

Does Modigliani and Miller Relevance and Irrelevance Theory of Capital Structure Apply Among Non – Finance Quoted Companies in Ghana?

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ABSTRACT: This study tests the applicability of Miller and Modigliani relevance and irrelevance theories for a set of 15 companies in Ghana using that for the period 2010 to 2019. The test procedure involved examining how debt to equity ratios affect the value of the firms in the market, including how tax shield provided from debt accumulation improves the firms' value. The result from the empirical analysis shows that neither the irrelevance nor the relevance theory is prevalent among the quoted firms in the non-finance sector in Ghana over the reference period. Empirical evidence also indicate that debt structure does not influence firm value (that is, the use of long term or short term debt pattern does not matter for firm value) among the sampled firms. The result also shows that debt to equity ratio does not influence firm performance. Moreover, tax shield from use of debt is shown to have no significant influence on the changes in firm value STATA computer econometric software package. The estimation was carried out using the Stata 13.0 statistical software.

KEYWORDS: M&M Relevance and Irrelevance theories, capital Structure,

1.0 INTRODUCTION

Over the years, private organization have been facing the challenges of selecting debt or equity option or combination of both in financing their operations. Private sector which serve as a pivot of development for both developed and developing nations lack adequate capital to finance operational activities. According to Gwatidzo (2009), a vibrant and developed private sector that can serve as engine of growth and development is very crucial in any nation. It means therefore that every nations strive to encourage private sector development. However, the choice of debt and equity financing always poses challenges for growth and development of the private sectors. Duet to these challenges, organizations are faced with the possible means of combining available types of debt and equity that would ensure the maximization of shareholder wealth or minimizes the weighted average cost of capital. However, these arguments negate the irrelevant capital structure theorem of Modigliani and Miller (195) proposition that the different combination of debt and equity (capital structure) does not affect firm value. Modigliani and Miller (1958) argued in their first preposition that the capital structure of the firm is independent of the value of the firm.

Modigliani and Miller (1958) argued that capital structure has irrelevance proposition. Syed, Sagib, Agha and Saif-ur (2012)

stated the assumptions of Modigliani and Miller of a firm as follows: Particular set of expected cashflow, it divides the cashflows among the investors when it chooses a certain combination of debt and equity for purchasing of assets, firms and investors have equal opportunity to access the financial markets, and the investors can create any leverage according to their own. They therefore conclude that firm can leverage that has no effect of the market value of the firm. They went further to explain that the irrelevant theorem of capital structure needs some certain circumstances otherwise, it cannot run. Syed et al. (2012) posit that are two different types of capital irrelevance propositions. First, classical theory says that firm can create its own leverage irrelevance of the investors rather than Modigliani and Miller. Secondly, contribution to irrelevance theory of proposition was that 'given a firm's investment policy, the dividend payout it chooses to follow will affect neither the current price of its shares nor the total return to its shareholders' (Miller & Modigliani, 1961). Simply stating, neither dividend nor capital structure matters in perfect market.

The relevant proposition opined that company value and its capital structure are related. Therefore, the debt of a firm has significant impact on its value. According to Danso (2014), when a firm brings in a considerable size of debt into its capital structure, the weighted average cost of capital will fall.

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This is because the benefit of low- cost debt finance more than outweighs any increases in the cost of equity needed to compensate equity holders for higher financial risk. Conversely, as the proportion of debt goes up, equity holders will demand increasingly higher returns and ultimately, this increase will begin to outweigh benefit of cheap debt finance and the weighted average cost of capital will rise as the firm’s value falls. The question of capital structure relevance and irrelevance had been lingering over the years. These has generated a lot argument and counter-argument in the volume of empirical testing. However, this study attempt to test Modigliani and Miller relevance and irrelevance theory of capital structure among non – finance quoted companies in Ghana.

It is against this background, that this paper attempts to empirically examine the applicability of the Relevant and Irrelevance theories among the quoted firms in the non-finance sector in Ghana.

2.0 LITERATURE REVIEW

Modigliani and Miller (1958, 1963) proposition of relevance and irrelevance theory of capital structure has been the subject of argument over the years; both in theory and empirical research. According to Levati, Qiu and Mahagaonkar (2011), Modigliani – Miller demonstrated that in a perfect market, the value of a firm is independent of how that firm is financed. Financing and investing decision are the most important issue every firm faces. These has made the firm behavioural finance pattern and it determinants a great issue of debate that has attracted a lot of empirical research. Modigliani and Miller follow a partial – equilibrium approach focusing on the firm and industry in order to address the cost – of – capital problem. Under assumption of perfect markets, and in the absence of taxes on corporate income, they show that the market value of any firm is independent of it capital structure (Dedes, 2010). M – M argument was that firm value was not based on the choice of capital structure but the operating profit of the firm and its investments decisions made. Modigliani and Miller (1963) theorized that tax benefits of using debt – debt is tax – deductible. They opined that firm should increased debt usages as possible so as to maximize their value. However, Myers (1984) took a different look at capital structure by introducing Trade – off theory. His argument was that firms should use debt when considering cost and benefit of an investment. The benefits for using debt is the tax – shields of interest on accrued on debt while the costs are the agency costs as well as the bankruptcy cost (Wanja, 2011).

According to Laisi (2016), the original paper (Modigliani and Miller, 1958) makes three proposal concluding that firms’ capital structure is irrelevant in a world without taxes,

bankruptcy cost, agency cost or information asymmetries. The argument is that if the factors exist then the firm capital structure is affected by these or some other factors. The paper proposes that in efficient capital markets arbitrageurs correct any price differences resulting from the differences in the asset’s financing structure. The theorem thus creates a basis for observing the effects of violating these assumption (Laisi, 2016). The first proposal state that in equilibrium the value of an asset is independent of its capital structure. The proposition suggests that it is irrelevant whether a stream of income is generated from equity or debt if they are similar in all meaningful aspects. Therefore, two equivalent income streams of a firm must also be equally priced or an arbitrageur could exploit the discrepancy by for example buying power price stock and selling higher priced bond (Modigliani and Miller, 1958, Laisi, 2016). Hence a firm cannot change the value of its businesses by changing debt to equity or vice versa.

The second proposal state that a firms’ average cost of capital is a linear function of the firm’s leverage ratio. Given that the cost of debt is constant at all levels of leverage, the average cost of capital of a firm is the relative combination of its levered cost of equity and its cost of debt with respect to its current capital structure. Therefore the average cost of capital is constant at different levels of debt as the levered cost of equity increases with higher leverage (Modigliani and Miller, 1958).

The third proposed conclude the first and second proposals. In the third proposal a firm should always execute an investment opportunity if the rate of return on the investment is equal or higher than the firm’s average cost of capital. Firms average cost of capital is independent on its capital structure. And as a consequences the choice of investing is independent on the type of security it is financed with (Laisi, 2016).

According to Laisi (2016); Modigliani and Miller noted that actual capital markets have various inefficiencies. Developed and emerging countries legislation allows interest payments to be deducted from taxable income. Modigliani and Miller (1958) proposed capital structure irrelevance with some revised assumptions to illustrate market conditions more realistically. Firstly, corporate taxation is accounted in the theory. Interest payment deductibility alters the basic propositions as the average cost of capital is no longer identical with different levels of leverage. As leverage lower tax payments, the leverage cost of capital decreases with higher leverage. Therefore, the value of a levered firm equals the value of an unlevered firm and the value of tax shield generated by debt. Furthermore, this signifies that an optimal capital structure for a firm is achieved by being completely financed with debt if bankruptcy costs are excluded. In other words bankruptcy costs combined with leverage determine the

optimal capital structure for a firm (Laisi, 2016). Secondly, due to the existence of variation in interest rates, the interest expenses of a firm tend to increase with higher leverage. The cost of borrowing additional funds increases with leverage but is evened out by an equivalent decrease in firm's cost of equity funding. Therefore the average cost of capital from all sources of funding is still independent of the firm's capital structure with the exception of the tax effect (Modigliani and Miller, 1958).

The Irrelevance capital structure theorem witnessed a lot of criticism which were subject to controversy, but it has been accepted as an implication of equilibrium in perfect capital markets (Rose, 1959; Stiglitz, 1967; Miller, 1988; Durand, 1989 and Laisi, 2016). For instance, capital structures decision in real world capital markets several additional theories with relaxed M–M assumptions have been developed. For this purpose, there have been several argument that the Modigliani and Miller theorem of capital structure irrelevancy does not describe a realistic image of firm financing but instead provides a basis for examining why the way of financing may be relevant (Frank and Goyal, 2005; Laisi, 2016). However, some empirical studies had revealed that theories of agency costs, corporate control, information asymmetry, utilization of tax benefits and product – input markets as capital structure determinants have been empirically successful in describing firm financing behaviour and chosen leverage level (Harris and Reviv, 1991; Feld, Heekemeyer and Overesch, 2011, and Laisi, 2016).

2.1 Relevance of Capital Structure Theory

Brigham (2004) refers capital structure as the various ways in which a firm finances its investments and growth through optimal mix of debt and equity. Capital structure could also be regarded as the selection of different securities to finance firms' operational activities. Capital structure remains a key decision because it determines the financed performance of a firm (Abor, 2005 and Wanja, 2012). The main goal of capital structure is to maximize the market value of a firm (Weston and Brigham, 1992 and Wanju, 2017). Again, Brealey and Myers (2003) sees capital structure as the problem that is determined by the market. The biggest debate that has persisted even today – the big question is whether optimal capital structure exists and if it does, does it matter? Are there some capital structure that are better than others? (Maria and Demetrios, 2009 and Wanju, 2017).

According to Wanju (2017), the controversy on whether capital structure really matters came to life with the seminal working paper of Modigliani and Miller (1958) contrary to the traditional perspective. Kamere (1987) and Wanju (2016) sees the traditional perspective of capital structure as the ultimate theory before 1958. The traditional financial theorists asserted

that optimal capital structure existed and that the value of the firm was well maximized when the cost of capital is minimized through careful use of debt as a source of finance. They believed that the value of the firm solely depended on its net operating income and the value of risk pegged to it. Hence, the optimal capital structure was the point where there was sagacious mix of debt and equity (Pandey, 2001 & Wanju, 2016).

Modigliani and Miller (1958) asserted that the traditional view of capital structure is not real. According to them, capital structure was irrelevant and did not define the value of a firm. To them, the value of the firm depended on the quality of investments undertaken. With the assumption of perfect capital markets, similar risks and no taxes, Miller and Modigliani termed capital structure irrelevant (Wanju, 2016). This was a big controversy and many scholars like Durand (1959) questioned the theory on the realms of how applicable arbitrage was as well as how the world was considered riskless yet as we know it, the world is full of myriads of risks.

Modigliani and Miller (1963) amended their theory and included taxes – interest on taxes was tax – shielded. Hence, firms would now employ debt more in their capital structure in order to get tax relief on interest on debt. The inclusion of debt with in capital structure was to be faced by the risks of bankruptcy and high interest on debt, which increases a debt – equity ratio increases (Baxter, 1967 and Wanju, 2016). Furthermore, the application of debt increases the variance of earnings and this means that investors ask for greater returns on their investments (Maria and Demetrios, 2009; Wanju, 2016). This would only mean one thing; that firms would seek capital structure that maximizes tax benefits as result of use more debt while minimizing probability and possibility of bankruptcy cost. After all, a capital structure is so good in reduces the overall cost of capital.

According to Wanju (2016), several studies have been conducted to confirmed the existence of optimal financing through mix of equity and debt. Stiglitz (1972) opined that optimal structure was possible under certain assumptions but did not discount the ramifications of bankruptcy especially on the value of the firm. Kraus and Litzenberger (1973), highlighted corporate taxes and bankruptcy penalties in their optimal capital structure model, echoed the same. Brennan and Schwartz (1978) again, clarified that the eminence of bankruptcy costs brought in a lot of uncertainty in accrual of tax savings and this led to optimal capital structure.

Generally speaking, the determination of optimal capital structure remains a key decision that managers of firms must make. Hence, a very relevant and crucial point that must be taken if growth and profitability of business is something to go by (Wanju, 2016).

2.2 Irrelevance Theory of Capital Structure

According to Danso (2014) Modigliani and Miller's of 1958 has provided the platform for the huge interest in the corporate financing behaviour. M and M's work on capital structure, made a number of assumptions in deriving their famous irrelevance theory which has in recent times attracted a wide variety of research in corporate finance and other fields in the academic circles. The assumption includes the following:

- (1) No taxation for either individuals or companies
- (2) No transaction cost
- (3) Debt is risk free
- (4) Perfect capital market where investors have the same information as management regarding the future state of affairs upon which they can Act rationally.

M and M's also assumed that a firm average cost of capital and for that reason, the value of the firm is independent of its capital structure. They argued that, there is no optimal capital structure that maximizes the firm's value and for that matter a firm can make use of any amount debt or equity. In contrast to the claim of the traditionalist perspective therefore, M and M (1958) argued that the market value of their company cannot be changed by simply altering the capital structure.

Danso (2014), in addition to the above, M and M's (1958) assumed that the rate of return that shareholders of a firm demand goes up as more debt is applied. The reason behind the argument is that shareholder see the firm as more risky as the firm stands a high chance of experiencing a financial distress (i.e due to the high level of debt in the capital structure). As a result of this, the increase in cost of equity offsets any benefits derived from the use of cheaper debt finance and therefore the weighted average cost of capital remains the same. The implication of this is that choice of finance is not relevant to the wealth of shareholders and firms can therefore make use of any mix of funds (Modigliani and Miller, 1958; Shyam – Sunder and Myers, 1999, Danso, 2014).

Modigliani and Miller (1958) opined that, firms that operate in the same kind of business or industry (e.g. firms in the construction industry or the retail industry) and which have identical operating risks must have the same overall value, regardless of their capital structure. They based their argument on the fact that the value of a firm depends on the future operating income generated by its assets and not by altering its debt – equity mix. In other words, the manner in which this operating income is divided between returns to equity holders and debt holders must not make any difference to the total value of the company (Danso, 2014). According to Danso (2014) the implication of M and M's argument is that financial managers who want to maximise the value of their firm (that is increasing the wealth of shareholders), must aim at other

aspect of the firm rather than just altering the debt – equity level.

2.3 Empirical Studies

In testing the relevancy and irrelevancy of the capital structure, a lot of empirical studies had been carried out in the literature that attempt to favour the theoretical arguments of this theories. Ogbulu and Emeni (2012) when analyzing 124 quoted companies in Nigeria Stock Exchange (NSE) revealed that in an emerging economy like Nigeria, equity capital as a component of capital structure is irrelevant to the value of a firm, while long – term debt was found to be the major determinant of a firm's value. They advised corporate financial decision makers to employ more long term – debt than equity capital in financing their operations since it resulted to positive firm value. Paseda (2016) studied all non – financial corporations quoted on the Nigeria Stock Exchange (NSE) for the period 1999 – 2014 out of which 50 companies that met the minimum data criteria were utilized. The studies reveals factors that exert positive influence on corporate borrowing to include asset intangibility firm age and expected inflation while asset tangibility, growth, size, volatility of earnings, profitability, liquidity, dividend – paying status and uniqueness of industry exert negative influence on capital structure. And that, there was a weak evidence that tax considerations are crucial in capital structure choices. Frank and Goyal (2009) studied a sample of publicly traded us firms from 1950 – 2003 and market – based definition of leverage. They found that dividend paying firms tend to have lower leverage. Strebulaev and Yang (2013) examined US non – financial companies in CRSP Compustat Data base for the period 1962 – 2009. They found that zero – leverage dividend paying firms are more profitable, paying higher taxes and have higher cash balances than their proxies chosen by industry and size. Leary and Robert (2014) studied the data obtained from CRSP compustat for the period 1965 – 2008 and found that the financing decisions and the characteristics of peer firms are important determinants of corporate capital structure. Ibrahim and Barros (2008) examined relevance and irrelevance of capital structure, and found that capital structure does matter. They observed that the relative magnitude of outside equity makes a real difference to the quantity of aggregate investment equilibrium. Cline (2015) used statistical test for large US banks in 2012 – 2013 and found that less than half of this M and M offset attains in practice. Higher capital requirements would thus impose increases in lending costs, with associated output cost from lower capital formation. And that, these cost to the economy would need to be compared with benefits from lower risk of banking crises to arrive at optimal level of capital requirement. Kraus and Litzenger (1973) in their analyses, introduced corporate taxes and

bankruptcy penalties into the state preference model of optimal financial structure, to confirmed the existence of an optimal capital structure, Brennan and Schwartz (1978) found that, the possibility of bankruptcy cost increases the uncertainty of future tax savings and they also showed that the uncertainty is sufficient to induce an optimal capital structure, even if bankruptcy costs are isolated from their model. Mackie–Mason (1990) showed that firms faced with higher marginal tax rates are more likely to have higher debt ratio, and firms with low marginal tax rates will issue more equity compared to debt. Graham (1996) studied 10,000 firms and found that there was a statistically significant positive relationship between debt ratios and marginal tax rates. Also, Negash (2002) studied 64 firms quoted in the JSE industrial sector and found negative relationship between tax rate variables. Ozkan (2001) used a dynamic capital structure model for firm in the United Kingdom and found a significant negative relationship between non – debt tax shields and leverage. Fan, Titman and Twite (2008) studied a cross – section of firms in a heterogeneous sample of firms in 39 countries, and revealed that institutional differences are an important determining factor of capital structure choices compared to other factors like industry affiliation. Kobina (2016) examined capital structure dynamics of listed Banks in Ghana and found that asset tangibility and non – debt tax shield to have a positive relationship with equity. Danso (2014) examined the capital structure practices of firm in SSA countries by combining responses from a survey of 119 firms in Ghana and secondary data from seven other SSA countries obtained from DataStream. The result revealed that despite the institutional differences that exist between the western world and SSA firms, there are some firm – level factors that are relevant in explaining capital structure in the western context are also in SSA but however observed that tax is less important in capital structure decisions of firms in SSA. Voutsinas and Werner (2011) studied the effect of financial constraints on 1537 Japanese quoted firms and found that the effects of monetary policy and credit supply on firms’ capital structure. Smaller firms were found to experience financial constraints during the period of economic crisis. However, Chakraborty (2010) found that the difference in institutional structure between the developed and the developing economies, the dynamics which are important to explaining the capital structure decisions among firms in the developed economies are also vital in case of the emerging economies such as India.

3.0 RESEARCH METHODOLOGY

In testing the Modigliani and Miller relevance and irrelevance theory of capital structure, data from fund flow statement are

required. This study adopt data from Non – finance quoted companies in Ghana. Panel data estimations are employed in this study. This study attempt to adopt Tobin’s Q ratio formular for evaluating firm performance.

3.1 Model Specification

The empirical strategy adopted in the study follows the major objectives of the study which is to test the Miller and Modigliani relevance and irrelevance. The strategy in this study is to relate debt to equity structure of the firms to firms’ market value and performance. Moreover, two tests are conducted in the study: the irrelevance theory and the relevance theory. For the irrelevance theory, two equations are specified for estimation in the study in order to improve on the robustness of the investigation. Therefore, the models are specified in the following form:

$$SHP = (STDE, LTDE, TDETE) \dots \dots \dots (1)$$

$$TOBQ = (STDE, LTDE, TDETE) \dots \dots \dots (2)$$

Where

- SHP = share price
- TOBQ = Tobin’s Q
- STDE = short term debt to equity ratio
- LTDE = long term debt to equity ratio

In the model, the dependent variables (SHP and TOBQ) are considered to be influenced by the debt-to-equity ratios of the companies. The goal is to show that debt matters for firm value, implying that companies’ debt extensions influence the value in the market. In this direction, the three debt factors are expected to be negatively related with the two dependent variables. Thus, if the variables negatively and significantly affect the dependent variables, then the M-M irrelevance theory holds. The econometric form of the model is therefore specified as:

$$SHP_{it} = \alpha_0 + \lambda_1 STDE_{it} + \lambda_2 LTDE_{it} + \lambda_3 TDETE_{it} + \lambda_4 FS_{it} + \lambda_6 FG_{it} + \lambda_6 FA_{it} + \varepsilon_{it} \dots \dots (3)$$

$$TOBQ_{it} = \alpha_0 + \lambda_1 STDE_{it} + \lambda_2 LTDE_{it} + \lambda_3 TDETE_{it} + \lambda_4 FS_{it} + \lambda_5 FG_{it} + \lambda_6 FA_{it} + \varepsilon_{it} \dots (4)$$

Where α_0 and ϕ_0 are the mean or constant term, $\lambda_1 - \lambda_6$ and $\beta_1 - \beta_6$ are the coefficients of the independent variables to be estimated. Also, ε represents the error term or stochastic variables to be estimated. The i 's represent the individual banking sectors for the countries for the given time period t . The a priori expectation of the sign of the coefficient of the independent variables are given as: $\lambda_1, \lambda_2, \lambda_3, \beta_1, \beta_2, \beta_3 < 0$; $\lambda_4, \lambda_5, \lambda_6, \beta_4, \beta_5, \beta_6 > 0$.

For the of the relevance theory, the same dependent variables are used. However, tax shield derivable from debt use is employed as the independent variable used. Tax shield is obtained as the as an interaction terms between tax rate and

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debt to equity ratio in the firm ($tax_shield = dtax$). The model for this test is specified as:

$$SHP_{it} = \alpha_0 + \lambda_1 DTAX_{it} + \lambda_2 NTAX_{it} + \lambda_3 FS_{it} + \lambda_4 FG_{it} + \lambda_5 FA_{it} + \varepsilon_{it} \dots\dots\dots(5)$$

$$TOBQ_{it} = \alpha_0 + \beta_1 DTAX_{it} + \beta_2 NTAX_{it} + \beta_3 FS_{it} + \beta_4 FG_{it} + \beta_5 FA_{it} + \varepsilon_{it} \dots\dots\dots(6)$$

The *a priori* expectation of the sign of the coefficient of the independent variables are given as: $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, > 0$. For the relevance theory to hold, the coefficient of DTAX is expected to be significant and positive. This implies that tax shield is expected to provide benefits for the firms that may induce firm value growth over the period.

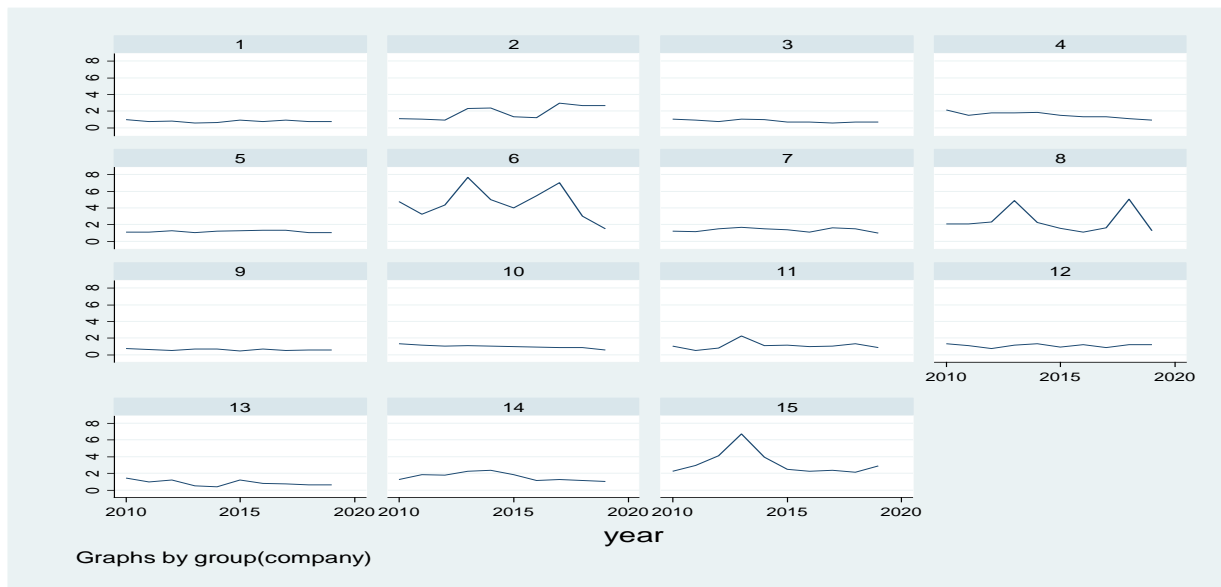
Given that the use of 15 companies used in the analysis a period of 10 years may generate within-sample bias when OLS technique is applied in the estimation, the panel data analysis method that can capture such biases and endogenise them is employed. Moreover, the panel data analysis involves application of the random effects (or cross sectional) term and the fixed effects (or period specific) term. Applying the Hausman test, the study employed the Random Effects technique in the estimation of the panel data models.

4.0 EMPIRICAL ANALYSIS

In this section, the presentation and analysis of data and the estimated models for the study are conducted. As noted in the previous section, the data for 15 companies in Ghana are employed in the analysis over the period 2010 to 2019 (10 years). The aim is to obtain empirical estimates that can be used to either validate or refute the preponderance of the Miller and Modigliani relevance and irrelevance hypothesis regarding the relationship between debt structure and firm value.

4.1 Descriptive Statistics

Two measures of firm value are used in the analysis in this study. These are share price (SHP) and the Tobin’s Q (TOBQ) measure of firm value. Figure 1 shows the ten-year trends in share prices among the selected firms in the analysis. The share prices of Benso Oil Palm Plantation, Fan Milk, Guinness Ghana Breweries, and Unilever Ghana were the only ones that showed appreciable movement over the 10-year period. The prices of Aluworks, Camelot Ghana, Mechanical Llyod Co., and Pz Cussons Ghana were completely flat, indicating that there were no price changes over the period of the study. This suggests that market movements in the Ghana Stock exchange appear to be limited to few firms for long periods of time.



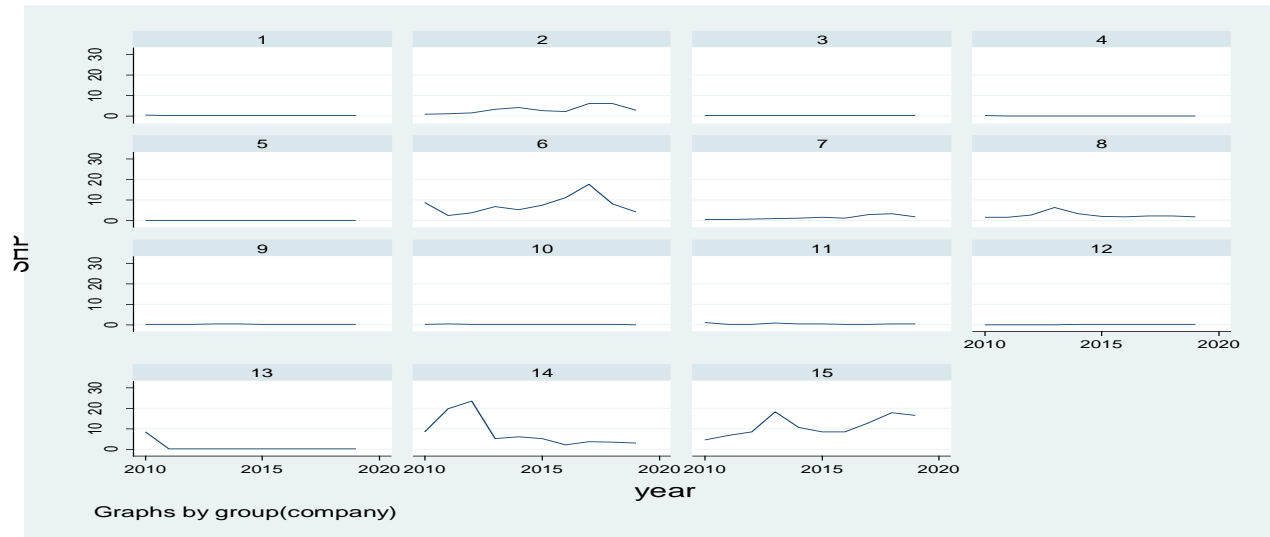
Note: 1 = Aluworks, 2 = Benso Oil Palm Plantation, 3 = Camelot Ghana, 4 = Clydestone (Ghana), 5 = Cocoa Processing Co., 6 = Fan Milk, 7 = Ghana Oil Company, 8 = Guinness Ghana Breweries, 9 = Mechanical Llyod Co., 10 = Produce Buying Company, 11 = Pz Cussons Ghana, 12 = Sam Woode, 13 = Starwin Products, 14 = Total Petroleum Ghana, 15 = Unilever Ghana.

Fig. 1: Share price trends for companies

In Figure 2, the trends of Tobin’s Q for the companies are reported. Four companies had Tobin’s Q values that changed significantly over the period, although the changes did not follow any particular trend – there were strong instability in

terms of the Tobin’s Q value for these firms. For the other firms, the Tobin’s Q value remained constant over the period, which indicates that the value did not change for the firms.

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Note: 1 = Aluworks, 2 = Benso Oil Palm Plantation, 3 = Camelot Ghana, 4 = Clydestone (Ghana), 5 = Cocoa Processing Co., 6 = Fan Milk, 7 = Ghana Oil Company, 8 = Guinness Ghana Breweries, 9 = Mechanical Llyod Co., 10 = Produce Buying Company, 11 = Pz Cussons Ghana, 12 = Sam Woode, 13 = Starwin Products, 14 = Total Petroleum Ghana, 15 = Unilever Ghana.

Fig. 2: Tobin’s Q trends for companies

The descriptive statistics for the data are reported in Table 1 where the mean and standard deviations for each of the companies, as well as for all the companies, are reported. Average return share prices for the entire sample is 2.36, with a standard deviation value of 4.35. Given that the standard deviation is much larger than the mean value, the share prices for the companies can be said to be effectively unstable over the period. Considering the mean and standard deviations for the individual firms, the high standard deviation noted for the entire sample can only be related to the heterogeneity among the firms. In terms of individual firms, Unilever had the highest share price of 11.36, while cocoa processing co. had the lowest average share price of 0.02. Average Tobin’s Q for all the companies is 1.59, suggesting relatively low performance of the firms in terms of significance in the market. This outcome justifies the flat trends noted among the companies in terms of Tobin’s Q above. Fan Milk had the highest average Tobin’s Q value at 4.6, while Aluwork has the

least Tobin’s Q value of 0.79. There is evidence that the measure of market performance did not change much among the companies as demonstrated by the respective standard deviation for the companies.

In terms of the debt-to-equity patterns, it is seen that average total debt to equity for the firms is greater for cocoa processing company and lowest for Benso Oil Palm Plantation. Average short term debt ratio is 53.53 percent while average long term debt ratio is 28.64. This implies that the companies have placed more premium on short term debt rather than long term debt. This is a rather interesting outcome given that companies often prefer to engage in long term debt contract for ease of operations. In terms of the tax shield, average debt tax shield is 2.84 while non-dent tax shield is 2.84. This implies that the firms tend to prefer to use profits to settle non-debt obligation before the remaining profit can be taxed.

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Table 1: Descriptive Statistics

COMPANY	SHP		TOBQ		STDE		LTDE		TDE		DTAX		NTAX	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Aluworks	0.12	0.09	0.79	0.13	30.54	6.08	87.43	43.54	1.71	0.64	5.06	3.36	3.11	1.45
Benso Oil Palm Plantation	3.03	1.92	1.85	0.81	8.73	3.59	1.71	2.94	0.12	0.06	0.00	0.00	0.10	0.04
Camelot Ghana	0.12	0.02	0.80	0.17	59.28	13.60	31.54	27.58	2.64	1.50	0.45	0.75	2.44	1.89
Clydestone (Ghana)	0.04	0.01	1.51	0.38	97.46	18.28	0.38	1.28	-0.07	25.96	0.00	0.00	2.08	0.55
Cocoa Processing Co.	0.02	0.00	1.16	0.11	59.81	11.67	5.71	2.42	20.30	13.71	0.29	0.62	2.17	1.71
Fan Milk	7.47	4.45	4.60	1.85	26.59	6.33	5.20	1.31	0.44	0.15	0.31	0.29	7.61	1.32
Ghana Oil Company	1.32	0.95	1.35	0.23	66.64	5.37	13.20	8.56	2.50	0.79	0.97	0.72	0.70	0.22
Guinness Ghana Breweries	2.47	1.41	2.41	1.40	38.87	15.22	80.95	62.11	1.93	1.21	7.66	4.65	11.92	7.98
Mechanical Llyod Co. Produce Buying Company	0.17	0.10	0.60	0.09	41.64	5.59	19.90	17.54	1.08	0.25	1.91	1.32	1.75	0.55
Pz Cussons Ghana	0.42	0.30	1.10	0.46	50.42	17.50	24.37	38.94	1.89	1.62	1.74	1.32	1.03	0.63
Sam Woode	0.04	0.01	1.09	0.20	71.89	15.51	89.39	58.63	5.89	4.20	5.44	4.73	3.02	1.33
Starwin Products	0.87	2.66	0.84	0.35	33.16	6.44	3.23	6.48	0.56	0.21	3.41	3.19	2.80	1.76
Total Petroleum Ghana	8.00	7.48	1.59	0.49	65.19	3.90	21.27	16.50	2.51	0.57	1.52	1.40	3.25	0.81
Unilever Ghana	11.26	4.86	3.20	1.43	68.90	14.75	13.52	8.04	3.36	1.76	1.13	0.98	0.84	0.60
All	2.36	4.35	1.59	1.28	53.53	25.28	28.64	41.22	3.52	9.07	2.84	4.88	2.89	3.72

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The initial relationships among the main variables in the study are reported in terms of scatterplots. In Figure 3, the relationship between the two dependent variables is shown. A strong positive relationship is shown between the variables for the period of the analysis. This indicates that share prices and

market value of the firms are positively related. This implies that both variables move in similar direction for the company. This outcome is to be expected, given that both variables are a reflection of the market indicator of how the firms perform at given periods.

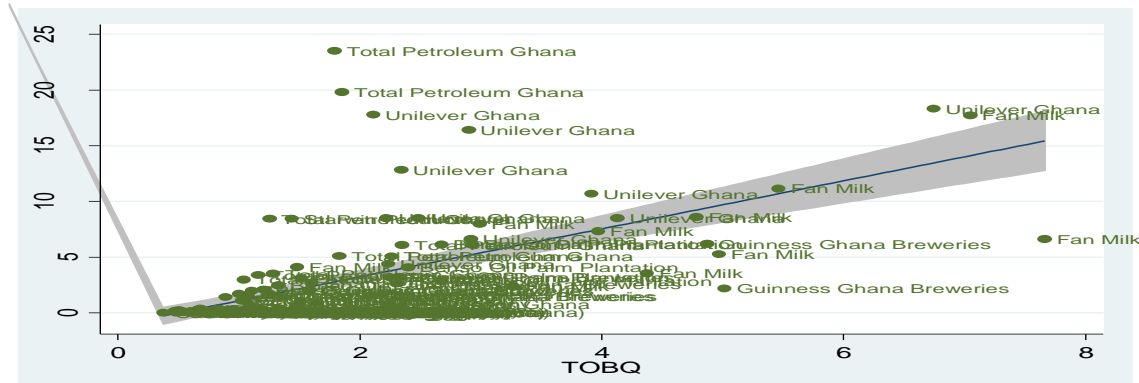


Fig. 3: Relationship between share prices and Tobin's Q

The relationship between long term debt to equity ratio and short-term debt to equity ratio is shown in Figure 4. There is no clear pattern of relationship between the variables as shown by the flat regression line demonstrated in the relationship.

This suggests that the scheduling of debt structures for the firm are not related. The companies tend to accumulate the two debt patterns at different rates and apparently based on different conditions.

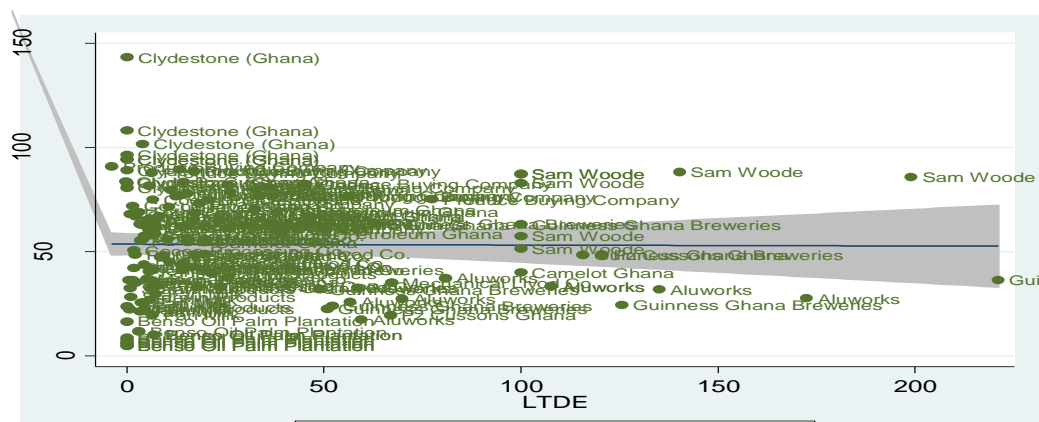


Fig. 4: Relationship between short term debt ratio and long term debt ratio

4.3 Empirical Results on the Panel Analysis

We conduct our econometric analysis to test the Miller and Modigliani theory among the companies in the sampled companies for Ghana is conducted within the panel data analysis framework. The analysis of the regression results is interested in determining the relevance or irrelevance of the Miller and Modigliani model by considering the estimated coefficients in terms of strength, significance and direction of effects on the dependent variables. As noted in the previous chapter, the nature of data used (small panel with $T = 10$ and $N = 15$) suggests that a dynamic panel data framework (based on the GMM estimates) cannot be employed in the analysis.

Hence the traditional Panel Data analysis procedure is adopted. The standard Hausman test for random effects test is used for identifying the time-varying conditions of the panel data used in the study in order to determine the method of panel analysis to be adopted. The result of the test is reported in table 2. The Chi-Square statistic for the random sections argument fails the significance test for each of the equations at the 5 percent level, implying that the null hypothesis holds, stating that a random effect actually exists in the cross sections of the data. This effectively rejects the fixed-effects estimation procedure as the best method to capture the relationships in

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the panel and indicates that the Random Effects (RE) estimates are more appropriate for the analysis.

Table 2: Hausman Test for Cross-Section Random Effects

<i>Model</i>	<i>Chi-Sq. Statistic</i>	<i>Chi-Sq. d.f.</i>	<i>Prob.</i>
Relevance			
<i>SHP</i>	5.34	6	0.5006
<i>Tobin's Q</i>	7.89	6	0.667
Non-Relevance			
<i>SHP</i>	6.11	6	0.2952
<i>Tobin's Q</i>	6.02	4	0.519

4.3.1 Empirical Test of the Miller and Modigliani Irrelevance Theory

The random effects estimates for testing the Miller and Modigliani irrelevance hypothesis is analysed in this section. The random effect estimates are also checked for robustness using the panel data OLS estimates in order to observe the consistency of the coefficient estimates across different estimation processes. In the result in Table 3, the goodness of fit statistics for both the share price and Tbin's Q equations are

essentially impressive based on the fact that a panel data framework is being deployed in the analysis (Iyoha, 2004). More importantly, Wald test of significance indicates that the overall estimates are significant at the 5 percent level. This suggests a significant relationship between the dependent variable and all explanatory variables combined. This also shows that firm value is effectively explained by debt dynamics and firm characteristics.

Table 3: Test of Miller and Modigliani Irrelevance Hypothesis

Variable	<i>Dep variable = share price</i>			<i>Dep variable = Tobin's Q</i>		
	Coef.	z	P> z 	Coef.	z	P> z
STDE	0.017	0.940	0.35	0.009	1.670	0.09
LTDE	-0.013	-1.620	0.11	0.000	-0.020	0.99
TDETE	-0.023	-0.790	0.43	-0.005	-0.590	0.55
FS	0.909	0.950	0.34	-0.430	-1.320	0.19
FG	0.025	3.350	0.00	0.003	1.430	0.15
FA	0.093	1.000	0.32	0.018	0.620	0.53
cons	-4.244	-1.040	0.30	2.858	2.110	0.04
R-sq	0.295			0.015		
Wald	15.05 (0.013)			11.43 (0.048)		

The test of the hypothesis is based on the outcomes of the three debt ratio variables (STDE, LTDE and TDETE). For the share price model, the coefficients of all the debt ratio variables fail the significance test at the 5 percent level. This indicates that the structure of debt to equity considerations do not affect the share price of the companies in the stock market. For the Tobin's Q estimates, the coefficients of the debt ratios also fail the significance test at the 5 percent levels. This means that the debt ratios also have no significant impact on

firm value. Essentially, the results have demonstrated it does not matter how debt is being structured in relation to equity, market value does not respond. Indeed, increasing debt over equity or equity over debt is not a major factor in explaining the value of the firms. The results also highlight the irrelevance of the debt structure in terms of short-term or long-term. This has particular implications given that firms are shown to be capable of maintaining substantially stable value in the market, irrespective of the debt pattern it adopts.

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Perhaps investors are impervious to the debt characteristics of the firms and they do not consider debt repayment systems in their valuation of the firms in the sample. The results therefore confirm the irrelevance of the Miller and Modigliani stance in terms of debt-equity relationship and firm values based on the Ghanaian market.

Only firm growth (FG) appears to be significant among the control variables. This shows that a firm growth prospect is a critical factor that determines the value of the firm in the market. Essentially growth prospects from the estimates, are considered to be more important than the current size of the firm in determine investor participation and valuation in the

market. It does appear that investors are more forward-looking, as expected in most markets.

In terms of robustness, the equations were estimated using the OLS technique and the results are presented in Table4. The F-values for the estimates are significant at the 5 percent level. Thus, a significant overall relationship is established between the dependent and independent variables. In the result, the coefficients of all the debt ratio variables fail the significance test at the 5 percent level for both the share price and Tobin’s Q estimates. This shows that the results obtained earlier are robust to estimation procedure. Apparently, there is strong evidence of irrelevance on the Miller and Modigliani hypothesis based on the Ghana data.

Table 4: Robustness Checks for Irrelevance Estimation

Variable	<i>Dep variable = share price</i>			<i>Dep variable = Tobin’s Q</i>		
	Coef.	t	P> t	Coef.	T	P> t
STDE	0.014	1.130	0.262	-0.001	-0.350	0.728
LTDE	-0.026	-1.500	0.261	-0.005	-1.170	0.132
TDETE	-0.053	-1.550	0.124	-0.012	-1.070	0.287
FS	1.134	2.600	0.010	0.149	1.040	0.300
FG	0.035	3.680	0.000	0.006	1.740	0.083
FA	0.261	4.740	0.000	0.060	3.290	0.001
cons	-7.659	-3.670	0.000	0.077	0.110	0.911
Adj R-sq	0.301			0.122		
F(6, 142)	11.61			4.42		

4.3.2 Empirical Test of the Miller and Modigliani Relevance Theory

The Miller and Modigliani Relevance hypothesis is more relatable when the tax shield concept is evaluated. Hence, the estimation of the test is based on explanatory variables that are

more related to tax shield. The results of the estimations are presented in Table5. In the estimates, the R-squared values are essentially good and the Wald test statistics are impressive (pass the significance test at the 5 percent level). Thus, the model exhibits impressive overall performance.

Table 5: Test of the Miller and Modigliani Relevance Hypothesis

Variable	<i>Dep variable = share price</i>			<i>Dep variable = Tobin’s Q</i>		
	Coef.	t	P> t	Coef.	t	P> t
DTAX	-0.105	-1.610	0.11	-0.021	-1.130	0.26
NTAX	0.024	0.250	0.81	0.100	3.560	0.00
EFFT	0.000	-0.180	0.86	0.000	-0.460	0.65
FG	0.025	3.270	0.00	0.002	0.990	0.32
FS	0.931	0.970	0.33	-0.075	-0.250	0.81
FA	0.098	1.030	0.30	-0.007	-0.240	0.81
cons	-3.743	-0.970	0.33	1.835	1.510	0.13
R-sq	0.306			0.155		
Wald	14.98 (0.020)			17.82 (0.00)		

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In terms of the test in particular, the results in Table 5 shows that the coefficients of the debt tax shield variable (which relates to the interactive factor between taxes and debt ratio) fails the significance test at the 5 percent level. This outcome is the same for both equations, indicating that tax shield arising from the structure of debt in the firms does not count for firm value among the firms. In the same vein, the coefficient of the tax shield is negative. Indeed, it is the coefficient of the non-debt tax shield that is significant in the Tobin’s Q model. When considered against the background that that the coefficient of the debt tax shield needs to be positive and significant for the Miller and Modigliani relevance hypothesis to hold, then the results from this study has fully shown that the relevance hypothesis does not hold for companies in Ghana. It should be noted that companies that have high leverage of debt tend to enjoy of tax shield (tax deductibility). This empirical finding cannot confirm the case

that such benefits are being reflected in the value of the firm. More broadly speaking reliance on debt for tax applications does not affect the value of the firms. Hence, the Miller and Modigliani relevance theory is shown to be non-existent for the firms. Like in the previous estimates, only the coefficient of firm growth is significant among the control variables, suggesting that prospects of the firms are critical for firm value in the market.

The result for the robustness check is shown in Table 6. The results are very similar to the baseline estimates in terms of signs of the coefficients. Although the coefficient of the debt tax shield is significant at the 5 percent level for both equations, the sign is negative instead of the expected positive sign. This confirms that outcome of the baseline equation (which found no evidence of the Miller and Modigliani relevance theory) holds irrespective of estimation procedure.

Table 6: Robustness Check – OLS

Variable	Dep variable = share price			Dep variable = Tobin’s Q		
	Coef.	t	P> t	Coef.	t	P> t
DTAX	-0.243	-3.830	0.00	-0.070	-3.650	0.00
NTAX	-0.011	-0.120	0.90	0.133	5.000	0.00
EFFT	-0.001	-0.840	0.40	-0.001	-1.040	0.30
FG	0.036	3.730	0.00	0.004	1.450	0.15
FS	1.399	3.250	0.00	0.308	2.370	0.02
FA	0.234	4.130	0.00	0.024	1.390	0.17
Cons	-7.950	-4.320	0.00	-0.513	-0.920	0.36
Adj R-sq	0.296			0.260		
F(6, 142)	11.45 (0.00)			9.03 (0.00)		

5.0 CONCLUSION

In this study, the test of the Miller and Modigliani relevance and irrelevance tests is conducted for 15 companies in Ghana for the period 2010 to 2019. The goal is to examine whether debt to equity patterns of the firms influence the value of the firms in the markets or whether tax shield provided from debt accumulation improves the firms’ value. The result from the empirical analysis showed that neither the irrelevance nor the relevance theory is prevalent among the Ghanaian companies over the period of the analysis. In particular, the study finds that debt structure does not influence firm value (the use of long term or short term debt pattern does not matter for firm value). The result also shows that debt to equity ratio does not influence firm performance. Moreover, tax shield from use of

debt is shown to have no significant influence on the changes in firm value.

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