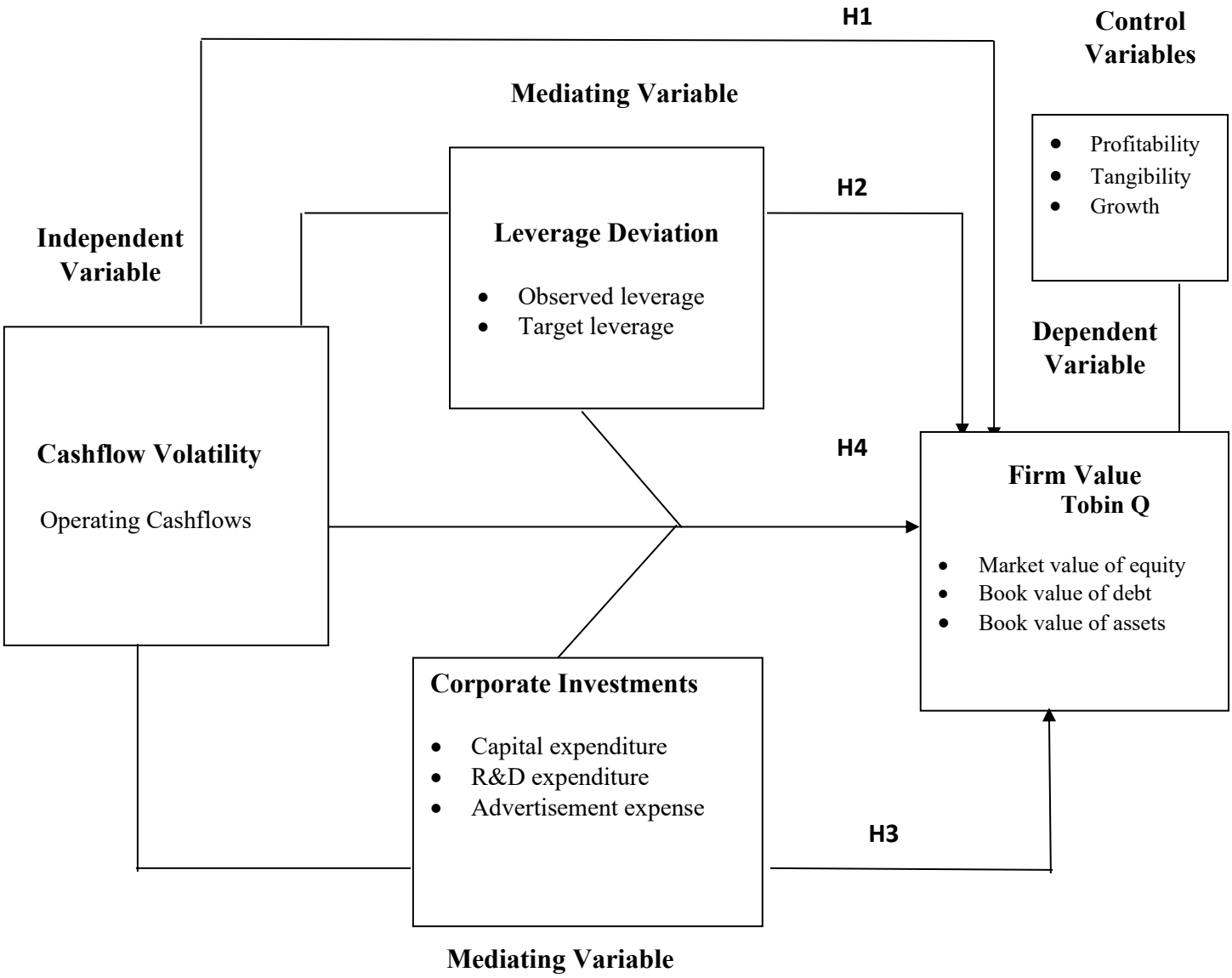
Exploiting investment opportunities has a favourable influence on firm value since investors perceive increased investment as a signal of high earnings in future. However, volatility of cashflows may undermine a firm's ability to undertake corporate investments as the cost of external financing becomes higher (Minton & Schrand, 1999). Corporate investment is measured

by total investment expenditure (capital expenditure, advertising expenditure, R&D expenditure, depreciation, and amortization) scaled by total assets. Thus, this study seeks to contribute to literature by evaluating the mediating role of corporate investments on the CFV to firm value relations. It hypothesizes that corporate investment explains the link between CFV and firm value.

The conceptual model (Figure 2.1) below shows the interrelations among variables in the current study. CFV is anticipated to be inversely related to firm value since high volatility of cashflows indicates high operating risks which sends negative signals to investors leading to a decline in firm value. Secondly, high CFV is anticipated to increase external finance cost which affects the ability of firms to maintain an optimal leverage hence a deviation from the target and leading to a decline in firm value. Thus, leverage deviation is anticipated to mediate the link between CFV and firm value where a positive relation is anticipated between CFV and leverage deviation and an inverse association between leverage deviation and firm value.

Furthermore, high CFV is anticipated to negatively affect corporate investments since firms favour cash perseveration over capital expenditure during uncertainty, and as a result, firm value is anticipated to decline. Thus, corporate investment is anticipated to mediate the relationship between CFV and firm value where an inverse correlation is anticipated between CFV and corporate investments and a positive association between corporate investment and firm value. Lastly, CFV, leverage deviation and corporate investment are anticipated to jointly affect firm value. It is expected that there will be a negative association between CFV and firm value, as well as between leverage deviation and firm value and a positive correlation between corporate investment and firm value.

Figure 2.1 Conceptual Framework



Source: Author, 2022

2.6 Research Hypothesis

This study sought to establish the interrelation among cashflow volatility (CFV) and firm value, the mediating effect of leverage deviation and corporate investments on the interrelation between CFV and firm value and the joint effect of CFV, leverage deviation and corporate investments on firm value. The four hypotheses have been premised on the research objectives, respectively. Thus, given the conceptual framework and research objectives, this study will assess the following four null hypotheses:

H_1: The effect of cashflow volatility on the value of nonfinancial corporations listed at the NSE is not significant.

H_2: The mediating effect of leverage deviation on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE is not significant.

H_3: The mediating effect of corporate investments on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE is not significant.

H_4: The joint effect of cashflow volatility, leverage deviation and corporate investments on the value of nonfinancial corporations listed at the NSE is not significant.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodological approach applied to conduct the research. It explains the alternative research philosophies and the rationale for adopting the positivist philosophy, various research designs are explained and the rationale for adopting the descriptive design. The chapter also describes the target population where data was drawn, the data collection and analysis techniques adopted and the measurements of the key study variables. Thus, the chapter encompasses the following subheadings: research philosophy, research design, population and sample, data collection processes, diagnostic tests, operationalization of study variables and the data analysis techniques.

3.2 Research Philosophy

Research philosophy refers to a set of assumptions and beliefs about the advancement of knowledge. It emphasizes the research strategy, methodological approach, data collection and evaluation techniques (Saunders, Lewis & Thornhill, 2009). Research philosophy can be classified into positivism, interpretivism, pragmatism, critical realism, and postmodernism. The first two are the major categories and tend to be at the end of two continuums. Interpretivism contends that social science research and human beings cannot be studied as physical phenomena. Interpretivists look at organizations from perspectives of diverse groups of people to analyse scenarios based on recollections, individual experiences, and expectations. Consequently, meaning is created and re-created over time resulting in several interpretations hence, a social reality, upon which people act, is created from those interpretations (Flowers, 2009).

Post modernism underscores the role of power relations and language to examine conventional approaches of thinking and grant voice to ostracized views. Post modernists go beyond interpretivist in criticizing positivist and objectivist. They strive to deconstruct realities and established ways of thinking to make what has been left out visible. Critical realism takes a middle ground between positivist, direct realism, and postmodernism. Unlike direct realist who believe that "what we see is what we get," critical realist believes that there is an underlying cause of experiences or sensations thus search for the deeper meaning. Pragmatists endeavour to bring together objectivism and subjectivism through accommodating diverse approaches of deciphering the world and doing research. They contend that ideas are significant only when they back actions and are more concerned about pragmatic results than hypothetical distinctions (Saunders, Lewis & Thornhill, 2009).

Positivism is associated with the philosophical standpoint of natural scientists and involves engaging with apparent social reality to generate law-like generalizations. It assumes that the social world operates externally and objectively, and that knowledge is legitimate only if it is premised on observation of the exterior reality. Positivism is premised on values of reason, truth and validity and relies entirely on facts obtained through observation and experience and is empirically measured quantitatively (Flowers, 2009). Positivists try to remain detached and neutral from the research. They develop hypotheses from existing theories that can be assessed in part or whole. Therefore, this study is grounded upon positivist research philosophy as it assesses hypotheses drawn from contemporary theories through the measurement of discernible social realities. Furthermore, the researcher maintains a detached and neutral position from the research and data.

3.3 Research Design

Research design is an extensive map for the collection of data in an empirical research venture. It is a "blueprint" for empirical research intended for responding to specific research questions or assessing certain hypotheses (Bhattacherjee, 2012). It involves outlining all aspects of research then planning for them to take place in an inclusive manner. There are three broad categories of research designs: exploratory, experimental, and descriptive designs. Exploratory design is conducted to clarify situations that are ambiguous. It is usually conducted as a first step with the expectation that further research will be undertaken to provide more conclusive evidence thus not an end unto itself. Experimental research is conducted for the researcher to make inference about the cause-and-effect relationship. It is conducted when the researcher has a good understanding of the phenomena being studied. A causal inference is determined when there is very specific evidence which is best established through experiments (Zikmund, 2010).

Descriptive design involves describing the attributes of people, firms, groups, objects, or environments. It attempts to "paint a picture" of a certain scenario by addressing what, who, how, when and where questions. Contrary to exploratory research, descriptive design is carried out when the researcher has obtained a good understanding of the situation being studied (Zikmund, 2010). This study adopted descriptive design because it allows the researcher to examine the scenario in a natural and unchanged environment. It also enables the researcher to depict characteristics and behaviour of a sample population in a time-efficient and holistic manner. In addition, this study used longitudinal design as it aims to examine variables across firms and over time to describe the pattern of change and direction of relationships.

3.4 Study Population

Population refers to an entire group about which information needed is to be established (Banerjee & Chaudhury, 2010). The scope of the population, that is, those to be included or excluded, is normally defined by the objectives in the research. The target population in the current study comprise of 42 nonfinancial companies listed at the Nairobi Securities Exchange (See appendix A). Following previous studies (Flannery & Rangan, 2006; Elsas & Florysiak, 2011, Kodongo et al., 2014), financial firms comprising of banks, insurance and investment corporations were omitted because their capital structure is not analogous to those of nonfinancial sector. Moreover, the capital composition of financial companies is highly regulated.

A census study was undertaken as the number of firms in the target population is small. The analysis was carried out over an eighteen-year period, from the year 2002 to 2019, resulting to a target of 756 firm-year observations. This period was sufficient to cover macroeconomic shocks that translate to cashflow volatility including changes in government, political tension, interest rate capping and the Brexit referendum. To be included in the analysis, firms were required to have a least three years of consecutive listing to provide sufficient data points to compute historical cashflow volatility. Six nonfinancial firms were excluded from the analysis due to suspension, delisting, and insufficient data points to carry out the analysis. This resulted to 36 nonfinancial firms observed over 18 years.

3.5 Data Collection

Secondary data was obtained from corporate reports of nonfinancial companies listed at the NSE. The secondary data was obtained from financial reports of the companies maintained by the Capital Market Authority and Bloomberg database. Data includes operating cashflows, operating profit,

capital expenditure, market value of equity, book values of debt and equity, total assets, depreciation, fixed assets, advertisement expenditure and research and development expenditure (See appendix B). Market prices were retrieved from NSE database.

Data was gathered from the year 2002 to 2019 as the period captures the most recent data as capital financing behaviour changes over time. The year 2002 is significant in several respects. In the political arena, there was a change of the leadership party for the first time in Kenya since political independence after the 2002 elections. The incoming political party was perceived to be more business friendly than the outgoing one. In the economic scene, the year 2002 coincided with the end of the dot-com recession that ended in November 2001 and the end of the first decade of Kenya's economic reforms. Thus, firms were expected to have better performance and broader access to financing following the end of the economic risks and transition to a new government. Previous related studies, Mwangi et al. (2012) captured data from the year 1999 to 2010 while Ngugi (2008) incorporated data from 1990 to 1999. The study applied unbalanced panel data as it presents a huge data set and blending attributes of both cross-sectional and time-series data, which enhances the efficiency of econometric estimations and provides added flexibility on the variety of variables applied as instruments for controlling endogeneity.

3.6 Operationalization of Variables

This is the act of developing specific measures for abstract theoretical constructs in a study. This study comprises of four main variables: independent, mediating, dependent and control. The independent variable, cashflow volatility, was operationalized as standard deviation of historical operating cashflows as applied by Minton and Schrand (1999). The mediating variable, leverage deviation, was operationalized as the gap between observed and target leverage as proposed by Ippolito, Steri and Tebaldi (2012) and Ilgaz (2012). The second mediating variable, corporate

investments, was operationalized as the summation of capital expenditure, advertisement expenditure, R&D, depreciation, and amortization costs) as applied by Minton and Shrand (1999) and Park and Jang (2013). The dependent variable, firm value, was operationalized as MV of equity plus BV of debt divided by total assets as applied by Rountree et al. (2008) and Kodongo et al. (2014). Control variables used in the study include profitability, growth opportunity and tangibility. The operationalization table 3.1 below outlines the specific variables and their respective measurements.

Table 3.1 Operationalization of Study Variables

Variable	Indicator	Measurement	Source
Independent Variable: Cashflow Volatility			
Cashflow volatility	Historical Operating Cashflows	Standard deviation of historical operating cashflows	Minton and Schrand (1999)
Mediating Variable: Corporate Investments			
Corporate investment	Capital expenditure, Advertisement expenditure and R&D expenditure	(Capital expenditure + advertisement expenditure + R&D expenditure + depreciation and amortization) / total assets	Park and Jang (2013) and Minton and Schrand (1999)
Mediating Variable: Leverage Deviation			
Leverage deviation		Observed leverage – Target leverage	Ippolito, Steri, and Tebaldi (2012) and Ilgaz (2012)
	Observed leverage	Market debt ratio: proportion of interest-bearing debt over sum of market value of equity and book value of debt (MDR)	Drobetz and Wanzenried (2006)

	Target leverage = f (firm size, growth opportunity, asset tangibility, profitability, non-debt tax shield)	Firm Size: Natural log of total assets (LnTA)	Flannery and Rangan (2006)
		Growth opportunity: Market to book value ratio of assets (MB)	
		Asset tangibility: Proportion of fixed assets to total assets (FA/TA)	
		Profitability: Earnings before interest and tax over total assets (EBIT/TA)	
		Non-debt tax shield: Depreciation as a percentage of total assets (DEP/TA)	
Dependent Variable: Firm Value			
Firm Value	Tobin Q ratio	Market value of equity plus book value of long-term debt / total assets	Rountree et al. (2008); Kondogo et al. (2014)
Control Variables			
Profitability	Operating profit	Earnings before interest and tax over total assets (EBIT/TA)	Flannery and Rangan (2006)
Growth Opportunity	Market to Book Value of Equity	Ratio of market value of equity to book value of equity (shareholder's equity)	Minton and Schrand (1999)
Tangibility	Asset tangibility	Asset tangibility: Proportion of fixed assets to total assets (FA/TA)	Kondogo et al. (2014)

Source: Author, 2022

3.7 Diagnostic Tests

These tests are used to examine the compliance of the classical linear regression assumptions and evaluate whether there are observations with significant and undue influence on the analysis. The following section describes the fundamental tests carried and the remedies undertaken if an assumption was violated. The tests were conducted to examine normality, multicollinearity, stationarity, homoskedasticity, autocorrelation and model specification.

3.7.1 Normality Test

Classical linear regression assumes that the error terms are normally distributed implying that they have a zero mean and constant variance. The normality assumption states that the error terms are obtained from a normal distribution, that is, bell shaped and usually follows the symmetrical pattern. Non-normality problem is detected from residuals of a regression model which is skewed, flatter or more sharply peaked than the normal distribution. Normality assumption is necessary for hypothesis testing and confidence intervals to be valid; T-test and F-test will be valid. Violation of normality implies that OLS estimators will still be unbiased and consistent, however, they will not be asymptotically efficient implying that the T-test and F-test will only be valid in large not small samples (Studenmund & Johnson, 2016).

Normality can be examined using Bera and Jarque test which investigates whether the coefficients of skewness and kurtosis are jointly zero. The null hypothesis is that the disturbances are normally distributed, skewness is zero and excess kurtosis (k-3) is equal to zero. An alternative measure of normality is Smirnov-Kolmogorov (SK) test used to determine whether residuals are normally distributed. This test examines the cumulative distribution of the residuals against that of normal distribution with a chi-square test to determine if there is a statistically significant difference. The null hypothesis is that there is no significant difference. Non-normality can be treated by

transforming the variables using natural log or square root, omitting the data with outliers, or adding the sample size (Wooldridge, 2001). The current study applied Smirnov-Kolmogorov (SK) test and treated non-normally using log transformation.

3.7.2 Multicollinearity Test

Multicollinearity refers to a scenario where two explanatory variables are highly related. Perfect multicollinearity is whereby one explanatory variable can be fully explained by another variable. Multicollinearity leads to high standard error term and a decline in the t-score values. It may also be observed in the event where the R-squared is high, but the individual coefficients are statistically insignificant. However, the overall fit of the equation and estimation of coefficients of non-multicollinear variables are unaffected (Wooldridge, 2001). Multicollinearity can be observed from a correlation matrix of the independent variables. When the correlation between two independent variables is greater than 80%, it indicates presence of multicollinearity. It can also be measured using variance inflation factor (VIF). VIF measures the extent to which the standard error of an independent variable is influenced by its interaction with other independent variables in the model. When significant multicollinearity exists, the VIF of the variables involved will be large. As a rule of thumb, a variable with a VIF greater than 10 indicates high collinearity (Gujarati, 2003).

Alternative measures can be applied to treat the multicollinearity problem. The first one is to remove one of the highly correlated variables. Although this method would solve the multicollinearity problem, dropping a variable may lead to specification bias if not supported by the theoretical underpinning. An alternative approach is to increase the sample size as it reduces the variance of the estimated coefficients thus diminishing the impact of multicollinearity. Other methods of treating multicollinearity may involve centring the variables, standardizing the

variables, or linearly combining the regressors by adding the correlated variables. The current study measured multicollinearity using the variance inflation factor and found no evidence of multicollinearity.

3.7.3 Stationarity (Unit Root) Test

A stationary series is one that has basic attributes such as mean and variance, which do not vary over time. Conversely, non-stationary series has one or more basic attributes that vary over time. Stationarity test also referred to as unit root test examines whether the data being examined is stationary or non-stochastic. It is normally applied on variables not the error term. The main effect of non-stationarity in regression analysis is spurious correlation which exaggerates the r-squared and the t-scores of the non-stationary independent variables leading to an inaccurate model specification. The r-square and t-scores are normally inflated because of the non-stationarity factor in the independent variable (for instance trend) which also predicts the dependent variable. Non-stationarity may also be observed among variables that increase rapidly over time. Thus, including a time trend can prevent spurious regression results in such instances (Studenmund & Johnson, 2016).

Several tests can be conducted to determine whether a variable has a unit root (non-stationarity). These include the Augmented Dickey Fuller test for time series data and IM, Pesaran and Shin test, Levin Lin and Chu test and Philip Perron Fisher test for panel data. Panel unit root test are stated as powerful due to the increased number of observations from time series and cross-sectional data, thus a higher ability to reject the wrong null hypothesis. Furthermore, panel unit root tests may account for cross section dependence (Baltagi, 2005). However, literature on panel data analysis (Phillips & Moon, 2000; Baltagi, 2005; Hsiao, 2014) suggest that stationarity normally becomes a concern in long panels that is panel data sets with large cross section dimension (N)

and large time dimension (T). For short panels, where N is greater that T, conventional panel regression models are applied, and stationarity is assumed due to the large cross section dimension. Furthermore, the panel unit root tests assume large T and large N asymptotic, and that N/T tends to infinity (Wooldridge, 2002). The current study is characterized by large N and small T data implying that panel unit root test may be inefficient thus, Augmented Dickey-Fuller test was applied. The null hypothesis is that the variables have a unit root and therefore non-stationary. The common remedy applied on variables with a unit root is to transform the data by differencing the level data to the point it becomes stationary.

3.7.4 Heteroskedasticity Test

Heteroskedasticity arises when the error term variation is nonconstant and depends on observations. Pure heteroskedasticity often occurs where there is a huge gap between the largest and smallest observed values of the response variable. It may also be observed when there are errors in data input or deteriorating data quality. Impure heteroskedasticity may be because of specification error where a variable has been omitted. Heteroskedasticity test detects whether error terms have the same variance across all values of the predictor variable. Violation of the constant variance assumption leads to incorrect standard errors. The ordinary least squares estimator is no longer the minimum variance estimator which implies that hypothesis tests and confidence intervals cannot be relied upon. However, pure heteroskedasticity does not cause bias or inconsistency in the coefficient estimates (Studenmund & Johnson, 2016).

Several tests can be undertaken to detect heteroskedasticity including Breusch Pagan test and White test. Breusch Pagan test examines whether the squared residuals can be explained by proportionality factors. Breusch Pagan test fit a linear regression model on the residuals of a regression model. It creates a statistic that is chi-square distributed. The null hypothesis is that

there is constant variance. Thus, if the p-value is less than 0.05, the null hypothesis of constant variance of populations is rejected implying that there is heteroskedasticity. White test examines whether the squared residuals can be explained by the equation's predictor variables. The hypothesis test is similar to Breusch Pagan test where the null hypothesis is of constant variance. The remedies to heteroskedasticity include checking for specification errors, using heteroskedasticity corrected (HC) standard errors, redefining the functional form of the variable for instance switching from a linear to a double log form or applying the weighted OLS method to minimize sum weighted squared residuals (Studenmund & Johnson, 2016). The current study tested for heteroskedasticity using Breusch Pagan test and applied robust standard error regression model to treat heteroskedasticity.

Robust regression models are usually applied where the underlying assumptions of least squares regression model are violated. The model is designed to be not excessively affected by violation of assumptions by the underlying data generating process. It is commonly used where there are outliers, the residuals have non-constant variance (heteroskedastic) or serially correlated residuals. The robust regression model is an appropriate strategy as it provides a compromise between eliminating the extreme values or including all the data points and weighting them based on how "well behaved" the observations are. Thus, robust regression model is a form of weighted and reweighted least squares regression model where the most influential points are dropped and the cases with large absolute residuals are weighted down (UCLA, 2021).

3.7.5 Serial Correlation Test

Serial correlation, also known as autocorrelation, refers to a phenomenon where members of a series of observations ordered in time (time series data) or ordered in space (cross-sectional data) are correlated. Serial correlation also known as autocorrelation is a violation of the classical linear regression assumptions which stipulates that an error term should not exhibit patterns of positive or negative correlation (Gujarati, 2003). Autocorrelation can be caused by inertia or sluggishness which is a common feature among time series data. Successive observations of time series data tend to be interdependent when there is an upswing for instance recovery from a recession. Autocorrelation may also arise due to specification bias that is omission of variables that should be included, or the model has the wrong functional form. For instance, fitting a linear model instead of a log-linear model. Serial correlation may also arise where data has been manipulated for instance generating quarterly data from monthly data (Studenmund & Johnson, 2016).

To detect autocorrelation, the Durbin Watson test or Wooldridge test of serial correlation can be undertaken. Errors can be correlated at first order (AR1) or second order (AR2). Durbin Watson is a test for first-order autocorrelation that presumes an association between an error term and the prior one. The null hypothesis is of no serial correlation. Another approach is to use the Wooldridge test for autocorrelation in panel data. Its null hypothesis is no first-order autocorrelation. One of the remedies for autocorrelation is to use dynamic panel data model where a lag-dependent variable is introduced as a predictor variable. Another approach is to apply the robust regression model. This study applied the Wooldridge test for autocorrelation and found evidence of first order autocorrelation. The robust standard error regression model was applied to remedy the autocorrelation.

3.7.6 Model Specification Tests

Panel regression models may take the form of a pooled ordinary least squares (POLS), fixed effect (FE) model or random effect (RE) model. The pooled ordinary least squares model produces consistent and efficient estimates when individual effects (cross-sectional or time-specific effects) does not exist. RE model assumes the existence of the individual effects (unobserved heterogeneity) which is uncorrelated with any regressors and is a component of the error term. FE model on the other hand assumes that the individual effects is part of the intercept, is time invariant and is allowed to be correlated with other regressors.

To determine whether to used POLS or FE model, the Breusch Pagan Langragian multiplier (LM) test is performed. The null hypothesis of the LM test is that there is no FE. The Breusch Pagan LM test was conducted in the current study and indicated that the p-value of the chow test is less than 0.05 implying that the null hypothesis should be rejected, and FE model should be applied. To decide whether to use FE or RE model, Hausman test was conducted. The null hypothesis of this test is that there is no correlation between the regressor and error term implying that RE model is suitable. If the p-value is less than 0.05, it implies that the null hypothesis should be rejected and the suitable model to apply will be the FE model. The study established that the RE model is suitable as p-value was greater than 0.05 thus rejecting the null hypothesis.

Table 3.2 Summary of Diagnostic Tests

Assumptions	Descriptions	Type of Tests	Interpretations	Treatment
Normality test	This test determines whether the error term is normally distributed. Diagnosis can be conducted through descriptive statistics (skewness and kurtosis), graphical approaches (P-P Plot) or statistical analysis. Null hypothesis is that the error term is normally distributed.	Probability plot test Bera-Jarque Test or Shapiro-Wilk or Anderson-Darling Smirnov-Kolmogorov (SK) test	Probability plot assesses whether the distribution of variables is consistent with a specified distribution. The residuals should be tightly close to the normal distribution line to form a straight line On the statistical tests, normality is observed when p-value is greater than 0.05	• If non-normality is due to non-linearity, transform variables using nonlinear approaches e.g., using logs or square root. • Examine data and exclude outliers • Add the size of the sample
Multicollinearity test	Multicollinearity refers to a scenario where two explanatory variables are highly related leading to high standard error term and decreases t-scores. It also causes high R-squared, but the coefficients are statistically insignificant	Correlation matrix Variance inflation factor (VIF)	Extremely high correction, greater than 0.80 may imply presence of multicollinearity which weakens the model power VIF greater that 10 signifies extremely high multicollinearity	• Remove the highly correlated variables • Linearly combine the regressors by adding • Center /standardize the variables • Add the size of the sample

Assumptions	Descriptions	Type of Tests	Interpretations	Treatment
Stationarity / Unit root test	Unit root test examines whether the data being examined is stationary or non-stochastic. Non-stationary data may lead to spurious regression	Levin, Lin& Chu Test Philip Perron Fisher Test Augmented Dickey Fuller test	Null hypothesis is that panel data is non-stationary and possess a unit root. Reject the null if P < 0.05	• Apply differencing on the level data to the point the data becomes stationary
Homoskedasticity test	This test detects whether error terms have the same variance across all values of the predictor variable. Violation of the constant variance assumption leads to incorrect standard errors OLS estimators are no longer best. This implies that hypothesis tests and confidence intervals cannot be relied upon	Breusch-Pagan Test Levene Test	Breusch Pagan test fit a linear regression model on the residuals of a regression model. It creates a statistic that is chi-square distributed. The null hypothesis is that there is constant variance. If P-value is < 0.05, reject the null hypothesis of constant variance of populations implying no homoskedasticity	• Look for specification errors in the model • Use heteroskedasticity-consistent (HC) standard errors • Redefine variables • Transform variables • Apply the weighted OLS method to minimize sum weighted squared residuals
Serial correlation/ autocorrelation	Serial correlation test checks if the error term of transfers from one period to next. Errors can be correlated at first order (AR1) or second order (AR2).	Durbin Watson Test Wooldridge test for serial correlation	If Durbin Watson value is > 2 then there is evidence of autocorrelation Null is no serial correlation	• Use dynamic panel data model where lag-dependent variable is introduced as an independent variable • Use robust standard error model

Assumptions	Descriptions	Type of Tests	Interpretations	Treatment
Model specification tests	Breusch Pagan LM test (Chow Test) is used to determine whether to use POLS or Fixed effects model.	Breusch Pagan LM Test	The null hypothesis is that there are no fixed effects.	• Use Fixed effects model
	Hausman test is used to examine whether to apply a random or fixed effects model. It tests whether the unobserved heterogeneity is correlated with the explanatory variable.	Hausman test	The null hypothesis no correlation. If $p < 0.05$, the researcher rejects the null hypothesis implying that FE model should be used.	• Use Random effects model if $P > 0.05$

Source: Author, 2022

3.8 Data Analysis

Data analysis is the systematic approach of organizing and synthesizing data to produce results for the researcher's interpretation. Data was collected and analysed using descriptive and inferential statistics. Panel regression analysis was applied in the study as it provides large data sets and blended features of time series and cross-sectional data that allow the use of efficient instruments to control for endogeneity (Ozkan, 2001). Furthermore, panel data model deals appropriately with unobserved heterogeneity or omitted variable bias which occurs when unobserved units or time specific factors influence the regression outcome beyond the defined regressors leading to inconsistent estimates (Baltagi, 2005).

3.8.1 The Effect of Cashflow Volatility on Firm Value

The first objective was to examine the association between cashflow volatility (CFV), and value of nonfinancial corporations listed at the NSE. Linear regression analysis was used to evaluate the association. The analysis was carried out in two steps. The first step examined the direct relationship between the predictor and response variable while the second step included control variables. Profitability, tangibility, and growth opportunity were included as control variables.

The panel regression model without control variables is expressed as:

$$\boldsymbol{FV_{it} = \beta_{01} + \beta_{1it} CFV + \varepsilon_{it}} \quad \textbf{..... (3.1a)}$$

The panel regression model with control variables is expressed as:

$$\boldsymbol{FV_{it} = \beta_{01} + \beta_{1it} CFV + Z_{it} + \varepsilon_{it}} \quad \textbf{..... (3.1b)}$$

Where:

$\boldsymbol{FV_{it}}$ = Firm value for i^{th} firm, in t^{th} year

$\boldsymbol{CFV}$= Cashflow volatility

$\boldsymbol{\beta_0}$= intercept

$\boldsymbol{\beta\_1it}$= coefficient

$\boldsymbol{Z\_it}$= control variables (profitability, tangibility, and growth)

$\boldsymbol{\varepsilon\_it}$= error term

3.8.2 The Mediating Effect of Leverage Deviation

The second objective was to establish the mediating effect of leverage deviation ($\boldsymbol{LDev}$) on the association between CFV and corporate value. Leverage deviation was computed as observed leverage minus and target leverage. Observed leverage was measured as the ratio of book value of total debt in firm *i* divided by sum of MV of equity and BV of total debt.

$$\boldsymbol{MDR_{i,t}} = \frac{\boldsymbol{D_{i,t}}}{\boldsymbol{D_{i,t}+P_{i,t}\,S_{i,t}}} \quad \textbf{..... (3.2)}$$

Where:

$\boldsymbol{MDR_{i,t}}$ = Market debt ratio of firm *i* at time *t*

$\boldsymbol{D_{i,t}}$ = Book value of total debt of firm *i* at time *t*

$\boldsymbol{P_{i,t}}$ = Share price of firm *i* at time *t*

$\boldsymbol{S_{i,t}}$ = number of shares of firm *i* at time *t*

Target leverage for firm *i* at a given time $\boldsymbol{t}$, $\left(\boldsymbol{MDR_{i,t}}*\right)$ is estimated by a vector of firm attributes that are correlated with the trade-offs of cost and gains of operating with several leverage ratios.

$$\boldsymbol{MDR_{i,t}}* = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 LnTA_{i,t-1}} + \boldsymbol{\beta_2 MB_{i,t-1}} + \boldsymbol{\beta_3}\frac{\boldsymbol{EBIT}}{\boldsymbol{TA}}_{\boldsymbol{i,t-1}} + \boldsymbol{\beta_4}\frac{\boldsymbol{FA}}{\boldsymbol{TA_{i,t-1}}} + \boldsymbol{\beta_5}\frac{\boldsymbol{DEP}}{\boldsymbol{TA}}_{\boldsymbol{i,t-1}} +$$

$$\boldsymbol{\varepsilon_{it-1}} \quad \textbf{..... (3.3)}$$

Where:

$\boldsymbol{\beta_0}$ = intercept

$\boldsymbol{\beta_t}$ = coefficient of the vector

$\boldsymbol{LnTA_{i,t-1}}$ (Firm size) = Natural log of total assets of firm i at time t

$\boldsymbol{MB_{i,t-1}}$ (Growth opportunity) = Market to book value ratio of assets of firm i at time t

$\boldsymbol{\frac{EBIT}{TA}_{i,t-1}}$ (Profitability) = Earnings before interest and tax over total assets of firm i at time t

$\boldsymbol{\frac{FA}{TA_{i,t-1}}}$ (Asset tangibility) = Proportion of fixed assets to total assets of firm i at time t

$\boldsymbol{\frac{DEP}{TA}_{i,t-1}}$ (Non-debt tax shield) = Depreciation as a percentage of total assets of firm i at time t

$\boldsymbol{\varepsilon_{it-1}}$= error term

A four-step process following Barron and Kenny (1986) was adopted to test the intervening effect.

3.8.2.1 Step 1 of Testing the Mediating Effect of Leverage Deviation

Barron and Kenny (1986) suggest that for mediation to be established, there must be a relationship between the predictor and response variable. Thus, the first step was to determine the correlation between the predictor variable, CFV and response variable, firms value. Control variables included in the model are profitability, tangibility, and growth. The panel regression model is expressed as:

$$\boldsymbol{FV_{ait} = \beta_{0a} + \beta_{1ait} CFV + Z_{it} + \varepsilon_{ait}} \quad \text{..... (3.4)}$$

Where:

$\boldsymbol{FV_{ait}}$ = Firm value for i^{th} firm, in t^{th} year

$\boldsymbol{CFV}$= Cashflow volatility

$\boldsymbol{\beta_{0a}}$= intercept

$\boldsymbol{\beta_{1ait}}$= coefficient

$\boldsymbol{Z_{it}}$= control variables

$\boldsymbol{\varepsilon_{it}}$= error term

This regression model is similar to equation 3.1 in section 3.8.1 above thus the results were adopted.

3.8.2.2 Step 2 of Testing the Mediating Effect of Leverage Deviation

The second step involves investigating the correlation between the predictor variable, CFV and mediating variable leverage deviation (LDev). Barron and Kenny (1986) suggest that for mediation to be established, the mediating variable should have a significant relation with the independent variable. Thus, the panel regression model is expressed as:

$$\boldsymbol{LDev_{bit} = \beta_{0b} + \beta_{1bit} CFV + \varepsilon_{bit}} \text{ ..... (3.5)}$$

Where:

$\boldsymbol{FV_{it}}$ = Firm value for i^{th} firm, in t^{th} year

$\boldsymbol{CFV}$= Cashflow volatility

$\boldsymbol{LDev}$ = Leverage deviation

$\boldsymbol{\beta_0}$= intercept

$\boldsymbol{\beta_{1it}}$, $\boldsymbol{\beta_{2it}}$= coefficients

$\boldsymbol{\varepsilon_{it}}$= error term

3.8.2.3 Step 3 of Testing the Mediating Effect of Leverage Deviation

The third step was to determine the correlation between the mediator variable, leverage deviation, and response variable, firm value. For mediation to be established, Barron and Kenny (1986) suggest that leverage deviation, should have a significant relation with firm value. Thus, the panel regression model is expressed as:

$$\boldsymbol{FV_{cit} = \beta_{0c} + \beta_{1cit} LDev + Z_{it} + \varepsilon_{cit}} \text{..... (3.6)}$$

Where:

$\boldsymbol{FV_{it}}$ = Firm value for ith firm, in tth year,

$\boldsymbol{CFV}$= Cashflow volatility

$\boldsymbol{LDev}$ = Leverage deviation

$\boldsymbol{\beta_0}$= intercept

$\boldsymbol{\beta_{1it}}$, $\boldsymbol{\beta_{2it}}$= coefficients

$\boldsymbol{Z_{it}}$= control variables

$\boldsymbol{\varepsilon_{it}}$= error term

3.8.2.4 Step 4 of Testing the Mediating Effect of Leverage Deviation

The fourth step involved testing the effect of both the predictor and mediator variable on the response variable. Barron and Kenny (1986) suggest that for mediation to be established the predictor variable, CFV, should have a lower statistical significance in step 4 compared to step 1 of mediation analysis in equation 3.1. Alternatively, the coefficient of CFV should be larger when it predicts firm value alone (equation 3.1) compared to when it predicts along with the mediator variable (equation 3.7).

$$FV_{dit} = \beta_{0d} + \beta_{1dit}CFV + \beta_{2dit}LDev + Z_{it} + \varepsilon_{dit} \text{ ..... (3.7)}$$

Where:

FV_{it} = Firm value for ith firm, in tth year

CFV= Cashflow volatility,

$LDev$ = Leverage deviation,

β_0= Intercept

β_{1it}, β_{2it}= Coefficients

Z_{it}= Control variables

ε_{it}= error term

3.8.3 The Mediating Effect of Corporate Investments

The third objective was to establish the mediating effect of corporate investment on the association between cashflow volatility and corporate value. A four-step process was followed to test the mediation.

3.8.3.1 Step 1 of Testing the Mediating Effect of Corporate Investments

Barron and Kenny (1986) suggest that for mediation to be established, there must be a relationship between the predictor and response variable. Thus, the first step was to determine the correlation between CFV and firms value. Control variables included in the model are profitability, tangibility, and growth. The panel regression model is expressed as:

$$FV_{ait} = \beta_{0a} + \beta_{1ait}CFV + Z_{it} + \varepsilon_{ait} \quad \text{..... (3.8)}$$

Where:

FV_{ait} = Firm value for ith firm, in tth year

CFV= Cashflow volatility

β_{0a}= intercept

β_{1ait}= coefficient

Z_{it}= control variables

ε_{it}= error term

This regression model is similar to equation 3.1 in section 3.8.1 above thus the results were adopted.

3.8.3.2 Step 2 of Testing the Mediating Effect of Corporate Investments

The second step involves examining the relationship between the predictor variable, CFV and mediating variable, corporate investments. Barron and Kenny (1986) indicated that a mediating variable should have a significant relationship with the predictor variable for mediation to be established. Thus, the panel regression model is expressed as:

$$INV_{bit} = \beta_{0b} + \beta_{1bit}CFV + \varepsilon_{bit} \text{ ..... (3.9)}$$

Where:

FV_{it} = Firm value for ith firm, in tth year

CFV= Cashflow volatility

$\boldsymbol{INV}$ = Corporate investments

$\boldsymbol{\beta_0}$= intercept

$\boldsymbol{\beta_{1it}}$, $\boldsymbol{\beta_{2it}}$= coefficients

$\boldsymbol{\varepsilon_{it}}$= error term

3.8.3.3 Step 3 of Testing the Mediating Effect of Corporate Investments

The third step was to determine the correlation between corporate investments and firm value. For mediation to be established, Barron and Kenny (1986) suggest that the mediating variable, corporate investment, should have a significant influence on the response variable, firm value. Thus, the panel regression model is expressed as:

$$\boldsymbol{FV_{cit} = \beta_{0c} + \beta_{1cit} INV + Z_{it} + \varepsilon_{cit}} \text{..... (3.10)}$$

Where:

$\boldsymbol{FV_{it}}$ = Firm value for i^{th} firm, in t^{th} year,

$\boldsymbol{CFV}$= Cashflow volatility

$\boldsymbol{INV}$ = Corporate investments

$\boldsymbol{\beta_0}$= intercept

$\boldsymbol{\beta_{1it}}$, $\boldsymbol{\beta_{2it}}$= coefficients

$\boldsymbol{Z_{it}}$= control variables

$\boldsymbol{\varepsilon_{it}}$= error term

3.8.3.4 Step 4 of Testing the Mediating Effect of Corporate Investment

The fourth step involved testing the effect of both the predictor variable, CFV and mediator variable, corporate investments on the response variable, firm value. Barron and Kenny (1986) suggest that for mediation to be established the predictor variable, CFV should have a smaller statistical significance in step 4 compared to step 1 of mediation analysis in equation 3.8. Alternatively, the coefficient of CFV should be larger when it predicts firm value alone (equation 3.8) compared to when it predicts along with the mediator variable, corporate investments, in equation 3.11.

$$\boldsymbol{FV_{dit} = \beta_{0d} + \beta_{1dit}CFV + \beta_{2dit}INV + Z_{it} + \varepsilon_{dit}} \text{ ..... (3.11)}$$

Where:

$\boldsymbol{FV_{it}}$ = Firm value for ith firm, in tth year

$\boldsymbol{CFV}$= Cashflow volatility

$\boldsymbol{INV}$ = Corporate investments

$\boldsymbol{\beta_0}$= intercept

$\boldsymbol{\beta_{1it}, \beta_{2it}}$= coefficients

$\boldsymbol{Z_{it}}$= control variables

$\boldsymbol{\varepsilon_{it}}$= error term

3.8.4 The Joint Effect of Cashflow Volatility, Leverage Deviation, Corporate Investments on Firm Value

The fourth research objective was to test the joint effect of CFV, leverage deviation, and corporate investments on value of the nonfinancial corporations. Control variables incorporated in the model are profitability, tangibility, and growth. The panel regression model is expressed as follows:

$$\boldsymbol{FV_{it} = \beta_0 + \beta_{1it} CFV + \beta_{2it} LDev + \beta_{3it} Inv + \varepsilon_{it}} \quad \text{..... 3.12a}$$

The panel regression model with control variables is expressed as:

$$\boldsymbol{FV_{it} = \beta_0 + \beta_{1it} CFV + \beta_{2it} LDev + \beta_{3it} Inv + Z_{it} + \varepsilon_{it}} \quad \text{..... 3.12b}$$

Where:

$\boldsymbol{FV_{it}}$ = Firm value for i^{th} firm, in t^{th} year

$\boldsymbol{CFV}$= Cashflow volatility

$\boldsymbol{LDev}$ = Leverage deviation

$\boldsymbol{Inv}$ = Corporate investments

$\boldsymbol{\beta_0}$= intercept

$\boldsymbol{\beta_{1it}, \beta_{2it}, \beta_{3it}}$= coefficients

$\boldsymbol{Z_{it}}$= control variables

$\boldsymbol{\varepsilon_{it}}$= error term

The summary of the research objectives, hypothesis, analytical models, and interpretation of analytical models is provided in table 3.3 below.

Table 3.3 Summary of Analytical Models for Hypothesis Testing

Research Objective	Research Hypothesis	Analytical Model	Interpretation
1. To determine the relationship between cashflow volatility and the value of nonfinancial corporations listed at the NSE	**H_1**: The effect of cashflow volatility on the value of nonfinancial corporations listed at the NSE is not significant	**Panel regression analysis** $\boldsymbol{FV_{it} = \beta_{01} + \beta_{1it}CFV + Z_{it} + \varepsilon_{it}}$ Where: $\boldsymbol{FV_{it}}$ = firm value for i[th] firm, in t[th] year, $\boldsymbol{CFV}$= cashflow volatility $\boldsymbol{\beta_0}$= intercept, $\boldsymbol{\beta_{1it}}$= coefficient, $\boldsymbol{Z_{it}}$= control variables, $\boldsymbol{\varepsilon_{it}}$= error term	If coefficient $\boldsymbol{\beta_{it}}$ is statistically significant (P<0.05), it provides sufficient evidence to reject the null hypothesis.
2. To establish the effect of leverage deviation on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE	**H_2**: The mediating effect of leverage deviation on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE is not significant	**Hierarchical Panel Regression (Barron & Kenny, 1986)** **Step 1:** $\boldsymbol{FV_{ait} = \beta_{0a} + \beta_{1ait}CFV + Z_{it} + \varepsilon_{ait}}$ **Step 2:** $\boldsymbol{LDev_{bit} = \beta_{0b} + \beta_{1bit}CFV + \varepsilon_{bit}}$ **Step 3:** $\boldsymbol{FV_{cit} = \beta_{0c} + \beta_{1cit}LDev + Z_{it} + \varepsilon_{cit}}$ **Step 4:** $\boldsymbol{FV_{dit} = \beta_{0c} + \beta_{1dit}CFV + \beta_{2dit}LDev + Z_{it} + \varepsilon_{dit}}$ Where: $\boldsymbol{FV_{it}}$ = firm value for i[th] firm, in t[th] year, $\boldsymbol{CFV}$= cashflow volatility, $\boldsymbol{LDev}$ = leverage deviation, $\boldsymbol{\beta_0}$= intercept, $\boldsymbol{\beta_{1it}}$, $\boldsymbol{\beta_{2it}}$= coefficients $\boldsymbol{Z_{it}}$= control variables, $\boldsymbol{\varepsilon_{it}}$= error term	If $\boldsymbol{\beta_{1a}}$, $\boldsymbol{\beta_{1b}}$ and $\boldsymbol{\beta_{1c}}$ are statistically significant (P<0.05). $\boldsymbol{\beta_{1d}}$ and $\boldsymbol{\beta_{2d}}$ are smaller and less significant than $\boldsymbol{\beta_{1a}}$ and $\boldsymbol{\beta_{1c}}$ respectively. This provides sufficient evidence to reject the null hypothesis that intervening effect of $\boldsymbol{LDev}$ is not significant.

	Research Objective	Research Hypothesis	Analytical Model	Interpretation
3.	To examine the influence of corporate investments on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE	**H_3**: The mediating effect of corporate investments on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE is not significant	**Hierarchical Panel Regression (Barron & Kenny, 1986)** **Step 1:** $\boldsymbol{FV_{ait} = \beta_{0a} + \beta_{1ait}CFV + Z_{it} + \varepsilon_{ait}}$ **Step 2:** $\boldsymbol{INV_{bit} = \beta_{0b} + \beta_{1bit}CFV + \varepsilon_{bit}}$ **Step 3:** $\boldsymbol{FV_{cit} = \beta_{0c} + \beta_{1cit}INV + Z_{it} + \varepsilon_{cit}}$ **Step 4:** $\boldsymbol{FV_{dit} = \beta_{0c} + \beta_{1dit}CFV + \beta_{2dit}INV + Z_{it} + \varepsilon_{dit}}$ Where:$\boldsymbol{FV_{it}}$ = firm value for ith firm, in tth year, $\boldsymbol{CFV}$= cashflow volatility, $\boldsymbol{INV}$ = corporate investments, $\boldsymbol{\beta_0}$= intercept, $\boldsymbol{\beta_{1it}}$, $\boldsymbol{\beta_{2it}}$, $\boldsymbol{\beta_{3it}}$= coefficients $\boldsymbol{Z_{it}}$= control variables, $\boldsymbol{\varepsilon_{it}}$= error term	If $\boldsymbol{\beta_{1a}}$, $\boldsymbol{\beta_{1b}}$ and $\boldsymbol{\beta_{1c}}$ are statistically significant (P<0.05). $\boldsymbol{\beta_{1d}}$ and $\boldsymbol{\beta_{2d}}$ are smaller and less significant than $\boldsymbol{\beta_{1a}}$ and $\boldsymbol{\beta_{1c}}$ respectively. This provides sufficient evidence to reject the null hypothesis that intervening effect of $\boldsymbol{INV}$ is not significant.
4.	To investigate the joint effect of cashflow volatility, leverage deviation and corporate investments on the value of nonfinancial corporations listed at the NSE	**H_4**: The joint effect of cashflow volatility, leverage deviation and corporate investments on the value of nonfinancial corporations listed at the NSE are not significant.	**Panel regression analysis** $\boldsymbol{FV_{it} = \beta_0 + \beta_{1it}CFV + \beta_{2it}LDev + \beta_{3it}Inv + Z_{it} + \varepsilon_{it}}$ Where:$\boldsymbol{FV_{it}}$ = firm value for ith firm, in tth year, $\boldsymbol{CFV}$= cashflow volatility, $\boldsymbol{LDev}$ = leverage deviation, $\boldsymbol{Inv}$ = corporate investments, $\boldsymbol{\beta_0}$= intercept, $\boldsymbol{\beta_{1it}}$, $\boldsymbol{\beta_{2it}}$, $\boldsymbol{\beta_{3it}}$= coefficients, $\boldsymbol{Z_{it}}$= control variables, $\boldsymbol{\varepsilon_{it}}$= error term	If $\boldsymbol{\beta_{1it}}$, $\boldsymbol{\beta_{2it}}$, $\boldsymbol{\beta_{3it}}$ are statistically significant (P<0.05), it provides sufficient evidence to reject the null hypothesis that the joint effect of $\boldsymbol{CFV}$, $\boldsymbol{LDev}$ and $\boldsymbol{Inv}$ on $\boldsymbol{FV}$ is not significant.

Source: Author ,2022

CHAPTER FOUR: DESCRIPTIVE DATA ANALYSIS AND RESULTS

4.1 Introduction

This chapter presents the descriptive analysis of the research variables and correlational analysis of all variables. It entails a discussion of the summary statistics of the predictor variable, cashflow volatility, response variable, firm value, mediating variables, leverage deviation and corporate investments. Correlational analysis of all the study variables is presented using Pearson Correlation method. Diagnostics tests were carried out as a preliminary step to running the regression models in order to ascertain conformity to the assumptions of ordinary least squares regression model as well as select the appropriate regression model.

4.2 Characteristics of Respondents

This study undertook a census of the population of nonfinancial corporations listed at the NSE. Out of the targeted 42 nonfinancial corporations, data was collected, and analysis carried out on 36 firms, representing 86% of the target. The firms were selected based on data availability and consistency of listing. Six nonfinancial firms were excluded from the analysis due to suspension, delisting, and insufficient data points to carry out the analysis. For inclusion, the study required firms to have at least three consecutive years of listing to compute the independent variable, cashflow volatility. Njagi (2017) studied nonfinancial corporations listed at the NSE and selected 30 out of 42 nonfinancial corporations representing 71% completion rate. Similarly, Kodongo (2014) included 29 out of the 60 listed firms at the Nairobi Securities Exchange, representing 48% response rate. Thus, 86% response rate was considered successful compared to the previous studies. Furthermore, data was collected over an 18-year period resulting to a panel data set with 580 observations.

4.3 Descriptive Analysis

Descriptive analysis was conducted to visualize the distribution of data, detect outliers, and identify associations among variables prior to conducting inferential analysis. To obtain the general outlook of the data, the researcher computed the mean, standard deviation, minimum and maximum. The mean represents the average values of the observations. It is calculated as the summation of all observations divided by the number of observations. Standard deviation shows the dispersion of the observations from the mean. It is computed as the square root of summation of squared deviations from the mean. The minimum and maximum provide the lower and upper bounds among the variables.

Table 4.1 Overall Summary Statistics of Main Study Variables

Variables	Obs	Mean	Std. Dev	Min	Max
Tobin Q	580	1.325	1.384	0.091	12.656
Cashflow volatility	580	2.930	6.364	0.001	47.019
Corporate investments	580	0.099	0.085	0.000	0.487
Leverage deviation	580	0.000	0.233	-0.526	0.763

Unbalanced panel data of 36 nonfinancial companies listed at the NSE from 2002 to 2019.

Source: Author, 2022

Table 4.1 above presents the summary statistics of the variables used in the study for nonfinancial corporations listed at the NSE for the period 2002 to 2019. It constitutes an unbalanced panel data with 36 firms over 18 years. The dependent variable, Tobin Q, was used as the proxy of firm value and was measured as the ratio of MV of equity plus BV of debt all divided by BV of total assets. When Tobin Q ratio is greater than one, it implies that investors are keen to give more for the

assets of the firm compared to the current book value. The study findings indicated that the mean Tobin Q of the nonfinancial corporations was 1.325 times with a maximum value of 12.66 times. This suggests that on average, investors are ready to pay a much higher value for the assets of nonfinancial firms compared to their book values. However, some firms had a Tobin Q ratio of less than one implying a negative perception by the market or an undervaluation of assets. There was a low variability on the market appraisal of target firm assets as indicated by the standard deviation of 1.384. Kodongo et al. (2014) found a mean Tobin Q of 1.846 times among the NSE listed nonfinancial firms suggesting that the firms were overvalued.

The predictor variable, cashflow volatility (CFV) was estimated as the standard deviation of operating cashflows five years prior to the reporting period. To be included in the analysis, a firm was required to have operating cashflows of at least two years prior to the reporting period. CFV measures the variations in the operating cashflows, indicating the level of operating risk or ability of the firm to generate revenue to cover operating costs. Study results show that the NSE listed nonfinancial companies had a mean CFV of 2.93 times which indicates moderate volatility. The standard deviation of 6.36 times on CFV indicates that most variations of the operating cashflows are centred around the mean. However, during certain periods, some firms manifested very high volatility as evidenced by the maximum value of 47.02 times while others had negligible volatility as indicated by a minimum value of 0.001 times. The high cashflow volatility may be attributed to the uncertainty observed during the study period which was characterized by shocks emanating from post-election violence in Kenya and the global financial crisis which emerged from the United States of America and spread to other economies thus leading to the high cashflow volatility.

The mediating variable, corporate investments, is measured as the summation of capital expenditure, R&D expenditure, advertisement expenditure, depreciation, and amortization divided by total assets. The study results show that corporate investments had a mean of 9.9% and standard deviation of 8.5% which indicates low level of capital investments and low variability in relation to assets among the nonfinancial companies during the study period. The minimum value indicates zero investment allocation amongst some firms while others had very high levels at a maximum of 48.7%. High corporate investments increase the earning capacity of firms and provides earnings stability which is vital to mitigate the effects market fluctuations causing cashflow volatility. The wide range of corporate investments observed points to the heterogeneity of firms studied that is capital-intensive versus non-capital-intensive firms.

The mediating variable, leverage deviation is estimated as the gap between observed leverage and target leverage. Target leverage is derived from regressing several firm characteristics including profitability, firm size, asset tangibility, tax shield, and MV to BV of assets against observed leverage (market debt ratio). Leverage deviation is thus the residual value from the target leverage model. It had a maximum of 0.763 times and a minimum of -0.526 times and a mean of 0. This indicates that the dispersion of the observed leverage from the target range from 76.3% to -52.6%. The mean of zero represents the firms at their target leverage point. This finding highlights the huge disparity in the leverage levels and shows that most firms do not maintain a target leverage as evidenced by the high standard deviation of 23.3% away from the mean.

Table 4.2 Overall Summary Statistics of Target Leverage Variables

Variables	Obs	Mean	Std. Dev	Min	Max
Market debt ratio	580	0.221	0.260	0.000	0.950
Profitability	580	0.096	0.120	-0.386	0.473
Firm size	580	15.502	1.817	10.784	19.810
Tangibility	580	0.575	0.212	0.048	0.960
Tax shield	580	0.037	0.028	0.000	0.200
Growth opportunity (MBVE)	580	2.808	7.016	-18.719	85.49

Unbalanced panel data of 36 nonfinancial companies listed at the NSE from 2002 to 2019.

Source: Author, 2022

Market debt ratio, MDR, the outcome variable on the target leverage model, is computed as BV of debt divided by sum of MV of equity and BV of debt. It has an average of 22% and standard deviation of 26% indicating that debt is widely dispersed around the mean. Furthermore, the minimum value of zero shows that some firms are financed entirely by equity while the maximum value of 95% indicates very high financial risk among other firms. It is notable that the firm with the highest MDR is not necessarily the firm with the highest leverage deviation. For instance, the firm that had the highest MDR of 95% in 2019 had leverage deviation of 25.3% in the same year while the firm that had the highest leverage deviation of 76.3% in 2003, had MDR of 81.7% during that year. This shows that a firm may have high observed leverage but operates close to the target level due to its firm characteristics (Ippolito et al., 2012).

Profitability is estimated as earnings before interest and tax divided by total assets. It shows how much operating income has been generated and how efficiently operating costs were managed.

The mean value indicates that on average the target firms generate operating profit of 9.6% from their revenue during the study period. This reflects inferior performance among the listed firms as the operational profit does not account for financing costs and taxes which tend to be fixed and beyond the control of management. The standard deviation of 12% however indicates wide variation in profits which is evidenced by huge disparity between the profit and loss-making firms. The most profitable firms constitute those in the telecommunication, manufacturing, and construction sectors while the least profitable firms emanated from automobile and manufacturing sectors.

Firm size is estimated as the natural log of total assets. Firm size had a mean of 15.50 which falls right between the minimum value of 10.78 times and the maximum of 19.81 indicating that the values are centred around the mean with low variability as evidenced by a standard deviation of 1.817. This suggests that the target firms comprise of a balanced mix between large and small size firms. It is notable that the largest firms are in the energy and petroleum sectors while the smallest firms are in the agricultural and manufacturing sectors, respectively. Large firms have higher debt capacity due to high asset backing and stability in earnings

Tangibility which measures the proportion of non-current assets to total asset, is used as a proxy for debt capacity of firms. It also indicates the ability of the firm to minimize cost of financial distress. It has a mean of 57.5% which shows that on average the target firms have more than 50% investment in fixed assets indicating strong collateral for debt. The maximum of 96% and minimum of 0.5% points to the distinct firm types in the target population that is, capital intensive firms (manufacturing, construction, and energy sectors) and non-capital-intensive firms (commercial and services sector). The disparity between firm types is further evidenced by the high standard deviation of 21.2%.

Tax shield is computed as the summation of depreciation and amortization expenses scaled by total assets. It indicates the ability of firms to minimize tax expenses and cost of financial distress by offsetting depreciation and amortization expenses against taxable earnings. Tax shield has a mean of 3.7% and a standard deviation of 2.8% which indicates low variability of values around the mean. The disparity between the maximum value of 20% and minimum of 0 indicates that some firms have high depreciation expense while others have negligible amounts. This may be due to the diverse firm types among the nonfinancial firms and their capital intensity.

Growth opportunity is estimated as MV of equity divided by BV of equity (shareholder's equity). It signifies the market perception of the firm based on its current performance and future earnings capacity. In the current study, growth opportunity had a mean of 2.81 times which indicates that on average investors price shares of the target firms more than twice their book values. There is a wide disparity however on the market perception of the stocks indicated by the standard deviation of 7.016 times, a minimum of -18.72 times and a maximum of 85.49 times. The negative values suggest poor firm performance or significant undervaluation while the high positive may signify an overvaluation of the stocks.

4.4 Correlation Analysis

This segment presents the outcome of correlation analysis using Pearson correlation coefficients, which examines the magnitude and direction of the association between two variables. It requires two continuous variables estimated on an interval or ratio scale. Pearson correlation coefficient takes values between -1 and +1 representing perfect negative and perfect positive correlation, respectively. A coefficient of zero reveals the absence of a relationship between the variables. A correlation greater than zero implies that when one variable increases, the other variable also increases. A correlation less than zero implies that when one variable increases, the other variable

decreases in value (Cooper & Schindler, 2014). Pearson correlation can also be used to check for multicollinearity among predictor variables. When the correlation coefficient between two predictor variables is greater than 0.80, they are considered to be collinear (Vengesai & Kwenda, 2018).

Table 4.3 Pearson Correlation Matrix of Main Study Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Tobin Q	1.000						
(2) CFV	-0.051	1.000					
(3) INV	0.182***	-0.157***	1.000				
(4) LDev	-0.045	0.064	-0.209***	1.000			
(5) MBVE	0.725***	0.044	0.015	0.108***	1.000		
(6) Profit	0.381***	-0.054	0.253***	-0.257***	0.101**	1.000	
(7) Tang	-0.158***	-0.266***	0.160***	-0.136***	-0.073*	-0.260***	1.000

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Source: Author, 2022

The table 4.3 above represents correlation coefficient matrix of the main study variables and the p-values at a statistical significance of 1%, 5% and 10%. The correlational analysis indicates that the dependent variable Tobin Q and predictor variable cashflow volatility have a weak negative relationship of -0.051. This shows that as cashflow volatility intensifies, the firm value decreases. The relationship is however insignificant at p-value of 10%. The relationship between the mediating variable corporate investments and Tobin Q is positive and highly significant at p-value of 1%. This shows that as capital investment increases, the value of the firm increases. The mediating variable, leverage deviation, has an inverse relationship with Tobin Q at a correlation

coefficient of -0.045. This suggests that as firms deviate from target leverage, firm value decreases. The relationship is however seen to be insignificant at p-value of 10%.

The control variables profitability, asset tangibility and market to book value of equity are all statistically significant at a p-value of 1%. Profitability has a correlation coefficient of 0.381. The positive correlation between profitability and firm value implies that profitable firms attract investors thus increasing firm value. The inverse correlation between tangibility and firm value at 0.158 indicates that investors negatively value firms with high proportion of fixed assets in their asset structure. This may be attributed to service and retail firms which do not need large proportions of fixed assets to generate returns. Thus, fixed assets are perceived to have tied up capital. This observation is similar to Kodongo et al. (2014) who found an inverse correlation between tangibility and firm performance. MV to BV of equity, a proxy of growth prospects, has a strong positive correlation with firm value at 0.725 showing that investors price favourably stocks that have high growth prospects. The correlation coefficients between the predictor and control variables are all less than 80% implying that there is no risk of multicollinearity.

4.5 Diagnostic Testing

Several diagnostic tests were conducted in the study to assess the suitability of the panel data for statistical analysis. The tests include normality, multicollinearity, panel level stationarity, heteroskedasticity test and serial correlation. Remedial measures were applied in cases where violation of the assumption was detected. Breusch-Pagan and Hausman tests were conducted to establish whether to fit a pooled ordinary least square (OLS model), fixed effects (FE) or a random effects (RE) model. Thus, this section presents the outcome of diagnostic tests applied on the data along with the relevant remedial action to ensure that the estimated coefficients were unbiased.

4.5.1 Normality Test

Classical linear regression supposes that the disturbance term of the regression model is normally distributed. Non-normality is a problem for small samples as the resultant estimators fail to be asymptotically efficient. Smirnov-Kolmogorov (SK) test was applied to determine whether residuals are normally distributed. This test examines the cumulative distribution of residuals against that of normal distribution with a chi-square test to examine if there is a statistically significant difference. The null hypothesis is that there is no significant difference. Table 4.4a below presents results for the target leverage variables which was run as a preliminary step to generate the mediator variable, leverage deviation and table 4.4b present results for the main study variables

Table 4.4a Smirnov-Kolmogorov Normality Test – Target Leverage Model

Skewness/Kurtosis tests for Normality ------ joint ------					
Variable	Obs	Pr (Skewness)	Pr (Kurtosis)	adj_chi2(2)	Prob>chi2
MDR_ Resid	580	0.000	0.0444	32.01	0.000

Source: Author, 2022

Table 4.4b Smirnov-Kolmogorov Normality Test – Main Variables Model

Skewness/Kurtosis tests for Normality ------ joint ------					
Variable	Obs	Pr (Skewness)	Pr (Kurtosis)	adj_chi2(2)	Prob>chi2
Tobin Q Resid	483	0.0527	0.000	19.31	0.0001

Source: Author, 2022

The null hypothesis in both models was rejected as the probability of the chi-square distribution is 0.000 inferring that the error term is not normally distributed. To correct for this violation, the variables were transformed using natural logarithm and robust standard errors regression analysis was applied.

4.5.2 Multicollinearity Test

Multicollinearity exists when two or more independent variables have a very strong correlation. This results to unreliable regression coefficients to measure the relationship between the predictor and response variable since the standard errors are inflated. Variance Inflation Factor (VIF) was applied as a test for multicollinearity in the study. VIF measures the extent to which the standard error of an independent variable is influenced by its interaction with other independent variables in the model. When significant multicollinearity exists, the VIF of the variables involved will be large. The rule of thumb is that a variable with VIF of more than 10 suggests high collinearity (Gujarati, 2003). Tables 4.5 below presents results of VIF tests.

Table 4.5a Variance Inflation Factor – Target Leverage Variables

Variance Inflation Factor			
Included Observations: 520			
Variable	Coefficient Variance	Uncentred VIF	Centered VIF
C	0.006443	83.40418	NA
Profitability	0.007304	2.218527	1.338648
Size	2.84E-05	89.68796	1.217787
Tangibility	0.002053	9.973734	1.204614
Tax Shield	0.110368	3.044851	1.37501
Market to Book Value of Assets	5.32E-05	2.490365	1.299581

Source: Author, 2022

Table 4.5b Variance Inflation Factor – Main Variables

Variance Inflation Factor			
Included Observations: 520			
Variable	Coefficient Variance	Uncentred VIF	Centred VIF
Cashflow volatility	3.87E-05	1.379079	1.139776
Corporate investments	0.209638	2.747227	1.160025
Leverage Deviation	0.027801	1.066142	1.064685
Profitability	0.113963	2.045646	1.214455
Market to book value of equity	2.66E-05	1.195021	1.033417
Tangibility	0.0352240	10.31979	1.212413
C	0.017026	13.16660	NA

Source: Author, 2022

Both models include an intercept term implying that the centred VIF is the relevant measure to examine multicollinearity in the current study. All the variables had VIF less than 10 implying that there is no evidence of multicollinearity among the main study variables and target leverage variables.

4.5.3 Stationarity Test

To run a regression model, the data needs to be stationary as non-stationary data may result to spurious regressions due to non-constant standard deviation and mean of the estimates (Baltagi, 2005). To test for stationarity, Augmented Dickey-Fuller test was applied to the current study since it is based on short panel data which is characterized by large N (cross-sectional component) and small T (time component). The null hypothesis is that the variables are not stationary (have a unit root). Results of the unit root tests on the study variables are presented in the table 4.6 below.

Table 4.6 ADF Unit Root Test Summary

	Augmented Dickey-Fuller Test	
Variable - Level	**t* statistic**	**p-value**
Tobin Q	-6.995224	0.0000
Cashflow volatility	-6.613280	0.0000
Leverage deviation	-6.995224	0.0000
Corporate investment	-6.561397	0.0000
Market debt ratio	-5.32805	0.0000
Profitability	-5.391511	0.0000
Market to book value of equity	-7.806933	0.0000
Firm size	-3.941222	0.0019
Tangibility	-5.056992	0.0000
Tax-Shield	-4.194190	0.0007

Source: Author, 2022

Results of the Augmented Dickey-Fuller test indicate that the p-values of all variables are less than 0.05 hence the null hypothesis of unit root can be rejected. This infers that all the variables are stationary at level.

4.5.4 Heteroskedasticity Test

Heteroskedasticity refers to a phenomenon where the variance of the residuals of a regression model are non-constant. It may occur due to large disparity of observations of the dependent variable or error in model specification. Heteroskedasticity may lead to biased estimators and consequently unreliable hypothesis testing and confidence intervals (Studenmund & Johnson, 2016). The Breusch-Pagan/ Cook Weiberg test was applied in the current study. The null hypothesis is that residuals have constant variance. Tables 4.7 below presents the findings of the test.

Table 4.7a Breusch-Pagan Test for Heteroskedasticity – Target Leverage Model

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: Profit MBVA Size Tang TShield
F (5, 574) = 8.26
Prob > F = 0.0000

Source: Author, 2022

Table 4.7b Breusch-Pagan Test for Heteroskedasticity – Main Variables Model

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: LnCFV LnMBVE LnProfit LnTang LDev LnINV
F (6, 476) = 5.47
Prob > F = 0.0000

Source: Author, 2022

The p-value of the F-statistic is 0.0000 in both models indicating that the null hypothesis of constant variance is rejected thus inferring that the residuals are heteroskedastic. To correct for this violation, all the variables were log transformed and the study applied the RE generalized least squares regression model robust for standard errors.

4.5.5 Serial Correlation Test

Serial correlation, also known as autocorrelation, refers to a phenomenon where the components of a successive observations ordered in time (time series) or ordered in space (cross-sectional) are correlated. Classical linear regression assumes that serial correlation is not present, that is, disturbance term of one observation does not influence the disturbance term of the other observations (Gujarati, 2003). To test for autocorrelation, the author applied Wooldridge test. The null hypothesis is that there is no first-order autocorrelation. Tables 4.8 below presents the results.

Table 4.8a Wooldridge Test for Autocorrelation – Target Leverage Model

```
xtserial MDR Profit MBVA Size Tang TShield

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
  F(1, 34) =     33.428
        Prob > F =      0.0000
```

Source: Author, 2022

Table 4.8b Wooldridge Test for Autocorrelation – Main Variables Model

```
xtserial TobinQ CFV MBVE Profit Tang LDev INV

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
  F(1, 34) =     11.943
        Prob > F =      0.0015
```

Source: Author, 2022

Results indicates that the p-value of the F-statistic of both models is less than 0.05 suggesting that the null hypothesis should be rejected hence indicating the presence of first order autocorrelation. To correct for this violation, the study applied the RE generalized least squares regression model with robust standard errors.

4.5.6 Panel Specification Tests

Panel regression models were used to determine the correlation between cashflow volatility and firm value, and to test the mediating effect of corporate investments and leverage deviation on the relationship. The first step of the analysis was to select the appropriate model using panel specification tests.

4.5.6.1 Breusch and Pagan LM Test for Random Effects

To determine whether to use pooled ordinary least squares (POLS) or a fixed effects (FE) model, Breusch and Pagan Langragian multiplier (LM) test was carried out. The null hypothesis of the LM test is that there are no fixed effects. Tables 4.9 below outlines the results of the Breusch and Pagan LM test.

Table 4.9a Breusch and Pagan LM Test for Random Effects- Target Leverage Model

Breusch and Pagan Lagrangian multiplier test for random effects

MDR[Company,t] = Xb + u[Company] + e[Company,t]

Estimated results:

	Var	sd = sqrt (Var)
MDR	.0673976	.2596105
e	.0205146	.143229
u	.0229508	.1514953

Test: Var(u) = 0
chibar2(01) = 1101.96
Prob > chibar2 = 0.0000

Source: Author, 2022

The Breusch-Pagan LM test indicated that the p-value of the chow test is less than 0.05 implying that the null hypothesis should be rejected, and FE model should be applied.

Table 4.9b Breusch and Pagan LM Test for Random Effects - Main Variables Model

Breusch and Pagan Lagrangian multiplier test for random effects

LnTobinQ[Company,t] = Xb + u[Company] + e[Company,t]

Estimated results:

	Var	sd = sqrt (Var)
LnTobinQ	.717621	.8471251
e	.042814	.2069154
u	.0481028	.2193235

Test: Var(u) = 0
chibar2(01) = 487.41
Prob > chibar2 = 0.0000

Source: Author, 2022

The Breusch-Pagan LM test indicated that the p-value of the chow test is less than 0.05 implying that the null hypothesis should be rejected, and FE model should be applied.

4.5.6.2 Hausman Specification Test

To identify whether to use FE or RE model, Hausman test was conducted. The null hypothesis of the test is that there is no relation between the regressor and error term implying that RE model is suitable. Table 4.10 below shows the results of the Hausman test.

Table 4.10a Hausman Specification Test – Target Leverage Model

Hausman test	Coef.
Chi-square test value	1998.916
P-value	0.000

Source: Author, 2022

Results in table 4.10a above indicate that the p-value of the chi square distribution is less than 0.05 suggesting that null hypothesis should be rejected, and FE is the most suitable model.

Table 4.10b Hausman Specification Test – Main Variables Model

Hausman test	**Coef.**
Chi-square test value	7.095
P-value	0.131

Source: Author, 2022

The Hausman test results in table 4.10b indicate that p-value is greater than 0.05 suggesting that the null hypothesis should not be rejected. Thus, RE model was selected.

4.6 Estimating the Mediator Variable (Leverage deviation)

This section comprises of preliminary analysis conducted prior to carrying out the inferential analysis of the key study variables. The preliminary analysis involves deriving the mediator variable, leverage deviation, using a panel regression model. Leverage deviation was estimated as the distance between the observed and target leverage. Target leverage was derived by regressing the lagged values of a vector of firm attributes including firm size, market to book value of assets, profitability, asset tangibility and tax shield against the observed leverage (market debt ratio). The panel regression model adopted below is as described in chapter 3 (equation 3.3).

$$\boldsymbol{MDR_{i,t}* = \beta_0 + \beta_1 LnTA_{i,t-1} + \beta_2 MB_{i,t-1} + \beta_3 \frac{EBIT}{TA}_{i,t-1} + \beta_4 \frac{FA}{TA_{i,t-1}} + \beta_5 \frac{DEP}{TA}_{i,t-1} + \varepsilon_{it-1}}$$

The resultant model was used to predict target leverage of each firm for each year. Thus, leverage deviation, of each firm for each year was derived from predicting the residuals of the target leverage model which represents the gap between the observed debt and the predicted target leverage. To correct for non-normality, all the variables were log transformed and robust standard error model was applied to correct for autocorrelation and heteroskedastic violations. Fixed effects regression model was applied as results from the Hausman test in Table 4.9a indicated that it is the most appropriate model.

Table 4.11 below presents the fixed effects regression model used to determine the target leverage.

Table 4.11 Summary Results of Target Leverage Model

LnMDR	Coef.	Std Err.	t-value	p-value	[95% Confidence Interval]		Sig
LnProfit_Lag	-0.355	0.086	-4.110	0.000	-0.530	-0.179	***
LnMBVA_Lag	0.058	0.249	0.230	0.818	-0.450	0.566	
Size_Lag	0.572	0.176	3.250	0.003	0.213	0.931	***
LnTang_Lag	0.114	0.100	1.140	0.263	-0.090	0.318	
LnTShield_Lag	0.471	0.213	2.210	0.034	0.037	0.904	**
Constant	-10.362	2.320	-4.470	0.000	-15.089	-5.636	***

Mean dependent var	-2.174	SD dependent var	1.665
R-squared	0.172	Number of obs	357
F-test	8.201	Prob > F	0.000

**** p<.01, ** p<.05*

Source: Author, 2022

Results in Table 4.11 shows that the p-value of the F-statistic is 0.000 implying that the overall model is statistically significant at 95% confidence level. The R-squared is 0.172 implying that 17.2% of the changes in market debt ratio (LnMDR) are explained by independent variables. The coefficients of profitability (LnProfit_Lag), firm size (Size_Lag) and tax shield (LnTShield_Lag) have a strong statistically significant relationship with market debt ratio at 95% confidence level. However, the coefficients of market to book value (LnMBVA_Lag) and tangibility (LnTang_Lag) were not statistically significant. Profitability (-0.355) is inversely related to market debt ratio implying that a firm with high profits rely less on debt financing. This finding is related to pecking order theory which contends that corporates prefer internally generated financing and when

external funding is required, debt is preferred over equity financing as it attracts lower floatation costs. The findings support the pecking order propositions as highly profitable firms have capacity to retain more resources to finance their operations thus require less debt financing. Firm size (0.572), tax shield (0.471), tangibility (0.411) and MBVA (0.058) are positively related to market debt ratio. These firm characteristics are expected to influence debt capacity of a firm as fixed asset provide collateral for debt and tax shield provides a cushion against tax burden. Thus, a positive relationship with MDR implies that the larger, the firm size, tangibility, growth, and tax shield, the larger the capacity of a firm to take more debt. The residuals generated from the FE model in table 4.11 constitutes the mediator variable, leverage deviation, in the second hypothesis of the main study since it represents the gap between observed and target leverage.

4.7 Chapter Summary

This chapter provides the results of descriptive analysis and preliminary data analysis. It constitutes the descriptive analysis, correlational analysis, diagnostic tests to examine adherence to classical linear regression assumptions and preliminary data analysis to derive the mediator variable, leverage deviation. Data was collected from 36 firms out of 42 nonfinancial companies listed at the NSE resulting to a response rate of 86%. The descriptive analysis was conducted to visualize the data, detect outliers, and identify associations among variables prior to carrying out inferential analysis. Pearson correlation analysis was undertaken to ascertain the intensity and direction of the association among the study variables. Cashflow volatility and leverage deviation had a negative relationship with firm value. However, both relationships were not statistically significant. Conversely, corporate investment, profitability, tangibility, and growth opportunity

had a positive correlation with firm value and the relationships were statistically significant. The predictor and control variables were correlated but none of the correlation coefficients was greater than 0.80 implying that there was no evidence of multicollinearity.

Several diagnostics tests were carried out prior to running the regression models in order to ascertain conformity to the assumptions of ordinary least squares regression model as well as select the appropriate regression model. The tests carried out include normality, multicollinearity, stationarity, heteroskedasticity and serial correlation test and panel specification tests. Results obtained from the diagnostic tests results indicated violation of some classical linear regression assumptions that is, non-normality and serial correlation and heteroskedasticity in the error terms. To correct for these violations all the variables in the study were transformed using natural logs and panel regression models robust for standard errors were applied. Panel specification tests indicated that FE model was most suitable for estimating target leverage while RE model was the most suitable to examine the interrelations between the main variables. Preliminary analysis was carried out to determine the mediator variable, leverage deviation. This involved regressing the lagged values of firm characteristics including profitability, firm size, growth opportunity, asset tangibility and tax shield against observed leverage to estimate the target leverage. The residuals of the regression model were generated and included as the mediator variable, leverage deviation, since it represents the gap between the observed and target leverage predicted by the model.

CHAPTER FIVE: INFERENTIAL ANALYSIS AND DISCUSSION OF FINDINGS

5.1 Introduction

This study sought to examine the relationship between cashflow volatility and corporate value, the mediating effect of leverage deviation and corporate investments on the link between cashflow volatility and firm value and the joint effect of cashflow volatility, leverage deviation, corporate investments on firm value. Thus, this chapter constitutes the presentation, analysis, and discussion of findings from hypothesis testing. All the research objectives were analysed using panel regression models.

5.2 Inferential Analysis

Panel regression models were applied to determine the correlation between cashflow volatility (CFV) and firm value, the mediating effect of leverage deviation and corporate investments on the link between CFV and firm value and the joint effect of CFV, leverage deviation, corporate investments on corporate value. Random effects model was applied as it was established from the Hausman test, done in chapter four (Table 4.10b), as the most appropriate model. Furthermore, the random effects model applied was robust for standard errors in order to cater for the violations of linear regression assumptions, heteroskedasticity and serial correlation, observed in the diagnostic test, done in chapter 4 (Tables 4.7 and 4.8).

5.2.1 Relationship Between Cashflow Volatility and Firm Value

The first objective of the study was to establish the correlation between cashflow volatility and firm value. This objective led to the first research hypothesis.

H_{01} *The effect of cashflow volatility on the value of nonfinancial corporations listed at the NSE is not significant.*

Table 5.1a below presents the Stata output of the random effects (RE) model robust for standard errors. The response variable is natural log of Tobin Q (LnTobin Q), and predictor variable is natural log of cashflow volatility (LnCFV).

Table 5.1 a Hypothesis 1 (H_{01}) Output of Relationship between CFV and Firm Value

LnTobinQ	**Coef.**	**Std Err.**	**t-value**	**p-value**	**[95% Confidence Interval]**		**Sig**
LnCFV	-0.019	0.037	-0.520	0.605	-0.092	0.053	
Constant	-0.079	0.111	-0.710	-0.477	-0.297	0.139	

Mean dependent var	-0.101	SD dependent var	0.847
Overall r-squared	0.047	Number of obs	575.000
Chi-square	0.267	Prob > chi2	0.605
R-squared within	0.001	R-squared between	0.096

Source: Author, 2022

The p-value of the chi-square statistic (0.605 > 0.0.5) in Table 5.1a indicates that the model is not statistically significant at 95% confidence level and the overall r-squared indicates that 4.7% of the changes in firm value is explained by cashflow volatility. Natural log of profitability (LnProfit), natural log of tangibility (LnTang) and natural log of market to book value of equity (LnMBVE) were included to control for other determinants of firm value and enhance the model specification. The output with control variables is presented in Table 5.1b.

Table 5.1b Hypothesis 1 (H_{01}) Output on Relationship between CFV and Firm Value with Control Variables

LnTobinQ	Coef.	Std. Err.	t-value	p-value	[95% Confidence Interval]		Sig
LnCFV	-0.024	0.012	-2.010	0.045	-.047	-.001	**
LnProfit	0.060	0.026	2.280	0.023	.008	.111	**
LnMBVE	0.647	0.048	13.500	0.000	.553	.74	***
LnTang	-0.104	0.052	-2.010	0.045	-.205	-.002	**
Constant	-0.205	0.090	-2.280	0.023	-.381	-.028	**
Mean dependent var		-0.027	SD dependent var			0.847	
Overall r-squared		0.855	Number of obs			483.000	
Chi-square		233.672	Prob > chi2			0.000	
R-squared within		0.803	R-squared between			0.872	
*** p<.01, ** p<.05							

Source: Author, 2022

The chi-square statistic (233.672, p-value 0.000) in Table 5.1b above shows that the overall model is statistically significant at 99% confidence level and the beta coefficients are jointly significant. The overall r-squared is 0.855 implying that 85.5% of the changes in firm value are explained by the predictor and control variables. The beta coefficient of LnCFV, -0.024, indicates that as volatility of cashflows increase by 1%, the value of the firm decreases by 0.024%. This relationship is statistically significant at 95% confidence level. This implies that as the level of operating risk rises, firm value declines. Furthermore, all the control variables were observed to be statistically significant at 95% level of confidence implying that they have an influence on firm value.

Profitability, LnProfit, has a coefficient of 0.060 which is statistically significant at 95% confidence level. It indicates that as profitability of the firm increases by 1%, the value of the firm increases by 0.060%. This result is intuitive as investors prefer firms whose earnings tend to be

higher as they anticipate higher returns. Market to book value of equity, LnMBVE, proxy for growth prospects, has a coefficient of 0.647 and is statistically significant at 99% confidence level. This implies that as growth prospects increase by 1%, firm value increases by 0.647%. Tangibility, LnTang, a proxy of debt capacity, has a coefficient of -0.104 and is statistically significant at 95% confidence level. This indicates that as tangibility increases by 1%, the value of the firm declines by 0.104%.

Table 5.1c Alternative Panel Regression Models Outputs of the First Hypothesis (H_{01})

	(1) Random	(2) POLS	(3) Fixed	(4) LSDV	(5) AREG
VARIABLES	LnTobinQ	LnTobinQ	LnTobinQ	LnTobinQ	LnTobinQ
LnCFV	-0.024**	-0.067***	-0.018	-0.018*	-0.018*
	(0.012)	(0.012)	(0.013)	(0.010)	(0.010)
LnProfit	0.060**	0.065***	0.057**	0.057**	0.057**
	(0.026)	(0.024)	(0.027)	(0.024)	(0.024)
LnMBVE	0.647***	0.657***	0.644***	0.644***	0.644***
	(0.048)	(0.021)	(0.050)	(0.027)	(0.027)
LnTang	-0.104**	-0.070	-0.112**	-0.112***	-0.112***
	(0.052)	(0.044)	(0.048)	(0.038)	(0.038)
Constant	-0.205**	-0.169**	-0.207**	0.129	-0.207***
	(0.090)	(0.074)	(0.085)	(0.102)	(0.073)
Company dummy				Yes	Yes
Observations	483	483	483	483	483
Chi square/ F statistic	233.67***	373.45***	52.05***	206.27***	179.27***
R-squared	0.855	0.862	0.804	0.929	0.929
Number of Company	37		37		

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2022

The outputs in Table 5.1c above represent a comparison of alternative panel regression models to check for robustness of the RE model of the first hypothesis one. All the models were robust for

standard errors, had R-squared greater than 80% and the F-statistics statistically significance at p-values of less than 0.05. Furthermore, the beta coefficients of the alternative models point to the same direction of relationships in the respective models and corresponding to the random effects model findings. This indicates that the RE model is robust for the analysis of H_{01}.

5.2.2 Mediating Effect of Leverage Deviation on the Relationship between Cashflow Volatility and Firm Value

The second research objective was to determine the mediating effect of leverage deviation (LDev) on the correlation between cashflow volatility (CFV) and firm value. This objective is linked to the second research hypothesis:

H_2: *The mediating effect of leverage deviation on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE is not significant.*

To investigate the mediating effect of leverage deviation (LDev) on the CFV and firm value association, a RE model robust for standard errors was applied. Following Baron and Kenny (1986), hierarchical regression analysis was carried out to test for the mediation effect using a four-step process. For mediation effect to be established, the beta coefficients of the independent and mediator variables should be statistically significant in step one, two and three and they become smaller or statistically insignificant in the fourth step. Similar to the first research hypothesis, control variables including profitability (LnProfit), growth (LnMBVE) and tangibility (LnTang) were included to control for other determinants of firm value.

5.2.2.1 Step 1 of Testing Mediating Effect of Leverage Deviation

The first step of the mediation analysis involved determining whether the predictor variable, CFV has a significant relationship with the response variable, corporate value. Findings from the analysis are presented in table 5.2

Table 5.2 Step 1: Output of Testing Mediating Effect of Leverage Deviation

LnTobinQ	Coef.	Std. Err.	t-value	p-value	[95% Confidence Interval]		Sig
LnCFV	-0.024	0.012	-2.010	0.045	-0.047	-0.001	**
LnProfit	0.060	0.026	2.280	0.023	0.008	0.111	**
LnMBVE	0.647	0.048	13.500	0.000	0.553	0.740	***
LnTang	-0.104	0.052	-2.010	0.045	-0.205	-0.002	**
Constant	-0.205	0.090	-2.280	0.023	-0.381	-0.028	**
Mean dependent var		-0.027	SD dependent var			0.847	
Overall r-squared		0.855	Number of obs			483.000	
Chi-square		233.672	Prob > chi2			0.000	
R-squared within		0.803	R-squared between			0.872	
*** p<.01, ** p<.05							

Source: Author, 2022

The findings and interpretations of step 1 are similar to the first research hypothesis in table 5.1b. Barron and Kenny (1986) suggest that for mediation to be established, there has to be a statistically significant relationship between the predictor and response variable. The output of step 1 indicates that the overall model is statistically significant at 99% confidence level, given that the p-value of the chi-square statistic is less than 0.05. The correlation between CFV and firm value is also statistically significant at 95% confidence level. The beta coefficient of LnCFV is -0.024 implying that when the volatility increases by 1%, firm value (LnTobinQ) decreases by 0.024%. Thus, the mediation analysis proceeds to step 2.

5.2.2.2 Step 2 of Testing Mediating Effect of Leverage Deviation

The second step of the mediation analysis was to assess whether the predictor variable, CFV has a statistically significant effect on the mediator, leverage deviation (LDev). Results are presented in table 5.3 below.

Table 5.3 Step 2: Output of Testing Mediating Effect of Leverage Deviation

LDev	**Coef.**	**Std. Err.**	**t-value**	**p-value**	**[95% Confidence Interval]**		**Sig**
LnCFV	0.016	0.007	2.29	0.022	0.002	0.029	**
Constant	-0.01	0.034	-0.02	0.988	-0.068	0.066	

Mean dependent var	-0.000	SD dependent var	0.244
Overall r-squared	0.072	Number of obs	527
Chi-square	5.254	Prob > chi2	0.022
R-squared within	0.009	R-squared between	0.195

**** p<.01, ** p<.05*

Source: Author, 2022

Results of step 2 shows that the overall model is statistically significant at 95% confidence level given that the p-value of the Chi-square statistic is less than 0.05. The p-value of the beta coefficients indicate that there is a positive and statistically significant correlation between CFV and the mediator variable, leverage deviation at 95% confidence level. The beta coefficient of LnCFV (0.016) suggest that when volatility increases by 1%, leverage deviation (LDev) increases by 0.016%. This suggests that as the level of operating risk rises, firms detour from their target leverage level.

5.2.2.3 Step 3 of Testing Mediating Effect of Leverage Deviation

The third step was to determine whether the mediator variable, leverage deviation has a statistically significant correlation with the response variable, Tobin Q. Results were presented in table 5.4 below. The findings of step 3 show that the overall model is statistically significant since the p-value of the chi-square statistic is less than 0.05. The overall r-squared indicates that 84.2% of variations in the response variable, firm value are explained by predictor and control variables. The beta coefficient (0.543) and p-value (0.005) of LDev shows that there is a positive and statistically significant association between leverage deviation and firm value at 99% confidence level. The beta coefficient shows that as leverage deviation increases by 1%, firm value increases by 0.543%. This finding suggests that leverage deviation is an important determinant of firm value. The control variables, LnProfit and LnMBVE indicate a positive and statistically significant interrelations with Tobin Q, while LnTang has an inverse and insignificant relationship.

Table 5.4 Step 3: Output of Testing Mediating Effect of Leverage Deviation

LnTobinQ	**Coef.**	**Std Err.**	**t-value**	**p-value**	**[95% Conf Interval]**		**Sig**
LDev	0.543	0.191	2.840	0.005	0.168	0.917	***
LnProfit	0.071	0.034	2.120	0.034	-0.005	0.137	**
LnMBVE	0.657	0.039	16.680	0.000	0.580	0.734	***
LnTang	-0.094	0.065	-1.46	0.145	-0.221	0.032	
Constant	-0.185	0.105	-1.760	0.078	-0.391	-0.021	*
Mean dependent var		-0.027	SD dependent var			0.849	
Overall r-squared		0.842	Number of obs			449	
Chi-square		534.350	Prob > chi2			0.000	
R-squared within		0.804	R-squared between			0.851	
*** p<.01, ** p<.05, * p<.1							

Source: Author, 2022

5.2.2.4 Step 4 of Testing Mediating Effect of Leverage Deviation

The fourth step of the mediation analysis was to ascertain the effect of the predictor variable, CFV on the response variable, Tobin Q while controlling for the effects of the mediator, leverage deviation. Results are presented in Table 5.5 below.

P-value of the chi-square statistic in step 4 indicates that the overall model is statistically significant at 99% confidence level. Furthermore, the overall r-squared shows that 85.8% of changes in the response variable, Tobin Q, are explained by the predictor and control variables. The beta coefficient, LnCFV (-0.04) and p-value (0.003) shows that CFV has an inverse and statistically significant relationship with Tobin's Q at 99% confidence indicating that when the volatility increases by 1%, firm value decreases by 0.04%.

Table 5.5 Step 4: Output of Testing Mediating Effect of Leverage Deviation

LnTobinQ	**Coef.**	**Std Err.**	**t-value**	**p-value**	**[95% Conf Interval]**		**Sig**
LDev	0.577	0.189	3.050	0.002	0.206	0.947	***
LnCFV	-0.040	0.013	-3.020	0.003	-0.065	-0.014	***
LnProfit	0.079	0.033	2.380	0.017	0.014	0.143	**
LnMBVE	0.658	0.038	17.26	0.000	0.583	0.733	***
LnTang	-0.100	0.061	-1.65	0.099	-0.219	0.019	*
Constant	-0.171	0.102	-0.102	0.092	-0.370	-0.028	*

Mean dependent var	-0.029	SD dependent var	0.851
Overall r-squared	0.858	Number of obs	447
Chi-square	580.141	Prob > chi2	0.000
R-squared within	0.808	R-squared between	0.867

*** $p<.01$, ** $p<.05$

Source: Author, 2022

The beta coefficient (0.577) and p-value (0.002) of LDev shows leverage deviation has a direct and statistically significant relationship with firm value at 99% confidence level. When leverage deviation increases by 1%, firm value increases by 0.577%. The control variables, LnProfit and LnMBVE have a direct and statistically significant interrelation with Tobin Q while LnTang has an inverse relationship.

The beta coefficients of both CFV and leverage deviation increased in value and statistical significance in step 4, compared to results of step 1 and step 3, respectively. Thus, based on Barron and Kenny (1986) approach, these results suggest that leverage deviation does not mediate the relationship between CFV and firm value.

5.2.3 The Mediating Effect of Corporate Investments on the Relationship between Cashflow Volatility and Firm Value.

The third objective of the study sought to examine the mediating effect of corporate investments on the relation between cashflow volatility and firm value. This objective resulted to the third research hypothesis:

H_3: *The mediating effect of corporate investments on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE is not significant.*

To assess the mediating effect of corporate investments (LnINV) on the link between CFV and firm value, a RE model robust for standard errors was applied. Following Baron and Kenny (1986), hierarchical regression analysis was carried out to test for the mediating effect using a four-step process. For mediation effect to be established, it is expected that the beta coefficients of the predictor and mediator variables are statistically significant in step one, two and three and that they become smaller or statistically insignificant in the fourth step. Similar to the first research

hypothesis, control variables including LnProfit, LnMBVE, and LnTang were included to control for other determinants of firm value.

5.2.3.1 Step 1 of Testing Mediating Effect of Corporate Investments

The first step of the mediation analysis involved testing whether the predictor variable, CFV has a significant effect on the response variable, Tobin Q. Findings from the analysis are presented in Table 5.6

Table 5.6 Step 1: Output of Testing Mediating Effect of Corporate Investment

LnTobinQ	**Coef.**	**Std Err.**	**t-value**	**p-value**	**[95% Confidence Interval]**		**Sig**
LnCFV	-0.024	0.012	-2.010	0.045	-0.047	-0.001	**
LnProfit	0.060	0.026	2.280	0.023	0.008	0.111	**
LnMBVE	0.647	0.048	13.500	0.000	0.553	0.740	***
LnTang	-0.104	0.052	-2.010	0.045	-0.205	-0.002	**
Constant	-0.205	0.090	-2.280	0.023	-0.381	-0.028	**

Mean dependent var	-0.027	SD dependent var	0.847
Overall r-squared	0.855	Number of obs	483.000
Chi-square	233.672	Prob > chi2	0.000
R-squared within	0.803	R-squared between	0.872

**** p<.01, ** p<.05*

Source: Author, 2022

The findings and interpretations of step 1 are similar to the first research hypothesis in Table 5.1b. Barron and Kenny (1986) suggest that for mediation to be established, there has to be a statistically significant association between the predictor and the response variable. The output of step 1 indicates that the overall model is statistically significant at 99% confidence level, given that the

p-value of the chi-square statistic is less than 0.05. The relationship between CFV and firm value is statistically significant at 95% confidence level. The beta coefficient of LnCFV is -0.024 implying that when the volatility increases by 1%, firm value (LnTobinQ) decreases by 0.024%. Thus, the mediation analysis proceeds to step 2.

5.2.3.2 Step 2 of Testing Mediating Effect of Corporate Investments

The second step of the mediation analysis was to assess whether the predictor variable, CFV has a statistically significant effect on the mediator variable, corporate investments (LnINV). Findings are shown in table 5.7 below.

Table 5.7 Step 2: Output of Testing Mediating Effect of Corporate Investments

LnINV	**Coef.**	**Std. Err.**	**t-value**	**p-value**	**[95% Conf Interval]**		**Sig**
LnCFV	-0.098	0.032	-3.040	0.002	-0.161	-0.035	***
Constant	-2.696	0.119	-22.730	0.000	-2.929	-2.464	***

Mean dependent var	-2.664	SD dependent var	0.961
Overall r-squared	0.094	Number of obs	575.000
Chi-square	9.272	Prob > chi2	0.002
R-squared within	0.018	R-squared between	0.313

*** *p<.01*

Source: Author, 2022

Results of step 2 shows that the overall model is statistically significant at 95% confidence level given that the p-value of the chi-square statistic is less than 0.05 implying that beta coefficients of the model are jointly significant. The p-value of the beta coefficients indicate that there is an inverse and statistically significant association between CFV and the mediator variable, corporate investments at 95% confidence level. The beta coefficient of LnCFV (-0.098) suggest that when

volatility increases by 1%, corporate investments decrease by 0.098%. This suggests that as the level of operating risk rises, firms reduce their corporate investments.

5.2.3.3 Step 3 of Testing Mediating Effect of Corporate Investments

The third step was to determine whether the mediator variable, corporate investment has a significant relationship with the response variable, Tobin Q. Findings are shown in table 5.8.

Table 5.8 Step 3: Output of Testing Mediating Effect of Corporate Investments

LnTobinQ	Coef.	Std Err.	t-value	p-value	[95% Confidence Interval]		Sig
LnINV	0.057	0.020	2.870	0.004	0.018	0.097	***
LnProfit	0.055	0.024	2.320	0.021	0.008	0.101	**
LnMBVE	0.640	0.047	13.740	0.000	0.548	0.731	***
LnTang	-0.105	0.053	-2.000	0.046	-0.208	-0.002	**
Constant	-0.062	0.114	-0.540	0.586	-0.286	0.162	

Mean dependent var	-0.023	SD dependent var	0.845
Overall r-squared	0.846	Number of obs	487.000
Chi-square	251.039	Prob > chi2	0.000
R-squared within	0.809	R-squared between	0.853

**** p<.01, ** p<.05*

Source: Author, 2022

Results of step 3 shows that the overall model is statistically significant since the p-value of the chi-square statistic is less than 0.05. The overall r-squared indicates that 84.6% of changes in the response variable, firm value are explained by predictor and control variables. The beta coefficient (0.057) and p-value (0.004) of LnINV shows that there is a direct and statistically significant association between corporate investments and firm value at 99% confidence level. The beta coefficient shows that as corporate investment increases by 1%, firm value increases by 0.057%.

This finding implies that corporate investment is an important contributor of firm value. All the control variables are statistically significant; LnProfit and LnMBVE have a positive relationship with firm value while LnTang has an inverse relationship.

5.2.3.4 Step 4 of Testing Mediating Effect of Corporate Investment

The fourth step of the mediation analysis was to establish the effect of controlling for corporate investment on the CFV and firm value relation by incorporating both the dependent variable, LnCFV and the mediator variable, LnINV as predictors of the dependent variable, Tobin Q. Findings are shown in table 5.9 below.

Table 5.9 Step 4: Output of Testing Mediating Effect of Corporate Investments

LnTobinQ	Coef.	Std Err.	t-value	p-value	[95% Confidence Interval]		Sig
LnCFV	-0.021	0.013	-1.680	0.093	-0.046	0.004	*
LnINV	0.050	0.020	2.490	0.013	0.011	0.090	**
LnProfit	0.059	0.023	2.510	0.012	0.013	0.104	**
LnMBVE	0.641	0.047	13.600	0.000	0.549	0.733	***
LnTang	-0.108	0.050	-2.160	0.031	-0.207	-0.010	**
Constant	-0.075	0.114	-0.660	0.510	-0.299	0.148	

Mean dependent var	-0.027	SD dependent var	0.847
Overall r-squared	0.852	Number of obs	483.000
Chi-square	258.127	Prob > chi2	0.000
R-squared within	0.808	R-squared between	0.861

*** p<.01, ** p<.05, * p<.1

Source: Author, 2022

P-value of the chi-square statistic in Step 4 indicates that the overall model is statistically significant at 99% confidence level. Furthermore, the overall r-squared shows that 85.2% of the

changes in the response variable, firm value, are explained by the predictor and control variables. The beta coefficient, LnCFV (-0.021) shows that when volatility increases by 1%, firm value decreases by 0.021%. However, the p-value of the beta coefficient LnCFV is statistically significant at 90% confidence level. The beta coefficient (0.050) and p-value (0.013) of LnINV shows that corporate investments have a positive and statistically significant relation with Tobin Q at 95% confidence level. All the control variables are statistically significant; LnProfit and LnMBVE have a positive relationship with firm value while LnTang has an inverse relationship.

The beta coefficients of CFV and corporate investments decreased in value and statistical significance in step 4, compared to results of step 1 and step 3, respectively. Moreover, CFV is no longer statistically significant at 95% confidence level. Thus, based on Barron and Kenny (1986) approach, these findings suggest that corporate investment mediates the relationship between CFV and firm value.

5.2.4 The Joint Effect of Cashflow Volatility, Leverage Deviation and Corporate Investment on Firm Value.

The fourth objective of the study was to analyse the joint effect of predictor variables, cashflow volatility, leverage deviation and corporate investments on firm value. This objective resulted to the fourth research hypothesis:

H_4: *The joint effect of cashflow volatility, leverage deviation and corporate investments on the value of nonfinancial corporations listed at the NSE are not significant.*

A random effects model robust for standard errors was applied to determine the joint effect. The output of the analysis is shown in table 5.10a below.

Table 5.10a Summary Results of the Joint Effects Analysis

LnTobinQ	Coef.	St. Err.	t-value	p-value	[95% Confidence Interval]		Sig
LnCFV	0.006	0.041	0.150	0.882	-0.074	0.087	
LDev	-0.355	0.288	-1.230	0.218	-0.921	0.210	
LnINV	0.188	0.051	3.710	0.000	0.089	0.287	***
Constant	0.406	0.158	2.560	0.010	0.096	0.7717	**

Mean dependent var	-0.100	SD dependent var	0.852
Overall r-squared	0.036	Number of obs	527
Chi-square	14.158	Prob > chi2	0.003
R-squared within	0.080	R-squared between	0.011

**** p<.01, ** p<.05*

Source: Author, 2022

Table 5.10a output shows that the overall model is statistically significant while, the overall r-squared shows that only 3.6% of the changes in firm value are explained by the predictor variables. Moreover, cashflow volatility and firm value are not statistically insignificant at 95% confidence level. To enhance the model specification and control for other determinants of firm value, profitability (LnProfit) , tangibility (LnTang) and market to book value of equity (LnMBVE) were included as control variables. The output with control variables is shown in table 5.10 b below.

Table 5.10b Summary Results of the Joint Effects Analysis with Control Variables

LnTobinQ	Coef.	Std Err.	t-value	p-value	[95% Confidence Interval]		Sig
LnCFV	-0.035	0.014	-2.470	0.014	-0.063	-0.007	**
LnMBVE	0.650	0.037	17.510	0.000	0.577	0.722	***
LnProfit	0.078	0.029	2.720	0.006	0.022	0.134	**
LnTang	-0.109	0.059	-1.850	0.064	-0.223	0.006	*
LDev	0.589	0.179	3.300	0.001	0.239	0.940	***
LnINV	0.068	0.023	2.900	0.004	0.022	0.113	***
Constant	-0.001	0.126	0.000	0.996	-0.246	0.247	

Mean dependent var	-0.029	SD dependent var	0.851
Overall r-squared	0.857	Number of obs	447
Chi-square	625.764	Prob > chi2	0.000
R-squared within	0.814	R-squared between	0.864

**** p<.01, ** p<.05,* p<.1*

Source: Author, 2022

Table 5.10b output of the joint effects analysis shows that the overall model is statistically significant at 99% confidence level, given the p-value of the chi-square statistic at 0.000. The overall r-squared of 0.857 implies that 85.7% of the changes in firm value are explained by the predictor and control variables.

The beta coefficients of the predictor variables cashflow volatility (LnCFV), leverage deviation (LDev) and corporate investment (LnINV) have a statistically significant correlation with Tobin Q at 95% confidence level. The beta coefficient of CFV (-0.035) indicates that when CFV increases by 1%, firm value decreases by 0.035% indicating an inverse relationship. The beta coefficient of leverage deviation (0.589) shows that when deviation increases by 1%, firm value increases by 0.589% suggesting a positive relationship. The beta coefficient of corporate

investments, 0.068 suggest that when the level of investments increase by 1%, firm value increases by 0.068%. The control variables, profitability (LnProfit) and growth opportunity (LnMBVE) and had a direct and statistically significant relationship with Tobin Q while tangibility (LnTang) had an inverse relationship. The beta coefficient LnProfit indicates that when profitability increase by 1%, firm value increases by 0.078%. The beta coefficient LnMBVE suggest that when growth opportunities increase by 1%, firm value increases by 0.65% and the beta coefficient LnTang indicates that when tangibility increases by 1%, firm value decreases by 0.109%.

5.3 Discussion of Research Findings

The overall research objective of this study was to examine the interrelationships among cashflow volatility, leverage deviation, corporate investments and value of nonfinancial companies listed at the NSE. This section provides a discussion of results of hypothesis tests presented in section 5.2 above.

5.3.1 Relationship Between Cashflow Volatility and Firm Value

The first objective was to examine the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE. The study conjectured that the relationship between cashflow volatility and firm value is not significant. Output of the analysis is presented in table 5.1. The best predicting model was the random effects model whose p-value of the chi-square statistic predicting the joint significance of the beta coefficients and the p-value of the individual beta coefficients were less than 0.05. The null hypothesis (H_{01}) was therefore rejected implying that there is an inverse and statistically significant relationship between CFV and firm value. The resultant model is framed as:

Overall r-squared = 0.855, Chi-square = 233.672 at P-value = 0.000

$$LnTobinQ = -0.205 - 0.024LnCFV + 0.060LnProfit + 0.647LnMBVE - 0.104LnTang$$

Where:

LnTobinQ = Natural log of Tobin Q (Firm Value)

LnCFV = Natural Log of Cashflow Volatility

LnProfit = Natural Log of Profits

LnMBVE= Natural Log of Market to Book Value of Equity

LnTang = Natural Log of Asset Tangibility

The finding of inverse correlation between CFV and firm value is intuitive since investors are risk averse thus increase in uncertainty is shunned. Cashflow volatility represents operating risk which may emanate from the macroeconomic environment which the firms are operating, or it may emanate from internal business activities and managerial decisions. Investors use indicators from the financial statements to deduce such risks prior to buying a firm's stocks. Thus, fluctuations in operating cashflows may be perceived as risk and the firm is negatively rewarded. These findings are similar to results obtained by Rountree et.al (2008), Huang (2009), Makela (2012) who observed a negative association between CFV and firm value and contrary to Shipe (2015), Gworo (2019) and Sawalqa (2021) who observed a direct association between CFV and firm value.

The control variables, growth opportunities (MBVE) and profitability were observed to have a direct relation with firm value. These observations are innate since increase in profits and growth opportunities project favourable firm performance and hence high shareholders' returns. The

results are consistent with Shahid (2018) and Rountree et al (2008). The inverse correlation between tangibility and firm value is similar to findings by Kodongo et. al (2014). This finding suggests that although debt capacity should be attractive, investors negatively value additional investments in tangible assets. This observation may be attributed to the proportion of service-based companies among firms in the target population. Service-based firms tend to rely less on fixed assets to generate revenue, thus an increase in fixed assets may be perceived negatively as tying up funds which would otherwise be used to generate more returns for investors.

5.3.2 Mediating Effect of Leverage Deviation on the Relationship between Cashflow Volatility and Firm Value

The second research objective was to analyse the effect of leverage deviation on the relationship between CFV and firm value. The study proposed that the mediating effect of leverage deviation (LDev) on the CFV to firm value relationship of nonfinancial corporations listed at the NSE is not significant. Leverage deviation was obtained as the residual of a target leverage model which constitutes a regression of firm characteristics against market debt ratio (MDR). The output of the target leverage model is presented in table 4.11 in chapter 4. LDev was estimated as the residual since it represents the gap between observed leverage (MDR) and the derived target leverage. Subsequently, a four-step mediation analysis was applied to test the mediating effect of LDev following Barron and Kenny (1986). The individual outputs for each step are presented in tables 5.2 to 5.5 and summary results are included in appendix D.

The resultant models, r-square and chi square statistics of the four steps are as follows:

Step 1*: Overall r-squared = 0.855, Chi-square = 233.672 at P-value = 0.000*

$$\text{LnTobinQ} = -0.205 - 0.024\text{LnCFV} + 0.060\text{LnProfit} + 0.647\text{LnMBVE} - 0.104\text{LnTang}$$

Step 2: *Overall r-squared = 0.072, Chi square = 5.254 at P-value of 0.022*

$$\text{LDev} = -0.01 + 0.016\text{LnCFV}$$

Step 3: *Overall r-squared = 0.842, Chi square = 534.35 at P-value of 0.000*

$$\text{LnTobinQ} = -0.185 + 0.543\text{LDev} + 0.071\text{LnProfit} + 0.657\text{LnMBVE} - 0.094\text{LnTang}$$

Step 4: *Overall r-square d= 0.858, Chi square = 580.141 at P-value of 0.000*

$$\text{LnTobinQ} = -0.171 - 0.040\text{LnCFV} + 0.577\text{LDev} + 0.079\text{LnProfit} + 0.658\text{LnMBVE} - 0.100\text{LnTang}$$

Where:

LnTobinQ = Natural Log of Tobin Q (Firm Value)

LnCFV = Natural Log of Cashflow Volatility

LDev = Leverage Deviation

LnProfit = Natural Log of Profits

LnMBVE= Natural Log of Market to Book Value of Equity

LnTang = Natural Log of Asset Tangibility

The above representations show that the four models are statistically significant as the p-values of their chi square distribution are all less than 0.05. For mediation effect to exist, the beta coefficients of the predictor variable, CFV needs to be statistically significant in step one, two and four, the mediator variable, LDev is expected to be statistically significant in step three and four and the coefficients of both variables should become smaller in value or statistically insignificant in the

fourth step. Results presented in Tables 5.2 to 5.5 and the equations above provide evidence that CFV is statistically significant (p-value < 0.05) in step one, two and three. This indicates that CFV predicts the dependent variable, firm value (LnTobinQ) as well as the mediating variable, LDev. Furthermore, LDev was statistically significant (p-value < 0.05) in step three and four, implying that leverage deviation predicts firm value. However, the beta coefficients of CFV and LDev became bigger when both variables were introduced as predictor variables in step 4. This implies that the null hypothesis (H_{02}) cannot be rejected, and that leverage deviation does not mediate the relationship between CFV and firm value.

The findings of a negative relationship between CFV and leverage deviation are aligned to Lee et al. (2021), Memon et al. (2017), Keefe and Yaghoubi (2016) and Dudely and James (2015). The results of a direct relationship between leverage deviation and firm value are contrary to Kodongo et al. (2014) who observed that leverage does not impact firm value, Cai, and Zhang (2006) who observed that leverage deviation has no effect on stock returns and Chong and Kim (2019) who obtained an inverse relationship between capital structure volatility and stock returns. Furthermore, the results of a direct relationship between leverage deviation and firm value suggests that firms do not need to maintain a target leverage to maximize value. This finding is contrary to the trade-off theory of capital structure which contends that firms should operate at an optimal capital structure to maximize value (Kraus & Litzenberger, 1973). Literature examined the interrelations between CFV, leverage deviation and firm value separately. Thus, this study examined the mediating effect of leverage deviation on the link between CFV and firm value and found no mediating effects.

5.3.3 Mediating Effect of Corporate Investments on the Relationship Between Cashflow Volatility and Firm Value.

The third research objective was to determine influence of corporate investments on the relationship between cashflow volatility and firm value. The study proposed that the mediating effect of corporate investments on the link between cashflow volatility and value of nonfinancial corporations listed at the NSE is not significant. A four-step mediation analysis was applied to test the mediating effect of corporate investments following Barron and Kenny (1986). The individual outputs of each step are presented in tables 5.6 to 5.9 and summary results are included in appendix E.

The resultant models, r-square and chi square statistics of the four steps are as follows:

Step 1*: Overall r-squared = 0.855, Chi-square = 233.672 at p-value = 0.000*

$$\text{LnTobinQ} = -0.205 - 0.024\text{LnCFV} + 0.060\text{LnProfit} + 0.647\text{LnMBVE} - 0.104\text{LnTang}$$

Step 2: *Overall r-squared = 0.094, Chi square = 9.272 at p-value of 0.002*

$$\text{LnINV} = -2.696 - 0.098\text{LnCFV}$$

Step 3: *Overall r-squared = 0.846, Chi square = 251.039 at p-value of 0.000*

$$\text{LnTobinQ} = -0.062 + 0.057\text{LnINV} + 0.055\text{LnProfit} + 0.640\text{LnMBVE} - 0.105\text{LnTang}$$

Step 4: *Overall r-squared = 0.852, Chi square = 258.127 at p-value of 0.000*

$$\text{LnTobinQ} = -0.075 - 0.021\text{LnCFV} + 0.050\text{LnINV} + 0.059\text{LnProfit} + 0.641\text{LnMBVE} - 0.108\text{LnTang}$$

Where:

LnTobinQ = Natural Log of Tobin Q (Firm Value)

LnCFV = Natural Log of Cashflow Volatility

LnINV = Natural Log of Corporate Investments

LnProfit = Natural Log of Profits

LnMBVE= Natural Log of Market to Book Value of Equity

LnTang = Natural Log of Asset Tangibility

The above representations show that the four models are statistically significant as the p-values of their chi square distribution are all less than 0.05. For mediation to exist, the beta coefficients of the predictor variable, CFV should be statistically significant in step one and two and the mediator variable, LnINV should be statistically significant in step three and four and the coefficients of both variables should become smaller in value or statistically insignificant in the fourth step. Results presented in Tables 5.6 to 5.9 and the equations above provide evidence that CFV was statistically significant (p-value < 0.05) in step one and two but became insignificant in step four (p-value >0.05). The mediating variable, LnINV was statistically significant (p-value < 0.05) in step three and four, although the strength of significance declined in step 4 from 99% to 95% level of confidence. Furthermore, the beta coefficients of CFV and LnINV became smaller when both variables were introduced as predictor variables in step 4. This implies that the null hypothesis (H_{03}) can be rejected implying that corporate investment mediates the relationship between CFV and corporate value.

These results are aligned to Minton and Shrand (1999), Beladi et al. (2021) and Rashid et al. (2021) who observed an inverse relationship between CFV and investments and contrary to Kimaiyo (2017) and Cohen (2014) who observed a positive association between CFV and investments. Similarly, the results of a direct association between corporate investments and corporate value are in line with Mousa et al. (2021) and Kim et al (2018). Studies in literature examine the interactions between CFV, corporate investments and firm value separately. The current study has added to literature investigating the mediating effect of corporate investments on the link between CFV and firm value and found a significant effect. The results of the current study may however be influenced by the low levels of capital expenditure among the nonfinancial firms during the period of observation. Overall, the mean capital expenditure to total assets was found to be 9.9% with the highest observation being of 48.7% and a lowest value being zero as shown in the summary statistics of table 4.1.

5.3.4 The Joint Effect of Cashflow Volatility, Leverage Deviation and Corporate Investment on Firm Value.

The fourth objective of the study was to examine the joint effect of predictor variables, cashflow volatility, leverage deviation and corporate investments on firm value. The study postulated that the joint effect of CFV, leverage deviation and corporate investments on the value of nonfinancial corporations listed at the NSE is not significant. A random effects model robust for standard error was used to analyse the joint effect. The results were presented in Table 5.10. The resultant regression model is as follows:

Overall r-squared = 0.857, Chi square = 625.764 at P-value of 0.000

$$LnTobinQ = -0.001 - 0.035LnCFV + 0.589LDev + 0.068LnINV + 0.078LnProfit + 0.650LnMBVE - 0.109LnTang$$

Where:

LnTobinQ = Natural log of Tobin Q (Firm Value)

LnCFV = Natural Log of Cashflow Volatility

LDev = Leverage Deviation

LnInv= Natural Log of Corporate Investments

LnProfit = Natural Log of Profits

LnMBVE= Natural Log of Market to Book Value of Equity

LnTang = Natural Log of Asset Tangibility

The p-value of the chi-square distribution indicates that the model is statistically significant at 99% confidence level. The overall r-square is 0.848 suggesting that 84.8% of the changes in firm value is explained by the predictor variables in the model. The beta coefficients of all the predictor variables, LnCFV, LDev and LnINV and the control variables LnMBVE and LnProfit were statistically significant at 99% confidence level while LnTang was not significant. This implies that the null hypothesis (H_{04}) can be rejected suggesting that there is a joint effect on the relationship between the predictor variables, CFV, leverage deviation and corporate investments on firm value. These findings are aligned to the observations by Minton et al. (2002) who found an inverse association between CFV and corporate value even after controlling for firm

characteristics including investments and contrary to the findings by Chi and Sue (2017) who observed a positive relationship between CFV and firm value even after controlling for leverage and investments.

5.4 Chapter Summary

This chapter comprised of the presentation and discussion of results from hypothesis testing. Data was analysed using a random effects model robust for standard error and all the variables were transformed using natural logs as remedial measures for heteroskedasticity and autocorrelation detected in diagnostics tests in chapter 4. Summary results of the research objectives, hypothesis testing, interpretations and implications are outlined in the table below.

Table 5.11 Summary of Research Objectives, Hypothesis, Findings, and Implications

Research Objectives	Research Hypotheses	Statistical Test/ Research Findings	Interpretation &Implications
1. To determine the relationship between cashflow volatility and the value of nonfinancial corporations listed at the NSE	**H_{01}**: The effect of cashflow volatility on the value of nonfinancial corporations listed at the NSE is not significant	Panel regression analysis was appliedThe study established a negative and statistically significant relationship between cashflow volatility and firm value.	The results provide evidence to **reject the null hypothesis (H_{01})** suggesting that CFV has a significant effect on firm value.

	Research Objectives	Research Hypothesis	Statistical Test/ Research Findings	Interpretation &Implications
2.	To establish the effect of leverage deviation on the relationship between cashflow volatility and nonfinancial corporations listed at the NSE	**H_{02}**: The mediating effect of leverage deviation on the relationship between cashflow volatility and value of non-financial corporations listed at the NSE is not significant	Hierarchical panel regression analysis was applied. The study established a statistically significant relationship between CFV and firm value in step 1, a statistically significant relationship between CFV and leverage deviation in step 2, a statistically significant relation between leverage deviation and firm value in step 3 and 4. However, the size and statistical significance of the beta coefficients of both variables increased in step 4 suggesting that leverage deviation does not mediate the CFV to firm value relation.	The results provide evidence **to fail to reject the null hypothesis (H_{02})** implying that leverage deviation does not mediate the relationship between CFV and firm value.

	Research Objectives	Research Hypothesis	Statistical Test/ Research Findings	Interpretation &Implications
3.	To examine the influence of corporate investments on the relationship between cashflow volatility and nonfinancial corporations listed at the NSE	**H_{03}**: The mediating effect of corporate investments on the relationship between cashflow volatility and value of nonfinancial corporations listed at the NSE is not significant	Hierarchical panel regression analysis was applied. The study established a statistically significant correlation between CFV and firm value in step 1, a statistically significant relationship between CFV and corporate investments in step 2, a statistically significant relationship between corporate investments and firm value in step 3. However, the magnitude and statistical significance of the beta coefficients of both variables decreased in step 4 suggesting that corporate investment mediates the CFV and firm value relation.	The results provide evidence **to reject the null hypothesis (H_{03})** implying that corporate investment mediates the relationship between CFV and firm value.

	Research Objectives	Research Hypothesis	Statistical Test/ Research Findings	Interpretation &Implications
4.	To investigate the joint effect of cashflow volatility, leverage deviation and corporate investments on the value of nonfinancial corporations listed at the NSE	**H_{04}**: The joint effect of cashflow volatility, leverage deviation and corporate investments on the value of nonfinancial corporations listed at the NSE are not significant.	Panel regression analysis was applied. Results indicated that the beta coefficients of CFV, leverage deviation and corporate investments are all statistically significant when predicting the value of corporations listed at NSE.	The results provide evidence **to reject the null hypothesis (H_{04})** that the joint effect of CFV, leverage deviation, corporate investments on firm value is not significant.

Source: Author, 2022

CHAPTER SIX: SUMMARY OF FINDINGS, CONCLUSIONS, AND IMPLICATIONS

6.1 Introduction

This chapter encompasses a summary of research findings, conclusions, and recommendations. The chapter presents a summary of findings from descriptive statistics and hypothesis testing, conclusions of the study, contributions to knowledge, managerial policy, and practice. The chapter winds with a discussion of research limitations and identification of areas for future research.

6.2 Summary of the Findings

The overall objective of this study was to examine the interrelationship among cashflow volatility, leverage deviation, corporate investments and value of nonfinancial corporations listed at the NSE. The study specifically analysed the relationship between cashflow volatility and firm value, the mediating effect of leverage deviation and corporate investments on the cashflow volatility to firm value relationship and the joint effect of cashflow volatility, leverage deviation, corporate investments on firm value. The study was anchored on the theory of information asymmetry which explains the interrelations among the four study variables and used a positivist philosophy to evaluate research hypotheses. A descriptive longitudinal research design was applied to analyse secondary data of nonfinancial corporations listed at the NSE.

A census was conducted on a population of 42 nonfinancial corporations listed at the NSE from 2002 to 2019. Data was collected from 36 firms which had consistent listing and data during the study period resulting to an unbalanced panel data. Descriptive analysis using mean, standard deviation, minimum and maximum was carried out to visualize the distribution of data, detect outliers and identify associations among variables prior to conducting inferential analysis. Pearson correlation analysis was applied to measure the direction and intensity of relationships among the

study variables. It was observed that the predictor variables are linearly related to the response variable and there was no evidence of multicollinearity.

Diagnostic tests of normality, multicollinearity, stationarity, heteroskedasticity and serial correlation were conducted prior to carrying out inferential analysis and remedial measures applied in cases where violation of classical linear regression assumptions was detected. Panel regression model robust for standard errors and natural log transformations were applied as remedial measures for heteroskedasticity and autocorrelation detected on residuals. Model specification tests were also undertaken to determine whether to use pooled OLS, FE or RE model. Thus, random effects model robust for standard errors was determined as the most appropriate model for testing each hypothesis.

The first objective of the study was to ascertain the correlation between CFV and firm value. It was conjectured that the correlation between CFV and the value of nonfinancial companies listed at NSE is not significant. Findings indicated that the overall model was well specified as the p-value of the chi-square statistic was less than 5%. The beta coefficient of the independent variable, CFV was negative and statistically significant at 95% confidence level. Similarly, the control variables, profitability, growth prospects and tangibility were statically significant at 95% confidence level indicating that they influence firm value. Thus, the null hypothesis was rejected implying that there is a significant relationship between CFV and firm value.

The second objective was to ascertain the influence of leverage deviation on the CFV to firm value relationship. The study conjectured that the mediating effect of leverage deviation on the CFV to firm value relationship among nonfinancial corporations listed at the NSE is not significant. Leverage deviation was obtained as the residual of a target leverage model which constitutes a regression of firm characteristics against market debt ratio. Subsequently, a four-step mediation

analysis was applied to examine the mediation effect. Results indicated that the beta coefficients of the predictor variable, CFV and intervening variable, leverage deviation, became larger in magnitude and more statistically significant when both variables were jointly used as predictors of firm value compared to when each variable was used independently as a predictor of firm value. These findings indicate that leverage deviation does not mediate the CFV to firm value relationship. Thus, the study failed to reject the second null hypothesis.

The third objective was to ascertain the influence of corporate investments on the CFV to firm value relationship. The study conjectured that the mediating effect of corporate investments on the CFV to firm value relationship is not significant. A four-step mediation analysis was conducted to test the mediation effect. Results indicated that the beta coefficients of the predictor variable, CFV and mediating variable, corporate investments, became smaller in magnitude and the statistical significance declined when both variables were jointly used as predictors of firm value compared to when each variable was used independently as a predictor of firm value. These findings indicate that corporate investment mediates the CFV to firm value relationship, thus, the third null hypothesis was rejected.

The fourth objective was to assess the joint effect of cashflow volatility, leverage deviation and corporate investments on firm value. It was conjectured that the joint effect of CFV, leverage deviation and corporate investments on the value of nonfinancial companies listed at the NSE is not significant. A random effects model robust for standard errors was used to analyse the joint effect. Results indicated that overall model and all the predictor variables were statistically significant at 99% confidence level. Thus, the fourth null hypothesis was rejected inferring that cashflow volatility, leverage deviation, corporate investments have a significant joint effect on firm value.

6.3 Conclusions of the Study

The aim of this study was to ascertain the interrelationship among cashflow volatility, leverage deviation, corporate investments and value of nonfinancial companies listed at the NSE. The first objective evaluated the correlation between CFV and firm value. Findings from hypothesis testing provided evidence of a statistically significant and inverse relationship between CFV and firm value. This finding implies that nonfinancial companies listed at the NSE are adversely affected by CFV which connotes operating risk that emanates from the macroeconomic environment or internal business operations. The value of listed firms is driven by supply and demand forces in the market as investors participate in buying and selling the stocks of the firms. Thus, adverse information about a firm such as high CFV, signals weak performance leading to disposal of the stocks and a decline in the share price which is directly associated with firm value. This finding also indicates that investors analyse cashflow information reported by companies to make investment decisions and that they value smooth cashflows.

The second objective analysed the influence of leverage deviation on the CFV to firm value relationship. Leverage deviation was measured as the gap between observed and target leverage and was obtained from the residual of target leverage model, which is a regression of firm characteristics on observed market debt ratio. Results from the four-step mediation analysis provided evidence that leverage deviation does not mediate the CFV to firm value relationship. These finding implies that leverage deviation does not explain the CFV to firm value relationship. Although high CFV increases the deviation of leverage from its target level, increase in leverage deviation is directly related to firm value implying that firms do not need to narrow the leverage gap to maximize firm value. The finding also implies that investors do not examine the leverage deviation of firms when buying their stocks or may be using alternative measures of financial risk.

The third objective examined the influence of corporate investments on the CFV to firm value relationship. Results from the four-step mediation analysis provided evidence that corporate investments mediate the CFV to firm value relationship. This implies that corporate investments including capital expenditure, advertisement, research, and development pays off by increasing firm value. Increase in corporate investments signals to investors the effort by the company to increase its future earning capacity thus increasing the firm value. However, during periods of uncertainty, the results indicate that firms reduce their expenditure on corporate investments which dampens firm value.

The fourth research objective examined the joint effect of CFV, leverage deviation, corporate investments on firm value. Results from hypothesis testing indicated that the overall model and all the predictor variables were statistically significant. This finding therefore provides evidence that CFV, leverage deviation, corporate investments have a joint effect on value of nonfinancial companies listed at the NSE. This finding implies that operating risk measured by CFV adversely affects firm value while a deviation of leverage from the target and corporate investments positively affects firm value. Thus, the results imply that the risk mitigation measures adopted by a firm combined with the financing and investment decisions have a positive effect on the value of the firm. Firms can maximise their value by continuously monitoring and managing their risk exposure, managing the level of leverage, and undertaking positive net present value investments.

6.4 Contributions of the Study

This subsection describes the contribution of the study to the body of knowledge, to policy and managerial practice in the areas of cashflow volatility, leverage deviation, corporate investments, and firm value.

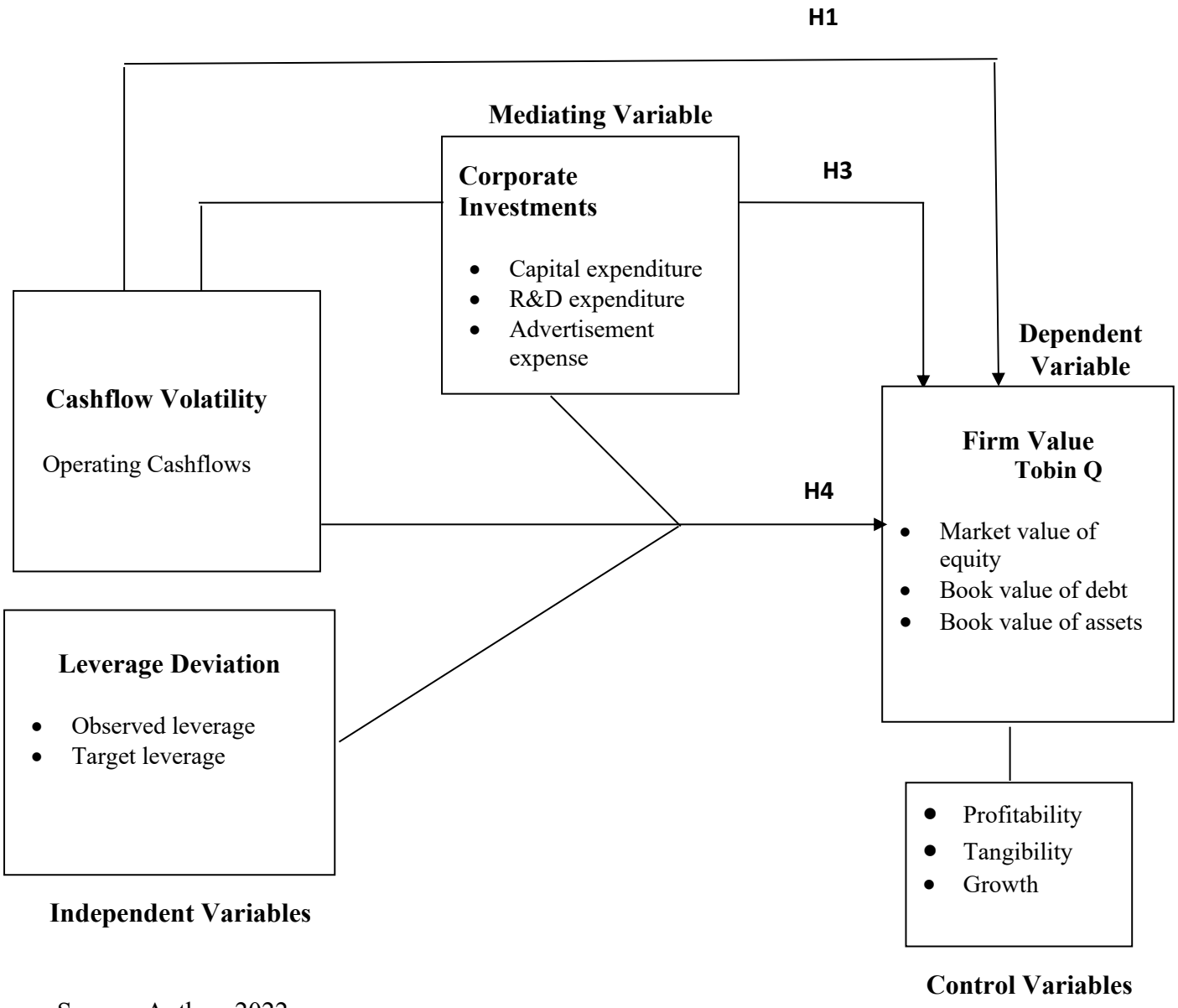
6.4.1 Contribution to Knowledge

The result of this study adds to the pool of knowledge in the areas of CFV, leverage deviation, corporate investments, and firm value. First, the results of this study aids in reducing controversy on the volatility to firm value relationship by providing evidence of an inverse relationship. Traditional asset valuation methods interpreted volatility as risk which decreases firm value (Sharpe, 1964 and Lintner, 1965). Conversely, option pricing theory alludes that volatility enhances the value of equity (Black & Scholes, 1973; Merton, 1974). Moreover, an empirical review of literature indicates conflicting findings on the effects of CFV on firm value. Rountree, Weston and Allayannis (2008), Mäkelä (2012) and Altuntas et al. (2017) observed an inverse association whereas Sawalqa (2021), Gworo (2019) and Shipe (2015) observed a positive association. The findings in this study provide evidence of an inverse association between CFV and firm value. This finding provides evidence to support the proposition of the theory of information asymmetry which contends that information discrepancy causes economic agents to undermine the value of a security. Similarly, volatility of cashflows intensifies information asymmetry which adversely affects firm value. Moreover, the findings indicate that investors in developing economies value low cashflow volatility as much as those in developed economies which are characterized by different culture and economic performance.

Secondly, this study adds to knowledge by introducing an alternative measure of financial risk, leverage deviation. Although prior studies (Zhou et al., 2016 and Ippolito, Steri & Tebaldi, 2012) applied leverage deviation to determine equity risk premium, no study has used leverage deviation to determine its effect on firm value. A review of literature shows that studies commonly use observed leverage which is obtained from book values (Kodongo et al., 2014, Dudely & James, 2015, Keefe & Yaghoubi, 2016). Estimation of firm performance using leverage deviation instead of observed leverage provides more accurate results since deviation captures the effect of heterogeneity inherent in the target leverage. Thus, firms with similar observed debt level but differing target debt levels, are likely to have varied risk profiles.

Thirdly, the findings of this study introduce corporate investments as a mediator variable on the CFV to firm value relationship. This finding implies that investment in capital expenditure, R&D expenditure or advertisement expenditure enhances firm value. However, volatility in cashflows destabilize the investments plans due to cash short falls leading to adverse effects on firm value. Furthermore, the finding provides evidence to support underinvestment theory. When firms reduce corporate investments, firm value is adversely affected. Finally, this study provides evidence against the optimal capital structure theory which opines that firms should maintain an optimal leverage level to maximize firm value (Kraus & Litzenberger, 1973). The finding of a direct relationship between leverage deviation and firm value implies that as leverage deviate from its target level, the value of the firm increases. This finding is contrary to optimal capital structure theory which suggests that firms should narrow the leverage gap. The resultant conceptual model is shown in figure 6.1 below.

Figure 6.1 Final Conceptual Model



Source: Author, 2022

The final conceptual model (Fig 6.1) above indicates that cashflow volatility and leverage deviation are predictors of firm value, corporate investments mediates the relationship between cash flow volatility and firm value and there is a joint effect of cashflow volatility, leverage deviation and corporate investments on firm value.

6.4.2 Contribution to Managerial Policy and Practice

This study provides evidence that cashflow volatility has an adverse impact on leverage, corporate investments, and firm value. This implies that shocks from macroeconomic factors such as inflation rate, exchange rates, tax rates and economic growth or internal business factors such as operational and managerial inefficiency could destabilize a firm's revenue and operating expenses leading to volatile cashflows which affects the capacity to pay debt obligations, undertake investments hence adversely impacting firm value. Therefore, this study provides a tool to sensitize various stakeholders including management, shareholders, regulators, and government on their role in enhancing firm value.

The study is valuable to corporate managers as it points out the effects of managerial, investment and financing policies on cashflows, financial risk, and firm value. Inefficient management and operational decisions may result to a decrease in revenue, high operating costs, and a decline in firm value. In addition, inadequate risk management framework results into fluctuating cashflows which affects the capacity of a firm to undertake new investments, to pay its debt obligations and results to high financial risk. Moreover, this study fails to support the optimal capital structure theory. This implies that managers should not obsess in determining an optimal debt level. Instead, they should focus on managing their cashflows and maintaining sustainable debt to minimize financial risk.

Shareholders will find this study useful as it points to an alternative tool to evaluate firm performance. Shareholders and potential investors tend to concentrate on return on equity or earnings per share trends to judge firm performance. These measures may be biased as earnings can be smoothed through discretionary accruals and are subject to potential manipulation and

measurement errors to influence firm value. The use of cashflow volatility provides a more accurate measure of firm performance as it represents the actual cashflow generated from operating activities which is indicative of a firm's capacity to pay its debt obligations and to undertake capital investments.

This study is beneficial to regulators and government as it sensitises them on the effects of unstable business environment on corporate value. The finding of an inverse cashflow volatility to firm value relationship provides a tool to sensitize regulators and government to draw policies on macroeconomic factors such as taxes, interest rates and exchange rates that impacts corporate cashflows and leverage levels. Furthermore, it is anticipated that the findings will sensitize government on the implications of political uncertainty and act as a point of reference to extract policy briefs and create a favourable working environment for businesses.

6.5 Limitations of the Study

Although various measures were applied to mitigate inherent limitations in the study, there are two factors that need to be considered when applying this study. First, the results may not be generalizable since the study was conducted among 36 nonfinancial firms listed at the NSE. Six firms were excluded due to highly inconsistent data and few years of listing; for inclusion, the study required firms to have a least three years of consistent listing. Data was collected from listed firms due to ease of accessing their financial data. These firms however represent a small fraction of nonfinancial companies in the country. Moreover, listed firms tend to be highly scrutinized and regulated hence their performance may not be representative of unquoted companies. To mitigate the challenge of few companies, the researcher used panel data consisting of 36 firms over 18 years thereby increasing the number of observations.

Secondly, the study was based solely on secondary data due to ease of access and ability to obtain a broad data set with blended characteristics of cross section and time series data which provides more flexibility with data analysis tools. Primary data however provides an opportunity to obtain rich insights on managerial decisions and firm performance as well as to triangulate the results. To cater for these limitations the study used panel data and regression model robust for standard errors.

6.6 Suggestions for Future Research

This research examined the effect of cashflow volatility on firm value and observed an inverse relationship. Cashflow volatility is a significant indicator of business risk, and it can be influenced by external factors from the macroeconomic environment or internal business factors. To provide a holistic evaluation of cashflow uncertainty and its impact on firm value, future studies should examine the antecedents of cashflow volatility. Particularly, researchers should investigate the impact of macroeconomic factors including economic growth, interest rates, exchange rates, inflation rate, and taxes on cashflow volatility. Similarly, researchers should examine the internal business factors that drive cashflow volatility such as operational efficiency, managerial expertise, investment, and financing policies.

Secondly, this study observed that leverage deviation has a positive correlation with firm value implying that firms do not need to operate at an optimal leverage level. Future research should examine if companies have a target leverage and the estimate the speed of adjustment to the target. Furthermore, if target leverage is established, future research should investigate the determinants of leverage deviation. A review of literature indicates that previous studies on capital structure adjustment at NSE are more than ten years old, a long enough period for business operating environment and firm strategies to have changed.

The findings of the current study indicates that cashflow volatility is inversely related to leverage deviation while leverage deviation is directly related to corporate value. This implies that when operating risk increases, financial risk increases and when financial risk increases, corporate value increases. However, findings in this study indicated that leverage deviation does not mediate the cashflow volatility to firm value relationship. Future studies should evaluate the mediating effect of financial risk on the association between cashflow volatility and firm value using alternative measures of financial risk.

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APPENDICES

Appendix A: Nonfinancial Firms Listed at the Nairobi Securities Exchange

AGRICULTURAL	ENERGY AND PETROLEUM
Eaagads Ltd	KenGen Co. Ltd
Kakuzi Ltd	KenolKobil Ltd
Kapchorua Tea Co. Ltd	Kenya Power & Lighting Co Ltd
The Limuru Tea Co. Ltd	Total Kenya Ltd
Sasini Ltd	Umeme Ltd
Williamson Tea Kenya Ltd	
Rea Vipingo Ltd	
AUTOMOBILES AND ACCESSORIES	**MANUFACTURING AND ALLIED**
Car & General (K) Ltd	A.Baumann & Co Ltd
Marshalls (E.A.) Ltd	B.O.C Kenya Ltd
Sameer Africa Ltd	British American Tobacco Kenya Ltd
	Carbacid Investments Ltd
	East African Breweries Ltd
COMMERCIAL AND SERVICES	Eveready East Africa Ltd
Atlas African Industries Ltd	Flame Tree Group Holdings Ltd
Express Kenya Ltd	Kenya Orchards Ltd
Hutchings Biemer Ltd	Mumias Sugar Co. Ltd
Kenya Airways Ltd	Unga Group Ltd
Longhorn Publishers Ltd	
Nairobi Business Ventures Ltd	
Nation Media Group Ltd	**TELECOMMUNICATION AND TECHNOLOGY**
Standard Group Ltd	Safaricom Ltd
TPS Eastern Africa Ltd	
Uchumi Supermarket Ltd	
WPP Scangroup Ltd	
CONSTRUCTION AND ALLIED	
ARM Cement Ltd	
Bamburi Cement Ltd	
Crown Paints Kenya Ltd	
E.A.Cables Ltd	
E.A.Portland Cement Co. Ltd	

Appendix B: Data Collection Sheet

For each nonfinancial firm listed at the Nairobi Securities Exchange

Years	Operating cashflow	Capital expenditure	Advertisement expenditure	R& D expenditure	Depreciation	Amortization	Market value of equity	Book value of debt	Book value of equity	Earnings before interest and tax	Total assets	Fixed assets	Sales revenue
2002													
2003													
2004													
2005													
2006													
2007													
2008													
2009													
2010													
2011													
2012													
2013													
2014													
2015													
2016													
2017													
2018													
2019													

Source: Author, 2022

Appendix C: Relationship between the Study Variables and Required Data

Variable	Measure / Indicator	Required data
Cashflow volatility	Standard deviation of operating cashflows	Operating cashflows
Investment expenditure	Capital expenditure/ total assets	Capital expenditure
	Advertisement expenditure/ total assets	Advertisement expenditure
	Research and development expenditure / total assets	Research and development expenditure
Observed leverage	Market value of debt/equity	Market value of equity
	Book value of debt/equity	Book value of debt
		Book value of equity
Target leverage	Profitability (EBIT/ total assets)	Earnings before interest and tax
	Firm size (natural log of total assets)	Total assets
	Tangibility (fixed assets/ total assets)	Fixed assets
	Growth (market to book value)	Market and book value of assets
	Non- debt tax shield	Amortization and Depreciation
Tobin Q	Total market value of a firm/ total book value of assets	Market value of equity
		Book value of debt
		Book value of equity
Profitability	Profitability (EBIT/ total assets)	Earnings before interest and tax
Growth Opportunity	Market to book value of equity	Market value of equity
		Shareholder's equity
Tangibility		Fixed assets

Source: Author, 2022

Appendix D: Summary Results of Four Step Mediation Analysis of Hypothesis 2 (H_{02})

	Step1	Step2	Step3	Step4
VARIABLES	**LnTobinQ**	**LDev**	**LnTobinQ**	**LnTobinQ**
LnCFV	-0.024**	0.016**		-0.040***
	(0.012)	(0.007)		(0.013)
LDev			0.543***	0.577***
			(0.191)	(0.189)
LnProfit	0.060**		0.071**	0.079**
	(0.026)		(0.034)	(0.033)
LnMBVE	0.647***		0.657***	0.658***
	(0.048)		(0.039)	(0.038)
LnTang	-0.104**		-0.094	-0.100*
	(0.052)		(0.065)	(0.061)
Constant	-0.205**	-0.001	-0.185*	-0.171*
	(0.090)	(0.034)	(0.105)	(0.102)
Overall r-squared	0.855	0.072	0.842	0.858
Chi-square	233.672***	5.254**	534.350***	580.141***
Observations	483	527	449	447
***** p<.01, ** p<.05,* p<.1**				

Source: Author, 2022

Appendix E: Summary Results of Four Step Mediation Analysis of Hypothesis 3 (H_{03})

	Step1	Step2	Step3	Step4
VARIABLES	**LnTobinQ**	**LnINV**	**LnTobinQ**	**LnTobinQ**
LnCFV	-0.024** (0.012)	-0.098*** (0.032)		-0.021* (0.013)
LnINV			0.057*** (0.020)	0.050** (0.020)
LnProfit	0.060** (0.026)		0.055** (0.024)	0.059** (0.023)
LnMBVE	0.647*** (0.048)		0.640*** (0.047)	0.641*** (0.047)
LnTang	-0.104** (0.052)		-0.105** (0.053)	-0.108** (0.050)
Constant	-0.205** (0.090)	-2.696*** (0.119)	-0.062 (0.114)	-0.075 (0.114)
Chi-square	233.672***	9.272***	251.039***	258.127***
Overall r-squared	0.855	0.094	0.846	0.852
Observations	483	575	487	483
***** p<.01, ** p<.05,* p<.1**				

Source: Author, 2022