MACROECONOMIC AND FIRM-SPECIFIC DETERMINANTS OF CAPITAL STRUCTURE OF LISTED FIRMS IN EMERGING MARKETS

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Abstract

Capital structure has attracted much attention in accounting research (Rajan & Zingales, 1995). However, factors driving capital structure keep changing (Öztekin & Flannery, 2012). Hence, this study focuses on macroeconomic and firm-specific factors that influence enterprises' capital structure decisions in emerging markets. We conduct longitudinal research, analysing data from seven emerging market companies from 2010 to 2018. The study used either a fixed effect or random effect model for estimation, depending on the outcomes of the Hausman specification test. Firm-specific factors such as growth prospects, debt capital cost, and firm size have a substantial impact on capital structure. Macroeconomic factors such as foreign direct investment, inflation rate, and gross domestic product (GDP) growth significantly impact enterprises' leverage. However, the impact of these characteristics varies across countries, exhibiting distinct patterns in the countries under study. Though, firm-specific and macroeconomic variables explain the capital structure, not all firm-specific and macroeconomic variables are relevant in all African countries. Understanding the elements that influence capital structure decisions can help firms optimise their financing decisions, while regulators can create effective financial regulations.

Keywords: Capital Structure, Firm-Specific Variables, Macroeconomic Variables, Mining and Manufacturing Firms

Authors' individual contribution: Conceptualization — M.Y. and B.Y.; Methodology — S.O.O.A. and E.A.D.; Validation — M.Y.; Formal Analysis — S.O.O.A.; Investigation — E.A.D.; Resources — S.O.O.A. and E.A.D.; Data Curation — M.Y. and S.O.O.A.; Writing — Original Draft — S.O.O.A.; Writing — Review & Editing — M.Y. and B.Y.; Supervision — M.Y. and B.Y.; Project Administration — M.Y.

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1. INTRODUCTION

Capital structure is peculiar to manufacturing and mining firms, especially in developing countries (Rajan & Zingales, 1995). Existing studies such as Yeboah and James Nyarkoh (2022), Mwangi (n.d.), and Ogundipe (2022) have shown that without the needed capital, the manufacturing and mining sectors, which are capital-intensive, cannot continue to play their enviable roles in the socio-economic development of the nations. This draws attention to these companies' capital structures. Predominantly, the most common method of raising capital is through debt or equity, which is dominant in the case of capital structure (Ogundipe, 2022; Al-Najjar & Hussainey, 2011; Azubuike et al., 2023). Hence, finance researchers and professionals have come to accept capital structure decisions as significant managerial decisions in manufacturing and mining companies (Perera, 2018).

The study of capital structure mainly attempts to explain the mix of securities and financing sources used by corporations to finance real investments (Myers, 1997). Similarly, (Orlova et al., 2020; Hovakimian et al., 2002) identified capital structure as permanent financing consisting of long-term debt, preferred stock, and shareholder equity. In simple terms, a firm has a choice among many alternative capital structures to have a varied mix of debt and equity. However, it is up to the manufacturing and mining firms, for example, to make prudent choices in selecting the appropriate mix that maximises their overall value (Hasan et al., 2014; Elliott & Shen, 2015). The choice of optimal capital structure is dependent on capital structure policies, with emphasis on firm-specific and macroeconomic conditions. For example, the use of debt capital provides tax shields on interest payments since interest is a tax-deductible expense, making tax a crucial factor that determines the optimal capital structure (Modigliani & Miller, 1963). The tax benefits theories, such as Modigliani and Miller's (1963) and Miller's (1977), hold varying perspectives on the optimal capital structure. For example, Modigliani and Miller (1963) suggested the irrelevance of capital structure and linked it to market imperfections. Modigliani and Miller (1963) saw firms' value as a function of leverage and tax costs, and as such, managers should adopt a form of capital structure that is realistic for the company. Merton Miller's theory asserts that altering the financial structure would not alter the net valuation of the corporation. However, the trade-off theory suggests that balancing the costs of debt and equity results in an optimal capital structure. Thus, based on the trade-off theory, the cost of debt and equity are critical to the capital structure decisions of manufacturing and mining firms (Hasan et al., 2014; Miller, 1977).

Capital structure decisions go beyond firm-specific considerations to also consider the macroeconomic conditions as suggested by economic intuitions (Korajczyk & Levy, 2003; Kang & Pflueger, 2015). However, studies on capital structure, for example, Orlova et al. (2020), M'ng et al. (2017), Mohammed (2014), and Arestis and Caner (2010) focused on firm-specific factors or macroeconomic factors separately, not both. A combination of firm-specific and macroeconomic factors in a single model is ideal for determining a country's capital structure factors, according to Korajczyk and Levy (2003). It is worth noting that the analysis of factors determining capital structure is highly susceptible to the choice of leverage definition (Rajan & Zingales, 1995). The definition of leverage used in most previous studies is the ratio of total liabilities to total assets (Rajan & Zingales, 1995). Leverage as a ratio of total liabilities to total assets may not be a reliable enough indicator of whether the firm faces the risk of default and also includes items such as accounts payable; it could well overstate the amount of leverage (Harris & Raviv, 1991). In emerging markets, many manufacturing and mining firms face the risk of default, and the debt component is very substantial in the capital structure mix. Thus, the usual definition of leverage as a total liability to total assets that previous studies used does not best describe the situation of manufacturing and mining firms in these countries, making the previous study less reliable. Therefore, the current study adopts a narrower and better definition of leverage for manufacturing and mining firms in Africa, shifting from the traditional definition of leverage as a total liability to total assets to a definition of leverage as total debt to total assets (Harris & Raviv, 1991). Thus, using total debt to total assets as capital structure, this study compared determinants of capital structure in emerging markets with emphasis on both firm-specific and macroeconomic factors.

The structure of this paper is as follows. Section 2 reviews the relevant literature. Section 3 analyses the research methodology. Section 4 presents the study results. Section 5 covers the discussion and Section 6 provides the conclusion.

2. LITERATURE REVIEW

2.1. Theoretical review

The capital structure is the combination of debt and equity that attains the stated managerial goals or maximises market value. Bartoloni (2013) defined capital structure as the optimal combination of debt and equity that minimises a firm's overall capital cost. The capital structure can also be defined as the mix of debt and equity securities used to finance real investments. The capital structure reflects the firm's financing strategy, including its overall target debt-equity ratio, and its financing tactics, including the design and timing of a specific debt issue (Cook & Tang, 2010; Strebulaev, 2007). Studies of capital structure typically assume that the firm has access to financing, taking the amount of financing as given. Despite the variety of methods for measuring capital structure, we commonly use leverage. Existing studies, for example, Khan (2004), Ramjee and Gwatidzo (2012), and Öztekin and Flannery (2012) have measured leverage as a total liability to total assets, total debt to total assets, equity ratio, debt to equity ratio, equity to debt ratio, and interest coverage. The choice of leverage indicators, however, depends on the characteristics of the companies being considered. When debt is a major issue for firms, such as manufacturing and mining companies in some developing countries, total debt to assets becomes a justifiable indicator of capital structure. This study used the ratio of total debt to total assets as a capital structure indicator. What determines optimal capital structure

has been a subject of debate in the theoretical literature. Consider both the pecking order theory and the trade-off theory.

2.2. Empirical review

This section of the chapter focuses on scholarly articles related to the determinants of capital structure. Important market factors such as size, competitiveness, prosperity, asset tangibility (collateral), the debt tax shield, the non-debt tax shield, risk, dividend policy, and age consistently determine how firms set up their capital structure, according to Sibindi's (2016) study. On the other hand, Öztekin and Flannery's (2012) study showed that differences in global adaptation in businesses reflect the costs and advantages of operating in indigenous markets. The study further demonstrates that cross-country pace shifts continuously influence the performance of a country's legal, financial, and political structures. The study indicates a strong correlation between measured transaction costs and institutional functionality (Öztekin & Flannery, 2012). In addition, Amidu's (2007) study revealed that long-term debt structure is closely and objectively connected to operating assets. His study also indicates that the main elements influencing the bank's capital structure are competitiveness, corporate tax, growth, asset management, and bank size.

Moreover, Lemma and Negash (2014) argue that, in developing economies, not only does the business capital structure reach the target, but it also experiences and/or benefits from differing degrees of cost adjustment. Furthermore, Ramjee and Gwatidzo's (2012) study indicates that the debt-to-equity ratio of South African companies is the target. They also noticed that these companies face higher transaction costs when transitioning to the target leverage level than the target long-term debt ratio. According to Ihsan et al.'s (2020) study, the non-debt tax shield has an essential interaction and a beneficial association with the established leverage of the company's trade-off principle. The company's size has a negative correlation with leverage and an insignificant statistical relationship. In conclusion, Chipeta et al. (2012) look into how firm leverage changes during a transitional economy in South Africa. Before liberalisation, they found that there was a negative relationship between firm leverage, profitability, and scale variables. On the other hand, the researchers consider a beneficial relationship between the company's leverage and the tax portion. During the post-liberalisation phase, they discovered a positive correlation between firm leverage, duration, growth, and dividend distribution variables. Firm leverage has once again had a detrimental impact on asset efficiency, tax, and tangibility parameters.

Moreover, the primary goal of many businesses or firms today is to grow in size. This perception, which prioritises having plenty of free cash flows, assumes that firms can deliver more financial gains as they expand, leading them to use internal funds instead of debt (Enos et al., 2020). Lemma and Negash's (2014) study posited that large firms are typically more likely to have access to bond markets and are therefore able to borrow at a lower rate than smaller firms. On the other hand, companies acquire real assets steadily as they expand. Rajan and Zingales (1995) argue that a greater share of the company's assets can serve as collateral, reducing the risk that the issuer will struggle due to agency debt costs (such as risk shifts). Therefore, we expect a positive tangible-leveraging relationship due to lower predicted distress costs and fewer debt-related difficulties with the creditors (Rajan & Zingale, 1995).

Frank and Goyal (2009) suggest that growth increases financial pressure, eliminates cash flow problems, and exacerbates debt-related issues. Growing businesses rely more on customer investments. Therefore, the principle of trade-offs assumes that growth will reduce leverage. Antoniou et al. (2008) anticipate a negative correlation between investment opportunities and leverage for two primary reasons. First, according to the theory of trade-offs, the cost of financial distress increases, with inflation likely to drive managers to minimise leverage in the financial system. Secondly, businesses issue equity instead of leverage in the face of knowledge asymmetries, as over-evaluations contribute to higher predicted growth. When businesses require extra funding, they release debt before equity, adhering to the pecking order theory, which enhances growth and productivity opportunities (Bartoloni, 2013; Statista Search Department, 2023).

On the other hand, inflation is one of the major factors that determines capital structure. Inflation means a large and irreversible rise in the average price level (Ogundipe, 2022). Hence Enos et al. (2020) study revealed that inflation did not significantly influence the financing choices of sample firms during the global financial crisis period. Conversely, Baoko et al.'s (2017) study revealed that inflation exerts a significant positive impact only in the short run by impeding capital structure. Interest rates, on the other hand, are another determinant of capital structure. The interest rate represents the cost of a short- or long-term debt purchase. Cook and Tang (2010) assert that firms typically take on more debt from the bank and bond sectors to finance their investments, particularly when costs are minimal. In most developed economies, the interest rate is very tiny (mostly a single digit), particularly in developing country-based banks. According to Sinha and Ghosh (2010), advanced countries expect a positive relationship between the interest rate and leverage because of the low interest rate that makes debt finance lucrative, as well as the high standards of institutions and legislation that secure borrowers' rights and guarantee contract compliance.

According to Sasu (2024), foreign direct investment (FDI) is an investment earning interest in firms outside the domestic jurisdiction of the holder. According to Ahmed Sheikh and Wang's (2011) study, major corporations forming branches outside their home countries do not keep a minimum of 10% of the ordinary shares to fund FDI but will have to assist some of the ordinary shares. In the global industry, FDI is playing an immense and rising role (Ogundipe, 2022). The exchange rate, on the other hand, is another factor that determines capital structure. According to Khan (2004), exchange rates serve as a strategic policy tool that guides the flow of financial capital into global trade domains, including skilled labour, assets, management know-how, and foreign exchange. According to

Schaling (2008), however, the stabilization of the exchange rate structure is dependent on economic activity and development stability.

3. METHODS

3.1. Research strategy and design

This study used a quantitative research strategy for two primary purposes. It helps test hypotheses, a scientific study characteristic. The quantitative research approach uses analytical evidence to test assumptions or ideas. In this analysis, we proposed and evaluated hypotheses using a quantitative research method. Also, it aims to generalise the research findings to the whole population. Agyedu et al. (2010) suggest that, despite using sample data instead of the entire population due to time constraints and insufficient financial capital, their findings are applicable to the entire population. We must use a quantitative research approach to achieve this goal. Therefore, using a quantitative research approach, this study would generalise capital structure determinants based on sample data to listed firms in Ghana, Kenya, Nigeria, and South Africa.

In consonance with the quantitative strategy, the study used an explanatory or correlational design. According to Rich et al. (2018), explanatory research design focuses on the cause and/or effect of a phenomenon. This study concentrated on the factors that influence capital structure, indicating that an explanatory research design was the most suitable approach. This study, with an explanatory research design was able to determine the firm-specific and macroeconomic factors that influence the capital structure of mining manufacturing firms in Ghana, Kenya, South Africa, and Nigeria. Furthermore, this study employed a longitudinal approach. This is due to the observation of the phenomenon under consideration, namely capital structure, over an extended period in numerous countries. His study used a longitudinal design because it can exclude time-invariant, unobserved individual differences, unlike a cross-sectional study.

3.2. Data

This study collected data from mining and manufacturing firms in Ghana, Nigeria, Kenya, and South Africa (see Table 1). Despite the abundance of mining and manufacturing firms in these countries, their websites do not publish all audited financial statements, leaving most of them with insufficient data. Accordingly, this analysis focused on mining and manufacturing companies in these countries that regularly issued audited financial statements.

Table 1. Companies selected from each country

Ghana	*Nigeria*	*Kenya*	*South Africa*
Greatwall Plastic Company Limited	Western Goldfields Group Limited	Coninx Industries Limited	South African Coal Mining Holding Limited
Latex Foam Rubber Products Limited	Agropet Nigeria Limited	Doshi Group of Companies	Consulmet South Africa
Tinatett Herbal Manufacturing and Marketing Company Limited	Comvicong Nigeria Company	Mayfox Mining Company Limited	Steeledale Manufacturing Company Limited
Permafix Industries (GHANA) Limited	Engee Pet Manufacturing Company	Karebe Gold Mining Limited	Mitek Industries South Africa
Ghana Gold Field Limited Obuasi.	SEVICO Manufacturing Company	Kenya Association of Manufacturers	Kellogg Company South Africa Limited.
GoldLine Mining Ghana Limited			
BL Mining and Marketing Company Ghana			

Note: The data from the firms were collected throughout 2010–2018.

The study obtained all firm-specific data from the audited financial statements of the companies over the period 2010–2018. In particular, this study computed several firm-specific variables, such as *leverage*, *cost of capital*, *firm size*, *interest cover*, *growth opportunity*, *tangibility*, and *market capitalisation*, from the audited financial statements of the companies. This study collected macroeconomic variables from the World Development Indicators, WDI (World Bank, n.d.) or the Central Bank websites of the countries, in addition to the firm-specific factors. We obtained the macroeconomic variables such as *inflation rate*, *real gross domestic product growth*, *exchange rate*, and *foreign direct investment* from the WDI (World Bank, n.d.). However, as macroeconomic variables, we sourced the *prime rate* and *exchange rate* from the respective countries' Central Bank websites.

The data were screened to detect and correct any irregularities, such as missing data and outliers. To detect any missing data and outliers, this study performed summary statistics on all the study variables, both firm-specific and macroeconomic variables. The summary statistics included mean observations, minimum and maximum observations, skewness, and kurtosis. We detected all outliers by comparing the minimum, maximum, and mean observations. We suspected outliers when the minimum, maximum, and mean observations showed significant differences. The study compared the data entered into Excel to the original data in the database of WDI (World Bank, n.d.), the financial statements of the firms, or the Central Bank websites of the countries. Through this, all outliers were corrected. On the other hand, we identified missing data through manual inspection of the database. The study used the mean observation of the neighbourhood figure to represent the missing observations. Specifically, we used the mean observation from two years before and after the year that reported the missing data to represent the missing observations.

3.3. Model specification

This study estimated the determinants of leverage using Köksal and Orman's (2015) model specification. Köksal and Orman (2015) specify the determinants of leverage as shown in Eq (1).

$$CS_{i,t} = \beta_0 + \sum_k \beta_k F_{k,i,t} + \cup_i + t_i + \varepsilon_{i,t} \quad (1)$$

where, $CS_{i,t}$ is the capital structure (total leverage) of the firm i in year t; F is the vector of the leverage determinants (firm-specific and macroeconomic determinants); $\cup_i$ is the time-invariant unobservable firm-specific effects; i,t is the time-fixed effect; and we used strong standard errors to figure out Eq. (1) and made sure it was correct for heteroskedasticity in both the fixed effect model and the random effect model. For the random effect model, we used the Hausman specification test and the Breusch and Pagan Lagrangian multiplier test. Table 2 describes the firm-specific and macroeconomic variables used in this study.

Table 3 shows the expected signals of the study variables with leverage based on the trade-off and pecking order theories.

Table 2. Descriptions of variables used in the study

Variables		Abbreviations	Formula/description	Source
Dependent variables	*Capital structure*	*CS*	$Leverage = Total\ debt/total\ asset$	Baker and Martin (2011).
Independent variables	***Firm-level factors***			
	Cost of debt capital	*CODC*	$CODC = [\frac{Finance\ cost}{Total\ debt}] * [1 - tax\ rate]$	Obaidullah (2015).
	Cost of equity capital	*COEC*	$COEC = \frac{Market\ price\ per\ share\ (MPPS)}{Equity\ per\ share\ (EPS)}$ where, $MPPS = \frac{share\ price\ (MPS)}{total\ share\ outstanding\ (T.SHS)}$ $EPS = \frac{turnover\ (TUROV)}{total\ share\ outstanding\ (T.SHS)}$	Kumar (2015).
	Firm size	*FIRMZ*	$Firm\ size = Ln\ (total\ asset)$	Rajan et al. (1999)
	Interest cover	*INTCOV*	$INTCOV = \frac{Earnings\ before\ interest\ and\ tax}{finance\ cost}$	Badertscher et al. (2014).
	Growth opportunity	*GROP*	Market-to-book value ratio.	Badertscher et al. (2014).
	Asset tangibility	*TANG*	Fixed asset share in total asset.	Baker and Martin (2011).
	Profitability	*ROA*	Earnings before interest and tax to total asset.	Stickney (1996).
		ROE	Earnings before interest and tax to total outstanding shares.	Elliott (2005).
		NPM	Summation of gross profit and indirect incomes less indirect expenses.	Stickney (1996).
	Liquidity	*LIQUID*	Ratio of current asset to current liability.	Elliot (2005).
	Macro-economic factors			
	Inflation rate	*INFL*	As reported.	WDI
	Government net debt	*GOVTND*	As reported.	Central Bank of the country
	Real gross domestic product growth	*GDPG*	Annual growth in real in gross domestic product (GDP).	WDI
	Foreign direct investment inflow	*FDI*	Annual growth in foreign direct investment.	WDI
	Exchange rate	*EXCR*	Rate of local currency to US dollar.	Central Bank of the Country.
	Monetary policy rate	*MPR*	The prime rate of the country.	Central Banks of the country.

Source: Authors' elaboration, 2020.

Table 3. Descriptions of variables used in the study

Variables	Abbreviations	Pecking order theory	Trade-off theory
Firm size	*FIRMZ*	- (negative)	+ (positive)
Interest cover	*INTCOV*	- (negative)	+ (positive)
Growth opportunity	*GROP*	+ (positive)	- (negative)
Profitability	*PROF*	+ (positive)	- (negative)
Asset tangibility	*TANG*	- (negative)	+ (positive)
Liquidity	*LIQUID*	+ (positive)	- (negative)
Inflation rate	*INFL*	Unknown	- (negative)
Real gross domestic product growth	*GDPG*	+ (positive)	- (negative)
Foreign direct investment inflow	*FDI*	+ (positive)	+ (positive)
Government net debt	*GOVTND*	Unknown	Unknown
Exchange rate	*EXCR*	Unknown	Unknown
Prime rate	*MPR*	- (negative)	+ (positive)

This study used STATA 13.0 to estimate all the models. This study utilised STATA because it facilitates the writing of codes and the use of Manus for analysis. STATA has aided Manus by providing an opportunity for users to learn how to perform specific analyses. Based on these advantages and others, STATA has assisted Manus in estimating the models mentioned above.

4. RESULTS

4.1. Summary statistics of study variables

The summary statistics of the study variables are presented in Table 4.

Table 4. Summary statistics of macroeconomic, firm-specific, and capital structure variables

Main variables	*Variables*	*Mean*	*Std. dev*	*Min*	*Max*
Macroeconomic	*INFL*	10.76469	10.50388	-4.320573	103.8228
	EXCR	16.6904	30.79585	-0.79	103.41
	MPR	14.01692	5.713059	5	26
	GOVTND	48.09455	20.40742	-5.62	83.24
	GDPG	6.106542	3.497279	-2.137057	14.046
	FDI	18.89957	7.636495	5.99313	22.90268
Firm-specific	*NPM*	1.615459	4.650987	-0.0127476	17.24908
	FIRMZ	14.98544	4.23885	1.241428	17.45628
	LIQUID	4.400984	13.74663	0.8508854	120.8488
	INTCOV	14.52856	21.74663	-5.1412	120.8488
	COEC	0.0074993	0.0246543	6.07e-07	0.1110396
	CODC	0.0946517	0.1616092	-0.02298	1.792308
	ROE	0.1441273	0.1449979	-0.1886299	0.9316479
	ROA	0.0926385	0.1015659	-0.0985659	0.5099814
	TANG	0.2643745	0.1735522	0.0000167	0.622482
	GROP	0.0002403	0.0002926	0.0000167	0.0013235
	CS	0.1186028	0.1048168	0.00011	0.40964

The results in Table 4 show that *INFL* averaged 10.76469 throughout 2010–2018 in Ghana, Kenya, Nigeria, and South Africa. The *EXCR* (that is, the local currency to the US dollar rate) had a mean score of 16.6904, and the exchange rate varied more between the firms than within a firm. Table 4 also revealed that the policy rate, or *MPR*, which is the rate at which central banks lend to commercial banks in the countries, had a mean value of 14.01692 and varied more between the firms than within the firms. To move further, Table 4 posits that *GDPG* averaged 6.106542 throughout 2010–2018 for Ghana, Kenya, Nigeria, and South Africa.

The results in Table 4 show that *ROA* had a mean value of 0.0926385 over the period 2010–2018. The return on assets varied less between the firms than within them. The mean *ROE* for the listed firms was 0.1441273 from 2010–2018. The return on equity varied more within the same firm than across the listed firms. Hence, considering the *NPM* the mean value over the period was 1.615459, and it varied more across the firms than within a firm. Table 4 also revealed that, among the *LIQUID*, this study relied on the current ratio, and this indicator had a mean value of 4.400984 from 2010–2018.

Furthermore, as shown in Table 4, *FIRMSZ*, *INTCOV*, *COEC*, *CODC*, *TANG*, and *GROP* had mean values of 14.98544, 14.52856, 0.0074993, 0.0946517, 0.2643745, and 0.0002403, respectively. Again, according to Table 4, *CS* had a mean value of 0.1186028, a standard deviation of 0.1048168, and minimum and maximum values of 0.00011 and 0.40964, respectively.

The study variables underwent a serial collinearity check.

Table 5 displays the results of the study, which used tolerance level (TL) and variance inflation factor (VIF) to determine whether or not the data set suffered from serial collinearity.

Table 5. Variance inflation factor and tolerance level

Main variables	*Variables*	*VIF*	*TL*
Macroeconomic	*INFL*	1.168	0.856
	GDPG	1.832	0.546
	EXCR	1.481	0.675
	MPR	1.490	0.671
	GOVTND	1.302	0.768
	FDI	1.171	0.854
Firm-specific	*NPM*	1.290	0.775
	FIRMSZ	1.272	0.786
	LIQUID	1.272	0.786
	INTCOV	1.131	0.884
	COEC	1.069	0.935
	CODC	1.272	0.786
	ROE	1.144	0.874
	ROA	1.297	0.771
	TANG	1.410	0.709
	GROP	1.117	0.895

According to Table 5, the VIF values for each variable are less than 5, and the TL is greater than 0.2, indicating that serial collinearity or multicollinearity is not a problem in the data set used in this study.

4.2. Determinants of capital structure

The first estimation used a total sample comprising all mining and manufacturing firms in all four countries. The study used a random effect model, as suggested by the Hausman specification test for the estimation. Table 6 presents the summarised results.

Table 6. Macroeconomic and firm-specific determinants of capital structure

Main variables		*Variables*	*Coeff.*	*Robust Std. Error*	*Z*	*p>|z|*	*{95% confidence interval}*	
Macroeconomic		*INFL*	-0.0009673	0.0003265	-2.96	0.003**	-0.0016072	-0.0003274
		GDPG	-0.0026759	0.0021335	-1.25	0.210	-0.0068575	0.0015056
		EXCR	-0.0004974	0.0004419	-1.13	0.260	-0.0013636	0.0003687
		MPR	-0.0002115	0.001916	-0.11	0.912	-0.0039667	0.0035438
		GOVTND	-0.0000897	0.0005666	-0.16	0.874	-0.0012002	0.0010209
		FDI	-0.0034246	0.0011949	-2.87	0.004**	-0.0057665	-0.0010827
Firm-specific		*NPM*	-0.0751466	0.0994251	-0.76	0.458	-0.2819124	0.1316192
		FIRMSZ	0.0417445	0.0186355	2.24	0.036**	0.0029898	0.0804992
		LIQUID	-0.002698	0.0001684	-1.60	0.124	-0.00062	0.0000805
		INTCOV	-0.0004437	0.0004439	-1.00	0.329	-0.0013668	0.0004794
		COEC	-0.2623744	0.5355163	-0.49	0.629	-1.376041	0.8512927
		CODC	-0.1002928	0.0094059	-10.66	0.000***	-0.1198534	-0.0807322
		ROE	-0.0184822	0.0400638	-0.46	0.649	-0.1017995	0.0648351
		ROA	0.0691663	0.0987367	0.72	0.478	-0.1299292	0.2682617
		TANG	0.0982336	0.0987368	0.99	0.331	-0.1071008	0.3035681
		GROP	-61.97215	29.48727	-2.10	0.048**	-123.2943	-6500223
Wald chi2(6)			92.23					
Prob > chi2			0.000					
R^2	within		0.0447					
	between		0.3623					
	overall		0.1633					

*Note: ***, **, * indicate 1%, 5%, and 10% significant level, respectively.*

4.2.1. General macroeconomic determinants of leverage

INFL (coeff =-0.0009673; p = 0.003) has a significant negative impact on the leverage of firms (both mining and manufacturing firms) in Ghana, Kenya, Nigeria, and South Africa. As a result, a unit increase in *INFL* significantly leads to a 0.0009673 unit decrease in leverage. On the other hand, a unit decrease in *INFL* significantly leads to a 0.0009673 unit increase in leverage. Table 6 also revealed that *FDI* (coeff. = -0.0034246; p = 0.004) has a significant negative impact on leverage. This means that a unit increase in *FDI* significantly decreases leverage by 0.0034246 units, and a unit decrease in *FDI* significantly increases leverage by 0.0034246 units. The study, however, revealed that *GDPG*, *EXCR*, *MPR* and *GOVTND* do not significantly impact the leverage of firms in the countries.

4.2.2. General firm-specific determinants of leverage

Table 6 shows that *FIRMSZ* (coeff. = 0.0417445; p = 0.036) has a significant positive impact on leverage. A unit increase in *FIRMSZ* significantly increases leverage by 0.0417445, and a unit decrease in *FIRMSZ* significantly decreases leverage by 0.0417445. However, the *CODC* (coeff. = -0.1002928; p = 0.000) and *GROP* (coeff. = -61.97215; p = 0.048) have a significant negative impact on leverage. Therefore, an increase in the *CODC* and *GROP* by a unit each significantly reduces leverage by 0.1002928 and 61.97215, respectively. According to Table 6, none of the three profitability indicators (*ROA*, *ROE*, and *NPM*) has a significant effect on the leverage of firms quoted on stock exchanges in Ghana, Kenya, Nigeria, and South Africa. Also, the results in Table 6 show that the current ratio does not have a significant impact on leverage. Furthermore, as shown in Table 6, *INTCOV*, *TANG*, and *COEC* did not have a significant effect on the leverage of the selected firms in Ghana, Kenya, Nigeria, and South Africa. The findings are summarised in Table 7.

Table 7. Summary of firm-specific and macroeconomic determinants of leverage

Main variables	*Variables*	*Actual sign*	*Significance level*	*Ranking of significant factors*
Firm-specific	*Net profit margin*	-(Negative)	Not significant	Not applicable
	Firm size	+(Positive)	5%	3rd important determinants
	Liquidity	-(Negative)	Not significant	Not applicable
	Interest cover	-(Negative)	Not significant	Not applicable
	Cost of debt capital	-(Negative)	1%	2nd important determinant
	Cost of equity capital	-(Negative)	Not significant	Not applicable
	Return on asset	+(Positive)	Not significant	Not applicable
	Return on equity	-(Negative)	Not significant	Not applicable
	Tangibility	+ (Positive)	Not significant	Not applicable
	Growth opportunity	-(Negative)	5%	1st important determinants
Macroeconomics	*Inflation*	-(Negative)	5%	2nd important determinant
	Gross domestic product growth	- (Negative)	Not significant	Not applicable
	Exchange rate	-(Negative)	Not significant	Not applicable
	Government net debt	-(Negative)	Not significant	Not applicable
	Foreign direct investment inflow	-(Negative)	5%	1st important determinant
	Monetary policy rate	-(Negative)	Not significant	Not applicable

According to Table 7, the major firm-specific factors that influence the leverage of firms listed on stock exchanges in Ghana, Kenya, Nigeria, and South Africa are *GROP*, *CODC*, and *FIRMSZ*. According to Table 6, the major macroeconomic factors that influence the leverage of firms quoted on stock exchanges in Ghana, Kenya, Nigeria, and South Africa are *FDI* and the *INFL*.

4.3. Firm-specific and macroeconomic determinants in each country

The study estimated the firm-specific and macroeconomic factors of capital structure for each country. Hausman specification tests informed the choice of estimation model for each country's capital structure determinant. Table 8 displays the summarised estimated results.

Table 8. Firm-specific and macroeconomic determinants of capital structure in various countries

Main variables	*Variables*	*Ghana (random effect)*	*Kenya (random effect)*	*Nigeria (random effect)*	*South Africa (fixed effect)*
Firm-specific	*NPM*	-0.4761226 (0.3548366)	0.3386284 (0.2971669)	-0.2397277 (0.1541391)	-0.0046952 (0.2288544)
	FIRMSZ	0.0260675 (0.0198504)	0.0495803 (0.049362)	0.0769366*** (0.0058378)	0.087289** (0.0306421)
	LIQUID	-0.0258983 (0.0261809)	-0.1266894 (0.0792671)	-0.0382033** (0.020221)	-0.0002385 (0.0001411)
	INTCOV	0.0000282 (0.0005011)	-0.0021441** (0.0007969)	-0.0016015** (0.0006095)	0.0003192 (0.0010789)
	CODC	0.2596553 (0.3606743)	-0.2700854 (0.4697352)	0.4141267** (0.2385558)	-0.1121066*** (0.0088123)
	ROE	-0.60782678** (0.2113084)	-0.0507052 (0.0481979)	0.0343842 (0.0580054)	0.0172958 (0.3128488)
	ROA	1.636104** (0.5340963)	0.2244509 (0.2774803)	-0.0441321 (0.0739369)	-0.2617129 (0.626006)
	TANG	0.3634169*** (0.0811181)	-0.026343 (0.1523277)	0.2498255*** (0.0547212)	-0.5382419 (0.2914407)
	GROP	-116.981556** (0.65977)	-0.4041577 (0.7739)	-32.7784224 (0.71658)	44.2035723 (0.40453)
	COEC	-0.0356906*** (0.0084541)	-0.0239808** (0.0083863)	0.0151559 (0.0154863)	-0.9156173 (0.4315946)
	Constant	-0.7590547** (0.344564)	-0.7292072 (0.7518984)	-0.08228159*** (0.01901017)	-1.123845 (0.5262485)
Macroeconomics	*INFL*	-0.0005503 (0.0098096)	0.0007136 (0.0064143)	-0.0087992** (0.0052422)	-0.0012685 (0.0008199)
	EXCR	0.0133926 (0.0848447)	-0.0018262 (0.002599)	-0.0030547** (0.0017876)	-0.0007478 (0.0009563)
	MPR	0.0011915 (0.0130707)	0.0009767 (0.0072738)	-0.0002362 (0.0037441)	-0.0034107 (0.0037499)
	GOVTND	-0.001377 (0.0026157)	0.0001774 (0.0006817)	0.0001421 (0.0007999)	-0.0029548 (0.0021914)
	GDPG	-0.0050122** (0.0027037)	0.0023997 (0.0043485)	0.0015766 (0.0024821)	-0.0073061*** (0.0018137)
	FDI	-0.0309964 (0.0297722)	0.0186473 (0.0451244)	-0.005048** (0.0015979)	0.0086633 (0.0062293)
Wald chi2(6)		98.345	89.581	99.459	85.728
Prob. > chi2		0.000	0.000	0.000	0.000
R^2	within	0.024	0.075	0.084	0.057
	between	0.356	0.431	0.411	0.362
	overall	0.136	0.214	0.156	0.174

*Note: ***, **, * indicate 1%, 5%, and 10% significant level, respectively.*

As shown in Table 8, *FIRMSZ* does not have a significant impact on the leverage of mining and manufacturing firms in Ghana and Kenya. However, Table 8 shows that *FIRMSZ* has a significant positive impact on the leverage of mining and manufacturing firms in Nigeria and South Africa. That is a unit increase in *FIRMSZ*, significantly increasing the leverage of mining and manufacturing firms by 0.0769366 and 0.087289 in Nigeria and South Africa, respectively. On the other hand, a unit reduction in firm size significantly reduces leverage by 0.0769366 and 0.087289 in Nigeria and South Africa, respectively. Again, the result in Table 8 shows that the *CODC* does not have a significant impact on the leverage of firms quoted on the stock exchanges of Ghana and Kenya. Table 8 further shows that the *CODC* has a significant positive impact on the leverage of firms quoted on stock exchanges in Nigeria. From the results, a unit increase in the *CODC* significantly increases leverage by 0.4141267, and a unit decrease in the cost of debt significantly decreases leverage by 0.4141267 in Nigeria. Also, Table 8 reveals that the *CODC* has a significant negative impact on the leverage of firms quoted on stock exchanges in South Africa. The result shows that a unit increase in the *CODC* significantly reduces leverage by 0.1121066, and a unit decrease in the *CODC* significantly increases leverage by 0.1121066 in South Africa.

The analysis in Table 8 also shows that *GROP* has a significant negative impact on the leverage of firms quoted on the stock exchange in Ghana. Thus, *GROP* reduces the leverage of firms quoted on the stock exchange by 116.981556 in Ghana. Table 8 further reveals that *GROP* does not have a significant impact on the leverage of firms quoted on the stock exchange in Kenya, Nigeria, and South Africa. Moreover, the results in Table 8 show that two of the profitability indicators (*ROE* and *ROA*) have a significant impact on the leverage of firms quoted on the stock exchange in Ghana. Again, the results in Table 8 show that none of the three

indicators of profitability (*ROA*, *ROE*, and *NPM*) has a significant effect on the leverage of firms quoted on stock exchanges in Kenya, Nigeria, and South Africa. On the other hand, the analysis in Table 8 shows that the *LIQUID* has a significant negative impact on leverage in Nigeria but is not significant in Ghana, Kenya, or South Africa. Thus, a unit increase in the *LIQUID* significantly reduces leverage by 0.0382033 in Nigeria. Furthermore, as shown in Table 8, *INTCOV* has a significant negative impact on the leverage of firms listed in Kenya and Nigeria. However, *INTCOV* does not have a significant impact on the leverage of firms quoted in Ghana and South Africa. Moreover, the results in Table 8 found that *TANG* has a significant positive impact on the leverage of the selected quoted firms on the stock exchange in Ghana and Nigeria. Thus, a unit increase in *TANG* significantly increases the leverages of selected quoted firms in Ghana and Nigeria by 0.3634169 and 0.2498255, respectively. Also, *TANG* has no significant impact on the leverage of the selected quoted firms on the stock exchange in Kenya and South Africa, according to Table 8. Table 8 further reveals that the *COEC* has a significant negative effect on the leverage of the selected quoted firms on stock exchanges in Ghana and Kenya. This means that the *COEC* significantly reduces the leverage of the selected quoted firms on stock exchanges in Ghana and Kenya by 0.0356906 and 0.0239808, respectively.

According to Table 8, among the macroeconomic variables, only *GDPG* has a significant influence on the leverage of selected quoted firms in Ghana and South Africa. Thus, *GDPG* has a significant negative influence on the leverage of selected quoted firms in Ghana and South Africa. This means that a unit increase in *GDPG* significantly reduces the leverages of the quoted firms by 0.0050122 and 0.0073061 in Ghana and South Africa, respectively. The results in Table 8 also reveal that none of the macroeconomic variables has a significant influence on the leverage of selected quoted firms in Kenya. Moreover, the analysis in Table 8 shows that *INFL*, *EXCR*, and *FDI* have a significant negative impact on the leverage of quoted firms in Nigeria. This shows that unit increases in *INFL*, *EXCR*, and *FDI* significantly reduce the leverages of selected quoted firms in Nigeria by 0.0087992, 0.0030547, and 0.005048, respectively. Table 9 summarises the results presented in Table 8.

Table 9. Comparison of firm-specific and macroeconomic determinants of leverage quoted firms in selected countries

Main variables	*Variables*	*Ghana*	*Kenya*	*Nigeria*	*South Africa*
Firm-specific factors	*Net profit margin*	Not a significant factor	Not a significant factor	Not a significant factor	Not a significant factor
	Firm size	Not a significant factor	Not a significant factor	Significant factor	Significant factor
	Liquidity	Not a significant factor	Not a significant factor	Significant factor	Not a significant factor
	Interest cover	Not a significant factor	Significant factor	Significant factor	Not a significant factor
	Cost of equity capital	Significant factor	Significant factor	Not a significant factor	Not a significant factor
	Cost of debt capital	Not a significant factor	Not a significant factor	Significant factor	Significant factor
	Return on equity	Significant factor	Not a significant factor	Not a significant factor	Not a significant factor
	Return on asset	Significant factor	Not a significant factor	Not a significant factor	Not a significant factor
	Tangibility	Significant factor	Not a significant factor	Significant factor	Not a significant factor
	Growth opportunity	Significant factor	Not a significant factor	Not a significant factor	Not a significant factor
Macroeconomic factors	*Inflation*	Not a significant factor	Not a significant factor	Significant factor	Not a significant factor
	Exchange rate	Not a significant factor	Not a significant factor	Significant factor	Not a significant factor
	Monetary policy rate	Not a significant factor	Not a significant factor	Not a significant factor	Not a significant factor
	Government net debt	Not a significant factor	Not a significant factor	Not a significant factor	Not a significant factor
	Gross domestic product growth	Significant factor	Not a significant factor	Not a significant factor	Significant factor
	Foreign direct investment inflow	Not a significant factor	Not a significant factor	Significant factor	Not a significant factor

According to Table 9, the *COEC*, *ROE*, *ROA*, *TANG*, and *GROP* all have a significant influence on the leverage of selected quoted firms in Ghana. Table 9 further reveals that *INTCOV* and the *COEC* have a significant influence on the leverage of selected quoted firms in Kenya. Also, *FIRMSZ*, *LIQUID*, *INTCOV*, *CODC*, and *TANG* have a significant influence on the leverage of selected quoted firms in Nigeria. Table 9 shows that *FIRMSZ* and the *CODC* have a significant influence on the leverage of selected quoted firms in South Africa. On the other hand, as shown in Table 9, *GDPG* has a significant influence on the leverage of selected quoted firms in Ghana. Table 9 also revealed that *INFL*, *EXCR*, and *FDI* have a significant influence on the leverage of selected quoted firms in Nigeria. Table 9 further reveals that *GDPG* has a significant influence on the leverage of selected quoted firms in South Africa.

5. DISCUSSION

As quoted firms grow in size, we expect them to accumulate more assets, which will allow them to access cheaper debt, thereby increasing their leverage. The trade-off theory expects firm size to have a significant positive effect on leverage. As a result, the findings on the effect of firm size on leverage are consistent with the trade-off theory but not the pecking order theory. Also, the findings are consistent with some empirical studies, such as Köksal and Orman (2015) and Amidu (2007). In some major developing countries, Köksal and Orman (2015) found that firm size has a significant positive effect on leverage. However, the study's findings on firm size are not consistent with those of Ihsan et al. (2020). They investigated the determinants of the capital structure of financial firms in Pakistan using data from 27 banks from 2005–2015 and found that firm size hurts the leverage of the sampled banks.

According to the findings, the cost of debt capital has a significant effect on the leverage of mining and manufacturing firms in Nigeria and South Africa, but not in Ghana and Kenya. According to trade-off theory, quoted firms chose internal financing and debt based on the cost and benefit of debt. According to the trade-off theory, when the cost of debt is high, firms will use more internal financing and less debt, which is consistent with the study's findings. This is an indication that firms in South Africa use more internal financing in operation, which reduces their debt, while Nigeria uses less internal financing, which increases their debt. Conversely, the analysis indicates that firms with higher growth opportunities in Ghana have lower debt than firms with lower growth opportunities in Ghana. The findings are consistent with the trade-off theory. Firms choose the balance between equity, or internal financing, and debt based on their opportunity for growth. According to Frank and Goyal (2009), growing banks, for example, rely more on customers' investments, thereby reducing their external financing or debt. Antoniou et al. (2008) explained that growing firms issue more equity instead of leverage, thereby reducing their debt components. Moreover, the results show that profitability has a significant impact on the leverage of firms in Ghana, indicating that firms in Ghana have enough funds and tend to rely more on internal financing, thereby reducing their debt. However, the findings indicate that the profitability indicators do not significantly influence the leverage of firms listed on stock exchanges in Kenya, Nigeria, and South Africa. Hence, the result on profitability in Kenya, Nigeria, and South Africa is not consistent with the pecking order theory. According to the pecking order theory, profitable firms have enough internal funds and tend to rely more on internal financing, thereby reducing their debt. Empirically, Köksal and Orman (2015) found that profitability has a significant negative relationship with leverage (short-term, long-term, and total leverage).

Again, the finding that the current ratio has a significant impact on leverage in Nigeria is consistent with the pecking order theory. Thus, according to the pecking order theory, liquid firms rely less on debt because they have more internal funds to undertake most of their investment activities. Conversely, interest cover has a significant negative influence on the leverage of firms in Kenya and Nigeria. This is also consistent with the pecking order theory's principles regarding the expected negative impact. As previously established, interest cover does not significantly affect the leverage of firms in Ghana and South Africa, thereby confirming the preposition of the pecking order theory regarding the impact of interest cover on leverage in these regions.

We realised that tangibility significantly positively impacts the leverage of the selected firms in Ghana and Nigeria. Hence, the findings are consistent with the trade-off theory and not the pecking order theory. For instance, the pecking order theory predicts a negative relationship between tangibility and leverage. The trade-off theory predicted that tangibility would positively influence leverage. Only gross domestic product growth significantly influences the leverage of selected firms in Ghana and South Africa, as established. The study is not consistent with Herwadkar's (2017) idea that during a high GDP growth phase, stock prices generally move up, expected bankruptcy costs decline, and taxable income increases. Cash held by corporations also increases. Firms are likely to raise more resources during this phase to finance their expansion plans. The value of corporate collateral follows a pro-cyclical trend and is higher during this phase. If firms borrow against collateral to raise resources, the leverage may be pro-cyclical. On the other hand, the results emphasize that none of the macroeconomic variables have a significant influence on the leverage of selected firms in Kenya. In this case, the finding is inconsistent with Köksal and Orman (2015), where there should be at least one macroeconomic factor that impacts leverage. His study revealed that macroeconomic variables like inflation significantly positively influence leverage in some major developing economies (Köksal & Orman, 2015).

As it revealed, inflation has a significant negative impact on the leverage of mining and manufacturing firms in Nigeria. The findings suggest that high inflation in Nigeria leads to quoted firms typically having lower levels of debt in their capital structure. This finding is consistent with the pecking/order theory but inconsistent with the trade-off theory. Therefore, firms' indebtedness decreases with inflation. An inflationary increase in nominal interest rates raises the cost of debt. The higher the cost of debt, the lower the debt amount, all other things being equal. This finding is not consistent with some findings from previous studies. For example, Köksal and Orman (2015) found a significant positive impact of inflation on leverage in some major developing economies. Furthermore, the full sample data revealed a positive influence of foreign investment on leverage. Foreign direct investment provides a corporation with innovative marketing and marketing opportunities, inexpensive production facilities, and access to new technologies, products, skills, and financing (Sasu, 2024). The host country or international investment firm also has access to new technologies, infrastructure, systems, products, organisation, and management skills. These advantages, when combined, increase production at a lower cost, thereby increasing internal funds, which, all other things being equal, would reduce the firm's reliance on debt.

6. CONCLUSION

The study concludes that opportunity for growth, cost of debt capital, and firm size are the major firm-specific factors that influence capital structure measured as leverage for mining and manufacturing firms quoted on stock exchanges in Ghana, Kenya, Nigeria, and South Africa. The study also revealed that foreign direct investment and the inflation rate are the major macroeconomic factors that influence capital structure, as measured by the leverage of mining and manufacturing in Ghana, Kenya, Nigeria, and South Africa. However, the firm-specific factors and macroeconomic factors that influence the leverage of mining and manufacturing firms vary by country, indicating the need for a country-specific consideration when making decisions about leverage or cost of capital.

The study has some constraints, notably its dependence on secondary data from publicly traded companies in emerging nations, which may be inadequate, inconsistent, or influenced by varying accounting standards. It exclusively examines publicly traded companies, omitting small and medium-sized enterprises (SMEs) and non-listed entities that may exhibit distinct capital structure dynamics, thereby constraining the generalizability of the results. The study focuses on a limited set of macroeconomic variables within a specific timeframe, which results in the neglect of long-term trends and the impact of rare macroeconomic events. Endogeneity and inadequate attention to sector-specific factors further limit the analysis's scope and robustness. A subsequent study should address these limitations by including SMEs and unlisted enterprises, thereby broadening the scope and achieving a more comprehensive understanding of the factors influencing capital structure. It should also examine country-specific and sector-specific analyses, integrate other macroeconomic variables, such as exchange rate volatility and financial market growth, and assess the influence of ESG aspects. Utilising dynamic modelling to analyse the impacts of significant economic disruptions may yield profound insights into how firms adjust their capital structures in response to changing difficulties in emerging countries.

The study therefore recommends that mining and manufacturing firms carefully consider their size, cost of debt, and opportunity for growth in their capital structure decisions. The study also recommends that listed firms in Ghana, Kenya, Nigeria, and South Africa consider the rate of gross domestic growth and inflation in their respective countries of operation when making capital structure decisions or choosing between equity and debt. Financially, this study further recommends that mining and manufacturing companies in Ghana, Kenya, Nigeria, and South Africa should not blindly follow or imitate each other in their capital structure decisions since their leverage determinants differ.

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