

## IMPACT OF CAPITAL STRUCTURE OF A FIRM ON ITS MARKET TO BOOK VALUE: EMPIRICAL EVIDENCE FROM NIGERIA AND GHANA

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### **Abstract**

*This study adopts the Arellano-Bond first difference dynamic panel GMM framework to consider the effect of capital structure decision on a firm's market to book value ratio focusing on quoted firms in Nigeria and Ghana. Our sample is panel, comprising 17 quoted firms (Nigeria from 11 and Ghana from 6) from 2008 to 2017. Three measures of capital structure: namely, debt-to-equity ratio, non-current liability to total assets and interest coverage ratio are examined. Our results suggest that capital structure is irrelevant in determining a firm's market value relative to its book value. Therefore, we argue that investors in Nigeria and Ghana cannot improve their risk pricing model by incorporating capital structure variables in the valuation process.*

*Key words: Capital structure, market-book value ratio, panel GMM.*

### **Introduction**

It has become well-established in the corporate finance literature that financing decision is among the most important decisions of a firm, be it quoted or non-quoted. Financing decision means the corporate management actions regarding the capital mix of the firm. The seminal paper by Modigliani and Miller (1958) started this argument that given a perfect market environment, financing decision of a firm is irrelevant, hence cannot influence its value. Since then, there have been considerable studies focusing on the relationships between financing decision and firm value. These studies attempt to explain how real-world complications such as asymmetric information could affect the Modigliani-Miller perfect market assumption, and hence make financing decision relevant. Some of the recent studies in these areas include Baker et al, (2000), Myers (1984), Graham and Harvey (2001) and Toby (2014).

Subsequent theories like the pecking order and trade-off theories argue that capital structure is important for firm valuation. While the pecking theory contends that a firm can enhance its value by arranging its capital sources according to their risks and costs from cheapest to costliest, the tradeoff theory suggests that optimal capital structure can be attained when a firm balances the tradeoff between the tax benefit of debt with its bankruptcy costs. Also, the empirical results so far reported by previous studies are mixed. While some studies found evidence that are consistent with the irrelevant capital structure argument, the findings reported by others tend to support the alternative theories. This implies that the controversy regarding whether capital structure of firm is a significant determinant of its value is yet to be resolved.

This study contributes to the ongoing debate by investigating the effects of three capital structure variables on market to book value ratio focusing on firms in Nigeria and

Ghana. While the current study is based on a sample of 17 quoted firms (11 Nigeria and 6 Ghana) from 2008 to 2017, our empirical analysis is based on the Arellano-Bond first difference approach to dynamic panel GMM framework. This study is particularly distinct in two ways. First, it is, to our knowledge, the first empirical study to analyze the capital structure-firm value relationship in the context of Nigeria and Ghana using this robust empirical framework. Secondly, we measure market value in terms of price to book value ratio which is distinctive compared to previous Nigerian and Ghanaian studies that largely focused on market value per share.

The remainder of this study is organized into four sections. The next section presents the literature review. Section 3 describes the methodology and data. Section 4 contains the result presentation and analyses. Our conclusions are presented in section 5.

## **Literature Review**

### **Capital Structure Decision and Market to Book Value**

Book to market ratio is applied in calculating for the value of the firm. Book value examines the accounting value or historical cost. In some instances, the net worth (asset value) of companies is arrived at after comparing book value to the market value. Investors and borrowers care to know how the assets of a firm compare to its liabilities. Greater proportion of liabilities to asset is a sign of bankruptcy risks against investments of current stakeholders. The relationship between assets and liabilities is the center point of valuation of firms planning mergers and acquisition (M&A) or consolidation between parent and a target subsidiary which requires computation of percentage controlling interest and goodwill.

A high book value of assets attracts significant purchase consideration. In most M&A arrangements financing is based on share exchange, cash or deferred payment. Where a parent combines deferred payment with other modes of financing M&A deals, the required rate of return is expected to be moderate enough to make profitable acquisition. The purchase consideration offered by a parent company depends on assets fair value in a pre-acquisition date carried by the acquiree in the books. Thus, market price and book value of assets are special factors considered in financing firms' consolidation. Capital structure exerts theoretical influences on the performance of the firm based on its market value.

Firms' directors financing decision follows for curious evaluation of the capitalization rate or interest structure. By law, every licensed firm possesses element of debt in audited statement of financial position. Stakeholders depend on information from the financial statement of companies to make informed decisions. A firm with debt and equity is said to be leveraged. The proportion of debt to equity is expected to be less compared to owners' equity. Where this, is the opposite, the firm is said to be highly geared and depicts higher default risk and would not attract further debt funding from the lenders. For maximization of wealth of shareholders, managers compare the hurdle rate of the given funding source to expected future benefit. A trade-off exists between cost of financing and returns. The higher the costs of financing, the higher the riskiness in the potential investment and the lower the expected returns.

Allen, Bhattacharya, Rajan and Shoar (2008) opined that "although capital structure is a second-order concern, having the wrong capital structure can matter a lot

for most companies in certain situations—say, when economic uncertainty makes it very costly to refinance debt or issue equity”. The decision cuts across determining appropriate size of its long-term funding or short-term working capital and where best to mobilize any necessary financing requirements. To assist with this decision, pecking order theory developed by Majluf (1984) argues that firms prefer internal financing to debt. The risk associated with retained earnings as a variant of equity is an opportunity cost of abandoning potentially profitable investment.

Other scholars find conflict in linking optimal financial decision in a firm vis-à-vis firm value. The irrelevance hypothesis of M&M theorem refutes this theoretical claim. Modigliani and Miller (1958) argued that debt-equity composition does not determine a firm’s market value. Joliet and Muller (2013); Agliard and Koussi (2011) supports the M&M hypothesis because the cost of equity for a leverage firm is equal to cost for an unleveraged firm in addition to an added premium for financial risk. On the contrary investment is key to companies’ corporate success which is fundamental to firm’s earning power. In contrast, traditional view supports capital structure and market value relationship in firms. The view argues that suitable mixture of debt and equity is ideal for better firm value. Ogbulu and Emeni (2012) examined the impact of capital structure on a firm’s value and assert that in an emerging economy like Nigeria, equity capital is irrelevant to the value of the firm. Tongkong (2012) observed that positive relationship exists between a firm’s debt and its median industry leverage. Chen and Zhao (2004) confirmed that firms with greater market-to-book ratios are more likely to issue equity not because they intend to

downwardly adjust their target debt ratios, but because they face lower external financing costs.

### **Empirical Review**

Myers (1984) explored capital puzzles to bring to mind Fischer Black’s note on dividend puzzle which he ended by asking question on what corporations should do about dividend policy which the author ended with ‘we don’t know. However, it is concluded that people are comfortable with static trade-off theory merely because it sounds better and yields an interior optimum debt ratio. It is also observed that actual debt ratios differ largely across similar firms.

Titman and Wessel (1988) empirically analyzed the optimal capital structure theory using the measure of short-term debt, long term debt and convertible debt and concluded that concluded that the transaction cost is a major determinant of the choice of capital structure.

Watson and Head (2006) empirically argue that debt financing is a more convenient source of fund for project finance for the owners’ interest could be protected and debt finance does not lead to the dilution of ownership interest.

Antwi, Atta Mills and zhao (2012) studied capital structure impacts on firm’s value. The Ghana study gathered 34 Ghana stock exchange (GSE) quoted companies. Using ordinary least square analytical technique, data for the period 2005 – 2010 were analyzed. The result shows that equity within the capital structure is a critical determinant of firm value. Long-term debt as a component of capital structure is relevant to the value of the firm.

Vo and Ellis (2017) employed the static multiple regression framework to analyze the relationship between capital

structure and firm value from focusing on listed firms in Vietnam from 2007 to 2013. They found that controlling for size, price-book ratio, PE ratio and market risk, there is a negative relationship between capital structure, measured by the ratio of total liabilities to total assets, and shareholders' return.

From the risk management perspective, the study by Hapsoro and Jannah (2020) seeks to determine whether the enterprise's risk management disclosures affect the causal link from capital structure (debt to asset ratio) to firm value (Tobin Q) using the partial least square framework. Based on a sample of 386 non-financial firms in Indonesia, they found that while capital structure has a significant effect on firm value, disclosure of enterprise risk management moderates the relationship between capital structure and firm value.

Pratiwi (2020) employed the classical multiple regression to analyze whether firm value responds to changes in capital structure, profitability, and firm size focusing

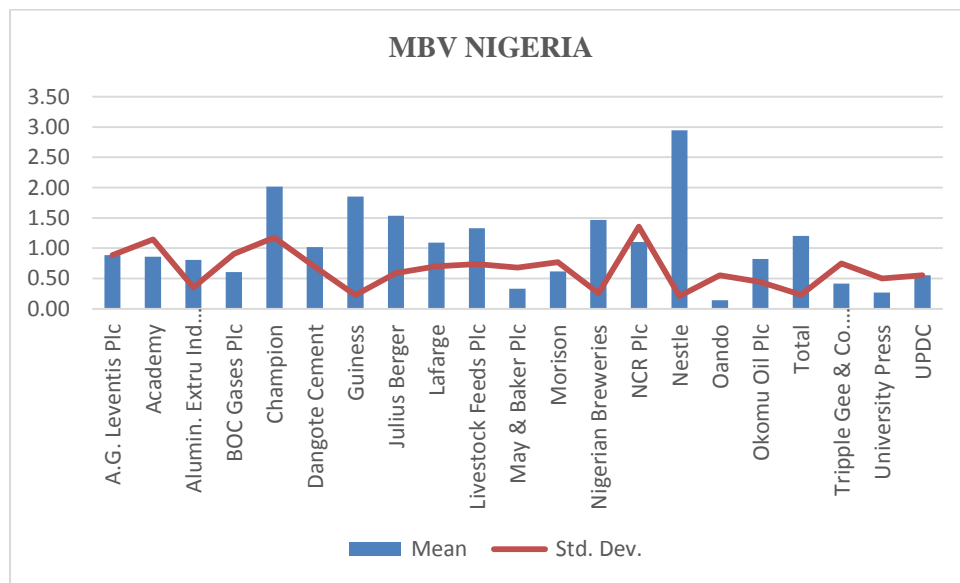
on 31 listed companies in Indonesia from 2014 to 2018. The study found amongst others that capital structure decisions are relevant in the firm valuation model.

**Research Methodology**

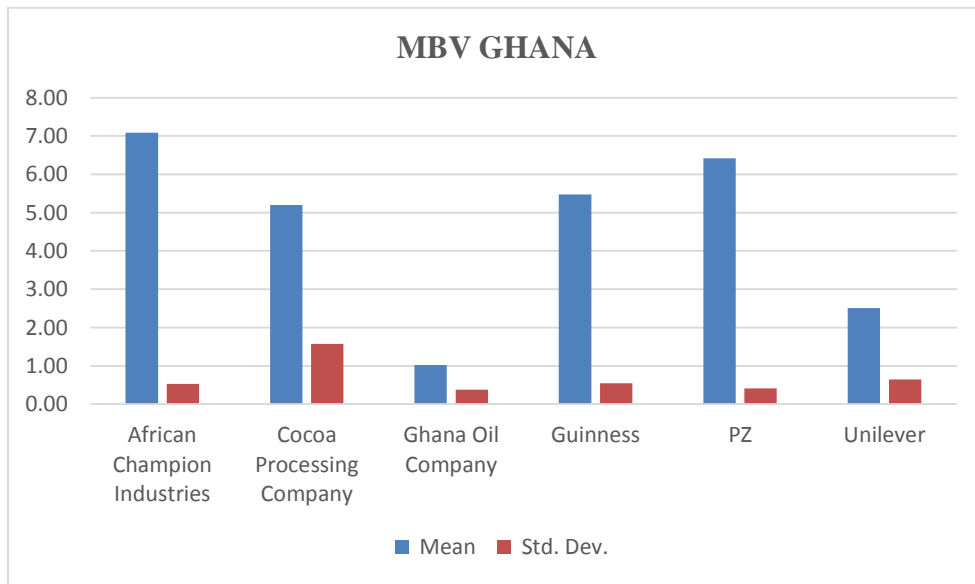
**Data Description**

Data used in this study are collected at yearly frequency. The dependent variable is firm value measured by market to book value ratio, capital structure decision is proxied by debt-equity ratio, long-term debt to total assets ratio and interest coverage ratio. The sample consists of 17 listed non-financial companies in Nigeria (11 firms) and Ghana (6 firms) from 2008 to 2017. The data on these variables are obtained from annual reports and accounts of the selected companies for the several years and are downloaded from the official websites of these companies. The empirical analysis is done in EViews.

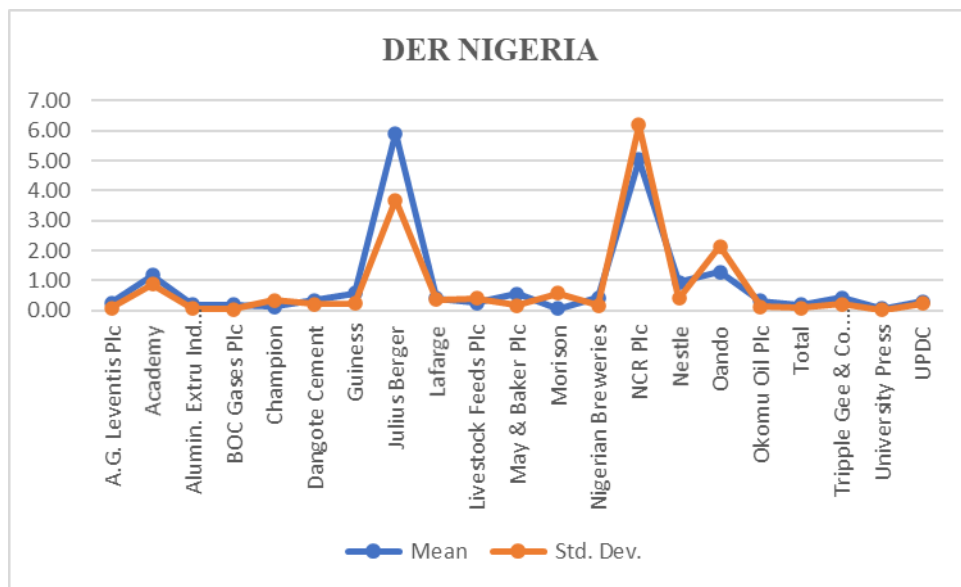
Figures 1-8 show the graphical description of the data.



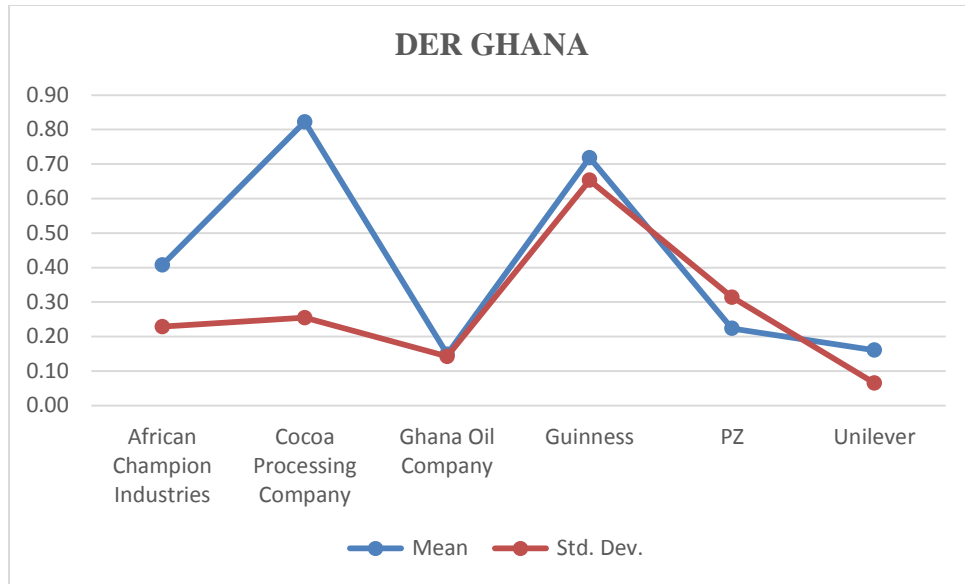
**Figure 1: Mean and Std Deviation for MBV for Nigerian Firms**



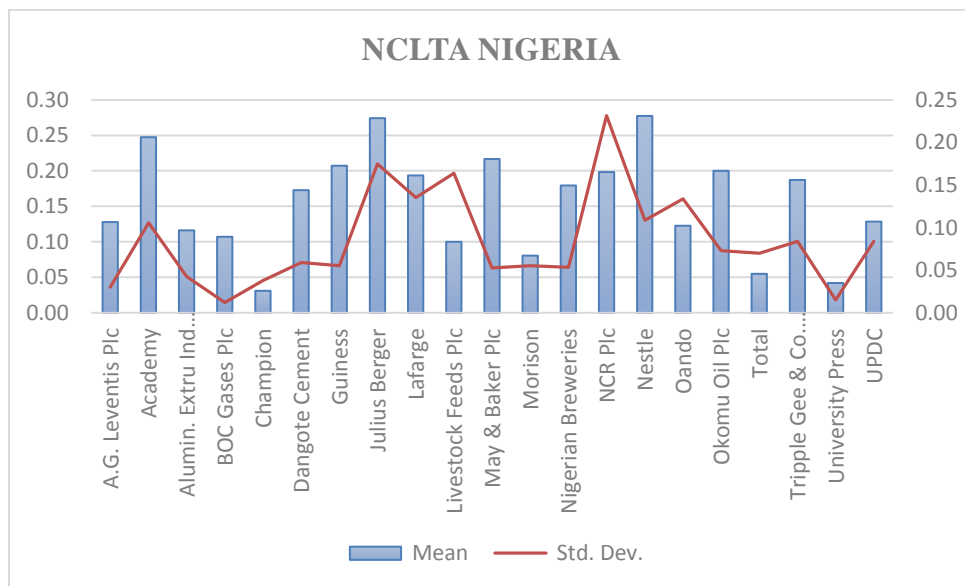
**Figure 2: Mean and Std Dev. for MBV for Ghanaian Firms**



**Figure 3: Mean and Standard Deviation for DER for Nigeria**



**Figure 4: Mean and Standard Deviation for DER for Ghana**



**Figure 5: Mean and Standard Deviation for NCLTA for Nigeria**

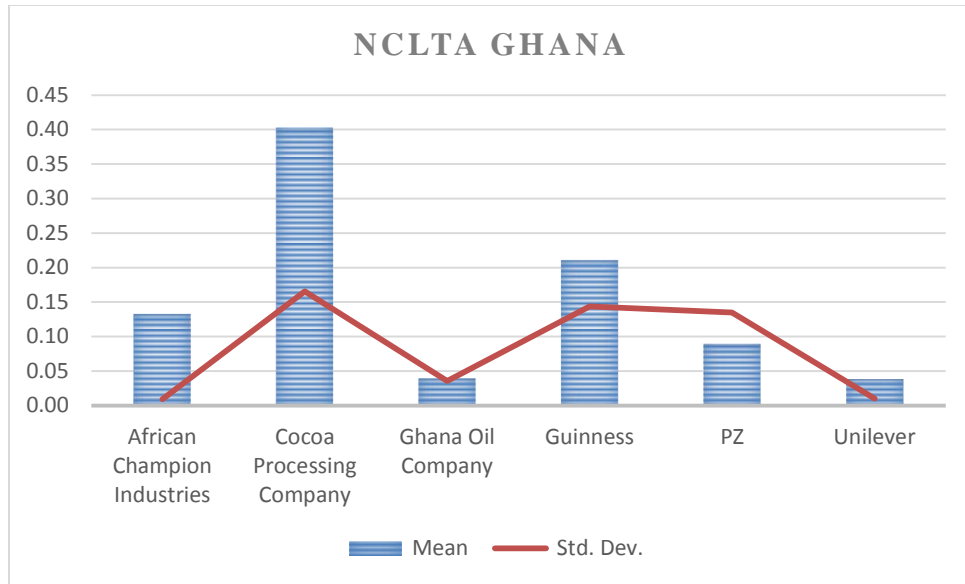


Figure 6: Mean and Standard Deviation for NCLTA for Ghana

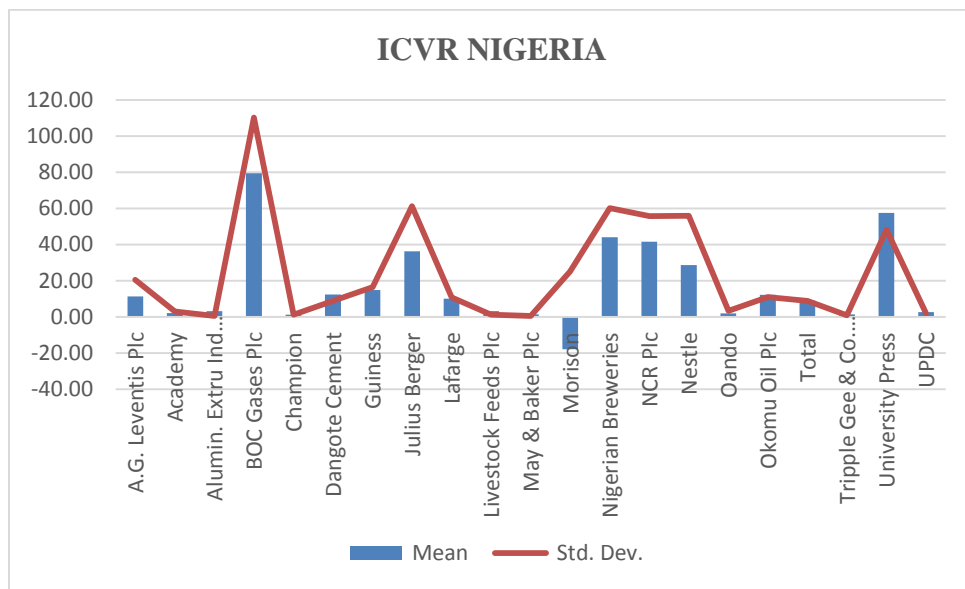
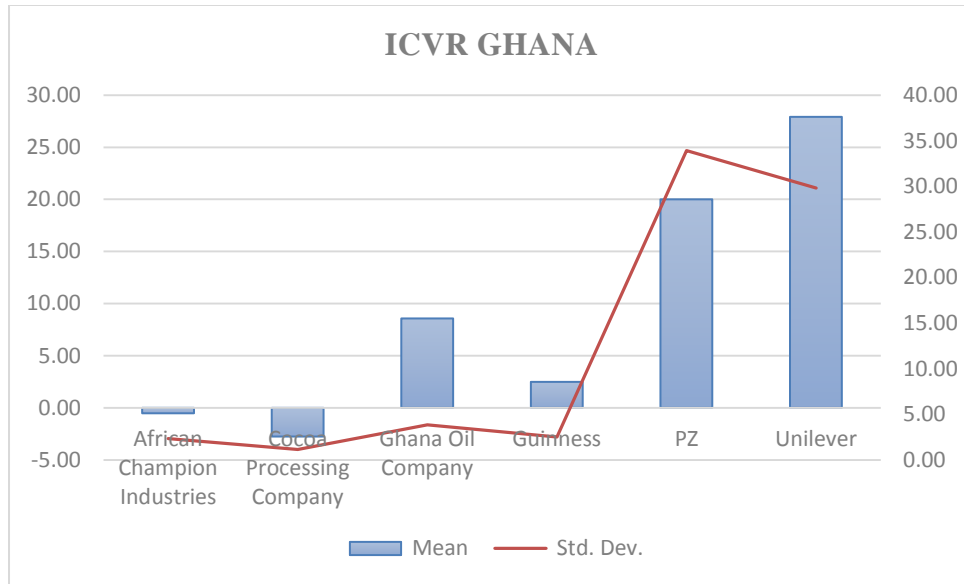


Figure 7: Mean and Standard Deviation for ICVR for Nigeria



**Figure 8: Mean and Standard Deviation for ICVR for Ghana**

### Model Specification

Our empirical framework is dynamic panel GMM based on the first difference Arellano and Bond (1991) approach. This framework is employed because it helps to control possible endogeneity bias arising from the possibility that the causal link from capital structure to firm value can be reversed. The approach is also based on instrumental variables.

Consistent the study objective, we specify the Arellano and Bond's (1991) first difference dynamic Panel GMM model linking MBV to three capital structure decisions proxies;  $DER$ ,  $NCL/TA$  and  $ICVR$  as follows:

$$\Delta MBV_{it} = \vartheta_1 \Delta MBV_{it-1} + \vartheta_2 \Delta DER_{it} + \vartheta_3 \Delta NCL/TA_{it} + \vartheta_4 \Delta ICVR_{it} + \Delta \epsilon_{it} \quad (24)$$

### Where

MBV = market to book value, DER = debt-equity ratio, NCL/TA = non-current liability (long-term debt) to total assets ratio and ICVR = interest coverage ratio.

Also,  $\Delta$  = first difference operator,  $MBV_{it-1}$  = lagged market value per share,

and  $\epsilon_{it}$  = error term. If  $\vartheta_1 \neq 0$ , then market to book value ratio is persistent and technical analysts' assumption holds for our sampled firms, implying that firm value can be predicted based on its historical trend. Further,  $\vartheta_2, \vartheta_3$  and  $\vartheta_4$  are the individual coefficients for  $DER$ ,  $NCL/TA$  and  $ICVR$  respectively, hence if the restriction,  $\vartheta_2 = \vartheta_3 = \vartheta_4 = 0$  holds, then capital structure decision has no impact on market value per share, and MM hypothesis would be confirmed.

To control for the potential endogeneity bias induced by  $MBV_{it-1}$ , we follow the usual approach by including lag levels of all endogenous variables (i.e  $MBV_{it-2}$ ,  $DER_{it-1}$ ,  $NCL/TA_{it-1}$   $ICVR_{it-1}$ ) as instruments.

### Empirical Analysis

#### Model Estimation and Results

For our empirical model, market to book value ratio is specified to depend on lagged market to book value ratio and the three financing decision variables: namely, debt to equity ratio, long-term debt to total assets ratio and interest coverage ratio. Table 1 presents the dynamic panel GMM



results for this model using the Arellano-Bond first difference estimation approach. The endogeneity bias is controlled by incorporating 4 lags of the dependent

variable from period 2 to 5 as well as two lags of each of the explanatory variables as instrumental variables in our dynamic panel GMM specification.

**Table 1: Panel GMM Results**

Variable	Coefficient	p-value
<i>MBV</i> (-1) ( $\vartheta_1$ )	0.0347	0.9080
<i>DER</i> ( $\vartheta_2$ )	0.9508	0.2042
<i>NCLTA</i> ( $\vartheta_3$ )	-0.2281	0.7918
<i>INCR</i> ( $\vartheta_4$ )	0.0101	0.9454
Wald ( $\vartheta_2 = \vartheta_3 = \vartheta_4 = 0$ )	3.0042	0.3910
Instrument rank	10	–
J-statistic	4.4514	0.6158
AR(1)	-0.5740	0.5659
AR(2)	0.1757	0.8605

From Table 1, we can see that the instrument rank of 10 is much greater than the number of coefficients in the model, indicating that our GMM model is over identified. However, the J-statistic has a probability of 0.6158, indicating the Sargan test is not significant. Thus, the null hypothesis of over identifying restrictions is not rejected, implying that the estimated GMM model is correctly specified. Further, the first order Arellano-Bond statistic (AR(-1) = -0.5740, p-value = 0.5659) has the expected negative sign, though not statistically significant, whereas the second order statistic (AR(-2) = 0.1757, p-value = 0.8605) is statistically insignificant. Therefore, we conclude that the model residuals have no serial correlation in levels, which further validates our GMM results.

Also, from Table 1, we can see that  $\vartheta_1$ , which captures the effect of lagged market to book value ratio, is estimated at 0.0347 with a probability of 0.9080, indicating that previous market to book value ratio has a positive but statistically insignificant impact on current market to book value ratio. The small size of this coefficient also suggests that shocks to market to book value ratio is not persistent,

and the effect of one lagged period market to book value ratio on current market to book value ratio is also not significant economically.

Further, from the results, we can see that *DER* ( $\vartheta_2 = 0.9508$ ) and *INCR*( $\vartheta_4 = 0.0101$ ) both have a positive coefficient, while *NCLTA* ( $\vartheta_3 = -0.2281$ ) has a negative coefficient. This shows that market to book value ratio moves in the similar direction with both debt-equity ratios while it moves in opposite direction with long-term debt to total assets ratio. Further, the associated p-values of 0.2042, 0.7918 and 0.9454 indicate that like the case of investment decision variables, *DER*, *NCLTA* and *INCR* none enters the market to book value ratio model significantly in statistically sense. However, the size of the estimated betas suggests that the effects of both debt-equity ratio and long-term debt to total assets ratio may be economically significant whereas the effect of interest coverage ratio may be economically insignificant. The Wald statistic (p-value = 0.3910) is associated with a high probability, indicating that the combined effect of debt-equity ratio, long-term debt to total assets ratio and interest coverage

ratio on market to book value ratio is statistically not significant.

### Discussion of Findings

Our main objective is to test whether financing decision of a firm has a significant effect on its market to book value ratio. Here, the effects of debt-equity ratio, non-current liability to total assets ratio and interest coverage ratio are all examined both individually and collectively. Thus, the effect of financing decision on market to book value ratio is tested based on the joint significance of  $\vartheta_2$ ,  $\vartheta_3$  and  $\vartheta_4$  in Table 1. Theoretically, there are mixed views regarding the effect of capital structure on firm value. While Modigliani and Miller (1958) show that capital structure decision plays no significant role in the firm valuation model, other theorists such as Myers (1984), Myers and Majluf (1984), La Porta et al., (2000), Jensen (1986) argue that capital structure decision of a firm significantly affects its market value. Thus, *a priori*, we have mixed expectations.

Consistent with Modigliani and Miller's (1958) irrelevance capital structure theory, our results show that financing decision has no significant effect on market to book value ratio of quoted firms in Nigeria and Ghana. As evident is Table 1, the Wald statistic, which tests the joint significance of  $\vartheta_2$ ,  $\vartheta_3$  and  $\vartheta_4$  in market to book value ratio model, is associated with a probability of 0.3910, which is higher than all conventional significance levels, indicating that debt to equity ratio, non-current liability to total assets ratio and interest coverage ratio all collectively have no statistically significant effect on market to book value ratio. Individually, none of these financing decision variables has a statistically significant effect on market to book value ratio as all of them also enter

the MBV model with probabilities that are substantially higher than all conventional levels. Thus, contrary to the opponents of irrelevance theory such as Myers (1984), Myers and Majluf (1984), La Porta et al., (2000), Jensen (1986), our empirical evidence cannot lead us to reject the null hypothesis that financing decision has no significant effect on market to book value ratio. This finding also contradicts several empirical studies including Otieno and Ngwenya (2015), Adenugba, Ige and Kesinro (2016). The findings in both studies suggest that capital structure decision is a relevant determinant of firm value.

On the contrary, however, our finding is consistent with Kodongo, Mokoaleli-Mokoteli and Maina (2014), who find that for Kenyan listed companies, financial leverage does not affect firm value measured by Tobin Q, and Khan, Shaikh, Bashir Shah, Zahid and Shaikh (2017), who find that debt to equity ratio does not significantly affect both return on equity and return on assets of quoted companies in Pakistan.

### Summary and Conclusions

This study examines the effect of financial structure on firm value in Nigeria and Ghana using the Arellano-Bond first difference approach to dynamic panel GMM framework. The sample comprises 17 quoted firms (11 from Nigeria and 6 from Ghana) from 2008 to 2017. Capital structure is measured by three proxies: namely, debt to equity ratio, long-term debt to total assets ratio and interest coverage ratio.

From the results, we conclude that changes in capital structure have no significant effect on firm value for listed firms in Nigeria and Ghana. Therefore, incorporating information about the firm's capital structure variables in the valuation

process cannot improve the firm's market value relative to its book value.

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