THE IMPACT OF FINANCIAL STRUCTURE ON PROFITABILITY OF FIRMS: A CROSS-SECTIONAL INDUSTRY ANALYSIS OF NIGERIAN QUOTED FIRMS

EKUMANKAMA Ogbuagu. O*

Abstract

This study empirically examines the impact of financial structure decision on the profitability of Nigerian quoted firms. Cross-sectional time series data of 72 Nigerian quoted firms were collated and analysed. Two hypotheses were proposed for the study, while the ordinary least square (OLS), fixed-effects (FE) and the gerneralised least square (GLS) regression were used on pooled and panel data to estimate the relationship between financial leverage and the different measures of profitability in Nigeria quoted firms. In determining the extent of the influence of leverage on the dependent variables, most of the industrial groups showed evidence of sizable positive influence of leverage on profitability and earnings yield. This was significant and robust with all the measures of leverage.

Keywords: Listed Firms, Nigeria, Cross-Sectional Analysis, Finance

**lecturer in Banking and Finance Department, Federal Polytechnic Nasarawa, Nigeria, fellow of the African Institute of Applied Economics*
Email: ikposonu@yahoo.com

This paper is part of a doctoral dissertation of the author, in the University of Nigeria Enugu campus.

Introduction

One of the central issues in both the theory and practice of financial management is the problem of determining the optimal capital structure of the firm. Given capital market conditions and the array of investment opportunities, is there some optimal composition of liabilities and equity at which the value of the firm will be maximized? (Wippern, 1966). Extant theories of capital structure and financing decisions of firms' suggest that there is an optimum financial structure, upon which a firm maximizes her value (Myers, 1984; Masulis, 1983; Taggart, 1977; Miao, 2005; Wippern, 1966; Miller, 1977). They also suggest that debt-equity mix has implications for the shareholders' earnings and risk, which in turn, affects the cost of capital and the market value of the firm (Pandey, 2002). This is further supported by Abor (2005) assertion that capital structure decision is important to a firm because of the need to maximize returns to various organizational constituencies – returns in the forms of after-tax profits and shareholders' returns in relation to market value of the shares.

The various means by which a firm is financed is known as the financial structure of that firm (Pandey, 2002). It could be by increasing creditors' claims, issuing more equities or retaining earnings. The debt-equity mix of a firm is called its capital structure, while the term financial structure is used in a broader sense to include equity and all liabilities of the firm (ibid). Theory posits that the financing structure of a firm affects shareholders' return and risk, and consequently, the market value of shares (see for example, Masulis, 1983; Modigliani and Miller, 1958, 1963 and 1966; Miao, 2005; and Pandey, 2002), hence its significance in corporate financing decision. The difference between financial structure and capital structure lie in the tenor of the fixed-commitment financing. Traditionally, short-term borrowings are excluded from the list of methods of financing a firm's capital expenditure (Pandey, 2002). However it should be borne in mind that the management of both long-term and short-term financing is equally important to the survival of a firm, though they may differ theoretically – the neglect of either could spell doom for any firm. In most cases, the lack of working capital has resulted to liquidation of firms due to illiquidity. Secondly both short-term and long-term financing have effects of risks and returns on the firm.

Furthermore, it should be borne in mind that availability of sources of financing are jurisdictional, being influenced by the market conditions prevalent in each corporate jurisdiction. Empirical studies to this end abound. Borio (1990) for instance, classifies Japanese and Continental Europe firms as high leveraged firms, while the Anglo-American firms were classified as low leveraged firms. Rutherford (1988) using Organisation of Economic co-operation and Development (OECD) data presented evidence

that firms in France, Germany and Japan are more highly levered than United States, and United Kingdom firms. The economics explanation to the differences in the pattern of leverage in the different corporate jurisdictions could be explained by the extent and nature of financial intermediation, differences in institutional structures governing bankruptcy and debt negotiation, and differences in the market for corporate control (Borio, 1990, Frankel and Montgomery, 1991 and Berglof, 1990).

In the Nigerian corporate jurisdiction, it was noticed that due to institutional, market and cultural constraints, Nigerian firms seem to patronize the short-term end of the financial markets more than the longer-term end. It was also noticed that most of the firms that closed shop in Nigeria, did so for lack of working capital, rather than long-term finances (Glen and Pinto, 1994; Adelagan, 2007; Ezeoha, 2007). Furthermore, Booth, Aivazian, Demirgűç-Kunt, and Maksimovic (2001), notes that the major difference between developing and developed economies is that developing ones have substantially lower amounts of long-term debts. This also was consistent with the findings of Demirgűç-Kunt, and Maksimovic (1999). This has the implication of limiting the explanatory power of capital structure in developing economies, if short-term debts are removed from the aggregates. This informs why this study will therefore follow the pattern of earlier studies by using total debt to total capitalisation as the major measure of leverage, while using other measures of leverage for robustness tests.

This study is peculiar for some obvious reasons. First, there has been no known empirical study on the subject matter for the Nigerian corporate jurisdiction, though Nigeria occupies a place of pride in the West African sub-region and African region generally. Secondly, Nigeria poses a puzzle on the corporate financing pattern and corporate productivity, if viewed from the perspectives of liberal tax shield, lavish investment incentives and a friendly income tax regime (Adelagan, 2007; FIRS, 2002 as amended), which should enhance corporate profitability. Therefore this paper examines the impact of corporate financial structure on the profitability of Nigerian quoted firms. The rest of the paper is organized in four sections. Following the introduction is the theoretical and empirical review of related studies; next is the description of the data and the methodology of the analysis; this is followed by the analysis and results interpretation, and finally the concluding section.

I. Theoretical and Empirical Review

There is an extensive theoretical literature concerning optimal capital structure (see for example Modigliani and Miller, 1958 & 1963; Kraus and Litzenberger, 1973; Scott, 1976; Miller, 1977; and DeAngelo and Masulis, 1980, Miao, 2005; Bosshardt, 2003). However, there is little empirical evidence of a relationship between changes in capital structure and firm value (Excepting for a few like, Wippern, 1966; Masulis, 1983; Miao, 2005, Abor, 2005, Adelagan, 2007). In the best known test of an optimal capital structure model, Modigliani and Miller (1963) report evidence of a positive relationship between firm value and leverage which they attributed to a debt tax shield effect. According to Masulis (1983), their results appear suspect, because of seeming statistical problems they encountered when attempting to adjust for differences in the firms' asset structures. Secondly, since only regulated firms were examined, there was also some concern that their empirical findings were caused by some other extraneous variables like the regulatory environment in which these firms operated. No strong evidence of a relationship between a firm's value and the size of its debt tax shield has been uncovered since the Miller-Modigliani (1963) study.

Both theory and empirics show that financial structure has some influence on the firm value. Financial leverage at first sight provides the potentials of increasing both returns and risks for shareholders (Wippern, 1966; Masulis, 1983; and Rajan and Zingalese, 1995). According to Pandey (2002) the role of financial leverage in magnifying the return of the shareholders is premised on the assumptions that the fixed-charges funds can be obtained at a lower cost than the firm’s rate of return on net assets.

Conventional capital structure theories (Myers, 1977; Jensen, 1986) suggest that firms’ optimal capital structure is related to costs and benefits associated with debt and equity financing. With the optimal debt-to-equity mix, firms could achieve the lowest financing costs and consequently increase the value of shareholders (Sheel, 1994). Although the optimal mix varies from industry to industry (Kim, 1997) and from country to country (Wald, 1999); the financing structure puzzle is even more complicated in developing countries, where markets do not always work efficiently, and controls and institutional constraints abound (Glen and Pinto, 1994). It is further reported that the banking system of the developing countries are incapable of providing the needed resources for private sector expansion, due mainly to government interventions, uncertain macroeconomic environment, and high reserve requirements which leaves the banks with little percentage of their deposits to lend freely.

The controversy over the optimal capital structure question however focuses on the effect of the addition of non-equity financing on the quality of the firm's earnings and, thus, on the rate at which the earnings are capitalized. Does the addition of a moderate amount of fixed commitment financing result in demands by shareholders for an increase in the risk premium component of equity yields sufficient to offset the incremental earnings derived from the new financing? Wippern (1966) notes that if investors respond in the above manner, the value of the firm remains unaffected by changes in financial

structure and it may be concluded that financial structure is of no consequence in a firm's attempts to achieve the objective of wealth maximization for its stockholders. However if the increase in yield demanded by shareholders is either more or less than sufficient to offset the advantages of incremental earnings derived from additional non-equity financing, then financial structure will have an important effect on the value of the firm. In this latter case, financial structure decisions become important variables in pursuing the goal of maximization of shareholder wealth (Wippern, 1966).

A complex set of decisions creates a firm's capital structure. Capital structure dictates the funding sources tapped by the company and allocates risks and control rights to various parties. Pursued wisely, capital structure decisions should enhance value in financial markets (Chaplinsky, 1996). The modern traditional view of financial structure builds on M-M's theory, but concludes that a firm can pick an optimal mix of debt and equity by focusing on the tradeoffs between the tax benefits of debt and the potential costs of financial distress.

Previous researchers have constantly found capital structure theories applicable when explaining financing decisions (Tang and Jang, 2006). Since Modigliani and Miller's (1958) capital structure irrelevance proposition, researchers have searched for capital structure explanations primarily within the context of firm boundaries that are determined by explicit contracts among stakeholders; including shareholders, debt holders, managers, and the government. The research in this stream of literature provides important insights into the effects of taxes, bankruptcy costs, information asymmetries, agency issues, and other frictions on corporate leverage decisions. (Kale and Shahrur, 2007).

Other capital structure studies have also focused on the tax advantages of debt (Modigliani and Miller, 1963), the choice of debt levels as a signal of firm quality (Ross, 1977; Leland and Pyle, 1977), the use of debt as an anti-takeover device (Harris and Raviv, 1988), agency costs of debts (Jensen and Meckling, 1976; Myers, 1977) and the role of debt in restricting managerial discretion (Jensen, 1986). The major work on the relationship between financial structure and the value of the firm are those by Nielsen (1961), Wippern (1964 & 1966), and Masilus (1983) which were mainly based on the United States environment. Yet the results of these studies yield to further controversies, either by the different variables used or by the statistical treatment of these variables. When checked against the main stream study by M-M (1963), there are usually some disagreements. However, financial structure is known to have different effects and impacts on a firm. For example, financial structure has been known to have impact on firms' financial constraints (Baum, Schafer and Talavera, 2009), on growth (Liu and Hsu, 2004), on profitability (Abor, 2005), and on the value of the firm generally (Wippern, 1966; Adelagan, 2007; Masulis, 1983).

The controversy whether there is an optimum financing structure upon which a firm can maximize her value has endured over the years. Some normative views have also been presented in literature, like the traditional static trade-off theory, the M-M Non-relevance theory (1958), with latter modifications; Donaldson (1961) and Myers (1984) Pecking Order theory, and Miller (1977) Neutral Mutation theory, Jensen and Meckling (1976) Agency Cost theory. The normative solutions as presented by the various theories hinge on efficiency, the investors, and the agents perception. The controversy over the optimal capital structure focuses on the effect of the addition of non-equity financing on the quality of the firm's earnings and, thus, on the rate at which the earnings are capitalized (Wippern, 1966).

There appears to be a surfeit of empirical studies on the determinants of capital structure, financing decisions, and related issues (see for example, Titman and Wessels, 1998; Brounen, Jang and Koedijik, 2006; Booth, Aivazian, Demirguc-kunt, and Maksimovic, 2001; Rajan and Zingales, 1995; Taggart, 1977; etc). Studies on the effects of these decisions on the value of the firm and shareholders wealth are relatively scanty, whether country-specific or industry-specific studies. According to Elkelish and Marshall (2007) there seems to be no agreement among researchers about the impact of these decisions on the value of the firm in practice. The famous "irrelevance" propositions by Modigliani and Miller (1958), which state that the overall market value of any firm is completely independent of its capital structure, and that the expected rate of return on the common stock of a geared firm increases in proportion to the debt/equity ratio, have received some empirical support (See Carpentier and Suret, 2001). However, these propositions are widely claimed to be impractical due to the existence of some capital market imperfections (See Bradley et al., 1984).

Data and Methodology

A sample of seventy-two (72) firms from fifteen (15) industry classifications were used, from a population of 212 quoted firms in the Nigerian Stock Exchange. It should be noted that leverage studies after the M-M studies exclude firms in highly regulated industries like: public utilities, financial services, etc. (see for example, Wippern, 1966, Masulis, 1983, Rajan and Zingalese, 1995, Pandey, 2001, Miao, 2005, Abor, 2005 and Ezeoha, 2008). Thus this study drew her sample from industries whose financial structures are not influenced by explicit regulations, in keeping with prior studies. Both the random sampling and non-random sampling methods were employed to arrive at the sample selection. The samples selected were based on the following criteria: Firms in sectors other than

finance sector, Power and Steel, Petroleum; and firms quoted in the second tier/emerging market; Firms whose financial reports were consistently published for the period of the study, as to reduce missing values. The time frame spans from 1997 to 2007 (see appendix for the list of the industry classifications). This method of sample selection appears to be favoured in financial structure (leverage) studies (see for instance, Masulis, 1983; Rajan and Zingalese, 1995; Miao, 2005; Abor, 2005; Pandey, 2001; Ezeoha, 2008).

Thus the relevant data were collected from the annual reports and accounts of the various companies, under study; Nigerian Stock Exchange (NSE) yearly fact books covering the period of study, and the NSE daily summaries of stock price movements. Such reports and accounts are believed to constitute the most authoritative and accessible documents for assessing the performances of the affected firms. This is because, the Nigerian Stock Exchange is a reliable source of data for quoted firms, and because the quoted companies are required to mandatory submit their financial statements to the Stock Exchange, on quarterly and bi-annually basis.

The study is designed to use econometric models in the analysis. It is also designed to be both a time serial and cross-sectional study, which by implication means the use of panel data. The use of panel data is justifiable, because it overcomes some limitations of using either time series or cross-sectional analysis (Ezeoha, 2008, Kennedy 2003, and Torres-Reyna, undated). In a bid to further validate the reliability of the results, the following tests were carried out: *Hausman's Specification Tests* which determined the suitability of either the fixed effect (FEM) or random effect (REM) panel data model in running the panel test. The *Multicollinearity and Autocorrelation Diagnostic Tests* were also carried out. Both the STATA and SPSS packages were used in running the panel and pooled data tests, respectively.

Description of Research Variables

Due to the aggregate implications of leverage on the firm – risk-return and solvency-takeovers (Miller, 1977; Jensen and Meckling, 1976; Pandey, 2002; and Miao, 2005), this study therefore analyses the implications of leverage on the financial returns of firms – profit after tax (PAT) and earnings yields. In all cases the profitability measures is the regressand, while the leverage measures is regressor. This is in line with works of Allayannis, Brown and Klapper (2003), Wippern (1966), Miao (2005), Masulis (1983), Rajan and Zingalese, (1995), Abor (2005) and Pandey (2004).

Still in keeping with prior studies, total liability/total capitalisation is used as the major leverage measure, while the narrow definitions of leverage are used for robustness test. Other variables which are believed to have an influence on the explained variables will also be introduced, along side a multiple regression that will include other intervening variables (see for instance, Ezeoha, 2007; Abor, 2005; Babosa and Moraes, 2003; Allayannis, Brown and Klapper, 2003; Pandey, 2001; Rajan and Zingalese, 1995; Masulis, 1983; De Angelo and Masulis, 1980).

Both the market values and the book values will be used where applicable. Both measures however have their own constraints. The market value to financial leverage theoretically appears a more appropriate measure under certain market conditions, since they reflect the investor's current attitude. (Pandey, 2004; Wippern, 1966). However, the biases posed by this measure could be noticed in the area of determination of securities prices. It is generally recognized that the market values of the securities of a firm is a function of a number of variables, other than the financing structure alone; also market values of securities fluctuate quite frequently coupled with the fact that it is difficult to extract reliable information on market values, in practice. This is more so, when the market is far from being perfect (Wippern, 1966, Pandey, 2004). Thus, the above two constraints in the use of market values yield to statistical biases. This was also noticed by Modigliani and Miller (1958).

As regards the use of book value in leverage measurement, it shows the relationship between the par value of debt after adjusting for unamortized discounts or premiums, to the amount of equity as determined by the historical costs of assets less the book value of outstanding debts (Wippern, 1966). Its use as a measure of financial risk implies that it is most relevant in determining lenders' and investors' claims to the earnings stream of the firm. This is so, if it is assumed that the risks of fixed-commitment financing arises solely due to the expected losses in liquidation, which is reflected in the book values

To overcome this seeming limitation, this study used both the market and book values, so as to make a more rigorous analysis and study. This is consistent with like studies (see for instance Masulis,1983; Miao, 2005; Abor, 2005; Pandey, 2001; Ezeoha, 2007).

Definition of Variables

In line with the objectives of this study and in line with some earlier studies (Masulis, 1983; Miao, 2005; Abor, 2005; and Pandey, 2001), the following variables were adopted as proxies for the study.

Dependent Variables

The value of the firm is the function of two variables – the expected earnings stream from the assets and the rate at which the market capitalizes that stream. A measure of the cyclical variability of past earnings is one of the parameters most widely used as a basis from which inferences are made regarding the

uncertainty of the receipt of future earnings (Wippern, 1966). This is because one of the principal undesirable effects of financial leverage is that it increases the variability of the income stream of the stakeholder. This degree of variability in gross income stream is often cited as a major determinant of the amount of fixed charge financing that may be undertaken by a firm (see Farrar, 1962; Wippern, 1964 & 1966; and Pandey, 2002).

Earlier studies have used some treated performance indicators as dependent variables in financial structure studies. Variables like ratios of dividend to market price (dividend yield) and earnings to market price (earnings yield) (Modigliani and Miller, 1958; Wippern, 1966). This study however used the normalized performance indicator (PAT), in addition to the one previously used (earnings yield). This adaptation is so as to permit scholarly comparisons with previous studies, in addition to making further contributions to the discussion on financial structure studies currently raging. Below are the dependent variables used for this study:

PAT = EBIT – (INT + taxes) …… 1a

The major reason for introducing fixed-commitment financing is to enhance the earnings capability of the firm, which derives from its tax-shield benefits. This justifies the use of PAT as a dependent variable in a study of this nature.

Earnings yield = EPS/MV per share ……..…….. 1b

The above variable evaluates the shareholders return in relation to the market value of the share (Pandey, 2004), thereby being of interest to investors in the stock market.

The market value shall be measured by the mean of high-low share prices for the chosen and available data set, in line with Wippern (1966). The least square (ordinary or generalised) were used for the regression analysis.

Explanatory Variables

Leverage, as noted by Rajan and Zingales, (1995), can de defined in different ways, the definition depending on the objectives of the analysis (see also Aghion and Bolton, 1992 and Wippern, 1966). This study however, adopted the total liability/total capitalisation as the major proxy for leverage, while the other proxies were adopted for further tests of robustness.

Therefore the proposed leverage ratios are:

Total liabilities to total capitalisation (TL/TC) …….. 2a
Long-term debts to total capitalisation (LD/TC) …… 2b
Short-term debts to total capitalisation (SD/TC) …… 2c

As had earlier been stated, firm size and growth was introduced in line with the recommendations of the previously mentioned works, as control variables, as is discussed below.

Firm Size

It should be noted that the log of sales, log of total assets, and the log of net assets are commonly used measures for firm size (Wippern, 1966; Abor, 2005; Pandey, 2001; Booth et al, 2001; Schoubben and van Hulle, 2004; Padron, Apolinario, Santura, Martel and Sales, 2006; Ezeoha, 2007). This could be explained, because both size and market dominance (sales) are related in effect. This study, however adopted the use of log of net assets as proxy for firm size. This is in line with the proxy used by Wippern (1966). The choice of net assets by this work is premised on the following: It is the net assets that stakeholders have recourse, in the event of liquidation. Additionally, works of comparable study also made use of the net asset as the proxy for firm size; and since total assets are determined in part by the firm's leverage ratio, there is the likelihood of bias due to reverse causality, if total assets are used as proxy for firm size.

Thus this study defines firm size as:

Firm Size = logarithm of net assets (logN/A) ……..…… 3a.

Growth Rate

Theoretical studies generally suggest growth opportunities are negatively related with leverage. Indicators of growth include capital expenditures over total assets (CE/TA) and the growth of total assets measured by the percentage change in total assets (GTA) (Haung and Song, 2006). Since firms generally engage in research and development to generate future investments, research and development over sales (RD/S) also serves as an indicator of the growth attribute (Titman and Wessels, 1988). Other measures of growth are sales growth (Wald, 1999), Tobin's Q (Rajan and Zingales), and

market-to-book ratio of equity (Booth, Demirgűç-Kunt and Maksimovic, 2001)

However, a comparable study by Wippern (1966) used the mean, of the slopes of logarithmic regressions of earnings per share on time over a ten-year and a four-year period as proxy for growth rate. But considering the fact that not all growth translates to increase in earnings per share and vice versa, this study used the percentage change in total assets as proxy for growth rate. Thus the growth could be written as:

Growth Rate = Percentage change in total assets (%▲TA) ……. 3b

4.0 Regression Results and Interpretation

4.1 Introduction and Hausman Test

The various regression results used in validating the hypotheses set forth for this study are presented and discussed under this section. Included in the regressions are the OLS pooled and GLS panel regression estimates (run with the intent to correct possible heteroscedaticity), used in the validation of the two hypotheses formulated for this study. Furthermore, the OLS fixed and random effect panel regression together with the Hausman test, used to determine the suitability of either the fixed or random effect regression models were also presented and discussed. The results were also subjected to collinearity and serial autocorrelation diagnostic tests, which is discussed alongside the regression analyses.

Two hypotheses were formulated, to test the impact of leverage on profitability, using the broad definition of leverage (see equation 2a above) as the major estimation model and adopting other definitions of leverage (see equations 2b and 2c above) for robustness test. Furthermore, since the study is a cross-sectional industry study of Nigerian quoted firms, leverage effects were also tested and reported along industry patterns. Therefore each hypothesis is presented along industry patterns and all-sample pattern to help in the achievement of the objectives of the study.

For easy understanding and flow of the study, regression results of each hypothesis is presented and discussed. The Hausman's test of determining the suitability of either the fixed or random effect is presented first. In all the Hausman tests for the pooled and panel regression showed preference for the fixed effect estimates rather than the random effect estimates. Below is a typical Hausman test for the main definition of leverage effect.

Table 1. Hausman Test for Fixed and Random Effects

	Coefficients		
	Within-Groups (fixed effects model) (b)	Generalised Least Square (Random effect model) (B)	Difference (b)-(B)
TL_TC	.0654365	.0865964	-.0211599
LogTA	.2668741	.3834657	-.1165916
ChangeTA	-.0000191	-.0000163	-2.77e-06

χ^2 = (b-B)*[(v_b-v_B)^(-1)](b-B) = 29.22
Prob> χ^2 = 0.0000
Test: Ho: difference in coefficient not systematic.

4.2 Regression Results

This section discusses the OLS regression results for the various sampled industrial groups and the pooled all-sample OLS and GLS regression results, together with the robustness test conducted for all-sample result. The hypotheses validation follows each regression result. It was noticed that the model and the variables used in the regression fits very well as could be seen from the correlation coefficient (R) between the observed and predicted values of the dependent variable (see appendix for the complete result). Of interest therefore in this section is to determine the level of influence the independent variables have on the dependent variables, and to check it against the backdrop of other diagnostic tests.

4.3 Relationship between Financial Leverage and Profit after Tax

The relationship between financial leverage and profit after tax are positive across the sampled industrial groups (see table 2 in appendix), what then is of interest therefore, is the degree of the of the relationship. To determine this, the R^2 which is the coefficient of determination and the adjusted R^2 were used. The R^2 which is the goodness-of-fit measure of a linear model, sometimes called the coefficient of determination, is the proportion of variation in the dependent variable explained by the regression model. While the adjusted R^2 tends to optimistically estimate how well the model fits the population. The model usually does not fit the population as well as it fits the sample from which it is derived. The adjusted R^2 therefore attempts to correct R^2 to more closely reflect

the goodness of fit of the model in the population. Other statistics as shown on the table will also enhance the discussion as it progresses.

From the result in table 2 (see appendix), it could be seen that the coefficient of determination for most of the industrial groups indicate that, to a large extent, profitability of Nigerian firms are explained by leverage (broadly defined). The results show that industries in the agriculture, automobile, breweries, construction, health care, and packaging sectors; have there profitability explainable by leverage to the tune of between 50 percent to about 70 percent, though they were not statistically significant, excepting for the automobile industry whose significance level was (.040). Other industrial groups had their coefficient of determination range between (.261) and (.498), excepting for the computer industrial group that had as little as (.098). When these results were adjusted to take cognisance of the within-samples the influence ranged between twenty-six percent and sixty percent, for the earlier industrial groups mentioned. When all the firms sampled for the study were considered, the influence of leverage on profitability was statistically significant, and could explain about 16 percent of there profitability.

The issue of the results being statistically non-significant could be explained by the time serial nature of the data, which indicates that the relationship is not time-serially linear in nature. What this means is that profitability could be explained by leverage. This however is consistent with both theory and empirics, which show that financial leverage provides the potentials of increasing both risks and returns of the firm (Wippern, 1966; Masulis, 1983; Rajan and Zingalese, 1995). This is true when checked against the backdrop of the fact that interest-yielding debts, like bank credits are tax deductible, thereby having the ability to boost the profit after tax (which was used as proxy for profitability). This argument is consistent with the report of Miller and Modigliani (1963), who reported evidence of a positive relationship between firm value and leverage, which was attributed to debt tax shield.

The regression results, when subjected to collinearity tests, show that there were no multi-collinearity problems. This is explained by both the tolerance levels and the variance inflation factors. The tolerance level is the statistic used to determine how much the independent variables are linearly related to one another (multicollinear). The proportion of a variable's variance not accounted for by other independent variables in the equation. A variable with very low tolerance contributes little information to a model, and can cause computational problems (values are usually between 0 and 1); while the VIF is the reciprocal of the tolerance. As the variance inflation factor increases, so does the variance of the regression coefficient, making it an unstable estimate. Large VIF values are an indicator of multicollinearity. As could be seen from table 2 (see appendix), the tolerance levels are high, while the VIF levels are low (below 4.00, as against the 10.00 limits).

Both the t values and the DW test show that regression results are consistent with the interpretations – that the coefficients of determination were in the main not significant, excepting for the all-sample regression and that of the automobile industrial group. The t statistic is used to test the null hypothesis that there is no linear relationship between a dependent variable and an independent variable. When the significance level is small (less than 0.10) the coefficient is considered significant. On the other hand DW test is a test for serially correlated (or autocorrelated) residuals. One of the assumptions of regression analysis is that the residuals for consecutive observations are uncorrelated. If this is true, the expected value of the Durbin-Watson statistic is about 2. However, any sign of serially correlated residuals is not supposed to pose a threat to the regression result, since they are covered by the stochastic disturbances (the *U* in the equations).

Validation of Hypothesis One

> Ho: The Profit after Tax (PAT) of Nigerian firms is negatively and significantly related to the degree of firm's financial leverage.
> Ha: The Profit after Tax (PAT) of Nigerian firms is positively and significantly related to the degree of firm's financial leverage.

To validate the above hypothesis the F – test in the regression result will be used. F – The ratio of two mean squares. Usually, when the F value is large and the significance level is small (typically smaller than 0.05 or 0.01) the null hypothesis can be rejected **(reject Ho if $F > F_{0.05}$)**. In other words, a small significance level indicates that the results probably are not due to random chance.

Furthermore, the results of both the OLS pooled regression and the GLS panel regression will also be presented and used in the validation of the hypotheses. It should be borne in mind that the total liability measure is the major explanatory variable, while the other measures are for robustness test; this will be applicable in the remaining tests.

The hypothesis test model is stated thus:

$$\mathbf{PAT = b_0 + b_1 Leverage + b_2 Size + b_3 Growth + u} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Table 3. Hypothesis One Result

OLS Pooled Regression			GLS Panel Regression		
	R^2	F		R^2	F
TL/TC	.159	43.640 (.000)*	TL/TC	.1548	42.75 (.0000)*
LTD/TC	.165	45.574 (.000)*	LTD/TC	.1583	43.85 (.0000)*
STD/TC	.160	43.854 (.000)*	STD/TC	.1553	42.91 (.0000)*

* All figures in parenthesis are the significant values of the F statistic.
OLS had k-1 = 3; n-k = 690; while in GLS it is k-1 = 3 and n-k = 700
Source: From both the SPSS and STATA regression results.

Interpretation

From the results of the hypothesis as presented in table 3 above, it could be seen that all the coefficients of determination are positive, while all the F statistics are large with very low significant values, at the (0.05) level of significance; thus being interpreted to mean that **profit after tax (PAT) of Nigerian quoted firms are positively and significantly related to financial leverage**. This result is robust in all the measures of leverage and is consistent with both theory and empirical findings, as had been earlier stated in the discussion of the regression results (see Miller and Modigliani, 1963; Wippern, 1966; Masulis, 1983; Rajan and Zingalese, 1995).

When the result is checked with the F distribution table, it shows that $F_{0.05,\ 3,690}$ *or (3,700) (that is the critical value of F); we have 2.90 as the table value, which is below all the calculated F values. And by our decision rule, the Ho is rejected.*

Decision

Since $F > F_{0.05,\ 3,690\ and 700}$ *we reject the Ho and alternatively accept the Ha, which states that* ***the Profit after Tax (PAT) of Nigerian firms is positively and significantly related to the degree of firm's financial leverage.***

4.4 Relationship between Leverage and Earnings Yield

To determine the relationship between leverage and earnings yield among Nigerian quoted firms, table 4 (see appendix) summaries of the regression results of the relationship, will be used. As was the case in table 2 (in appendix), the various coefficients and statistics presented in the table is interpreted in line with this objective.

As could be seen from table 4 (in appendix), the coefficient of determination (R^2) for all the industrial groups are in the main positive, though when adjusted for the within-sample variance (adjusted R^2) some of the industrial groups like; Breweries, Computer, Health care, and Industrial and domestic products become negative in sign. However the R^2 indicates that above 50 percent of earnings yield of the following industrial groups could be explained by leverage: Agriculture, Building materials, Chemicals and paints, Food beverages and tobacco, packaging and Petroleum (marketing) industrial groups (specifically, their R^2 ranges from .501 to .866). The conglomerates, construction and printing and publishing industrial groups had their R^2 range between .437 and .477 (which also shows high percentage values of coefficients determination). The result of all the firms sampled for the study, show that about 3.8 percent of their earnings yield could be explained by leverage. This result was statistically significant at the 5 percent significance level.

The t statistic for all the industrial groups, with exception of the agriculture industry and the all-sampled firms, show that the noted regression coefficients does not mean that the dependent and independent variables have time serial linear relationship. As was earlier explained in table 2 the t statistic is used to test the null hypothesis that there is no linear relationship between a dependent variable and an independent variable. When the significance level is small (less than 0.10) the coefficient is considered significant. The collinearity diagnostic test, represented by the tolerance level and the variance inflation factor (VIF) also show that there are no multicollinearity problem among the independent variables (they fall within the acceptable regions as was earlier explained in 4.3 above).

Validation of Hypothesis Two

Ho: The Earnings Yield of Nigerian Quoted Firms are negatively but significantly related to the degree of Firm's Financial Leverage.
Ha: The Earnings Yield of Nigerian Quoted Firms are positively but significantly related to the degree of Firm's Financial Leverage.

The results of both the OLS pooled regression and the GLS panel regression is presented and used in the validation of the hypotheses. It should be borne in mind that the total liability measure is the major explanatory variable, while the other measures are for robustness test; this will be applicable in the remaining tests.

To validate the hypothesis, the F – test in the regression result is used. The F statistic is the ratio of two mean squares. Usually, when the F value is large and the significance level is small (typically smaller than 0.05 or 0.01) the null hypothesis can be rejected **(reject Ho if $F > F_{0.05}$)**. In other words, a small significance level indicates that the results probably are not due to random chance.

The hypothesis test model is stated thus:

$$\textbf{EPS/MV per share} = b_0 + b_1\textbf{Leverage} + b_2\textbf{Size} + b_3\textbf{Growth} + u \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Table 5. Hypothesis Two Result

OLS Pooled Regression			GLS Panel Regression		
	R^2	F		R^2	F
TL/TC	.038	9.152 (.000)*	TL/TC	.03512	9.101 (.0000)*
LTD/TC	.037	8.798 (.000)*	LTD/TC	.03343	8.660 (.0000)*
STD/TC	.038	9.116 (.000)*	STD/TC	.03510	9.088 (.0000)*

* All figures in parenthesis are the significant values of the F statistic.
OLS had k-1 = 3; n-k = 691; while in GLS it is k-1 = 3 and n-k = 700
Source: From both the SPSS and STATA regression results

Interpretation

From the results of the hypothesis as presented in table 5 above, it could be seen that all the coefficients of determination are positive, while all the F statistics are large with very low significant values, at the (0.05) level of significance; thus being interpreted to mean that **earnings yield of Nigerian quoted firms are positively and significantly related to financial leverage**. This result is robust in all the measures of leverage and is consistent with both theory and empirical findings, as had been earlier stated in the discussion of the regression results (see Modigliani and Miller, 1963; Wippern, 1966; Masulis, 1983; Rajan and Zingalese, 1995).

When the result is checked with the F distribution table, it shows that $F_{0.05,\ 3,691}$ or $_{700}$ (that is the critical value of F); we have 2.90 as the table value, which is below all the calculated F values. And by our decision rule, the Ho is rejected.

Decision

*Since $F > F_{0.05,\ 3,691\ and 700}$ we reject the Ho and alternatively accept the Ha, which states that **the Earnings Yield of Nigerian firms is positively and significantly related to the degree of firm's financial leverage.***

Conclusion

In determining the extent of the influence of leverage on the dependent variables, most of the industrial groups showed evidence of sizable influence of leverage on profitability, averaging about 45 percent when checked across industrial groups; and 16 percent when all the sampled firms are considered. It was found that there is a positive relationship between the different measures of firm profitability and leverage, among Nigerian quoted firms, thus being consistent with the findings of Modigliani and Miller (1963) that due to debt tax shield, there is a positive relationship between firm value and leverage. This is consistent with both theory and previous empirical findings, which was further confirmed by Wippern (1966), Masulis (1983) and Rajan and Zingalese (1995). It was also found that leverage had a significant positive influence on profitability of Nigerian quoted firms; this being consistent with the findings of Long and Maltiz (1985), Abor (2005) and Elkelish and Marshal (2007) whose studies found a significant positive relationship between leverage and profitability. The earnings yield also showed positive relationships with leverage across industrial groupings in Nigeria. The result of both the OLS pooled result and the GLS panel result, show that there exists a positive and significant relationship between leverage and the above named measures of profitability. This result was consistent with previous empirical findings of Wippern (1966) and Masulis (1983) found that there is a significant positive relationship between leverage and firm value (which they measured by earnings yield).

In sum, though they were some industrial variations of the coefficients of determination of leverage effects on profitability measures, they all reported positive relationships. The same also was recorded for all sample results. All the hypotheses rejected the null, thus accepting the alternative hypotheses that there are positive and significant relationships between leverage and the different measures of profitability in Nigerian quoted firms.

References

1. Abor, J (2005), "The Effect of Capital Structure on Profitability: an Empirical Analysis of Listed Firms in Ghana", *The Journal of Risk Finance* 6(5): 438-445.
2. Adelagan, O (2007), "Effects of Taxes on Business Financing Decisions and Firm Value in Nigeria",

International Research Journal of Finance and Economics 12: 189-213.
3. Allayannis, G., G.W. Brown and L.F. Klapper (2003), "Capital Structure and Financial Risk: Evidence From Foreign Debt Use in East Asia", *The Journal of Finance* LVIII (6): 2667-2709.
4. Barbosa, E and C. Moraes (2003), "Determinants of the Firms Capital Structure: The Case of the Small Enterprises", *Unamed Journal 1-72*.
5. Baum, C.F., D. Schafer and O. Talavera (2009), "The Impact of Financial Structure on Firms' Financial Constraints: A Cross-Country Analysis", *Working Paper WP 690* from grant Az. 10.06.2.121 from Fritz Thyssen Stiftung.
6. Booth, J., V. Aivazian, A. Dermiguc-Kunt and V. Maksimovic (2001), "Capital Structure in Developing Countries", *The Journal of Finance* LVI (1) 87-130.
7. Bosshardt, D.I (2003), "Capital Structure, Investment Unanimity and Public Goods: A Case for Social Responsibility", *Quarterly Review of Economics and Finance* 43: 239-260.
8. Bradley, M; G.A. Jarell and E.H. Kim (1984), "On the Existence of an Optimal Capital Structure: Theory and Evidence", *The Journal of Finance* 39: 857-880.
9. Carpentier, C and J. Suret (2001), "Capital Structure Changes and Firm Value", www.fsa.ulaval.ca.
10. Chaplansky, S (1996), "Capital Structure Theory: A Current Perspective", University of Virginia Discussion Paper UVA-F-1165, *Darden: University of Virginia Business Publishing.*
11. De Angelo, H and R. Masulis (1980), "Optimal Capital Structure under Corporate and Personal Taxation", *Journal of Financial Economics* 8: 3-29.
12. Dermiguc-Kunt, A and V. Maksimovic (1999), "Institutions, Financial Markets and Firm Debt Maturity", *Journal of Financial Economics* 54: 295-336.
13. Donaldson, G. (1961), *Corporate Debt Capacity: A Study of Corporate Debt Policy and the Determination of Corporate Debt Capacity*, Harvard Business School.
14. Elkelish, W.W and A. Marshall (2007), "Financial Structure and Firm Value: Empirical Evidence from the United Arab Emirates", *International Journal of Business Research.*
15. Ezeoha, A.E (2008), "Impact of Major Firm Characteristics on the Financial Leverage of Quoted Companies in Nigeria", *Unpublished Doctoral Thesis, University of Nigeria.*
16. Federal Inland Revenue Services (2002), General *Tax Guide for Tax Administrators and Practitioners*, Publication of Federal Inland Revenue Services (June) 2002.
17. *Finance*, 54: 319-340.
18. Frankel, A. B., and J. D. Montgomery (1991). Financial structure: An international perspective. *Brookings Papers on Economic Activity, 1:* 257–297.
19. Glen, J. and B. Pinto (1994), "debt or Equity? How Firms in Developing Countries Choose", *Discussion Paper 22*, International Finance Corporation.
20. Harris, M and A. Raviv (1988), "Corporate Control Contests and Capital Structure", *Journal of Financial Economics* 20: 55-86.
21. Jensen, M (1986), "Agency Costs of Free Cashflow, Corporate Finance and Takeovers", *American Economic Review* 76: 323-339.
22. Jensen, M and W. Meckling (1976), "Theory of the Firm: Managerial Behaviour, Agency Costs and Capital Structure", *Journal of Financial Economics* 3: 305-360.
23. Kate, J.R and H. Shahrur (2007), "Corporate Capital Structure and the Characteristics of Suppliers and Customers", *Journal of Financial Economics* 83: 321-365.
24. Kennedy, P. (2003), *A Guide to Econometrics*, 5th Edition, Massachusetts, The MIT.
25. Kim, W.G. (1997), The Determinants of Capital Structure Choice In The US Restaurant Industry. *Tourism Economics* 3 (4): 329–340.
26. Kraus, A. and R. Z. Litzenberger, (1973), "A state preference model of optimal financial leverage", *Journal of Finance* pp. 911-922.
27. Leland, H and D. Pyle (1977), "Information Asymmetrics, Financial Structure and Financial Intermediation", *Journal of Finance* 32: 371-388.
28. Liu, W and C. Hsu (2004), "Financial Structure, Corporate Finance and Growth of Taiwan's ManufacturingFirms", *A Paper Presented at the Asian Crisis VI Conference on New Challenges and opportunities for the Post Crises Asia.*
29. Long, M., & Maltiz, I. (1985). "The Investment-Financing Nexus: Some Empirical Evidence". *Midland Corporate Finance Journal*, 3: 53–59.
30. Masulis,R.W (1983), "The Impact of Capital Structure Change on Firm Value: Some Estimates", *The Journal of Finance* XXXVIII (1) 107-126.
31. Miao, J (2005), "Optimal Capital Structure and Industry Dynamics", *The Journal of Finance* LX(6) 2621-2658.
32. Miller, M. H (1977), "Debts and Taxes", *Journal of Finance* 32: 261-276.
33. Modigliani, F. F., and M. H. Miller (1958), "The Cost Of Capital, Corporation Finance And The Theory Of Investment", *American Economic Review*, 48, 267–297.
34. Modigliani, F. F., and M. H. Miller (1963). "Corporation Income Taxes and the Cost of Capital: A Correction", *American Economic Review*, 53: 433-442.
35. Myers, S (1977), "Determinants of Corporate Borrowing", *Journal of Financial Economics* (5): 147-175.
36. Myers, S (1984), "The Capital Structure Puzzle", *Journal of Finance* 39: 575-592.
37. Nielsen, S (1962), "Market Value and Financial Structure in The Rail Road Industry", A Doctoral Dissertation at the Massachusetts Institute of Technology (1961). Abstract Published in the *Journal of Finance*.
38. Padron, Apolinario, Santana, Martel, and Sales (2006), "Determinant factors of Leverage: An Empirical Analysis of Spanish Corporations", *Journal of Risk Finance* (6) 1: 60-68.
39. Pandey, I.M (2001), "Capital Structure and the Firm Characteristics: Evidence from an Emerging Market", *Indian Institute of Management Ahmedabad Working Paper No. 2001-10-04*, Retrieved form http:/hq.ssrn.com/articles.
40. Pandey, I.M (2004), *Financial Management*, New Delhi: Vikas Publishing House PVT Ltd.
41. Rajan, R. and L. Zingalese (1995), "What Do We Know About Capital Structure? Some Evidence from

International Data", *The Journal of Finance* 50 (5) 1421-1460.
42. Ross, S (1977), "The Determination of Financial Structure: The Incentive Signaling Approach", *Bell Journal of Economics* 8: 23-40.
43. Scott, J. (1976). "A Theory of Optimal Capital Structure", *Bell Journal of Economic and Management Science*, 7: 33–54.
44. Schoubben, F. and Van Hulle, C. (2004), "The Determinants of Leverage: Differences Between Quoted and Non Quoted Firms", *Trijdschrift voor Economie en Management*, XLIX (4).
45. Taggart, R.A (1977),"A Model of Corporate Financing Decision", *The Journal of Finance* 32 (5): 1467-1484.
46. Tang, C and S. Jang (2007), "Revisit to the Determinants of Capital Structure: a Comparison between Lodging Firms and Software Firms", *Hospital Management* 26: 175-187.
47. Titman, S. and Wessels, R. (1988), The Determinants of Capital Structure, Journal of Finance, 43.
48. Torres-Reyna, O. (Undated), "Panel Data analysis: Fixed and Random Effects", Princeton University *Working Paper. Available at http://dss.princeton.edu/training/.*
49. Wald, J.K (1999), "How Firm Characteristics Affect Capital Structure: An International Comparison", *Journal of Financial Research* 22(2) 161-187.
50. Wippern, R.F (1964), "Earnings Variability, Financial Structure and the Value of the Firm", Unpublished Doctoral Dissertation, Stanford University. Abstract Available in *Journal of Finance.*
51. Wippern, R.F (1966), "Financial Structure and the Value of the Firm", *The Journal of Finance,* XXI (4): 615-633.

APPENDIX

1. SAMPLED INDUSTRIAL GROUPS
   i. Agriculture
   ii. Automobiles
   iii. Breweries
   iv. Building Materials
   v. Chemicals and Paints
   vi. Computer
   vii. Conglomerates
   viii. Construction
   ix. Food Beverages and Tobacco
   x. Health Care
   xi. Industrial and Domestic Products
   xii. Packaging
   xiii. Petroleum (Marketing)
   xiv. Printing and Publishing
   xv. Textiles

Table 1. Hausman Test for Fixed and Random Effects

	Coefficients		
	Within-Groups (fixed effects model) (b)	Generalised Least Square (Random effect model) (B)	Difference (b)-(B)
TL_TC	.0654365	.0865964	-.0211599
LogTA	.2668741	.3834657	-.1165916
ChangeTA	-.0000191	-.0000163	-2.77e-06

χ^2 = (b-B)*[(v_b-v_B)^(-1)](b-B) = 29.22
Prob> χ^2 = 0.0000
Test: Ho: difference in coefficient not systematic.

Table 2. Summary Regression Results of Relationship between Leverage and PAT

Industry	B	R^2	Adjusted R^2	F	t	DW	Tolerance	VIF
Agriculture		.593	.389	2.913	-2.267	1.667		
logNA	.962			(.123)*	2.912		.622	1.608
CHTA	-.279				-1.015		.898	1.114
TL/TC	.709				2.149		.623	1.606
Automobile		.727	.591	5.331	-1.294	2.811		
logNA	.530			(.040)*	2.134		.737	1.357
CHTA	-.269				-.981-		.603	1.659
TL/TC	-.919				3.570		.686	1.458
Breweries		.511	.267	5.093	1.202	1.682		
logNA	.235			(.203)*	.736		.800	1.250
CHTA	.259				.744		.671	1.496
TL/TC	-.677				-2.070		.761	1.314
Building Materials		.397	.096	1.319	1.941	1.679		
logNA	-.415			(.353)*	-1.162		.790	1.26
CHTA	-.349				-1.054		.914	1.094
TL/TC	-.693				-1.869		.729	1.371
Chemicals & Paints		.407	.110	1.372	1.023	1.979		
logNA	-.375			(.338)*	-.871		.532	1.878
CHTA	.768				1.941		.631	1.585
TL/TC	.039				.107		.751	1.331
Computer		.098	-.353	.218	.398	1.277		
logNA	-.015			(.881)*	-.038		.899	1.113
CHTA	.312				.797		.989	1.011
TL/TC	-.052				-.128		.907	1.103
Conglomerates		.428	.142	1.498	.355	1.864		
logNA	-.064			(.308)*	-.175		.710	1.408
CHTA	.677				1.872		.728	1.374
TL/TC	-.088				-.280		.971	1.030
Construction		.644	.466	3.618	.599	2.420		
logNA	-.108			(.084)*	-.326		.535	1.868
CHTA	.117				.467		.949	1.054
TL/TC	.691				2.039		.516	1.938
Fb/Bev/Tobacco		.261	-.108	.707	.702	1.873		
logNA	.185			(.582)*	.327		.386	2.590
CHTA	.185				.414		.619	1.615
TL/TC	-.261				.555		.558	1.792
Health		.660	.490	3.881	.677	2.243		
logNA	.115			(.074)*	.406		.702	1.424
CHTA	.555				2.097		.810	1.235
TL/TC	-.613				-2.379		.852	1.173
Ind/Domestic		.488	.231	1.904	-1.503	2.158		
logNA	.865			(.230)*	2.296		.602	1.661
CHTA	.052				.175		.976	1.025
TL/TC	.734				1.942		.593	1.672
Packaging		.653	.480	3.771	-1.654	2.721		
logNA	.668			(.078)*	\.264		.867	1.153
CHTA	.678				2.651		.883	1.132
TL/TC	.732				2.727		.803	1.246
Petroleum		.451	.176	1.642	-.724	1.363		
logNA	.916			(.277)*	1.714		.320	3.122
CHTA	.474				1.456		.862	1.159
TL/TC	.524				.959		.307	3.262
Print/Publishing		.498	.246	1.981	.756	2.959		
logNA	-.113			(.218)*	-.197		.253	3.948
CHTA	.351				1.138		.879	1.137
TL/TC	-.613				-1.083		.261	3.833
All-Sample		.159	.156	43.640	-1.645	1.018		
logNA	.074			(.000)*	2.025		.924	1.082
CHTA	.124				3.494		.969	1.032
TL/TC	.376				10.302		.916	1.092

* All figures in parentheses represent the significant values of F statistic

CHTA stands for percentage change in total assets (normalised), TL/TC is the total liability leverage ratio, and logNA is the normalized net asset; all the variables have been defined earlier.

Table 4. Summary Regression Results of Relationship between Leverage and Earnings yield

Industry	B	R^2	Adjusted R^2	F	t	DW	Tolerance	VIF
Agriculture		.866	.799	12.893	5.199	2.438		
logNA	-1.007			(.005)*	-5.306		.622	1.608
CHTA	.226				1.433		.898	1.114
TL/TC	-1.089				-5.747		.623	1.606
Automobile		.479	.229	.594	.717	2.041		
logNA	-.428			(.641)*	-1.026		.737	1.357
CHTA	.295				.639		.603	1.659
TL/TC	.496				1.147		.686	1.458
Breweries		.111	-.1334	.249	-.844	1.627		
logNA	-.122			(.859)*	-.283		.800	1.250
CHTA	-.156				-.322		.671	1.490
TL/TC	.299				.677		.761	1.314
Building Materials		.548	.300	.857	-1.649	1.223		
logNA	.303			(.512)*	.790		.790	1.266
CHTA	.076				.213		.914	1.096
TL/TC	.633				1.584		.729	1.371
Chemicals & Paints		.595	.354	1.098	-1.286	2.350		
logNA	.559			(.420)*	1.244		.532	1.878
CHTA	-.722				-1.748		.631	1.583
TL/TC	-.392				-1.036		.751	1.331
Computer		.053	-.421	.111	-1.272	1.194		
logNA	.153			(.950)*	.366		.899	1.113
CHTA	.137				.342		.989	1.011
TL/TC	.137				.328		.907	1.103
Conglomerates		.456	.208	.526	-.800	3.211		
logNA	.290			(.680)*	.674		.710	1.408
CHTA	-.515				-1.209		.728	1.374
TL/TC	-.095				-.259		.971	1.030
Construction		.437	.191	.473	-1.643	2.193		
logNA	.460			(.712)*	.918		.535	1.868
CHTA	-.088				-.233		.949	1.054
TL/TC	.062				.122		.516	1.938
Fd/Bev/Tobacco		.694	.542	4.543	-1.460	2.289		
logNA	-.053			(.055)*	-.146		.386	2.590
CHTA	-.535				-1.864		.619	1.615
TL/TC	.471				1.558		.558	1.792
Health		.163	-.256	.389	-1.097	2.745		
logNA	.242			(.766)*	.543		.702	1.424
CHTA	.129				.312		.810	1.235
TL/TC	.168				.416		.852	1.173
Ind/Domestic		.038	-.443	.079	-.198	1.886		
logNA	-.208			(.969)*	-.402		.602	1.661
CHTA	-.129				-.318		.976	1.023
TL/TC	-.116				-.225		.598	1.672
Packaging		.501	.252	2.012	.335	1.665		
logNA	.280			(.214)*	.903		.867	1.153
CHTA	-.429				-1.399		.883	1.132
TL/TC	-.580				-1.801		.803	1.246
Petroleum		.579	.368	2.750	1.238	1.522		
logNA	-1.145			(.135)*	-2.446		.320	3.122
CHTA	-.199				-.697		.862	1.159
TL/TC	-.562				-1.174		.307	3.262
Print/Publishing		.477	.216	1.828	-2.104	1.870		
logNA	1.080			(.243)*	1.843		.253	3.948
CHTA	-.266				-.846		.879	1.137
TL/TC	1.243				2.151		.261	3.833
All-Sample		.038	.034	9.152	-4.427	1.411		
logNA	-.040			(.000)*	-1.018		.924	1.033
CHTA	.024				.647		1.000	1.000
TL/TC	-.201				-5.184		.924	1.083

* All figures in parentheses represent the significant values of F statistic

CHTA stands for percentage change in total assets (normalised), TL/TC is the total liability leverage ratio, and logNA is the normalized net asset; all the variables have been earlier defined.