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Influence of Financial Gearing on Volatility of Stock Returns at the NSE in Kenya

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Abstract:

This study sought to examine the effect of financial gearing on firm-specific volatility of stock returns. Efficient Market Hypothesis, Modern Portfolio Theory and Fama & French three-factor model informed the study. The research employed a quantitative approach with a correlational research design using secondary data. Firms forming the NSE 25 share index formed the target population (N = 25), with annual data for 10 years from 2010 to 2019, yielding 250 data points. Fixed effects dynamic panel data regression model was used to analyse data. The results indicated that Financial Gearing measured by DCR has a positive and significant relationship with idiosyncratic volatility of stock returns (DCR: $\beta = 0.455505$, $p=0.0000$). On the other hand, the result showed a negative and significant relationship between financial gearing, measured as AER, and volatility of stock returns (AER: $\beta = -0.025187$, $P = 0.0037$); the overall model significance r^2 was $r^2 = 63.3907\%$. The study concludes that financial gearing (DCR) is a significant positive predictor of stock return volatility at the NSE, while AER is a significant negative predictor of stock return volatility. It is recommended that NSE-listed firms should decrease their capital expenditure, use more internal sources of finance and focus more on wealth maximization objectives to reduce the volatility of stock returns.

Keywords: Financial gearing, idiosyncratic volatility of stock returns

1. Introduction

Idiosyncratic risks are inherent to a firm due to various firm characteristics such as financial gearing, capital expenditure, profitability and earnings quality. Firm-specific risks can lead to firm-specific volatility of stock returns in the stock market. The strong form version of the efficient market hypothesis (EMH) holds that all information, both public and private, is completely accounted for in current stock prices, and there is no type of information that can give an investor an advantage over other investors in the market (Fama, 1970; Ayaibei, 2018). It is not yet clear whether firm-specific risks posed by financial gearing significantly affect stock returns volatility at the Nairobi Securities Exchange (NSE), warranting their incorporation in the pricing of stocks. According to Fama and French three Factor (FF3F) theory, the portfolio's sensitivity to the market (beta), the size of stocks in the portfolio (size), and the average weighted book-to-market (value) can explain 95% of the portfolio's expected returns. The researcher hypothesized that the remaining 5% could be explained by the sensitivity of individual stocks in the portfolio to firm-specific risks represented by risks associated factors such as financial gearing. Information relating to firm-specific risks is contained in the residuals of the FF3F model.

Pandey (2010) defines financial gearing as the use of debt in financing part of the activities of the firm. The significance of financial gearing decisions can be linked to their close association with other corporate finance decisions, which can have an impact on the firm's overall returns, competitiveness, as well as solvency level (Javeed et al., 2014; Ramli & Nartea, 2016; Kenyanya & Ombok, 2018). Empirical studies reviewed do not lead to consistent results with regard to the influence of financial gearing on stock return volatility. Some studies have shown weak relationships between financial gearing and the volatility of stock returns. Most of the empirical studies reviewed have focused more on financial gearing in relation to stock returns and stock price variance and not stock return variance. Zhang et al. (2020) found a negative financial gearing-stock price synchronicity relationship. The studies of Byung et al. (2019), Wasafi et al. (2016) and Mohammad et al. (2015) all found a negative relationship between financial gearing and stock returns. Studies by Yossi et al. (2019) and Zeeshan et al. (2018) used financial gearing as a dependent variable, with the volatility of stock returns as an independent variable, giving a positive relationship. Kinoti, Muturi and Oluoch (2019) assessed the effect of firm characteristics on stock returns of non-financial listed companies in Kenya. The study showed that both cash flow and gearing have significant effects on the stock returns of non-financial listed companies in Kenya. Past studies have found a relationship between financial gearing and stock returns. However, previous studies have fallen short of directly linking financial gearing and the volatility of stock returns. Also, the models adopted in past studies to measure volatility have failed to capture asymmetric patterns of volatility and change of magnitude over time exhibited by idiosyncratic volatility of stock returns.

2. Literature Review

David and Yossi (2019) investigated the direct theoretical relationship between the variance of stock returns and financial gearing considering both corporate and personal taxes. Using sample data from the U.S. industrial firms, they modeled the volatility of stock returns as a function of the firm's financial gearing. Their results showed that the volatility of stock returns was positively related to financial gearing in all sample years tested. This positive relationship remained significant regardless of whether financial gearing was measured in book or market terms and whether the tax estimates were relatively or absolutely measured. The result also showed that the relationship between stock return volatility and gearing was positive in all of the three theoretical models tested: the perfect capital market, the corporate tax model, and both the corporate and personal tax model. Finally, the study indicated that when market measures are used, better results in terms of R squared are produced and the difference between the theoretical and actual parameters is reduced. This study modeled stock returns as a function of leverage, as given in Modigliani and Millar (1958, 1963), considering both personal and corporate taxes. This model did not capture the asymmetric volatility response to information and time-varying properties of idiosyncratic volatility of stock returns. This model also did not capture the sensitivity of the stock to portfolio size and portfolio value.

Zhang and Zhou (2020), with a sample of the Chinese stock market for the period from 2007 to 2016, employed a quantile regression model to investigate the impact of gearing structure on different levels of stock price synchronicity. The result of the study indicated that financial gearing is significantly and negatively related to stock price synchronicity. The study majored in stock price synchronicity and did not do model volatility in a manner to capture asymmetric volatility response to information and time-varying properties of idiosyncratic volatility of stock returns.

Byung and Chong (2019) did a study on Capital structure volatility, financial vulnerability, and stock returns using Evidence from Korean firms. Using a sample of listed firms in Korea, they tested whether capital structure volatility affects stock returns in a systematic way. The results of the study indicated that the stock returns of firms with high capital-structure-volatility, belonging to different size groups, move together over time, an indication of the existence of a capital-structure-volatility factor. This factor earns a significant, negative risk-premium of -1.08% on a monthly basis over the sample period spanning 13 years, and the factor return is adversely affected by deteriorating financial market conditions. Moreover, the cross-sectional relation between capital structure volatility and stock returns is also negative, presenting another pricing puzzle in the stock markets. This study did not solve this puzzle since it did not relate capital structure to the volatility of stock returns. This study also did not consider stock returns' sensitivity to portfolio size and portfolio value.

Wasafi And Haneen (2016) examined the relationship between capital structure and stock returns for all industrial firms listed in the Amman Stock Exchange from 2007–2014. The control variables in the study included: growth opportunities, firm size, liquidity and profitability. They used an unbalanced panel data statistical approach for analysis. The empirical results suggested that there is a statistically significant negative effect of capital structure on stock return. The study did not capture stock returns' sensitivity to the market, portfolio size and portfolio value. The study did not capture the variance of stock returns and volatility clustering associated with stock return volatility.

Zeeshan and Daw (2018) investigated the impact of stock return volatility on different capital structure measures of non-financial firms using data from Pakistan Stock Exchange from 2001-2014. They employed a dynamic panel model and the results indicated that stock return volatility has a significant negative relationship with book gearing and long-term market gearing ratios. They concluded that firms significantly reduce their debt financing to minimize the volatility of stock returns to avoid possible consequences of default. In this study, financial gearing was the dependent variable, while the stock return volatility was the independent variable. Stock return volatility was estimated using residuals of CAPM, the single factor model, which did not capture stock returns' sensitivity to portfolio size and portfolio value. The sample data only contained non-financial firms, which easily face liquidity challenges and a higher risk of default.

Shalaby (2020) conducted a study on the relationship between financial gearing and equity returns in Arab stock markets. The study used the Capital Asset Pricing Model (CAPM), the Fama-French 3-factor (FF3F) model and the Fama-French 5-factor (FF5F) model to test the relationship between financial gearing and equity returns. The results showed that gearing change and gearing level has no significant relations with stock returns for all countries included in this study. The findings of this study contradict those obtained by other scholars such as (David & Yossi, 2019 and Wasafi & Haneen 2016). Further study is required to ascertain the source of the contradiction. The study did not consider the volatility of stock returns and hence, did not ascertain the extent to which financial gearing can influence the volatility of stock returns. This study also could not capture the element of volatility clustering.

Rizal, Amrie, Dani and Ahmad (2022) examined the association between financial gearing and idiosyncratic risk in Indonesia. This study also included integrated reporting elements as moderating variables. This study employed a quantitative approach with secondary data obtained from: www.idx.co.id, www.finance.yahoo.com and related company websites. The study population included firms engaged in the manufacturing sector, listed on the IDX in 2016–2020, with a sample of 450 companies based on purposive sampling. This study found that financial gearing positively affects idiosyncratic risk ($\beta = 0.06$; $p = 0.0022$; $R^2 = 0.0283$). Also, this study suggests that integrated reporting positively moderates the effect of financial gearing on idiosyncratic risk ($\beta = 0.8811$; $p = 0.0032$; $R^2 = 0.4189$). This study only used DER to measure financial gearing. The study identifies financial gearing as an element of idiosyncratic risk but did not go further to determine the relationship between this risk and the volatility of stock returns. The study findings could be biased since only firms in the manufacturing sector were considered, with the exclusion of all firms in other sectors of the economy.

Richard, Ivan and Ralf (2015) assessed the role financial gearing plays in the relationship between stock returns and idiosyncratic risk for Real Estate Investment Trusts (REITs) where debt levels are characteristically high. The results

from regression showed idiosyncratic risk is negatively associated with stock returns ($\beta = -0.2395$ and $p = 0.0000$) and this is further re-affirmed when both systematic and idiosyncratic risk are included as explanatory variables along with the gearing measure (DER). The financial gearing variable is significant at the 95% level of confidence and does not weaken the relationship idiosyncratic risk has with stock returns. This study only used financial gearing as a control variable. This study could not, therefore, establish the relationship between financial gearing and volatility of stock returns.

Mohammad, Kamruddin, Tarana and Rahat (2015) assessed the impact of financial gearing and market size of selected stocks on stock returns. The gearing of the selected firms was estimated from the annual financial reports covering a period of five years from 2008 to 2012 of five corporations operating in the manufacturing sector. Furthermore, the average monthly stock prices of the selected stocks between 2008-2012 for the five firms were established. The study findings showed a significantly negative relationship between gearing and stock return when the overall industrial data is used. However, at the individual firm level, the relationship was not stable. Four out of the five firms selected had a negative relationship between gearing and stock returns. One firm had a positive relationship between gearing and stock returns. The paper also found the relationship between size and stock returns to be significantly positive. R^2 value obtained for the study ($r = 0.756$, $p = 0.0000$) indicates that the independent variables, gearing and size explained 75.6% of the total variations in stock returns. The remaining 24.4% of the variation is explained by other factors which were not included in the model. The study sample only consisted of firms from the manufacturing sector and its findings could be biased. This study did not relate financial gearing to the volatility of stock returns. The study also did not explain the source of the contradiction in its results, where some firms post negative results while others posit positive results in the same sector.

Kinoti, Muturi and Oluoch (2019) assessed the effect of firm characteristics on stock returns of non-financial listed companies in Kenya. The study considered the effect of Cash flows, Gearing and Firm size on stock return for non-financial listed companies in Kenya. The study was a census and it covered all the 44 non-financial listed companies at the NSE between the years 2008 to 2016. The study used a Panel regression model to test the significance of the independent variables on the dependent variable. The study showed that both cash flow and gearing have significant effects on the stock returns of non-financial listed companies in Kenya. The results further indicated that firm size significantly and positively moderates the relationship between gearing and cash flow on stock returns. The study did not link financial gearing to stock return volatility.

Most of the above empirical studies have focused on financial gearing in relation to stock returns and stock price volatility. While David and Yossi (2019) found a positive relationship between financial gearing and stock return volatility, Zhang et al. (2020) found a negative relationship between financial gearing and stock price synchronicity; Byung et al. (2019), Wasafi et al. (2016) and Mohammad et al. (2015) all found a negative relationship between financial gearing and stock returns. Zeeshan et al. (2018) used financial gearing as a dependent variable with the volatility of stock returns as an independent variable and found a negative relationship. The Studies have not directly analysed the effect of financial gearing on the volatility of stock returns. The current study sought to establish the source of the contradiction and contribute to the existing literature using data from the Kenyan capital market-NSE. The current study sought to establish the relationship between financial gearing (measured as DCR and AER) and volatility of stock returns at the NSE.

3. Methodology

3.1. Research Design

This study embraced a quantitative research design. More specifically, the study used a Correlational research design using secondary data sourced from financial statements of companies listed on the NSE and other relevant market data.

3.2. Target Population

The target population for this study comprised firms forming the NSE 25 share index, which were continuously listed during the period 1st January 2010 to 31st December 2019. NSE is the only stock market in Kenya where the listing of companies is done. Firms listed at NSE were considered since they are required by law to publish their annual audited financial reports making the relevant data to be collected authentic and readily available. This study was designed to cover a period of 10 years, from 1st January 2010 to 31st December 2019.

3.3. Data Reliability

Reliability refers to the internal consistency of the collected data, allowing the data to maintain some form of internal consistent pattern (Creswell & Plano, 2007). Ascertaining reliability is important as this guarantees consistency or stability of the data even when the test is repeated. Preliminary reliability assurance emanated from the fact that this study used secondary data from audited financial statements prepared in line with Generally Accepted Accounting Principles (GAAPs) (Mule & Mukras, 2015; Kenyanya & Ombok, 2018). According to Field (2000), secondary panel data is considered reliable if it is stationary. Unit root test was conducted using the Levin Lin and Chun (LLC) test to determine whether the variables series were stationary or non-stationary. The LLC test results presented in table 1 below indicate that all variables series are stationary at first difference (absence of unit roots) both at 1% and at 5% level of significance.

Cross-Sections Included: 3		
Method	Statistic	Prob.**
Levin, Lin & Chu t*	-14.1883	0.0000
** Probabilities are computed assuming asymptotic normality		

Table 1: Panel Unit Root Test Results for the Study Variables

Source: Research Data, 2023

3.4. Model Specification

3.4.1. The Fama and French Three-Factor Model

$$R_{i,t} = \alpha_{i,t} + \beta_{i,t}(R_{m,t} - R_{f,t}) + s_{i,t}SMB_t + h_{i,t}HML_t + \varepsilon_{i,t}, \quad \varepsilon \sim N(0, \sigma_{i,t}^2) \dots \dots \dots (3.1)$$

Where:

 $R_{f,t}$ is the risk-free rate, $R_{m,t}$ is the market return for period t , $\alpha_{i,t}$ is the stock's alpha, or abnormal return at a time t , $\beta_{i,t}$ is the stocks' sensitivity to the market return at a time t , SMB_t and HML_t represent the portfolios' sensitivity to size and value, respectively and $s_{i,t}$ and $h_{i,t}$ are the coefficients related to each factor. $R_{i,t} - R_{m,t}$ is the excess return on the stock i at time t , $R_{m,t} - R_{f,t}$ is the excess returns on the market and $\varepsilon_{i,t}$ are the residual terms relating to security i at a time t .

3.4.2. The Generalized Autoregressive Conditional Heteroskedasticity (GARCH) Model

$$\sigma_{i,t}^2 = \omega + \alpha \varepsilon_{i,t}^2 + \beta \sigma_{i,t-1}^2 \dots \dots \dots (3.2)$$

Where:

 ω is the intercept, α is the coefficient for the variance of the residual and β is the loading on the conditional variance estimate at time $t - 1$.

In the next sub-section, the study details the test framework where firm-specific dispersion is specified as $\varepsilon_{i,t}$ and describes the computation of firm-specific volatility based on $\sigma_{i,t}^2$. The parameters of the GARCH (1,1) process must be non-negative ($\omega \geq 0, \alpha \geq 0, \beta \geq 0$) to ensure that $\sigma_{i,t}^2$ is positive for all values of the white noise process $\varepsilon_{i,t}$. The new information at time t is embodied in the ARCH term, the squared residual, $\varepsilon_{i,t}^2$. The carrier of the old information at time $t-1$ is the GARCH term, $\sigma_{i,t-1}^2$ (Rachev et al., 2008). The persistence of shocks to volatility becomes greater as the sum ($\alpha + \beta$) approaches unity.

3.4.3. Empirical Model

A dynamic panel data regression model was employed in this study to assess the effect of capital expenditure, financial gearing, profitability and earnings quality on idiosyncratic volatility of stock returns of NSE-listed firms' securities. Dynamic panel data is autoregressive, which contains one or more lagged effects of the dependent variable on itself. In line with the study of Hsiao (2003), the Panel data contained observations for DCR and AER was obtained over a ten-year period for each of the 24 firms.

$$Y_{i,t} = \beta_{20} + \beta_{21} X_{2i,t} + \beta_{22} Y_{i,t-1} + \varepsilon_{i,t} \dots \dots \dots (3.3)$$

Where:

 $Y_{i,t}$ represents the dependent variable which denotes idiosyncratic volatility of stock returns of firm i at time t , i denotes individual firm, $i = 1, \dots, 24$ while t is the period in years, $t = 2010-2019$, $X_{2i,t}$ denotes a vector of independent variables, $Y_{i,t-1}$ denotes one period lag for idiosyncratic volatility for firm i , β_{21} and β_{22} are specific effects to be estimated, β_0 is a constant term, and $\varepsilon_{i,t}$ is a residual term.

The following specific models are derived from the general model:

$$Y_{i,t} = \beta_{20} + \beta_{21} DCR_{i,t} + \beta_{22} Y_{i,t-1} + \varepsilon_{i,t} \dots \dots \dots (3.4)$$

$$Y_{i,t} = \beta_{20} + \beta_{21} AER_{i,t} + \beta_{22} Y_{i,t-1} + \varepsilon_{i,t} \dots \dots \dots (3.5)$$

Where;

DCR

Debt Capital Ratio

AER

Asset Equity Ratio

4. Results

4.1. Correlation Analysis between Financial Gearing and Volatility of Stock Returns

Pearson's correlation analysis was performed to measure the strength of the association between dependent and independent variables.

The results in table 2 below show a moderate positive and significant correlation between Capital Expenditure (CAPIT) and firm-specific volatility of stock returns (SRV). The results in table 2 below show that financial gearing, when measured as DCR, is strongly positively and significantly correlated with Idiosyncratic volatility of stock returns at NSE ($r = 0.679134$; $p = 0.0000$). This is in tandem with the results obtained in past studies such as Alnasubul, 2019; Zang and

Zhou, 2020. This implies that a highly geared firm is prone to increased stock return volatility. Thus, firms listed at NSE can increase stability in stockholders' returns by employing optimum debt in their capital structure. On the other hand, the Asset Equity Ratio (AER) was moderately, negatively and significantly correlated with idiosyncratic volatility of stock returns at NSE ($r = -0.180872$; $p = 0.0000$). This implies that an 18.0872% increase in assets in relation to equity causes a decline in idiosyncratic volatility by 18.0872%.

Included Observations: 240 Correlation			
Probability	SRV	DCR	AER
SRV	1.000000		

DCR	0.679134	1.000000	
	0.0000	-----	
AER	-0.180872	0.530139	1.000000
	0.0049	0.0000	-----

Table 2: Correlation Analysis of Capital Expenditure and Volatility of Stock Returns

Source: Research Data, 2023

4.2. Effect of Financial Gearing on Volatility of Stock Returns amongst Firms Listed at NSE

To actualize the second objective, a null hypothesis, H_{02} , assuming that Financial Gearing has no significant effect on the volatility of stock returns among listed firms in Kenya, was formulated. Fixed effects regression analysis was conducted and table 2 above presents the regression results. The results of the regression analysis in table 2 show that financial gearing, measured by DCR, is a significant strong positive predictor of stock return volatility at the NSE ($\beta = 0.740345$, $p = 0.0000$). This implies that a unit increase in debt in relation to a firm's Capital causes an increase in stock return volatility by 74.0345%. This confirms the assertion in the study of Pandey (2010), which posits that increased use of financial gearing for low-growth firms increases the firms' default risk, which scares away potential investors while spooking existing investors causing demand for the firms' stock to decrease causing increased volatility in stock return. The result of the current study is in line with the study of David and Yossi (2019), who found a positive relationship between financial gearing and stock return volatility. Nevertheless, the study of David and Yosin (2019) modeled the variance of stock returns as a function of financial gearing as given in Modigliani and Millar (1958) and this could not capture the asymmetric volatility response to information and time-varying properties of idiosyncratic volatility. The study also posited a low goodness of fit ($R^2 = 11.1\%$), implying that the model was a significant but not good predictor of the volatility of stock returns using leverage as the independent variable. On the other hand, the regression result in table 2 shows that Asset Equity Ratio (AER) is a significant negative predictor of stock return volatility at the NSE ($\beta = -0.028459$, $p = 0.0006$). This result is in line with the studies of Zhang et al. (2020) who found a negative relationship between financial gearing and stock price synchronicity with a goodness of fit of $R^2 = 47.7\%$, Byung et al. (2019), Wasafi et al. (2016), Mohammad et al. (2015) and Zeeshan et al. (2018) all who found a negative relationship between financial gearing and stock returns. However, all these studies linked financial gearing, measured as Total liabilities to Total assets, to either stock price asynchronicity or stock returns but not stock returns volatility. To cure the shortcomings of the past studies, the current study analysed the effect of financial gearing, measured as DCR & AER, on the volatility of stock returns, which were modeled as the standard deviation of residuals of FF3F model (taking care of all market, size and value factors) with the aid of the GARCH model which captured the asymmetric volatility response to information and time-varying properties of idiosyncratic volatility. This resulted in a higher goodness of fit ($R^2 = 63.3907\%$), indicating that the model is a better predictor of stock return volatility with financial gearing as the predictor variable, as compared to models in earlier studies.

The resulting models are as follows:

Models 4.11 & 4.12 show the Effect of Financial Gearing on Volatility of Stock Returns amongst Firms Listed at NSE.

$$SRV = 0.0288083 + 0.740345DCR + 0.087184SRV_{t-1} + \varepsilon_{i,t} \dots \dots \dots (4.11)$$

$$SRV = 0.0288083 - 0.028459 AER + 0.087184SRV_{t-1} + \varepsilon_{i,t} \dots \dots \dots (4.12)$$

The reported coefficient of determination (Adjusted R^2) of 0.633907 shows that Financial Gearing, measured as Debt Capital Ratio (DCR) and Asset Equity Ratio (AER), together with the one-period lag volatility, will predict 63.3907% of idiosyncratic volatility of stock returns with other variables not included in the model predicting the remaining 36.6093%. Hypothesis testing was done using the simple linear regression represented in table 2 (above) and determined using its p-value. The acceptance/rejection was that if the p-value is less than 0.05, H_{02} is rejected; otherwise, H_{02} is not rejected. The results in table 2 above indicate that there was a positive and significant relationship between financial Gearing, measured by DCR and Idiosyncratic Volatility of stock returns among listed firms in Kenya ($\beta = 0.740345$, $p = 0.0000$), supported by a calculated t-statistic of 8.588384 that is greater than the critical t-statistic of 1.96. The study also indicates that there was a negative and significant relationship between financial Gearing, measured by AER and Idiosyncratic Volatility of Stock Returns among listed firms in Kenya ($\beta = -0.028459$, $p = 0.0006$), supported by a calculated t-statistic of 3.496090 that is greater than the critical t-statistic of 1.96. Thus, the null hypothesis, H_{02} , that Financial Gearing has no significant effect on the volatility of stock returns among listed firms in Kenya is rejected based on the findings. It is, therefore, concluded that Financial Gearing, measured by DCR and AER, has a significant effect on the volatility of stock returns among listed firms in Kenya.

Dependent Variable: SRV				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.288083	0.023616	12.19862	0.0000
DCR	0.740345	0.086203	8.588384	0.0000
AER	-0.028459	0.008140	-3.496090	0.0006
SRV (-1)	0.087184	0.009353	9.321750	0.0000
R-squared	0.638521	Mean dependent var		0.221339
Adjusted R-squared	0.633907	S.D. dependent var		0.120656
S.E. of regression	0.073004	Akaike info criterion		-2.380019
Sum squared resid	1.252442	Schwarz criterion		-2.321835
Log-likelihood	288.4122	Hannan-Quinn criter.		-2.356572
F-statistic	138.3691	Durbin-Watson stat		1.742577
Prob(F-statistic)	0.000000			

Table 3: Effect of Financial Gearing on Volatility of Stock Return amongst Firms Listed at the NSE

Source: Research Data, 2023

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