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The determinants of capital structure

A comparison of financial and non-financial firms in a regulated developing country – Nigeria

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Abstract

Purpose – The purpose of this paper is to investigate whether there are differences between the determinants of the capital structure in financial and manufacturing firms and also assess how the speed of adjustment differs.

Design/methodology/approach – This study employed balanced panels data procedure using pooled ordinary least square, the random effects and fixed effects on manufacturing firms and banks that are listed on Nigeria Stock Exchange. The use of the three estimation method is in order to make a meaningful comparison between the models.

Findings – The findings indicate that there are similarities and differences in the capital structure determinants on the two sets of firms: banks tend to be more leveraged when they are more profitable and manufacturing firms tend to be less leveraged when they are profitable. In addition, banks adjust their leverage faster at a speed of 69 per cent than manufacturing firms at 46 per cent. The study also shows that changes in the economy influence the capital structure of financial firms more than that of manufacturing firms.

Research limitations/implications – The study only focused on one economy.

Practical implications – As a result of 2008 global financial crisis, there has been intense debate on the significance of regulatory capital. The study demonstrate the need for regulatory capital in banks to be procyclical rather than being static.

Originality/value – To the best of the knowledge, this is the first paper to empirically test how capital structure differ between banks and non-financial institutions.

Keywords Developing economies, Capital regulation, Capital structure determinants, Financial and non-financial firms

Paper type Research paper

1. Introduction

It is a generally held belief that the primary objective of most profit-making firms (financial and non-financial) is to maximise their shareholders' wealth. However, maximising firm value is not easy as it involves the selection of an appropriate mix of debt and equity, taking into consideration the costs and benefits applicable to these securities. Haphazard selection may lead the firm to financial stress and eventually bankruptcy. The extent of bankruptcy differs between financial (banks) and non-financial firms because in some cases, governments are likely to step in to bail out banks facing financial difficulties. A possible reason is that once a bank is financially distressed the problem is likely to spread throughout the relevant financial environment. The spread of the distress within the economy may lead to credit contraction or restriction, with a significant impact on other industries.

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Theoretical framework

Over the past decades, alternative capital structure theories have been developed in order to determine the optimal capital composition. These theories have been well documented in previous studies. However, the majority of these studies have been oriented towards the developed economies. In terms of financial firms, there have been very limited numbers of studies and the issue of capital structure has not been very well addressed (Marques and Santos, 2003). It is noticeable that a number of empirical works on the capital structure of banks have been undertaken in developed countries, for example Berger *et al.* (2007), Flannery and Rangan (2007) and Frank and Goyal (2007) for the USA and Gropp and Heider (2009) for European banks. These studies offer divergent views and the standard corporate finance textbook view is that there is no need to examine the capital structure of banks as this would be a departure from the Modigliani and Miller proposition for capital regulations on banks. It is argued that because of the high cost of holding capital, bank managers more often than not want to hold less capital than is required by the regulators. In this case, the amount of capital is determined by the bank capital requirement (Mishkin, 2000). On the other hand, Gropp and Heider (2009) argued that there is no strong evidence to suggest that regulatory capital is the first-order determinant of capital composition.

Although progress has been made in the study of capital structure in Nigeria both financial institutions and non-financial firms, for example Ezeoha (2008), Owolabi and Inyang (2012) for non-banks and Salawu and Awolowo (2007) for banks, we find no study that compares the two industries empirically. This is in order to assess how industry and economic factors influence leverage level in banks and non-financial firms. For instance we hope from this study, we would be able to assess how the general economic growth influences leverage in banks compared with non-financial firms. Likewise we endeavour aim to find whether there is any significant differences in the speed of adjustments in banks and in non-financial firms. This is in line with a survey carried by Adeyemi and Oboh (2011) in 90 Nigeria firms to find the significance of capital structure on the firm value. Totally, 50 per cent of the respondents noted that capital structure is directly related to firm market value.

The lack of consensus among researchers regarding the factors that influence the capital structure decision in banks and non-financial firms and the lack of extensive research on financing behaviour in Nigeria are some of the reasons that evoked the need for this research. We hope that the findings of this empirical study will not only fill the gap but also provide some groundwork upon which detailed evaluation could be based. Therefore, the objective of this research is to determine whether there are empirical similarities and differences in the determination of the capital structure between banks and manufacturing firms in Nigeria. The rest of the paper is divided into six sections. Section 2 discusses the determinants of capital structure from the perspective of previous studies. Section 3 examines the data that were used in the current research and the appropriate methodology. Section 4 considers the empirical result. Section 5 discusses the result and Section 6 draws conclusion.

2. Determinants of capital structure

This section discusses the attributes suggested by different conditional theories of capital structure which may affect the firms' capital structure and how these factors may influence the speed of adjustment to desired level of leverage.

Size

It is important to understand the relationship between size and leverage because large firms are likely to diversify their financing sources than small firms. Alternatively, size could be said to be the proxy for the probability of default in that large firms are less likely to fail and go into liquidation (Shumway, 2001). Also size may be the proxy for the volatility of the firm assets because small firms are likely to be growing rapidly and thus intrinsically volatile (Fama and French, 2002). Those who found positive effect support the agency theory in that large firms are widespread and too far for the owners to control the activities of the management (Chung, 1993; Colombo, 2001; Bevan and Danbolt (2002); Dess and Robertson, 2003; Antoniou *et al.*, 2008). However, Deferrari and Palmer (2001) argued that large and complex banks, relies increasing on assuring the sophistication and integrity of bank's own risk management models. The 2008 financial crisis was characterized by large banks failing, a doctrine of too big to fail which had been in existence for a long time (Stern *et al.*, 2004). This has intensified the current debate whether banks should be allowed to grow to be too big. However, Titman and Wessels (1988), Rajan and Zingales (1995), Chen (2003) and Uzeoha (2008) found a negative relationship between size and leverage. They attributed this to be high transaction costs of using expensive securities and thus small banks use more short-term debts than large ones. Also because large firms are likely to be diversified, they are likely to be profitable and able to adjust their leverage much faster than small firms.

Profitability

The order of preference as regards to financing is that, a firm starts with the least sensitive to risk to the most sensitive. From this argument, profitable firms with retained earnings may rely on them as opposed to seeking external finance. On the other hand, Jensen (1986) considered debt as a mechanism of ensuring that managers pay dividends out of profits rather than building empires. Jensen points out that, firms with free cash flows or high profitability will be highly levered. Also, DeAngelo and Masulis (1980) noted that those firms which are less profitable will have less debt because they believe that debt is more.

Titman and Wessels (1988), Barton *et al.* (1989), Harris and Raviv (1991), Rajan and Zingales (1995) and Antoniou *et al.* (2008) using international data found a negative association between profitability and leverage. Their findings support the pecking order theory in that, firms with high profit rates all things being equal would maintain lower leverage because they are able to generate funds from internal sources. Therefore, a negative relation is also expected with profitability and the speed of adjustment to target leverage. On the other hand, Colombo (2001), Dess and Robertson (2003), Chen (2004) and Iwarere and Akinyele (2010) found that there is a positive effect between profitability and leverage. This confirms the signalling theory in that firm will mimic to show good future prospects by taking more debt.

Asset structure

There are empirical evidences which show that the type of the assets that a firm has determines the amount of debt. The measure between tangible assets and total assets is called tangibility (Titman and Wessels, 1988; Rajan and Zingales, 1995; Booth *et al.*, 2001). Despite a number of theories predicting that there is a positive correlation between tangibility and leverage, there are others who find a negative relationship. Those who find a positive relationship, for example, Titman and Wessels (1988),

Rajan and Zingales (1995), Dess and Robertson (2003), Chen (2004), Faulkender and Petersen (2006) and Lemmon and Zender (2007) support the trade-off theory and agency theory from a shareholder's point of view. In addition, Cassar and Holmes (2003) and Hall *et al.* (2004) found a positive relationship between asset structure and both long-term and short-term debt. However, Ali (2011) found a negative correlation between debt level and tangibility in Jordanian listed mining and extraction industry. This could be due to the fact that intangible assets used in the analysis are not redeployable and may limit the firm's borrowing capacity.

In addition, Titman and Wessels (1988) noted that firms with specialised assets face more costs in terms of liquidation and hence may In addition. This argument was supported by Wald (1999) and Bhaduri (2002). On the contrary, Cassar and Holmes (2003) pointed that the relationship between the types of assets and liquidation depends on the measure used to calculate debt. Also Panno (2003) argues that, if a firm has more fixed assets, it can be an indication of less current assets or liquid assets which might lead to negative relationship with extra debt. However, this will depend on the type of the firm. That is, manufacturing firms are likely to have more fixed assets than financial firms. Most of the assets in manufacturing firms are likely to be specialised in nature compared with those in banks, which could easily be disposed of in the secondary market.

Earnings volatility

Corporate theories suggest that shareholders of the firms are better off if the company maintains stable earnings. For example, Froot and Stein (1998) argue that smooth earnings can enable the company to increase its value and hence reduce reliance on external finance. In other words, the more profitable the firm is and ability to maintain the profitability, the more it is likely to increase its retained earnings. In addition, as pointed by Minton and Schrand (1999), it is costly for the firm to have volatile earnings because it will affect the firm's investment policy by increasing the likelihood and cost of raising external funds.

High-earnings volatility also increases the chances of negative earnings surprises. In response to this, managers may, however, concentrate on earnings management through window dressing. Nevertheless, if a firm has stable or smooth earnings, it may reduce the probability of defaulting and hence the firm's borrowing costs may be lower. On the other hand, if a firm's earnings are unstable, the more likely it is to fail to meet the interest obligation if it is financed externally by debt. Therefore, a firm's leverage capacity may decrease with the increase in its earnings volatility, suggesting a negative association between leverage and earnings volatility (Bradley *et al.*, 1984; Fama and French, 2002).

However, risky firms like banks are more likely to suffer from information asymmetries and they are likely to have higher levels of leverage. Banks experience information asymmetries because they finance investments or businesses that they are not involved in managing. The success from such investments will depend on the management of the borrower among other factors, like the economic growth and the risk underpinning the investment.

Growth opportunities

Huang and Song (2002), firms with high-growth opportunities are likely to be more leveraged. In the case of those firms that are at a tender stage with more concentrated ownership, it is expected that high-growth firms will require more external financing

and could be highly leveraged (Heshmati, 2001). Moreover, Aryeetey *et al.* (1994) maintained that small firms appear to use external finance.

Michaelas and Chitterden (1999) argued that future opportunities will be positively related to leverage, in particular short-term leverage. However, Myers (1977) described growth opportunities as a call option, arguing that firms with growth opportunities will have a smaller proportion of debt in their capital structure. His reasoning was that the conflict of interest between the equity and the debt holders as growth opportunities produce moral hazard and small firms have an incentive to take risks in order to grow.

However, the existing literature is inconclusive as some researchers have found a positive relationship between growth and leverage (Titman and Wessels, 1988; Barton *et al.*, 1989; Um, 2001). This could be because growing firms that face pressure for investment opportunities are likely to exceed their retained earnings and, according to the pecking order theory, will prefer debt to equity. In addition, according to the signalling theory, the growth of the firm will signal good prospects in the future and is likely to be received positively by the capital market, hence resulting in more debt. Others have suggested that high-growth firms tend to use less debt (Stulz, 1990; Rajan and Zingales, 1995). This supports the trade-off theory, which predicts a negative relationship between leverage and growth since the market value grows at least in proportion to the investment outlays.

Aryeetey *et al.* (1994) maintained that small firms appear to use external finance. Nigeria, being a country that is classified as falling behind, is expected to have firms that can be classed as small, medium and large firms. It is expected that as a bank moves through the stages of growth, it shifts its financing sources and hence its growth opportunities are likely to influence the speed of adjustment significantly. That is, if there are positive investments to undertake, the firm is likely to use different sources of finance, including debt. In the case of insufficient retained earnings, growth opportunities are likely to shift the leverage upwards.

Effective tax rate

Firms pay tax on their profit once the interest on debt has been subtracted. This effectively reduces the tax bill compared with another firm of the same size in terms of operating profit in the same industry and legislation which is unlevered. This is the hallmark of the static trade-off theory model that looks at the benefits and cost of debt. As pointed by Modigliani and Miller (1958), the main benefit of debt is tax shields while the cost side of bankruptcy may act as a significant countervailing force. This means that, given perfect market assumptions and the presence of corporate taxes, the value of the firm will increase equivalent to the debt tax shield.

Givoly *et al.* (1992) considered the effect of the Tax Reform Act of 1986 on US firms. Although they used average past paid taxes, their conclusion was that firms decrease leverage as a result of a drop in the statutory tax rate. Graham (1999) used marginal tax rate which is the present value of current and future taxes paid on an additional dollar of income earned today instead of average taxes paid in the past. He concludes that firms with large marginal tax rate will have large expected tax bill and therefore will issue more debt.

Singh and Hamid (1992) collected data from nine developing countries in their study on capital structure. They find that, differences in the coefficients and signs are due differences in the tax system, legal and other institutional factors like accounting practices and degree of development of the capital market. Also, Booth *et al.* (2001) assess the how portable capital structure theories are to different countries with

different institutional framework. They concluded that across countries, debt rates are negatively related to tax rule. They attributed to this unexpected finding to the possibility of average tax rate measure used as the proxy for profitability. That is, the higher tax rate, the higher profitability and vice versa instead of tax shield potential.

Lastly, Antoniou *et al.* (2006) used panel data from Britain, France and Germany but find mixed results for tax rate variability and other factors. Therefore, the implication of tax depends on the tax policy objectives. For example, the tax system could be designed to favour retention of earnings against dividend payout and vice versa.

GDP growth

A number of studies including, Kwak and Smith (2005), Gupta (2005) and Detragiache and Rajan (2008) used cross-country data on the modern banking crisis to estimate the loss in output associated with systemic banking crisis. These studies find that, banking crisis is associated with reduction for bank-dependent borrower and substantial decline on economic activities of a country. In addition, Demirgüç-Kunt and Detragiache (2005), found that the financial crisis is correlated with macroeconomic indicators. That is crisis occurred in a period of low GDP growth and high inflation. Moreover, Bikker and Metzemakers (2007) observed at a range of OECD countries[1] and found that bank capital varies as an economic cycle varies. That is bank capital is negatively associated with the growth of the economy. However, when Jokipii and Milne (2006) observed the reaction of banks according to size, they concluded that small banks tend to have the capital that moves with economic cycles. While large banks move negatively with the cycle. In addition, Stein (2002) found that small banks have a large loan supply in response to economic shocks than large banks. On the other hand, during economic boom, it is expected that manufacturing will increase their factory output. This may lead to increased profitability and hence may require less external finance if following the pecking order theory. In order to increase their output, they might require external finance in case retained earnings being insufficient. Therefore it would be safe to point that the economic condition may significantly influence the speed at which manufacturing firms and banks may adjust their leverage.

Minimum capital requirements

While there are no minimum capital requirements for manufacturing firms, the effect of minimum bank capital regulation has re-emerged as a hot topic for debate since the establishment of risk-based guidelines. For instance there have been many regulatory changes in Nigeria banking sector including having a minimum capital requirement of 25 billion Nigeria Niras with the capital adequacy of 10 per cent. Such regulations are intended to curtail the excessive risk taking and to limit the exposure of deposit insurance schemes. However, it is unclear whether such guidelines meet the objective of having a stable and resilient banking at the same time encourage competitive environment. This is because as a result of banking reforms in Nigeria in 2004, according to Central Bank Nigeria (2005), the number of banks reduced from 89 to 25 resulting from mergers and acquisition. The reduced number of banks reduces competition in the banking industry and this could stifle the essences of largely capitalist economy. Peek and Rosengren (1995a) concluded in their study that small banks that have low-capital base disappeared through mergers. On the other hand, studies conducted by Altman *et al.* (2002) concluded that the enforcement of capital requirements has negative effects on loans supply. However, Demirgüç-Kunt and Harry (2004) argue that regulations are necessary for efficiency.

Consequently, as banks tend to hold minimum capital which is above the requirements, Allen *et al.* (2006) notes that capital requirements and not necessary binding. In addition to the regulatory capital, other empirical works posit that the bank capital structure is the outcomes of pressure emanating from debt holders, shareholders and depositors (Flannery and Rangan, 2007). Besides, under certain circumstances, borrowers may demand banks to commit some of their own capital when extending credit (Allen *et al.*, 2009). Since borrowers do not bother about the cost of raising capital, the level demanded may be above that required by the regulators. Despite this, Frank and Goyal (2007) point that managers' preferences have an impact on capital structure in that less risk-averse manager choose a more aggressive strategy and higher leverage.

However, a study carried by Gropp and Heider (2009) provided a strong evidence for the relevance of standards in determining capital structure. And as such, regulators require banks to hold a minimum level of capital in order to mitigate credit, operational and market risks. Therefore if the risk is the main drivers of bank capital structure, it can be inferred that capital regulations predominantly determines bank capital composition. However, strict bank capital requirements are not a substitution for risk monitoring and control (Kahane, 1977). This is because; a more stringent capital requirement may cause a utility maximising bank owner management to increase asset risk. So bank owners are likely to treat leverage and risk as substitution, (Gennotte and Pyle, 1991) and simply increase asset risk when they are forced to reduce leverage.

3. Data and methodology

The present study investigates the determinants of capital structure in banks and manufacturing firms in Nigeria using the annual financial statement from the year 2004 to 2008 as published in ORBIS database. Our selection criteria are that the company must have complete financial statements for the years under review. On the basis of our research objective, the variables used in the current research and their measurements are largely derived from the existing literature in order to have a meaningful and sound comparison of the findings and prior studies. The dependent variable is the leverage which is measured by total debt to total capital which is in line with Rajan and Zingales (1995), Bevan and Danbolt (2002), Philips and Sipahioglo (2004), and Deesomsak *et al.* (2004). This is because, it specifically shows the degree a firm is using borrowed capital and the risk it faces if not able to meet the repayment obligations. Moreover, the inclusion of short-term debt was important as it comprised a greater proportion of debt on the balance sheets of manufacturing firms. Indeed according to Ezeoha (2008), 91.4 per cent of the total finances of Nigerian-quoted firms is of short-term liabilities, with just 8.6 per cent constituting long-term liabilities. While the independent variables are size, profitability, asset structure, growth opportunities, earnings volatility, liquidity, effective tax rate, the economic growth and regulatory capital. Their definitions are listed in Table I. In addition, the choice of either using market value or book value is also very critical. Market value has been used in the past, Deesomsak *et al.* (2004) and will be used in the current research as it gives a more tentatively consistent result. However, both book and market values have been used in the literature and yield the same result[2].

Methodology

This study employed a balanced panel data procedure because the data contained is across firms and over time. Panel data increases the sample size considerably and is more appropriate to study the dynamics of change. In order to estimate the effect of

Table I.
Measurement of variables

Variables	Proxy and code	Measurement	Expected sign Banks	Expected sign Non-banks
Size	Log of total assets Log(TA)	Total assets = net fixed assets + total intangible + total investments + net current assets + other assets	+	+
Profitability	Net profit margin (NetMarg)	Net income available for common shareholders over sales × 100%	–	–
Growth opportunities	Growth in total assets (GRWT)	Annual growth in total assets	+	–
Asset structure	Tangibility of assets. PPE/TA	Ratio of fixed assets to total assets. PPE/total assets	+	–
Effective tax rate	Actual tax rate paid (ETR)	The tax paid/total earnings before tax	+	+
Earnings volatility	Standard deviation of % age change in operating income (ERNVOL)	SDV of operating income	+	–
Minimum regulatory capital	Tier1 capital	Risk weighted assets capital	–	Not applicable
Economic growth	GDP	Real growth in GDP	+/–	–
Liquidity	LIQ		+	–

regressors on the regressand, we used pooled ordinary least square (OLS), the random effects and fixed effects. Under the hypothesis that there is no group or individual effects among firms included in our sample size, we estimated the pooled OLS model which takes the form of Equation (1) for manufacturing firms and Equation (2) for banks as shown:

$$\begin{aligned} \mathrm{LEV}_{it} =& \beta_1 + \beta_2 \mathrm{SIZE}_{2it} + \beta_3 \mathrm{PROF}_{3it} \\ &+ \beta_4 \mathrm{ASST}_{i4it} + \beta_5 \mathrm{ERNVO}_{5it} \\ &+ \beta_6 \mathrm{GDPGROWTH}_{6it} + \beta_7 \mathrm{GROWTH}_{7it} \\ &+ \beta_8 \mathrm{ETR}_{8it} + \mu_{it} \end{aligned} \tag{1}$$

$$\begin{aligned} \mathrm{LEV}_{it} =& \beta_1 + \beta_2 \mathrm{SIZE}_{2it} + \beta_3 \mathrm{PROF}_{3it} \\ &+ \beta_4 \mathrm{ASST}_{i4it} + \beta_5 \mathrm{ERNVO}_{5it} \\ &+ \beta_6 \mathrm{GDPGROWTH}_{6it} + \beta_7 \mathrm{GROWTH}_{7it} \\ &+ \beta_8 \mathrm{ETR}_{8it} + \beta_9 \mathrm{REGC}_{9it} + \mu_{it} \end{aligned} \tag{2}$$

where β_1 is the common coefficient and μ is our unobserved variables. The model estimates a common constant for all cross-sections firms (Asteriou and Hall, 2011). The main assumption of this estimation method is that the regression coefficients, both the slope and the intercept are equal for all firms. This estimation method ignores any form of heterogeneity across firms. That is if heterogeneity is observed for all individual firms, then this means there is only the constant term for all firms, then the entire model can be treated as an ordinary linear model and fit by least square (Greene, 2007).

Since the panel data contain observations on the same cross-sectional firms both banks and manufacturing over the years 2004-2008, there might be cross-sectional effects on each firm or on a set of firms especially those in the same industry. Fixed effects models (FEM) and random effects models (REM) are available in order to deal with such problems. FEM assumes differences in the intercepts across the firms each individual intercept does not vary over time, which means that it is time invariant (Greene, 2007). However, intercept vary between cross-sectional firms so each firm has fixed, unique intercept and differences in the intercepts reflect the unobserved differences between these cross-sectional units. These differences could be due to differences in different firms, for example managerial style or philosophy. This takes the form of Equation (3) for manufacturing and Equation (4) for banks:

$$\begin{aligned} \mathrm{LEV}_{it} =& \beta_{1i} + \beta_2 \mathrm{SIZE}_{2it} + \beta_3 \mathrm{ASST}_{3it} \\ &+ \beta_4 \mathrm{PROF}_{4it} + \beta_5 \mathrm{ERNVOL}_{5it} \\ &+ \beta_6 \mathrm{GDPGROWTH}_{6it} + \beta_7 \mathrm{GROWTH}_{7it} \\ &+ \beta_8 \mathrm{ETR}_{8it} + \mu_{it} \end{aligned} \tag{3}$$

$$\begin{aligned} \mathrm{LEV}_{it} =& \beta_{1i} + \beta_2 \mathrm{SIZE}_{2it} + \beta_3 \mathrm{ASST}_{3it} \\ &+ \beta_4 \mathrm{PROF}_{4it} + \beta_5 \mathrm{ERNVOL}_{5it} \\ &+ \beta_6 \mathrm{GDPGROWTH}_{6it} + \beta_7 \mathrm{GROWTH}_{7it} \\ &+ \beta_8 \mathrm{ETR}_{8it} + \beta_9 \mathrm{REGC}_{9it} + \mu_{it} \end{aligned} \tag{4}$$

We estimated these cross-sectional fixed effects among firms in each firm both manufacturing and banks and found that they are not significant either individually and as a group.

While the REM estimates the coefficients under the assumption that individual or group effects are uncorrelated with other regressors. The model allows the intercepts to vary between units but variation is treated as randomly determined. It takes the form Equations (5) and (6) for manufacturing firms and banks, respectively:

$$\begin{aligned} \mathrm{LEV}_{\mathrm{it}} =& \beta_1 + \beta_2 \mathrm{SIZE}_{2\mathrm{it}} + \beta_3 \mathrm{ASST}_{3\mathrm{it}} \\ &+ \beta_4 \mathrm{PROF}_{4\mathrm{it}} + \beta_5 \mathrm{ERNVOL}_{5\mathrm{it}} \\ &+ \beta_6 \mathrm{GDPGROWTH}_{6\mathrm{it}} + \beta_7 \mathrm{GROWTH}_{7\mathrm{it}} \\ &+ \beta_8 \mathrm{ETR}_{8\mathrm{it}} + \mu_{\mathrm{it}} + \varepsilon_i \end{aligned} \tag{5}$$

$$\begin{aligned} \mathrm{LEV}_{\mathrm{it}} =& \beta_1 + \beta_2 \mathrm{SIZE}_{2it} + \beta_3 \mathrm{ASST}_{3\mathrm{it}} \\ &+ \beta_4 \mathrm{PROF}_{4\mathrm{it}} + \beta_5 \mathrm{ERNVOL}_{5\mathrm{it}} \\ &+ \beta_6 \mathrm{GDPGROWTH}_{6\mathrm{it}} + \beta_7 \mathrm{GROWTH}_{7\mathrm{it}} \\ &+ \beta_8 \mathrm{ETR}_{8\mathrm{it}} + \beta_9 \mathrm{REGC}_{9\mathrm{it}} + \mu_{\mathrm{it}} + \varepsilon_i \end{aligned} \tag{6}$$

where $\varepsilon_{\mathrm{i}} + \mu_{\mathrm{it}} = \omega_{\mathrm{it}}$.

ω_{it} is the error component which consists of cross-section error component and time series error component (Gujarati, 2003). Therefore one obvious disadvantage of REM is that there is need to make specific assumptions about the distribution of a random component (Asteriou and Hall, 2011). That is the error components are not correlated with each other and are not autocorrolated across both cross-section and time series units. If the unobserved group-specific effects are correlated with explanatory variables, then the estimates will be biased and inconsistent. Nevertheless if the variance of the error terms is zero, then there is no difference between the REM and pooling of data, in which case pooled OLS is appropriate.

To choose between the FEM and the pooled OLS model depends on the *F*-test. The null hypothesis states that all dummy parameters except one are zero. A large *F*-statistic rejects the null hypothesis in favour of the fixed group effect model, $p < 0.0000$. This leads one to conclude that FEM is better than the pooled OLS model. Also, the Akaike information criterion (AIC) is used where the model with the lowest value of AIC is chosen.

Furthermore it is important to choose between REM and pooled OLS. The null hypothesis of one way random group effect is that the variance of the group are zero or if the variance of the error term is zero, then pooled regression is appropriate. We used the Hausman test to test the use of REM and FEM. Using the unrestricted and restricted mode in our case the pooled OLS and FEM, respectively, we found that *F*-statistics is less than the *F* critical and also using the AIC the value of pooled OLS is less than that of FEM hence we estimated the regression using pooled OLS. Nevertheless, we estimated the regression using the three models for comparison purposes.

However, before undertaking any regression analysis, we checked that our variables were normally distributed and no outliers that can influence our R^2. All variables in both banks and manufacturing were normally distributed. We also undertook panel unit root tests on all variables to ensure that the series is stationary. This is because a model whose

coefficients are non-stationary will exhibit the unfortunate property that the previous values of error term will have a non-declining effect on the current value as time progresses.

In examining the dynamic relationships between two (or more) variables, the causality may be mutual rather than simply unidirectional. This situation often occurs among macroeconomic variables. We used vector autoregression modeling as an attempt to deal with this situation. We captured the simultaneity using the following specification:

$$Y(t) = \alpha_1 + \beta_1 w(t) + y_1 y(t-1) + y_2(t-1) + x(t) + e_y(t)$$

The endogenous variable $y(t)$ depends upon the contemporaneous value of the other endogenous variable $w(t)$, i.e. they are contemporaneously correlated, and depends as well on lagged values of itself, $y(t-1)$, and lagged values of the other dependent variable, $w(t-1)$. In addition, $y(t)$ depends upon an exogenous variable, $x(t)$.

We also tested that there is no multicollinearity of the variables as shown in Table V. If two predictors are perfectly correlated, that is they move together, then the value of β for each variable are interchangeable and difficult to distinguish the separate effects of these variables on leverage. As shown in the correlation matrix below, the correlation coefficients range between -0.014 and -0.737 which shows that, there is no indication of any multicollinearity. To affirm, we also carried collinearity test to ensure that there is no violation of the assumption underlying the use of regression analysis. Bowerman and O'Connell (1990) and Myers (1990) point out that if variance inflation factor is >10, then there would be a cause of concern. As shown in Appendixes 1 and 2, we find that there is no multicollinearity concern. Also in order to check whether one regression is sufficient for each country, we used Chow test to test for structural stability. As shown in Tables II and III there is no suggestion of any presence of structural break.

In addition, we tested for heteroscedacity to check whether the variance of the error terms differ across observations. This is because the variation will cause the standard errors to be biased and hence biased inferences. Using Breusch-Godfrey LM, we also tested the presence of serial correlation of the residuals in addition to Durbin Watson test because of its weakness in that it can have inconclusive results. In both cases, there was no suggestion of serial correlation as shown in Appendices 5 and 6. Similarly to

F-statistic	0.603932	Prob. *F*(10,31)	0.7983
Log likelihood ratio	9.077630	Prob. χ^2(10)	0.5248
Wald Statistic	6.039317	Prob. χ^2(10)	0.8119

Notes: Chow breakpoint test: 14. Null hypothesis: no breaks at specified breakpoints. Varying regressors: all equation variables. Equation sample: 2,260

Table II.
Stability test in banks

F-statistic	0.123555	Prob. *F*(10,31)	0.9993
Log likelihood ratio	1.993210	Prob. χ^2(10)	0.9964
Wald statistic	1.235546	Prob. χ^2(10)	0.9996

Notes: Chow breakpoint test: 108. Null hypothesis: no breaks at specified breakpoints. Varying regressors: all equation variables. Equation sample: 2,268

Table III.
Stability test manufacturing firms

heteroscedasticity, serial correlation in the residuals will lead to incorrect estimates of the standard errors, and invalid statistical inference for the coefficients of the equation.

Further, the mean of the residual given as the sum of the differences between the observed and the predicted value is zero. Also, we took the assumption that residuals do not have a common variance and they are normally distributed (Greene, 2007). If the residuals are not normally distributed, the least square estimators are still best linear unbiased but all the test of significance that are applied will not be valid. In addition, the error terms are assumed that they have the following properties: where μ is unobserved random variable.

$\varepsilon(\mu_i) = 0$ (exogeneity of independent variable). This means that the error terms should have zero mean as shown in Appendices 3 and 4.

4. Empirical results

The statistical summary of the dependent and independent variables are presented in Table IV. The descriptive statistics (Table IV) show that banks in Nigeria are more leveraged with a mean of 0.812 while manufacturing firms have an average of 0.616. That is, the banks fund substantial portion of their assets using debt rather than equity. High leverage means that they are likely to make high returns on equity when there exuberant economy but also a high risk of failing when the economy is low.

It is not only the fact that banks are highly leveraged but the nature of their business compared with manufacturing involves a mismatch in the maturities of their assets and liabilities that make them vulnerable to the interest rates or liquidity shocks. Most banks are known to borrow on short term and lend at long term. For example, banks use demand deposits to fund loans and other long-term investments. Although manufacturing firms in Nigeria are less leveraged than banks, they are also less leveraged than those firms in most developed countries. For example a study conducted by Rajan and Zingales (1995) indicates that leverage level for Germany is 0.73, France 0.71, Canada 0.56, USA 0.58 and UK 0.54. In comparison with other developing economies, a study by Booth *et al.* (2001) indicates that firms in India and Mexico have a mean leverage of 0.99. While those in South Korea the figure is 0.93 and 0.64 for Thailand. This could be attributed to the fact that there is limited access to capital market in Nigeria compared with developed countries. In addition, Table IV shows, banks are more profitable with a mean of 0.168 compared with that of

	LEV	SIZE	ASST	PROF	ERNVO	REGC	LIQ	GDP	GRWT	ETR
Banks										
Mean	0.812	2.630	0.039	0.168	0.525	0.304		0.082	5.925	0.255
SD	0.074	0.452	0.017	0.098	0.751	0.117		0.055	15.485	0.161
Minimum	0.595	1.593	0.019	0.003	−0.976	0.153		−0.031	−0.324	0.077
Maximum	0.919	3.303	0.114	0.368	2.330	0.673		0.121	67.670	0.926
Manufacturing firms										
Mean	0.616	4.535	0.489	0.065	0.860		0.729	0.082	0.101	0.333
SD	0.261	0.774	0.223	0.184	6.492		0.564	0.055	0.357	3.584
Minimum	0.044	2.740	0.006	−0.804	−21.200		0.010	−0.031	−2.313	−13.240
Maximum	2.079	6.047	1.000	0.894	44.700		3.070	0.121	0.963	43.70

Table IV.
Descriptive statistics of the variables

Notes: LEV, leverage; SIZE, size of the bank; ASST, asset structure; ERNVO, earnings volatility; REGC, regulatory capital; LIQ, liquidity of the firm; GDP, real gross domestic growth; GRWT, growth opportunities; ETR, effective tax rate

manufacturing firms with 0.065. This could be credited to the fact that because banks are more leveraged, they enjoy the advantage of debt over equity financing in that debt enables banks to reduce the tax bills other things being equal.

As described above that it is important that the variables are not highly correlated but can be associated to predict the relation we expect in the regression analysis. Hair *et al.* (2006) notes that, the variables are highly correlated if the magnitude is over 0.8. As shown in Table V, there is no variable with a coefficient of 0.8 across the four countries and hence no concern of multicollinearity.

The correlation matrix indicates that there is a positive relationship between leverage and the size of the banks and also manufacturing firm. However, the magnitude of size is much bigger (0.72) in banks compared with that of manufacturing firms (0.16). This could be large banks could have more diluted ownership compared with manufacturing firms and hence less control over the management and therefore debt is one mechanism of exercising control of managerial behaviour. Unlike Uzeoha (2008) who analysed 71 listed firms in Nigeria between 1990 and 2006 and found a negative association between size and leverage after controlling other factors, the positive association between leverage and size is consistent with, Ferri and Jones (1979), Titman and Wessels (1988), Rajan and Zingales (1995), Chen (2003) and Nadeem and Wang (2011). In addition as shown in Table VI, the pooled OLS estimates indicate that size has a positive coefficient at 1 per cent and a significant influence on leverage for both banks and manufacturing firms. Also a positive coefficient is reported using the random effect and fixed effect although not significant. The result could be attributed to the fact that large firms have lower agency costs of debt. For example lower monitoring costs because of less volatile cash flows and easy access to capital

	LEV	SIZE	ASST	PROF	ERNVOL	GROWTH	GDPG	REGC	ETR
LEV	1								
SIZE	0.721	1							
ASST	0.133	0.100	1						
PROF	0.642	0.624	0.033	1					
ERNVOL	−0.568	0.644	0.214	−0.350	1				
GROWTH	−0.420	0.371	−0.445	0.122	0.017	1			
GDPG	0.114	−0.192	0.021	0.214	−0.271	−0.116	1		
TIER1	−0.503	0.259	−0.064	0.033	0.680	0.285	0.021	1	
ETR	0.454	0.381	−0.288	−0.737	0.104	−0.014	−0.083	−0.028	1

Correlation matrix for manufacturing firms

	LEV	SIZE	ASST	PROF	ERNVOL	GROWTH	GDPG	ETR	LIQ
LEV	1								
SIZE	0.157	1							
ASST	−0.176	−0.198	1						
PROFIT	−0.392	0.426	−0.283	1					
ERNVOL	0.272	−0.130	0.084	−0.166	1				
GROWTH	0.075	0.038	−0.134	0.235	0.031	1			
GDPG	−0.046	0.085	0.070	0.096	−0.043	0.165	1		
ETR	0.452	−0.064	0.166	−0.186	0.519	−0.050	−0.168	1	
LIQ	−0.449	0.062	−0.351	0.417	−0.101	0.147	−0.068	−0.083	1

Notes: LEV, leverage; SIZE, Size of the bank; ASST, asset structure; ERNVO, earnings volatility; REGC, regulatory capital; LIQ, liquidity of the firm; GDP, real gross domestic growth; GRWT, growth opportunities; ETR, effective tax rate

Table V.
Correlation matrix for banks

Variables	Banks			Manufacturing firms		
	Poole OLS	FE	RE	Pooled OLS	FE	RE
Constant	0.741***	0.755***	0.738***	0.09*	0.008	0.011
	(0.021)	(0.121)	(0.061)	(0.005)	(0.017)	(0.015)
SIZE	0.057***	0.039	0.060	0.348***	0.214*	0.241
(se)	(0.007)	(0.035)	(0.018)	(0.047)	(0.109)	(0.076)
Elasticity	0.18	0.122	0.187	2.647	1.629	1.834
ASST	0.372***	0.345	−0.391	−0.209***	−0.162	−0.174
(se)	(0.108)	(0.404)	(0.336)	(0.034)	(0.122)	(0.106)
Elasticity	0.017	0.015	−0.018	−0.169	−0.132	−0.141
PROF	0.316***	0.356*	0.307***	−0.208***	−0.140*	−0.206**
(se)	(0.021)	(0.136)	(0.067)	(0.023)	(0.078)	(0.074)
Elasticity	0.070	0.079	0.069	−0.023	−0.015	−0.022
ERNVOL	−0.033***	−0.022	−0.021*	0.032	0.051	0.042
(se)	(0.003)	(0.013)	(0.009)	(0.0004)	(0.001)	(0.001)
Elasticity	−0.001	0.0008	0.004	−0.003	0.001	0.003
Liquidity				−0.108**	−0.091**	0.109***
(se)				(0.009)	(0.032	(0.027)
Elasticity				−0.142	0.110	0.144
GROWTH	−0.021***	0.031	−0.051	0.089*	−0.018	−0.007
(se)	(0.001)	(0.002)	(0.004)	(0.005)	(0.035)	(0.028)
Elasticity	−0.005	0.005	−0.005	0.015	−0.003	−0.001
TIER1	−0.304***	−0.041	−0.310***			
(se)	(0.022)	(0.052)	(0.042)			
Elasticity	−0.103	−0.012	−0.105			
ETR	0.011	0.041	0.011	0.009***	0.003	0.009***
(se)	(0.014)	(0.052)	(0.042)	(0.001)	(0.002)	(0.003)
Elasticity	0.003	−0.012	0.003	−0.005	0.002	0.005
GDP G.	−0.091***	0.034	0.034**	0.009	−0.024	0.018
(se)	(0.025)	(0.149)	(−0.213)	(0.049)	(0.163)	(0.160)
Elasticity	−0.017	−0.003	−0.003	0.001	−0.003	0.002
Dummy	−0.006	0.036	−0.004	−0.009		0.007
	(0.007)	(0.022)	(0.015)	(0.021)		(0.013)
R^2	0.821	0.897	0.820	0.428	0.693	0.426
Adj. R^2	0.817	0.829	0.776	0.424	0.475	0.375
F-statistics	229.008****	13.173***	18.324***	90.921***	3.18***	8.433***
Speed of adjustment (%)	69			46		

Notes: LEV, leverage; SIZE, size of the bank; ASST, asset structure; ERNVO, earnings volatility; REGC, regulatory capital; LIQ, liquidity of the firm; GDP, real gross domestic growth; GRWT, growth opportunities; ETR, effective tax rate. Standard errors in parenthesis. *,**,***Significant at 10, 5 and 1 per cent, respectively

Table VI.
Regression results

markets. Additionally, the result is consistent with the trade-off theory which points out that large firm are able to diversify and take benefit of tax shield on interest payments. Although we found that size is significant in determining leverage in banks and manufacturing, the result also point that size of the bank is important in influencing the speed of adjustment.

Further, as firms grow in size, they tend to diversify, employee skilled workforce and use sophisticated techniques. As a result and as shown in the correlation matrix for banks and manufacturing firms, the larger the firm the more profitable the firm is. The positive association between size and profitability in banks was also found by Nadeem and Wang (2011) on their study of manufacturing firms in Pakistan. On the

other hand, the more profitable manufacturing are, the less leveraged they tend to be. This is because more profitable the manufacturing firm is the more retained earnings it is likely to have. As a result of retained earnings being less costly and easier to access than external finance, firms opt to use it before resorting to external sources. Consequently, pooled OLS shows that there is a significant negative association between profitability and leverage in manufacturing firms hence supporting pecking order theory. On the other hand, while when banks are more profitable, the more leveraged they are. This result supports the signalling theory in that once a firm is profitable, it tends to be attractive to bond holders. Also one line of argument is that because of agency problem, the more profitable the firm is, the more managers are likely to consume huge perquisites and hence interest obligation will commit the managers and act as a means of controlling them.

Rajan and Zingales (1995) and Harris and Raviv (1991) a greater proportion of tangible assets on the firm's financial position, the more the capital market is willing to lend. Hence, our findings indicate a positive correlation between asset structure of the bank and leverage which is in line with previous studies (Ferri and Jones, 1979; Marsh, 1982; Bradley *et al.*, 1984; Titman and Wessels, 1988; Rajan and Zingales, 1995; Chen, 2003).

Growth opportunities

As expected, the growth of the firm is likely to place a great demand on financial resources hence resorting to external finance. Consequently the correlation matrixes indicate that there is a positive association between growth opportunities and leverage in manufacturing firms. In addition, the regression for manufacturing firms shows that growth opportunities are a significant influence of leverage with a positive sign. Our findings are consistent with the findings, Wald (1999), Chen (2003) and Nadeem and Wang (2011). The relationship indicates that, the more growth opportunities a firm has, it signals good news to the capital market and attract more debt and hence supporting the signalling theory. Also the positive association of growth opportunities and leverage could be attributed to the facts that firms which have potential investment projects may not have sufficient retained earnings and hence resorts to debt finance. On the other hand, while growth opportunities is significant at 10 per cent as with manufacturing firms, it is significant at 1 per cent with a negative coefficient in banks hence supporting the trade-off theory. Our findings are in line with Myers (1977), Stulz (1990) and Rajan and Zingales (1995).

Earnings volatility

The more variation in the earnings, especially negative, the more the probability of financial woes because the firm may not be able to meet its financial obligations. Unexpectedly, our findings show mixed result in that there is a negative association between earning volatility and leverage in banks while with manufacturing firms the relationship is positive. Also the regression shows a negative coefficient of earnings volatility although not significant across the three methods of estimation. A negative relation has also been found in the past by Booth *et al.* (2001), De Jong *et al.* (2008) and Nadeem and Wang (2011). One possible explanation for a positive association lies with agency theory in that, managers would engage to protect the interest of the shareholders and the more volatile the earnings are, the more debt they will take. This is because, in case investment turns to be positive, then the bondholders would be repaid and if on the hand the investment returns to be negative, bondholders get empty corporate shell hence not affecting the shareholders.

Effective tax rate

Although effective tax rate is significant in determining manufacturing firms leverage, the reverse is true to banks. However, both manufacturing firms and banks have positive coefficient implying that, the higher the effective tax rate, the more leveraged they may tend to be. This finding supports a number of literatures including, MacKie-Mason (1990) and Graham (1999). The empirical finding is consistent with the static-trade-off theory in that because the loan interest is paid before taxation, the more the interest to be paid the less the tax bills.

Regulatory capital requirement

There have been a number of studies investigating whether regulatory capital is the first order determinant of capital structure in banks, amongst them are Gropp and Heider (2009) who examined the capital structure of large listed banks within Europe. Their findings indicated that there is no evidence to suggest that regulatory capital is the main determinant of capital structure in that having made other variables redundant, regulatory capital could only account for 10 per cent. This is contrary to our finding which shows that regulatory capital is significant and can explain 66 per cent of leverage. This shows that in the case of banks in Nigeria, regulatory capital is quite significant in influencing capital structure. However, the mean regulatory capital held by banks is 30 per cent with the minimum of 15 per cent which is above the set threshold of 10 per cent. This means that the banks voluntarily choose to hold excess capital above the regulatory requirement because of the high cost associated with raising additional equity. The elasticity of regulatory capital implies that a 1 per cent increase in the regulatory capital will also lead to a decrease in leverage by 10.3 per cent.

Estimating speed of adjustment

Although in the current research bank fixed effect and that of manufacturing firms are not significant individually and as a group, adding them to the pooled OLS enables us to explore the variation of leverage following Lemmon *et al.* (2008). The finding indicates that the banks' fixed effects account for 16.2 per cent of leverage compared with 8 per cent on non-financial institutions. The significance of bank fixed effects can cast doubt on how important the regulatory capital is on individual banks as the regulation and supervision are standardized regardless of bank differences.

Although regulatory capital is irrelevant to manufacturing firms, a comparison of the speed of adjustment to target level will shed light on how different are banks from non-financial institution. Indeed Huang and Ritter (2009) argue that speed of adjustment is perhaps the most important issue in capital structure. One will expect that banks will adjust their leverage ratio faster than non-financial institution because of the fear of bank run in case of bad news spreading. Even though the regression is essentially estimated using pooled OLS, Flannery and Rangan (2006) argue that using pooled OLS estimate underestimates the speed of adjustment. This is because pooled OLS assumes that there is no unobserved heterogeneity at firm level. Therefore adding firm fixed effect to pooled OLS will improve the speed of adjustment. Thus the speed is given as $DIST = LV^{*}_{it} - LV_{it}$ where LV^{*}_{it} is the fitted value of the fixed effects regression. Using this approach we found that the speed of adjustment is 69 per cent for banks and 46 per cent for manufacturing firms. This implies that a bank takes about 0.6 years to remove half of the effect of shock on its leverage. While manufacturing firms take about 1.1 years. This implies there is reasonably active management intervention in

banks and in manufacturing firms. The findings are comparable with a number of empirical researches. For example, Lemmon *et al.* (2008) using pooled OLS they found the speed of adjustment of non-financial institutions to be 13 per cent. Adding the bank's fixed effect, they got the adjusting speed of 45 per cent. Also Flannery and Rangan (2006) found the adjusting speed of close to 34 per cent.

Estimating the speed of adjustment allows the testing of trade-off theory predictions in that according to the theory, a firm has a target leverage level and moves towards that level over time. The 69 per cent speed of adjustment to banks implies that every year, a bank gets roughly 69 per cent closer to the leverage target. In striving to achieve its target, the firm has ideally four options. That is, one to retire debt or issue equity when it is overleveraged and it can repurchase the shares or issue debt when underleveraged in order to enjoy the benefit of debt. That is to say debt interest deduction which shields the profits and also in order to control the activities of managers as they will be committed to payment of interest. And so the existence of debt payment helps in aligning the interest of the managers and that of shareholders. If a bank or a firm need to increase its debt in order to reach the target level, it might take longer time especially if it has more free cash flows and so less pressure to obtain external funds and also might want to preserve debt capacity. In contrast, a bank that needs to reduce debt so as to strive to target level, it might be able to adjust faster if they have generated more free cash flow. However, transaction costs including legal and investment bank fees may prevent banks or firms from adjusting their target leverage continuously especially if these costs are prohibitively high.

Other than firm-specific factors like profitability, non-debt tax shield, volatility in earnings, growth, dividend payments that may play a role in adjusting target leverage, external factors like growth of the economy also may help in rebalancing the leverage. As shown in Appendix 6 the growth of the economy is significant in influencing the adjustment of leverage in banks. Also the elasticity of leverage to GDP is −0.017 for banks and 0.001 for manufacturing firms. This means that a 1 per cent growth in GDP will lead to a decrease in bank leverage by 0.017 and an increase of 0.001 for manufacturing firms. One possible reason is that once the economy is growing, internal funds may not sufficient enough to undertake positive investment and hence look for finance including debt. On the other hand, during economic boom, firms are likely to honour their debt obligation and hence less non-performing loans. This will enable banks to increase their retained earnings and reduce their leverage in case following the pecking order theory. The significance of GDP in adjusting leverage is in line with Cook and Tang (2010) who also noted that banks are able to rebalance their leverage faster when macroeconomic condition are favourable than manufacturing firms. In addition, Oztekin and Flannery (2012) find that, legal and financial frameworks are associated with the speed of adjustment. This is because better institutions are associated with lower transaction costs. Also the country's tax framework and laws may influence the speed of adjustment because share repurchase can be one of the most tax efficient of distributing the earnings.

5. Discussion

This empirical work attempted to elucidate the factors that determine the capital structure of banks and manufacturing firms in Nigeria. We carried the investigation employing the use econometric tools, namely pooled OLS, FEM and REM using a balanced panel data. The *F*-statistic and AIC test are in favour of the use of pooled OLS

but we used the three methods in order to undertake meaningful comparison of the coefficients.

According to the findings, across the two industries, leverage and size are positively correlated. Also the pooled OLS report a significant positive coefficient of 1 per cent in both cases. This implies that, the bigger the firm, the more leveraged it is. However, there is a significant difference in the magnitude of influence. We found that size has a huge magnitude of 0.72 in banks compared with that of manufacturing of 0.16. This could be because large banks are known to the capital market and could be more diversified and hence less transaction cost. Additionally, the more diversified the bank is, the more likely to be profitable and according to the static trade-off theory, the more profitable the more leveraged the firm is.

Leverage and earning volatility are negatively related in the banks. This is consistent with signalling theory in that, the more volatile the bank's earnings are, the less attractive to the capital market because volatile earnings will have bad signal. On the other hand, the more volatile the earnings are, the more leveraged the manufacturing firms are. One possible explanation of this positive relation is because of the agency principle relation. That is, the managers would like to protect the interest of the shareholders and therefore if the earnings are uncertain, the more they are likely to resort to debt. This is so because, if an investment in which finance is sought turns to be negative, the bondholders especially unsecured will get empty corporate shells and by then managers could have protected the interest of their shareholders.

Further, the findings indicate that, the more the growth opportunities the firm has, the more leveraged the firm hence supporting signalling theory. Another possible reason why lenders may recognise growth opportunities according to signalling theory is that high-value firms are able to use more debt because debt has dead weight costs which make less valuable firms vulnerable to bankruptcy (Ross, 1977). However, the reverse could be expected if the capital market does not recognise the growth opportunities.

Regulatory capital

One policy that has generated debate is counter cyclical capital requirement that increases during the benign economic period and decreases during economic downturns (Turner, 2008; Pelaez and Pelaez, 2009; Repullo and Suarez, 2010). This is in order to reduce the severity of economic worries and hence the reason why the current research shows that there is positive relationship between regulatory capital and real gross domestic growth. This suggests that, banks should freely recapitalise once there an increase in risk as a result of external shock like economic downturn.

Additional charge of capital during economic boom could lead to increase in the cost of lending ostensibly curtailing exuberant credit supply which can be damaging to the economy. For example, Peek and Rosengren (1995b) studied the effect of the introduction on 1998 Basel capital requirement in the USA and found that bank capital regulations contributed to the slowdown in credit activity in the 1990-1991 recession. In addition, Gambacorta and Mistrulli (2004) examined the effect of higher capital required than the required Basle 8 per cent on lending in the Italian banks and found out that it reduced the lending by 20 per cent. This supports the findings of inverse relationship between regulatory capital and growth opportunities and also to that of economic growth. The possible reason is that while slowing the economic activity in the short term, by requiring additional capital during economic boom would provide a cushion which would absorb the unexpected loss allowing banks to sustain lending during recessionary periods.

GDP real growth

It is possible that unlike the non-financial firms, the economic growth in terms of gross domestic product matters more to banks given their financial intermediation role they play in the economy. That is as banks finance firms so their business depends on the firms' investment opportunities. It is therefore reasonable to expect that the business cycle affect the bank's capital structure more than non-financial firms hence as shown in Table VI, the GDP growth is significant to banks and less significant to manufacturing firms. We wanted to find out whether banks specific variables simply pick up business cycles, rather than bank-specific trade-off. There should be more profitable projects in a growing economy and since growth opportunities of the bank are closely related to growth in the economy, banks with large growth opportunities as a result of economic boom tend to use less debt hence the reason why the coefficient is negative and significant at 1 per cent.

Gertler and Gilchrist (1993) noted that the aggregate debt issue increased in large firms during recession induced by monetary contraction. Nevertheless, during economic boom, intuitively there should be more profitable projects which imply that there will be an increase in taxable income and the value of collateral will increase which makes the firm's debt less risky and leverage pro-cyclical. Therefore, as manufacturing firms are likely to experience increase in taxable profits when the economy is growing, they are likely at the same time increase their deposits in the banks hence the positive association between leverage and GDP real growth. The findings are in line with Frank and Goyal (2009) who argued that agency problems are more pronounced during economic downturn and if the debt was to discipline managers going by the agency theory, then leverage should be counter cyclical.

6. Conclusion

The empirical results show that, banks in Nigeria tend to be more leveraged when they are profitable thereby supporting the trade-off theory. Also, the results show that large firms appear to be highly leveraged which supports the agency theory in that as firms grow in size, owners become devoid of control and hence will prefer debt so that managers can be committed to interest payment obligations.

Further, our findings are consistent with Ross (1977) signalling theory as regards to banks in that the more unpredictable the earnings are, the more likely the bad signal it emits to the capital market and hence less attractive to the bond market. While, the more volatile the earnings of a manufacturing firm are, the more it is likely to be leveraged hence supporting the agency theory. The asset structure has been identified in the literature to be the main determinant of leveraged especially in non-financial firms. This is because the more the tangible asset the firm has, the more it is able to offer security to secure a debt. That is in case the borrower default, the lender can be able to recover their money by disposing of the secured assets. The regression result also demonstrates that, the more tangible assets the bank has, the more leveraged it tends to be. Surprisingly the result shows a negative coefficient for asset structure to leverage in manufacturing firms. This could be because, the more tangible assets the firm has that it can use as security, the more relaxed the managers are likely to be towards the repayment of debt. Also, manufacturing firms are likely to have specialised tangible assets which are less likely to redeployable or saleable in secondary market.

Moreover, our findings are consistent with existing literature in that the existence of growth opportunities places greater demand of funds. If the internal funds are not

sufficient, firms resort to external finance including debt. Also the existence of growth opportunities is a credible way to send good signals to the bond market as an indication of good management with good future prospect.

A notable remark is that, manufacturing firms prefer short-term finance. A majority of empirical evidence argues that firms in developed countries prefer long-term debt which could be due to developed capital market. The result also depicts that to a certain extent, capital structure theory is comparable in banking and in the manufacturing industry. This is because there are those factors like profitability and size that have been found to be significant across the two sectors of the economy. However, there are profound differences especially the significance of economic growth in that the business cycles are more significant on banks than manufacturing firms because the success of banks depends on how successful are the manufacturing firms. That is during the economic growth, firms are likely to be more profitable and increase their deposits. While during economic decline, they are less likely to be profitable and hence increase in non-performing loans. Because there is a level at which the bank can lend the deposits from outside (reserve ratio currently 8 per cent, Central Bank of Nigeria, 2012), requiring more capital will make banks stronger as this will further immobilize further banking liquidity currently at 30 per cent. However, the higher capital requirements reduce the amount the bank can lend. In addition reserve ratio might affect the monetary policy as a higher reserve ratio, the less money will be available to lend. Consequently this will lead to lower money creation hence strengthening the Nigeria naira and also based on the priori reasoning that regulatory capital should be adjusted during the economic boom in which capital requirement increases in the rate of growth of real GDP. This will require riskier banks to face higher capital requirements without CBN exacerbating credit bubble and crunches. Therefore capital regulation should be by economic substance rather than legal form. Also the result shows that the changes regulatory capital influences significantly the adjustment of leverage level. That is, a 1 per cent increase in the regulatory capital will lead a decrease in leverage by 10 per cent.

There is a general presumption than the chance of bank bankruptcy is lower than that of non-financial firm and therefore the speed of adjustment differs significantly with that of banks being 69 per cent and that of manufacturing firms 46 per cent in a year. This means that it takes 0.6 and 1.1 years for banks and manufacturing, respectively, to remove half of the effect of shock on its leverage which implies that there is active and also quick management intervention in both banks and manufacturing firms. However, managers in banks adjust leverage faster than those in manufacturing firms. The main reasons for this are twofolds. That is, the degree of regulation and supervision that is characterised in banking is much tighter controlled than in other industries. This tight regulation, control and monitoring of banks ranges from issuance of license to operate as a bank, having minimum reserves and liquidity ratio. The second reason is that going by the 2008/2009 financial crisis; governments are unlikely to allow large banks to fail. One argument for government involvement of bank bailout in case of financial woes is that a fail of one institution could be catastrophic to the entire banking industry if allowed to collapse. Therefore, large depositors in banks could be less concerned with bankruptcy than the bondholders in manufacturing firms.

Direct bankruptcy costs are likely to be lower in banks than in other firms. This is because, liquidating financial assets are lower than liquidating fixed assets for

instance real estate. The ease of liquidation of financial assets could be attributed to the existence of an efficient capital market.

Notes

1. The OECD (organisation for economic co-operation and development) is an international organisation of countries with highly developed economies and democratic governments. Its members include, Australia, UK, USA, Sweden, Spain, Belgium, Japan, Italy, Turkey, Germany and Canada.
2. Exception is Barclay *et al.* (2006) who focus on book leverage and Welch (2004), Gropp and Heider (2009), and Song (2005) used both measures and arrived at the same result.

References

Adeyemi, S.B. and Oboh, C.S. (2011), "Perceived relationship between corporate capital structure and firm value in Nigeria", *International Journal of Business and Social Science*, Vol. 2 No. 19, pp. 131-143.

Ali, A.A. (2011), "Determinants of capital structure of Jordanian mining and extraction industries. Empirical evidence", *European Journal of Economics, Finance and Administrative Sciences*, Vol. 29 No. 29, pp. 156-164.

Allen, B.T., Demirgüç-Kunt, A. and Levine, R. (2006), "Bank concentration, competition, and crises: first results", *Journal of Banking and Finance*, Vol. 30 No. 5, pp. 1581-1603.

Allen, F., Carletti, E. and Marquez, R. (2009), "Credit market competition and capital regulation", *Review of Financial Studies*, Vol. 24, pp. 983-1018.

Altman, E., Bharath, S. and Saunders, A. (2002), "Credit ratings and the BIS capital adequacy reform agenda", *Journal of Banking & Finance*, Vol. 26 No. 5, pp. 909-921.

Antoniou, A., Guney, Y. and Paudyal, K. (2006), "The determinants of corporate debt maturity structure: evidence from France, Germany, and the UK", *European Finance Managers*, Vol. 12 No. 2, pp. 161-194.

Antoniou, A., Guney, Y. and Pandyal, K. (2008), "The determinants of capital structure. Capital market oriented versus bank oriented institutions", *Journal of Financial and Quantitative Analysis*, Vol. 43 No. 1, pp. 59-92.

Aryeetey, E., Baah, A., Duggleby, T., Hittige, H. and Steel, W. (1994), "Supply and demand for finance for small scale enterprises in Ghana", Discussion Paper No. 251, The World Bank, Washington, DC.

Asteriou, D. and Hall, S.G. (2011), *Applied Econometrics. A Modern Approach Using Eviews and Microfit*, 6th ed., Macmillan, New York, NY.

Barclay, M., Erwan, M. and Clifford, S. (2006), "On the debt capacity of growth options", *Journal of Business*, Vol. 79 No. 2, pp. 37-61.

Barton, S.L., Ned, C.H. and Sundaram, S. (1989), "An empirical test of stakeholder theory predictions of capita", *Financial Management*, Vol. 18 No. 1, pp. 36-44.

Berger, A., De Young, R. and Flannery, M. (2007), "Why do large banking organizations hold so much capital?", working paper, Board of Governors, FDIC and University of Florida, May, Chicago.

Bevan, A.A. and Danbolt, J. (2002), "Capital structure and its determinants in the UK a decompositional analysis", *Applied Financial Economics*, Vol. 12 No. 6, pp. 159-170.

Bhaduri, S.M. (2002), "Determinants of capital structure choice: a study of the Indian corporate sector", *Applied Financial Economics*, Vol. 12 No. 9, pp. 655-665.

Bikker, J.A. and Metzemakers, P.A.J. (2007), "Is bank capital pro-cyclical? A cross-country analysis", *Kredit und Kapital*, Vol. 40 No. 2, pp. 225-264.

Booth, L., Aivazian, V., Demirgue-Kunt, A. and Maksimovic, V. (2001), "Capital structure in developing countries", *Journal of Finance*, Vol. 55 No. 1, pp. 87-130.

Bowerman, B.L. and O'Connell, R.T. (1990), *Linear Statistical Models: An Applied Approach*, 2nd ed., Duxbury Press, Belmont, CA.

Bradley, M., Jarrel, G.A. and Han Kim, E. (1984), "On the existence of an optimal capital structure: theory and evidence", *The Journal of Finance*, Vol. 39 No. 3, pp. 857-878.

Cassar, G. and Holmes, S. (2003), "Capital structure financing of SMEs. Australian evidence", *Journal of Accounting and Finance*, Vol. 43 No. 2, pp. 123-147.

Central Bank of Nigeria (2005), "Monetary policy", available at: www.cenbank.org/Monetary Policy/policy.asp (accessed 12 June 2013).

Central Bank of Nigeria (2012), "Financial inclusion strategy. Summary Report, Abuja, 20 January", available at: www.cenbank.org/Out/2012/publications/reports/dfd/CBN-Summary%20Report%20of-Financial%20Inclusion%20in%20Nigeria-final.pdf (accessed 10 June 2013).

Chen, J. (2004), "Determinants of capital structure of Chinese listed companies", *Journal of Business Research*, Vol. 54 No. 12, pp. 1341-1135.

Chen, J.J. (2003), "Determinants of capital structure of Chinese-listed companies", *Journal of Business Research*, Vol. 57 No. 1, pp. 1341-1351.

Chung, K.H. (1993), "Asset characteristics and corporate debt policy: an empirical test", *Journal of Business Finance and Accounting*, Vol. 20 No. 1, pp. 83-98.

Colombo, E. (2001), "Determinants of corporate capital structure. Evidence from Hungarian firms", *Applied Economics*, Vol. 33 No. 13, pp. 1689-1701.

Cook, D. and Tang, T. (2010), "Macroeconomic conditions and capital structure adjustment speed", *Journal of Corporate Finance*, Vol. 16 No. 1, pp. 73-87.

DeAngelo, H. and Masulis, W. (1980), "Optimal capital structure under corporate and personal taxation", *Journal of Financial Economics*, Vol. 8 No. 1, pp. 3-29.

Deesomsak, R., Paudyal, K. and Pescetto, G. (2004), "The determinants of capital structure. Evidence from Asia Pacific region", *Journal of Multinational Financial Management*, Vol. 14 Nos 4-5, pp. 387-405.

DeFerrari, L.M. and Palmer, D.E. (2001), *Supervision of Large Complex Banking Organizations*, Federal Reserve Bulletin No. 87, February, pp. 47-57.

De Jong, A., Kabir, R. and Nguyen, T.T. (2008), "Capital structure around the world: the roles of firm- and country-specific determinants", *Journal of Banking & Finance*, Vol. 32 No. 9, pp. 1954-1964.

Demirgüç-Kunt, A. and Detragiache, E. (2005), "Cross-country empirical studies of systemic bank distress: a survey", IMF Working Papers No. 05/96, IMF, 1 May, Washington, DC.

Demirgüç-Kunt, A. and Harry, H. (2004), "Market discipline and deposit insurance", *Journal of Monetary Economics*, Vol. 51 No. 2, pp. 375-399.

Dess, R. and Robertson, D. (2003), "Debt incentives and performance. Evidence from UK panel data", *Economics Journal*, Vol. 113 No. 490, pp. 903-919.

Detragiache, D.G.E. and Rajan, R. (2008), "The real effect of banking crises", *Journal of Financial Intermediation*, Vol. 17 No. 1, pp. 89-112.

Ezeoha, E. (2008), "Firm size and corporate financial leverage choice in a developing economy: evidence from Nigeria", *Journal of Risk Finance*, Vol. 9 No. 4, pp. 351-364.

Fama, E.F. and French, K.R. (2002), "Testing trade-off and pecking order predictions about dividends and debt", *Review of Financial Studies*, Vol. 15 No. 1, pp. 1-33.

Faulkender, M. and Petersen, M.A. (2006), "Does the source of capital affect capital structure?", *The Review of Financial Studies*, Vol. 19 No. 1, pp. 45-79.

Ferri, M. and Jones, W. (1979), "Determinants of financial structure. A new methodological approach", *Journal of Finance*, Vol. 32 No. 3, pp. 631-654.

Flannery, M. and Rangan, K. (2006), "Partial adjustment toward target capital structures", *Journal of Financial Economics*, Vol. 79 No. 3, pp. 469-506.

Flannery, M. and Rangan, K. (2007), "What caused the bank capital build-up of the 1990s?", *Review of Finance*, Vol. 12, pp. 391-429.

Frank, M. and Goyal, V. (2007), "Corporate leverage adjustment: how much do managers really matter?", unpublished working paper, University of Minnesota, available at: http://gsf.aalto.fi/seminar_papers/MgrTurnoverApril2007.pdf (accessed 10 May 2013).

Frank, M.Z. and Goyal, K.V. (2009), "Capital structure decisions: which factors are reliably important?", *Financial Management*, Vol. 38 No. 1, pp. 1-37.

Froot, K.A. and Stein, J.C. (1998), "Risk management, capital budgeting, and capital structure policy for financial institutions: an integrated approach", *Journal of Financial Economics*, Vol. 47 No. 2, pp. 55-82.

Gambacorta, L. and Mistrulli, P.E. (2004), "Does bank capital affect lending behaviour", *Journal of Financial Intermediation*, Vol. 13 No. 4, pp. 436-457.

Gennotte, G. and Pyle, D. (1991), "Capital controls and bank risk", *Journal of Banking and Finance*, Vol. 15 Nos 4-5, pp. 805-824.

Gertler, M. and Gilchrist, S. (1993), "The role of credit market imperfections in the monetary transmission mechanism: arguments and evidence", *Scandinavian Journal of Economics*, Vol. 95 No. 1, pp. 43-63.

Givoly, D., Carla, H., Aharon, R.O. and Oded, S. (1992), "Taxes and capital structure: evidence from firms' response to The Tax Reform Act of 1986", *Review of Financial Studies*, Vol. 5 No. 2, pp. 331-355.

Graham, J.R. (1999), "Do personal taxes affect corporate financing decision?", *Journal of Public Economies*, Vol. 73 No. 1, pp. 41-73.

Greene, W. (2007), *Econometric Analysis*, 6th ed., Prentice Hall, Upper Saddle, NJ.

Gropp, R. and Heider, F. (2009), "Determinants of bank capital structures", Working Paper Series No. 1096, European Central Bank.

Gujarati, D. (2003), *Basic Econometrics*, 4th ed., McGraw-Hill/Irwin, New York, NY.

Gupta, P. (2005), "Aftermath of banking crises: effects on real and monetary variables", *Journal of International Money and Finance*, Vol. 24 No. 4, pp. 675-691.

Hair, J., Black, W., Babin, B., Anderson, R. and Talham, R. (2006), *Multivariate Data Analysis*, 6th ed., Person Printice Hall, New Jersey, NJ.

Hall, G., Hutchinson, P. and Michaelas, N. (2004), "Determinants of the capital structure of European SMEs", *Journal of Business Finance and Accounting*, Vol. 31 No. 5, pp. 711-728.

Harris, M. and Raviv, A. (1991), "The theory of capital structure", *Journal of Finance*, Vol. 46 No. 1, pp. 297-355.

Heshmati, A. (2001), "'The dynamics of capital structure: evidence from Swedish micro and small firms', SSE/EFI", Working Paper Series in Economics and Finance No. 440, Department of Economic Statistics, Stockholm School of Economics, April, Stockholm.

Huang, R. and Ritter, J.R. (2009), "Testing theories of capital structure and estimating the speed of adjustment", *Journal of Financial and Quantitative Analysis*, Vol. 44 No. 2, pp. 237-271.

Huang, S.G. and Song, F.M. (2002), Hong Kong Institute of Economics and Business Strategy Working paper 1042, available at: www.hiebs.hku.hk/working_paper_updates/pdf/wp1042.pdf (accessed 10 May 2013).

Iwarere, H.T. and Akinyele, G.T. (2010), "Capital structure determinants in the Nigerian banking industry: financial managers' perspectives", *Pakistan Journal of Social Sciences*, Vol. 3 No. 3, pp. 205-212.

Jensen, M. (1986), "Agency cost of free cash flow, corporate finance and takeovers", *American Economic Review Papers and Proceedings*, Vol. 76 No. 2, pp. 323-329.

Jokipii, T. and Milne, A. (2006), "The cyclical behaviour of European bank capital buffers", Research Discussion Paper No. 16-2006, Bank of Finland, working paper, Bank of Finland 17, available at: www.suomenpankki.fi/en/julkaisut/tutkimukset/keskustelualoitteet/Documents/0617netti.pdf (accessed May 2013).

Kahane, Y. (1977), "Capital adequacy and the regulation of financial intermediaries", *Journal of Banking and Finance*, Vol. 1 No. 1, pp. 207-218.

Kwak, J.S.B. and Smith, B.S. (2005), "The real output losses associated with modern banking crises", *Journal of Money, Credit, and Banking*, Vol. 37 No. 6, pp. 977-999.

Lemmon, M.L., Roberts, M.R. and Zender, J.F. (2008), "Back to the beginning: persistence and the cross-section of corporate capital structure", *Journal of Finance*, Vol. 63 No. 4, pp. 1575-1608.

Lemmon, M.L. and Zender, J.F. (2007), "Debt capacity and tests of capital structure theories", working paper, 23 February 2004, Leeds, available at: http://leeds-faculty.colorado.edu/zender/papers/LZ2_Feb_25_2004.pdf (accessed 15 May 2013).

MacKie-Mason, J.K. (1990), "Do taxes affect corporate financing decision?", *The Journal of Finance*, Vol. 45 No. 5, pp. 1471-1493.

Marques, O.M. and Santos, C.M. (2003), "Capital structure policy and determinants: evidence from Portuguese banking industry", unpublished working paper, available at: www.fep.up.pt/investigacao/cempre/actividades/sem_fin/sem_fin_01/PAPERS_PDF/paper_sem_fin_14nov03.pdf (accessed 5 May 2013).

Marsh, P. (1982), "The choice between equity and debt: an empirical study", *Journal of Finance*, Vol. 37 No. 1, pp. 121-144.

Michaelas, N. and Chitterden, F. (1999), "Finance policy and capital structure choice in UK. SME empirical evidence from company panel", *Small Business Economies*, Vol. 12 No. 2, pp. 113-130.

Minton, B. and Schrand, C. (1999), "The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing", *Journal of Financial Economics*, Vol. 54 No. 3, pp. 423-460.

Mishkin, F.S. (2000), "What should central banks do?", *Federal Reserve Bank of St Louis Review*, Vol. 82 No. 6, pp. 1-13.

Modigliani, F. and Miller, H. (1958), "The cost of capital, corporate finance theory of investment", *American Economic Review*, Vol. 48 No. 3, pp. 261-297.

Myers, S.C. (1977), "Determinants of Corporate Borrowing", *Journal of Financial Economics*, Vol. 5 No. 2, pp. 147-175.

Myers, S. (1990), "Still searching for optimal capital structure", *Conference Series No. 33, Are the Distinction Between Debt and Equity Disappearing? Federal Research Bank of Boston, MA*, pp. 80-95 (Cited in Kopcke, R. and Rosengren, E.).

Nadeem, A.S. and Wang, Z. (2011), "Determinants of capital structure. An empirical study of firms in manufacturing industry in Pakistan", *Journal of managerial finance*, Vol. 37 No. 2, pp. 117-133.

Owolabi, S.A. and Inyang, U.E. (2012), "Determinants of capital structure in Nigerian firms. A theoretical review", *eCanadian Journal of Accounting and Finance*, Vol. 1 No. 1, pp. 7-15.

Oztekin, O. and Flannery, M. (2012), "Institutional determinants of capital structure adjustment speed", *Journal of Financial Economics*, Vol. 103 No. 2, pp. 219-244.

Panno, A. (2003), "An empirical investigation on the determinants of capital structure: the UK and Italian experience", *Applied Financial Economics*, Vol. 13 No. 2, pp. 97-112.

Peek, J. and Rosengren, E.S. (1995a), "Bank regulation and the credit crunch", *Journal of Banking and Finance*, Vol. 19 No. 1, pp. 678-692.

Peek, J. and Rosengren, E. (1995b), "The capital crunch: neither a borrower or a lender be", *Journal of Money, Credit and Banking*, Vol. 27 No. 3, pp. 625-638.

Pelaez, N. and Pelaez, C. (2009), *Regulation of Banks and Finance. Theory and Policy after Credit Crisis*, Palgrave Macmillan, Great Britain.

Philips, S. and Sipahioglo, M. (2004), "Performance implications of capital structure. Evidence from quoted UK organisation with hotel interest", *Service Industries Journal*, Vol. 24 No. 5, pp. 31-50.

Rajan, R. and Zingales, L. (1995), "What do we know about capital structure? Some evidence from international data", *Journal of Finance*, Vol. 50 No. 5, pp. 1421-1460.

Repullo, R. and Suarez, J. (2010), "The procyclical effects of bank capital regulation", Working Paper No. 2010-29S, Center for Economic Research, Tilburg University, available at: https://pure.uvt.nl/portal/files/1199895/2010-05S.pdf (accessed 9 May 2013).

Ross, S. (1977), "The determination of financial structure. The incentive-signalling approach", *Bell Journal of Economics*, Vol. 8 No. 1, pp. 23-40.

Salawu, R.O. and Awolowo, O. (2007), "The determinants of the capital structure of financial firms in Nigeria: the financial managers' perspective", *Global Journal of Business Research*, Vol. 1 No. 1, pp. 60-69.

Shumway, T. (2001), "Forecasting bankruptcy more accurately: a simple hazard model", *Journal of Business*, Vol. 74 No. 1, pp. 101-124.

Singh, A. and Hamid, J. (1992), *Corporate Financial Structures in Developing Countries (Technical Paper No. 1)*, International Finance Corporation, Washington, DC.

Song, H-S. (2005), "Capital structure determinants. An empirical study of Swedish companies", Electronic Working Paper Series No 25, CESIS, Janvier, available at: www.diva-portal.org/smash/get/diva2:565199/FULLTEXT01.pdf (accessed 10 June 2013).

Stein, J. (2002), "Information production and capital allocation: decentralized versus hierarchical firms", *Journal of Finance*, Vol. 57 No. 5, pp. 1891-1921.

Stern, H.G., Ron, J. and Feldman, J.R. (2004), *Too Big To Fail: The Hazards of Bank Bailouts (ISBN 0-8157-8152-0)*, Brookings Institution Press, Washington, DC, available at: www.peterleeson.com/TBTF_review.pdf (accessed 10 May 2014).

Stulz, R. (1990), "Managerial discretion and optimal financial policies", *Journal of Financial Economics*, Vol. 26 No. 1, pp. 3-27.

Titman, S. and Wessels, R. (1988), "The determinants of capital structure choice", *Journal of Finance*, Vol. 43 No. 1, pp. 1-19.

Turner, L. (2008), "Banks want to shoot the messenger over fair value rules", *Financial Times*, October 2, p. 17.

Um, T. (2001), "Determination of capital structure and prediction of bankruptcy in Korea", unpublished PhD thesis, Cornell University, New York, NY.

Uzeoha, A.E. (2008), "Firm size and corporate financial-leverage choice in a developing economy: evidence from Nigeria", *The Journal of Risk Finance*, Vol. 9 No. 4, pp. 351-364.

Wald, J.K. (1999), "How firm characteristics affect capital structure: an international comparison", *Journal of Financial Research*, Vol. 22 No. 2, pp. 161-187.

Welch, I. (2004), "Capital structure and stock returns", *Journal of Political Economy*, Vol. 112 No. 1, pp. 106-131.

Further reading

Antoniou, A., Guney, Y. and Paudyal, K. (2002), "Determinants of corporate capital structure: approach to testing agency theory and an application to the bank industry", *Journal of Banking & Finance*, Vol. 30 No. 1, pp. 1065-1102.

Boateng, A. (2004), "Determinants of capital structure: evidence from international joint ventures in Ghana", *International Journal of Social Economics*, Vol. 31 No. 2, pp. 56-66.

Chui, A.C.W., Lloyd, A.E. and Kwok, C.C.Y. (2002), "The determination of capital structure: is national culture a missing piece to the puzzle?", *Journal of International Business Studies*, Vol. 33 No. 1, pp. 99-127.

Diamond, D. and Rajan, R. (2000a), "A theory of bank capital", *Journal of Finance*, Vol. 55 No. 6, pp. 2431-2465.

Jenson, M. and Meckling, W. (1976), "Theory of the firm, managerial behaviour, agency costs and ownership structure", *Journal of Financial Economics*, Vol. 3 No. 4, pp. 305-360.

Miller, M. (1977), "Debt and tax", *Journal of Finance*, Vol. 32 No. 2, pp. 261-274.

Myers, S.C. (1984), "The capital structure puzzle", *Journal of Finance*, Vol. 39 No. 3, pp. 575-592.

Schulman, C.T., Deborah, W.T., Sellers, K.F. and Kennedy, D.B. (1996), "Effects of tax integration and capital gains tax on corporate leverage", *National Tax Journal*, Vol. 49 No. 1, pp. 31-54.

United Nations Conference on Trade and Industrialisation (2011), "Economic development in Africa Special Report 2011", available at: http://unctad.org/en/Docs/aldcafrica2011_en.pdf (accessed 1 March 2013).

Wiwattanakantang, Y. (1999), "An empirical study on the determinants of the capital structure of Thai firms", *Pacific-Basin Finance Journal*, Vol. 7 Nos 3-4, pp. 371-403.

Appendix 1

Model	Collinearity statistics Tolerance	VIF	1/VIF
(Constant)			
PROF	0.350	2.856	0.3501
ASST	0.250	3.993	0.2504
LIQ	0.157	6.362	0.1571
SIZE	0.506	1.975	0.5063
GROWTH	0.309	3.240	0.3086
NDBT	0.368	2.714	0.3685
ERNVOL	0.297	3.371	0.2966
ETR	0.252	3.965	0.2522

Note: Dependent variable: leverage

Table AI.
Multicollinearity test: manufacturing firms

Appendix 2

Model	Collinearity statistics Tolerance	VIF	1/VIF
ERNVOL	0.487	2.052	0.4873
PROFITABILITY	0.519	1.927	0.5189
GDPGROWTH	0.741	1.349	0.7413
ASSET STRUCTURE	0.797	1.254	0.7974
SIZE	0.467	2.142	0.4669
GROWTH	0.610	1.639	0.6101
ETR	0.704	1.421	0.7037
TIER1	0.405	2.470	0.4049

Table AII. Multicollinearity test banks

Appendix 3

Banks	Minimum	Maximum	Mean	SD	*n*
Predicted value	−4.5360	23.4151	3.9215	5.54111	55
Residual	−8.03187	28.57494	00000	4.69472	55
Std. predicted value	−1.526	3.518	0000	1.000	55
Std. residual	−1.630	5.798	0000	0.953	55
Manufacturing firms					
Predicted value	0.2260	0.8083	0.5399	0.16861	61
Residual	−0.11216	0.10438	00000	0.05267	61
Std. predicted value	−1.861	1.592	0000	1.000	61
Std. residual	−1.579	1.470	0000	0.742	61

Table AIII. Residuals statistics[a]

Appendix 4

Model	*R*	R^2	Adjusted R^2	SE of the estimate	Durbin-Watson
1	0.898[a]	0.806	0.764	0.03546	1.960

Notes: [a]Predictors: (constant), TIER1, Growth, GDP, Effective Tax Rate, Asset Structure, Earnings Volatility, Profitability, Size; [b]dependent variable: LEV

Table AIV. Model summary banks

Appendix 5

	R	R^2	Adjusted R^2	SE of the estimate	Durbin-Watson
1	0.765[a]	0.586	0.442	0.0479	1.952

Notes: [a]Dependent variable: LEV; [b]Predictors: Size, Asset Structure, Profitability, Earnings Volatility, Liquidity, Effective Tax Rate, GDP, Non Debt Tax Shield, Growth

Table AV. Model summary manufacturing

Appendix 6

Variable	Coefficient	SE	*t*-statistic	Prob.
C	0.713817	0.014188	50.31279	0.0000
D(LEV)	0.318935	0.015175	21.01700	0.0000
PROFITABILITY	0.352377	0.015621	22.55841	0.0000
REALGDP	−0.155838	0.027067	−5.757470	0.0000
ASST	−0.536265	0.077684	−6.903187	0.0000
SIZE	0.058230	0.004342	13.41229	0.0000
GROWTH	−0.000914	0.000104	−8.777402	0.0000
ETR	0.007822	0.009693	0.807045	0.4201
TIER1	−0.235684	0.015913	−14.81108	0.0000
ERNVOL	−0.000718	0.002128	−0.337513	0.7359
D3	−0.011994	0.003478	−3.448492	0.0006
FIXED	0.014131	0.000147	0.141461	0.0145
Speed of adjustment	0.69			
R^2	0.909677	Mean dependent var		0.825583
Adjusted R^2	0.907666	SD dependent var		0.072294
SE of regression	0.021968	Akaike info criterion		−4.774861

Notes: Dependent variable: Lev. Method: pooled least squares. Total pool (balanced) observations: 460

Table AVI.
Speed of adjustment in Banks

Appendix 7

Variable	Coefficient	SE	*t*-statistic	Prob.
C	0.595882	0.008150	73.11527	0.0000
(LEV)	0.540836	0.050086	10.79814	0.0000
SIZE	0.057717	0.041639	1.386125	0.1660
ASST	0.240612	0.055880	4.305866	0.0000
LIQ	0.086817	0.015430	5.626488	0.0000
PROFITABILITY	0.024668	0.040052	0.615904	0.5381
ERNVOL	−0.001100	0.000696	−1.580208	0.1143
REAL_GDP	−0.073582	0.083639	−0.879753	0.3792
ETR	−0.022466	0.001443	−15.56948	0.0000
GROWTH	−0.000773	0.014682	−0.052664	0.9580
D3	−0.242786	0.034500	−7.037344	0.0000
FIXED	0.012421	0.014251	0.014231	0.1241
Speed of adjustment	0. 46			
R^2	0.256633	Mean dependent var		0.593274
Adjusted R^2	0.249807	SD dependent var		0.225093
SE of regression	0.194961	Akaike info criterion		−0.422082

Notes: Dependent variable: LEV. Method: pooled least squares. Total pool (balanced) observations: 1,100

Table AVII.
Speed of adjustment in manufacturing firms

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