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## FINANCIAL MANAGEMENT MODELLING OF THE PERFORMANCE OF NIGERIAN QUOTED SMALL AND MEDIUM-SIZED ENTERPRISES

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### Abstract

This article tests four regression models using the available data of Nigerian quoted small and medium-sized enterprises (SMEs) between 1999-2003. It is conceptualised that sustained growth, adequate liquidity and requisite profitability in the SME sector is significantly related to their investment and financing decisions. The empirical results show a significantly inverse relationship between current ratio and the gross profit margin, holding the working capital gap constant. This portrays a 'financial management dilemma' as the Chief Finance Officer (CFO) endeavours to synchronise the conflicting objectives of liquidity and profitability. It is also shown that neither the total assets turnover nor the fixed assets turnover ratios is significant in determining the gross profit margin in Nigerian quoted SMEs. Moreover, a 1 per cent increase in the current ratio brings about a more than proportionate decrease in the debt-equity ratio and the debt-assets ratio. The quoted SMEs' current asset ratios are significantly sensitive to commercial banks' liquidity ratio, cash reserve requirements, and the loan-to-deposit ratio. Overall, our model results confirm that the SME sector in Nigeria is still limited by the liquidity-profitability dilemma, efficiency constraints, pecking order reversals, stringent monetary policy regimes and a risk-averse banking system.

*Keywords:* : Liquidity; Profitability; Capital structure; Efficiency; Stock market; Small and medium-sized enterprises

*JEL Classification:* C13, C32, C45, G10, G13

### Introduction

The field of corporate financial management has developed very extensively since the early 1950s. Sophisticated quantitative models have been developed and applied to the analysis of the interactions among investment, financing and dividend policy decisions within a shareholders' wealth maximisation framework. The propositions outlined under **The Separation Theorem**, which was first identified by Irving Fisher<sup>1</sup> in the 1930s and formally set out by Hirshleifer<sup>2</sup> have been severally tested with data mainly from large enterprises. The crux of *The Separation Theorem* is that investment, financing and dividend policy decisions are irrelevant in determining enterprise value. The effects of taxation, inflation and financial market dynamics on these financial decisions have also been investigated and reported extensively. Recently, the cherished "random walk" view

that stock returns are unpredictable, the "CAPM" view that the market is the only benchmark and market exposure the only source of returns, and the "expectations hypothesis" relating interest rates of various maturities and countries have all been abandoned<sup>3</sup>.

**The applications of the various financial management models to the small business sector have been limited, particularly in developing economies.** The persistent lack of relevant data on small enterprises is still an issue to be addressed by policy makers and the Federal Office of Statistics (FOS). However, there are a few studies that have investigated working capital management practices, financial reporting systems, and capital structure in small and medium-sized enterprises (SMEs) in U.S.A., U.K. and North America. The works of Reid<sup>4</sup> show how in theory and practice the key variables which characterise the small firm's financial

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structure evolve over several time periods after inception. Reid provides a dynamic theory of the small firm which supports the cheap equity case, except when interest rates are low. Brounen, et al<sup>5</sup> find that while large firms frequently use present value techniques and the capital asset pricing model when assessing the financial feasibility of an investment opportunity, Chief Finance Officers ( CFOs) of small firms still rely on the payback criterion.

### Prelude

Since the **Bolton Report** in 1971<sup>6</sup>, there have been a number of other surveys and studies of the growth constraints experienced by smaller firms (for example, Soufani, 2002, ACOST 1990, Aston Business School<sup>7</sup>, Cambridge Small Business Research Centre (CSBRC)<sup>8</sup> 1992). The CSBRC (1992) survey concluded that two important constraints for all firms relate to matters of finance. Due to diverse financial as well as non-financial and behavioural factors<sup>9</sup> small businesses rely more heavily on short-term funding and this makes them more sensitive to macroeconomic changes<sup>10</sup>. Under such circumstances, businesses have to strive for more efficient working capital management and especially the management of accounts receivable and accounts payable, which make up the largest proportions of working capital needs in small firms. Peel and Wilson<sup>11</sup> indicate that if the financial/working capital management practices in the SME sector could be improved significantly, then fewer firms would fail and economic welfare would be increased substantially. Yet even though the importance of sound financial and working capital management is recognised, theoretical and empirical work on the area has been very minimal.

The deregulation of the Nigerian financial services industry between 1986 and 1992 resulted to high interest rates, persisting liquidity crisis in the banking system and credit rationing in favour of large companies. The policy somersaults that characterised the post-deregulation period (1993-2005) left Nigerian SMEs under severe financial stress and extreme financing gaps. The adoption of a medium-term perspective monetary policy was characterised by a high minimum liquidity ratio (MLR) and increasing cash reserve requirement (CRR) between 9-12 per cent with the consequential credit crunch and high mortality rates among Nigerian SMEs. Until recently, Nigerian policy on SME financing has

been direct. The myriad of failed small enterprise credit schemes necessitated an indirect intervention in the form of the Small and Medium Industries Equity Investment Scheme (SMIEIS). SMIEIS is a voluntary initiative of the Bankers' Committee which requires all licensed banks to set aside 10 per cent of their profit before tax (PBT) for equity investment in, and promotion of SMEs. The goal of this scheme is essentially to reduce SMEs' borrowing and consequently relieve them from interest and other bank charges that are not favourable to their capital structure. The scheme is also intended to provide the financial, advisory, technical and managerial support to SMEs.

The environment within which Nigerian SMEs operate is equally stressful. Global indices have shown that Nigeria ranked dismally low in growth competitiveness, technology and innovation and overall quality of national business environment<sup>12</sup>. A good business environment or investment climate will encourage private firms to be well managed and efficient, be profitable to grow, create jobs, increase the rate of economic growth, and reduce poverty<sup>13</sup>. Kilby<sup>14</sup> has recognised that the external environment can confound our capacity to clearly understand and explain the nature and degree of entrepreneurial bottlenecks in Nigeria. It has been argued in Abereijo and Fayomi<sup>15</sup> that the challenges which Nigerian banks have to tackle before a successful implementation of SMIEIS include those that relate to deal flow, investment structuring, monitoring/value enhancement, and liquidity and exit strategies.

The contributions which small enterprises make to the economic development process have been well documented in Agboli and Ukaegbu<sup>16</sup>, Gellatly, et al<sup>17</sup> and Mambula<sup>18</sup>. Small-scale enterprises (SSEs) generate more direct jobs per naira of investment than do large enterprises. They serve as a training ground for developing technical and entrepreneurial skills and by virtue of their greater use of indigenous technological capabilities, they promote local inter-sectoral linkages and contribute to the dynamism and competitiveness of the economy. The major balance sheet relationships are analysed in this article. First, we investigate the nature of the liquidity-profitability relationship in the SMEs to shed light on the corporate finance dilemma. Second, we investigate the relationship between efficiency and profitability, and thirdly the correlation between indebtedness (leverage) and liquidity. Fourthly, we also

analyse the relationship between bank liquidity and SME liquidity management practices. Specifically, the following research hypotheses are tested in this study:

H<sub>1</sub>: There is a significantly negative relationship between liquidity and profitability of Nigerian quoted SMEs

H<sub>2</sub>: There is a significantly positive correlation between SME profitability and their efficiency

H<sub>3</sub>: There is a significantly positive correlation between capital structure and the liquidity of quoted SMEs.

H<sub>4</sub>: There is a significantly positive correlation between banking sector liquidity and SME liquidity profiles.

The results of this study are intended to stimulate greater efficiency, productivity and financing of Nigerian SMEs through a moderate monetary policy environment and an effective financial system.

### Definitional Clarifications

The definition of small and medium-sized enterprises in Nigeria has changed from time to time, given various economic and business realities. In 1996, the National Council on Industry provided an important clarification that distinguished clearly Nigerian enterprises using four major classifications (**Exhibit 1**). The first classification defines a *cottage industry* as an industry whose total cost excluding cost of land but including capital is not more than N1.5 million with a labour size of not more than 10 workers. The second classification defines a small industry as an industry, whose total cost, including working capital, but excluding cost of land, is over N1.5million, but not more than N40 million and a labour size of between 11 and 35 workers. A medium-scale industry is defined as an industry whose total cost including working capital, but excluding cost

#### EXHIBIT-1

#### 'NATIONAL COUNCIL ON INDUSTRY' DEFINITION OF SMALL AND MEDIUM-SCALE INDUSTRIAL ENTERPRISES (1996)

1) **Cottage Industry**

This is an industry whose total cost excluding cost of land but including capital is not more than N1.5million with a labour size of not more than 10 workers

2) **Small Industry**

An industry, whose total cost, including working capital, but excluding cost of land, is over N1.5million but not more than N40 million and a labour size of between 11 and 35 workers.

3) **Medium-scale Industry**

An industry whose total cost including working capital, but excluding cost of land is above N40 million but not more than N150 million with a labour size of between 36-100 workers.

4) **Large-scale Industry**

An industry whose total cost including working capital, but excluding cost of land is higher than N150 million with a labour size of over 100.

of land is above N40million, but not more than N150 million with a labour size of between 36-100 workers. However, a large-scale industry is an industry whose total cost including working capital, but excluding cost of land is higher than N150 million with a labour size of over 100.

**Exhibit 2** shows the current definitions of SMEs adopted under the Small and Medium Industries Equity

Investment Scheme (SMIEIS). The classifications are employment-based and asset-based. The various organisations distinguish between micro, small and medium enterprises. Under employment-based classification, the International Finance Corporation (IFC) defines a micro-enterprise as one with less than 10 employees, a small enterprise as one with between 10-50 employees, and medium enterprises as having between 50-100 employees. The Central Bank of Nigeria (CBN)

<b>EXHIBIT-2</b>			
<b>DEFINITIONS OF SMALL AND MEDIUM-SCALE ENTERPRISES UNDER THE SMALL AND MEDIUM INDUSTRIES EQUITY INVESTMENT SCHEME (SMIEIS) (2005)</b>			
<b>Organisation</b>	<b>Micro Enterprises</b>	<b>Small Enterprises</b>	<b>Medium Enterprises</b>
<b>Employment-Based Classification</b>			
International Finance Corporation (IFC)	< 10	10-50	50-100
Central Bank of Nigeria (CBN)	-	< 50	< 100
National Association of Small-scale Industrialists (NASSI)	-	< 40	-
Accenture	-	< 50	< 500
<b>Asset-Based (Excluding Real Estate) Classification</b>			
International Finance Corporation (IFC)		< \$2.5 million	
Central Bank of Nigeria (CBN)		< N10million	< N150 million
National Association of Small-scale Industrialists (NASSI)		< N40 million	-
Federal Ministry of Industry		< N50 million	< N200 million
National Economic Reconstruction Fund (NERF)		< N10 million	-

rather prefers to distinguish between small and medium-scale enterprises, leaving out micro-enterprises. The CBN defines a small enterprise as that business entity with less than 50 employees, while medium-scale enterprises are defined as having less than 100 employees. The National Association of Small-scale Industrialists (NASSI) defines a small enterprise as that industrial venture that has less than 40 employees. Accenture, a consulting firm, defines a small enterprise as having less than 50 workers, while medium-enterprises should have less than 500 workers.

The asset-based classification, excluding real estate, provides another definitional shift as adopted by many organisations under the SMIEIS programmes. The International Finance Corporation (IFC) defines small enterprise as having an asset base of less than US\$2.5 million. The Central Bank of Nigeria defines a small enterprise as having an asset value of N10million, while a medium-enterprise should have an asset base of less than N150 million. The National Association of Small-scale Industrialists (NASSI) defines a small enterprise as having an asset base of less than N40 million; it should be less than N50 million from the perspective of the Federal Ministry of Industry (FMI). The FMI also defines a medium-enterprise as having an asset value of less than N200 million. The National Economic Reconstruction Fund (NERF) defines a small enterprise

as a business entity with an asset base of less than N10million.

#### **SME Growth, Performance and Role of the Banking Sector**

The data in Table 1 show growth rates in selected balance sheet variables for Nigerian quoted SMEs for two periods, 1998-2002 and 1999-2003. We find a drastic reduction in the growth of net current assets from 68.2 per cent to 5.0 per cent revealing acute liquidity shortages in Nigerian quoted SMEs between Periods I and II. The situation would have been more acute in unquoted SMEs. However, growth in total assets increased from 94.9 per cent to 143.2 per cent apparently by the SMEs relying on the stock market for additional funds and/or falling on reserves. Financing expansionary asset growth under a regime of liquidity constraints could also be costly. There is evidence that the proportion of share capital in the shareholders' funds portfolio declined from 91.2 per cent to 65.1 per cent. This could be due to a risk-averse financial sector in which the investors' required rate of return is only equivalent to a risk-free interest rate. The declining risk premia which characterised market response to increased equity financing could be defined by the perceived risk class of Nigerian small and medium-sized enterprises.

**TABLE 1**  
**GROWTH RATES IN SELECTED BALANCE SHEET**  
**INDICATORS OF NIGERIAN QUOTED SMES**  
**(1998-2002, 1999-2003) Average Figures \***

Indicator (%)	1998-2002	1999-2003
Net Current Assets	68.2	5.0
Total Assets	94.9	143.2
Share Capital	91.2	65.1
Reserves	(179.2)	128.5
Shareholders' Funds	50.3	56.0
Turnover	151.5	137.9
Profit after tax	909.0	(28.3)

\* Based on the data of quoted small and medium-sized enterprises

The rapid increase in the proportion of reserves in the shareholders' funds portfolio from -179.2 per cent to 128.5 per cent could have provided a cost-effective means of financing asset growth in Nigerian quoted SMEs between 1998-2003. Although growth in turnover (sales) decreased marginally from 151.5 per cent to 137.9 per cent, we find growth in net profit decline drastically from 909.0 per cent to -28.3 per cent. The average size of turnover growth rate could have been scaled down by high operating cost profiles. The data in Table 2 show average selected financial ratios of Nigerian quoted

SMEs in the 1999-2003 period. In terms of current ratio (CR), we find a decline from 154.7 per cent in 1999 to 44.1 per cent in 2003. Hence the working capital gap (WCG) increased from 134.2 per cent to 323.7 per cent, reflecting a rising portfolio of current liabilities above the portfolio of current assets.

The debt ratios show average increases within the period (1999-2003). The debt-to-equity ratio (DER) increased from 49.9 per cent in 1999 to 168.4 per cent in 2003, with an average of 265.1 per cent for the period. Similarly, the debt-to-assets ratio (DAR) increased from 93.9 per cent in 1999 to 269.2 per cent in 2003, with an average of 125.4 per cent within the 1999-2003 period. The choice of debt over equity in financing asset growth is in line with the Pecking Order Framework (POF) due to cost advantages associated with debt financing. The radical improvement in the turnover and efficiency ratios could have improved the cash flow positions of these quoted SMEs. The Fixed Assets Turnover Ratio (FATR) of the quoted SMEs increased from 143.2 per cent in 1999 to 391.4 per cent in 2003. Moreover, the total assets turnover ratio (TATR) increased from 154.5 per cent in 1999 to 364.6 per cent in 2003. However, this efficiency was constrained by a stressful and costly operating environment as the gross profit margin declined from 14.1 per cent in 1999 to 10.7 per cent in 2003, with an exceptional performance in 2001.

**TABLE 2**  
**AVERAGE FINANCIAL INDICATORS OF NIGERIAN QUOTED SMES: 1999-2003**

Year	Liquidity ratios		Indebtedness ratios		Turnover ratios		Profitability ratio
	CR (%)	WCG (%)	DER (%)	DAR (%)	FATR (%)	TATR (%)	GPM (%)
1999	154.7	134.2	49.8	93.9	143.2	154.5	14.1
2000	292.2	309.8	35.2	40.1	668.2	357.9	8.82
2001	50.3	519.8	120.9	172.9	412.2	364.7	1020.3
2002	60.9	329.1	951.2	50.9	663.96	361.2	10.3
2003	44.1	323.9	168.4	269.2	391.4	364.6	10.7
Average	120.5	323.4	265.1	125.4	455.8	320.6	212.9

Notes :  
 CR - Current Ratio  
 WCG - Working Capital Gap  
 DER - Debt/Equity Ratio  
 DAR - Debt/Asset Ratio  
 FATR - Fixed Asset Turnover Ratio  
 TATR - Total Asset Turnover Ratio  
 GPM - Gross Profit Margin

Source: Author's computations based on SME financial summaries in the Nigeria Stock Exchange Factbook (2004).

The financial ratios of Nigerian banks deviated radically from monetary policy targets. The data in Table 3 show banks' liquidity ratio (BLR) was an average of 57.2 per cent between 1999-2003, which exceeded the minimum liquidity requirement (MLR) which ranged between 35-40 per cent within this period. The cash reserve ratio (CRR) averaged 10.9 per cent in the 1999-2003 period. In order to facilitate the monetary transmission mechanism, the CRR was reduced by the regulatory authorities from 11.7 per cent in 1999 to 10.5 per cent in 2003. In line with this, the loan-to-deposit ratio (LTDR) increased from 54.6 per cent in 1999 to 70.0 per cent in 2003 with an average of 61.6 per cent for the period. The improved liquidity in the banking system and the consequential expansionary loans' portfolios did not however favour SME financing in Nigeria. The data in Table 4 show that commercial banks loans to small-scale enterprises as a percentage of total credit to the economy declined from 48.8 per cent in 1992 to just 7.5 per cent in 2003. It is noteworthy that the mandatory banks' credit allocation of 20 per cent of its total credit to small-scale enterprises wholly-owned by Nigerians was abolished in 1997.

**TABLE 3**  
**SELECTED FINANCIAL RATIOS OF COMMERCIAL BANKS : 1999-2003**

Year	Liquidity Ratio <sup>1</sup> (BLR)	Cash Reserve Ratio <sup>2</sup> (CRR)	Loan-to-deposit Ratio <sup>3</sup> (LTDR)
1999	61.0	11.7	54.6
2000	64.1	9.8	51.0
2001	52.9	10.8	65.6
2002	58.2	11.3	66.5
2003	49.7	10.5	70.0
.....	.....	.....	.....
Average	57.2	10.9	61.6

**Notes :**

1. Liquidity ratio is the ratio of total specified liquid assets to total current liabilities.
2. Cash reserve ratio is the ratio of cash reserve requirements to total current liabilities.
3. Loan to deposit ratio, is the ratio of total loans and advances to total current liabilities

Source: Central Bank of Nigeria Survey (December, 2003)

**TABLE 4**  
**RATIO OF LOANS TO SMALL-SCALE ENTERPRISES TO COMMERCIAL BANKS' TOTAL CREDIT IN NIGERIA\***

Year	Commercial Banks Credit to Small-scale Enterprises (mn)	Commercial Banks' Total Credit (mn)	Commercial Banks Loan to Small-scale Enterprises, Percentage of Total Credit (%)
1992	20,400.0	41,810.0	48.8
1993	15,462.9	48,056.0	32.2
1994	20,552.5	92,624.0	22.2
1995	32,374.5	141,146.0	22.9
1996	42,301.1	169,242.0	25.0
1997	40,844.3	240,782.0	17.0
1998	42,260.7	272,895.5	15.5
1999	46,824.0	353,081.1	13.3
2000	44,542.3	508,302.2	9.7
2001	52,428.4	796,164.8	6.6
2002	82,368.4	954,628.8	8.6
2003	90,176.5	1,210,033.1	7.5

Note : \*The abolition of mandatory banks' credit allocations of 20 per cent of its total credit to small-scale enterprises wholly-owned by Nigerians took place in 1997.

Source: Central Bank of Nigeria, Annual Report (selected issues).

### Company Financial Analysis (2001-2005)

Data in Table 5 show the comparative performance of 9 Nigerian quoted SMEs in terms of liquidity, profitability, efficiency and shareholders' wealth maximisation. In terms of liquidity, the net current ratio of 6 out of the 9 quoted SMEs falls below a group average of 0.43. The worst-hit companies are Smart Products Plc, Union Ventures & Petroleum Plc, and Afrik Pharmaceuticals Plc, whose net current ratio averaged

between 0.06 and 0.28 in the 2001-2005 period. However, achieving a liquidity ratio below the industry average may not necessarily represent poor liquidity and possible insolvency. Cutix Plc, with a net current ratio of 0.42 below the group average achieved a superior positive net profit margin of 7.27 per cent far above the group average of -40.99 per cent. We observe also that Rokana Industries Plc with a superior liquidity profile of 0.89 above the industry average achieved a negative profitability ratio of -22.69 per cent.

**TABLE 5**  
**SELECTED PERFORMANCE INDICATORS OF NIGERIAN QUOTED SMES:**  
**COMPANY BY COMPANY ANALYSIS BASED ON 5 YEAR AVERAGE DATA : 2001-2005**

Company	Net Current Ratio (NCR)	Net Profit Margin (NPM)	Net Profit Per Employee (NPPE) (N'000)	Earning Per Share (EPS)	Dividend Per Share (DPS)
Adswitch Plc	0.54	(19.530)	327,626	2.96k	2.00k
Afrik Pharmaceuticals Plc	0.28	3.56	N.A	N.A.	N.A.
Capital Oil Plc	0.65	0.32	(33,480)	(0.81)	3.00k
Cutix Plc	0.42	7.27	213,200	23.215	9.5k
Juli Plc	0.38	(2.01)	(39,920)	(6.56)	0.00k
Rak Unity Petroleum Plc	0.39	2.47	N.A	N.A.	N.A.
Rokana Industries Plc	0.89	(22.69)	(118,520)	(19.17)	0.00k
Smart Products Nigeria Plc	0.06	(339.32)	(725,310)	(15.39)	0.00k
Union Ventures & Petroleum Plc	0.23	1.53	23,110	3.47K	0.00k
Group Avenue	0.43	(40.99)	(50,471)	(12.35)	4.83k

Source: Author's analysis based on data provided in the Nigeria Stock Exchange Factbook (2005)

### Inefficient and Unprofitable Quoted SMEs

A net profit margin average of -40.99 per cent shows that the quoted SME sector was characterised by negative profitability in the 2001-2005 period. Similarly, the net profit per employee, a measure of efficiency, was -N50,471 for the 2001-2005 period. The companies that recorded average negative profitability within the investigated period are Adswitch Plc, Juli Plc, Rokana Industries Plc and Smart Products Nigeria Plc. These quoted SMEs also recorded negative efficiency ratios, except Adswitch which recorded a positive net profit per employee of N327,626. Table 6 provides detailed company by company analysis over the 5-year period

(2001-2005). Adswitch Plc's profitability declined by 113.96 per cent in 2004, and this largely determined its overall net profit margin within the period under investigation. The profitability per staff in the remaining years was able to wipe out the negative figure in 2004. Adswitch Plc recorded an earnings per share (eps) of 2.00k. With sustained profitability it is hoped this company will soon leave the negative profitability bracket. However, Juli Plc, Rokana Industries Plc and Smart Products Nigeria Plc achieved negative earnings per share and most times non-existent dividend per share (dps). Although Capital Oil Plc recorded a marginal profitability ratio of 0.32 per cent, it recorded a negative net profit per employee of -N33,480 and a negative eps of 0.81k.

### High-Performing Quoted SMEs

The highly profitable quoted SMEs within the 2001-2005 period are Cutix Plc, Afrik Pharmaceuticals Plc, Rak Unity Petroleum Plc and Union Ventures & Petroleum Plc. These companies maintained reasonable liquidity profiles and were efficient by achieving positive net profit after tax per employee. Cutix Plc led the group with an average net profit margin of 7.27 per cent, while Union Ventures and Petroleum Plc tailed the group with a net

profit margin of 1.53 per cent within the 2001-2005 period. Cutix recorded improving net current ratios (liquidity) from 0.30 in 2001 to 0.48 in 2005. Within the same period its net profit margin grew from 6.46 per cent in 2001 to 7.62 per cent in 2005. The net profit after tax per employee grew from N213,200 in 2001 to N307,210 in 2005. The company's earnings per share (eps) improved significantly from 13.90k in 2001 to 33.02k in 2005, while the dividend per share (dps) also improved from 7.50k in 2001 to 10.00k in 2005.

**TABLE 6**  
**DETAILED FINANCIAL ANALYSIS OF NIGERIAN QUOTED SMES : 2001 AND 2005**

Company/Year	Net Current Ratio (NCR)	Net Profit Margin (NPM) %	Net Profit Employee (N'000)	EPS (K)	DPS (K)
<b>Adswitch Plc</b>					
2001	0.54	14.25	N288,538	12.00	2.00k
2005	0.53	11.90	N254,000	6.59	4.00k
<b>Afrik Pharmaceuticals Plc</b>					
2001	0.18	3.46	NA	NA	NA
2005	0.22	4.50	NA	NA	NA
<b>Capital Oil Plc</b>					
2001	0.64	0.40	10,283.87	0.72	0.00k
2005	0.56	(10.30)	(196,390)	(8.90)	0.00k
<b>Cutix Plc</b>					
2001	0.30	6.46	129.35	13.90	7.50k
2005	0.48	7.60	307.21	33.02	10.00k
<b>Juli Plc</b>					
2001	0.42	(1.84)	(17.55)	(19.0)	N.A
2005	0.49	0.36	9.95	3.6	N.A
<b>Rak Unity Petroleum Plc.</b>					
2001	-	-	N.A	N.A	N.A
2005	0.44	3.42	N.A	N.A	N.A
<b>Rokana Industries Plc</b>					
2001	0.25	(19.41)	(144.83)	(31.61)	N.A
2005	(0.06)	12.42	77.17	13.89	N.A
<b>Smart Products Nigeria Plc</b>					
2001	0.15	(143.2)	(1884.71)	(40.0)	N.A
2005	0.10	0.31	43.51	0.92	N.A
<b>Union Ventures &amp; Petroleum Plc</b>					
2001	0.25	1.63	15.28	6.29k	N.A
2005	0.27	2.32	41.81	2.29k	N.A

Source: Author's Computation from the Nigeria Stock Exchange Factbook (2005)



There are basically five types of models in financial management. These are manipulative, perceptive, predictive, complexity and uncertainty models. Manipulative models are essentially designed to take the "dreariness" out of grinding out financial statements, and more importantly, to permit a wider range of alternatives to be examined and permit changes to plans to be processed more readily. Accounting formed the earliest model of a company in terms of its profit and loss account and balance sheet. These models have been further refined and manipulated using computers for preparing budgets, plans, and for determining growth and profitability objectives. The perceptive models tend to be more in the form of mathematical equations and assist management in perceiving relationships – an awareness of which may have a major impact on corporate strategy. Examples include (1) formulae linking future and present values, (2) effect of dividend policy on growth and (3) relationship of rate of inflation to real return on equity.

Predictive models are used for forecasting purposes. Short-run forecasting as in inventory control and scheduling, as in the construction of momentum indexes for stock prices is a typical example. It generally uses exponential smoothing – a system of weighted averages. Complexity models would include the optimisation of a company's operations using linear programming, or the use of the critical path method to reduce construction time on large projects. The uncertainty models recognise that virtually all data about the future are uncertain. Using simulation methods the risk in major investment decisions can be gauged, and decision trees can be used to select an optimum strategy from a range of alternatives.

A variety of financial management models can be found in the literature. Notable among these are corporate financial planning models and public sector financial management models. Generally, financial planning and forecasting is the synthesis of theory and practice. Linear programming and simultaneous equation systems are two major alternatives for performing financial planning and analysis. In the programming model, an objective function is maximised, and different constraints are introduced to the model. The simultaneous-equation model does not explicitly maximise an objective function; it does, however, specify the interrelationship between investment, financing, and dividend policy. The

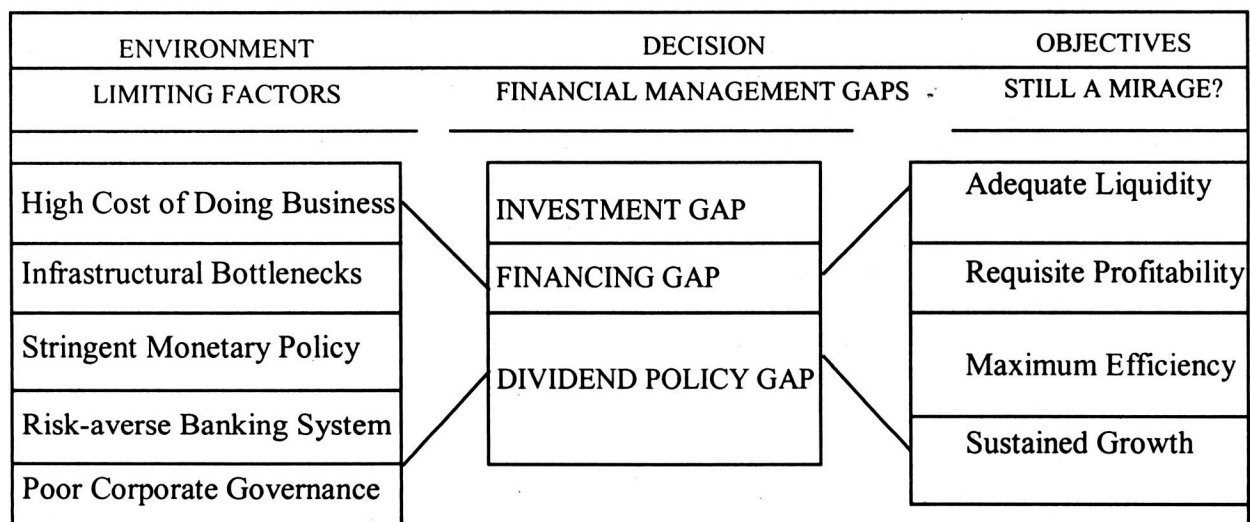
Carleton<sup>19</sup> Model is an optimisation model with one objective function and three distinct sets of constraints corresponding to accounting definitions, sources and uses of funds, and alternative financial policies. Policy constraints include (a) interest coverage (b) maximum leverage (c) pre-financing limitation (d) minimum dividend growth (e) payout restriction, and (f) cumulative payout restriction. The Warren and Shelton<sup>20</sup> Model is based on the simultaneous equation taking greater account of the interrelation of the financing, dividend and investment decisions. They rely upon a sales forecast as a critical input to the model. Unlike Carleton, Warren and Shelton (WS) explicitly use various operating ratios in their model. The entire Warren-Shelton model is a system of twenty equations of a semi-simultaneous nature. A FORTRAN computer programme called FINPLAN is used to solve the WS model. The actual solution algorithm is recursive, between and within segments.

One particular advantage of the WS model is that it defines the characteristics of a good financial planning model. First, the model results and the assumptions should be plausible and/or credible. Second, the model should be flexible so that it can be adapted and expanded to meet a variety of circumstances. Third, it should improve on current practice in a technical or performance manner. Fourth, the model inputs and outputs should be comprehensible to the user without extensive additional training. Fourth, it should take into account the interrelated investment, financing, dividend and production decisions and their effects on the market value of the firm. Fifth and finally, the model should be fairly simple for the user to operate without extensive intervention of non-financial personnel and tedious formulation of the inputs. Hence, the Francis-Rowell<sup>21</sup> Model extends the simultaneous linear-equation of the firm developed by Warren and Shelton. The objective of the FR Model is to generate proforma financial statements that describe the future financial condition of the firm for any assumed pattern of sales. Parameters of various equations in the system can be changed to answer "what if" questions, perform sensitivity analysis, and explore the various paths toward some goals or goals that may or may not be optimal. The FR Model is composed of ten sectors with a total of 36 equations. Brealey and Myers<sup>22</sup> have however argued that there is no model or procedure that encompasses all the complexity and intangibles encountered in financial planning analysis.

In developing a financial management model of the SME sector in Nigeria, we realise the major constraint – a stressful financial and business environment, macroeconomic policy instability and persistent managerial ineffectiveness. The accompanying figure shows that the realisation of the objective of adequate liquidity, requisite profitability, maximum efficiency and sustained growth in the Nigerian SME sector may remain a mirage without an appropriate institutional and policy framework for dealing with investment, financing and dividend policy gaps. The monetary policy framework

can determine the level of liquidity in the banking system and hence influence the liquidity of the SME sector which relies on the banking industry for working capital financing. The structural interplay between monetary policy outcomes and corporate financial management decisions could maximise or minimise shareholders' wealth in the long run. The financial managers of Nigerian SMEs need to understand the critical policy relationships that enhance balance sheet growth and investment performance.

FIGURE : A FINANCIAL MANAGEMENT MODEL OF NIGERIAN SMEs



Source: Based on author's research.

#### Methodology Used

In a dynamic financial model of the small, owner-managed enterprise, the emphasis is upon debt and equity relationships, and their modification, as the small firm goes through various stages of growth. The basis of this modelling is the extant literature on the dynamics of the firm, especially the works of Feichtinger and Hourt<sup>23</sup> and Hilten, et al<sup>24</sup>. This has been previously utilised in a small firms context by Reid<sup>25</sup>.

It is assumed that the owner-manager engages in maximizing the value of his firm according to **Equation 1**.

$$\max_{D, I, B} \int_0^{\tau} e^{-it} D dt + e^{-it} E(\tau) \quad (1)$$

where  $D \geq 0$  is the dividend stream, and  $i$  is the owner-manager's rate of time preference.  $E$  denotes equity,  $\tau$  is

the planning time horizon,  $I$  is gross investment and  $B$  is debt. For this model, the state variables are the amount of equity ( $E$ ) and the capital stock ( $K$ ); with the control variables being debt ( $B$ ), Investment ( $I$ ) and dividend ( $D$ ). It is assumed that the owner-manager pursues the goal of maximisation of value as in (1) by its dividend, investment and debt policy, subject to the constraint upon policy, and therefore upon the state of the firm and its performance:

$$\dot{E} = \pi - rB - D \quad (2)$$

$$K = I - dK \quad (3)$$

$$K = E + B \quad (4)$$

$$0 \leq B \leq \gamma E \quad (5)$$

$$B \geq 0, K \geq 0 \quad (6)$$

$$E(0) = e_0; K(0) = k_0 \quad (7)$$

where (2) is the state equation for equity, with  $\pi$  operating profit,  $r$  the interest rate on debt, and  $\delta$  the determination rate on capital goods.  $\gamma$  is the maximum gearing ratio permitted for the risk class of debt to which an interest rate  $r$  is attached. Notice that what drives this maximum on gearing is a limit on desired risk exposure, not a limit on outside finance (which could be expressed as credit rationing argument). In fact, limits on gearing depend on the debt-equity ratio, and not on the level to which equity or debt are provided by investors or lenders. It is also notable that small firms often have gearing ratios well in excess of unity, in the early stages of the life cycle, casting doubt on the credit rationing argument, so far as the provision of debt is concerned (the case typically argued).

Like, dividends, debt and capital are subject to non-negativity constraints, and the initialising values of equity, and capital are  $e_0$  and  $k_0$ , respectively. Operating profit ( $\pi$ ) is defined as the difference between sales ( $S$ ) and production costs ( $C$ ), given that capital is the only factor input. It is assumed that the output rate of the firm ( $Q$ ) is proportionately related to the capital input by the capital productivity parameter,  $k$ . Thus, operating profit may be written as **Equation 8**:

$$\begin{aligned}\pi &= PQ - \delta K \\ &= K(kP - \delta)\end{aligned}\quad (8)$$

assuming a unit price of capital goods. Finally, the firm's sales are defined by the function  $S(Q)$  which is monotonically increasing and concave in  $Q$ , with sales being positive for positive outputs. Thus:

$$\begin{aligned}S(Q) &= P(Q) \cdot Q \text{ with} \\ S' &> 0 \quad S'' < 0 \text{ and } S > 0 \text{ for } Q > 0.\end{aligned}\quad (9)$$

In effect, this small firm is subject to decreasing returns to scale, the source of which may be an imperfect goods market and/or unspecified non-production costs which raise the marginal costs of organising the production plan of the firm as it grows. The evidence for decreasing returns in small firms has been established in Reid<sup>26</sup>. In some measure, an organisational explanation for this is plausible, especially in a growth context<sup>27&28</sup>. Parameter restrictions for the model are shown in **Equation 10**:

$$t, r \in (0,1) \text{ and } \delta, \gamma, k \geq 0 \quad (10)$$

Moreover, little is also known about an entropy model of firm corporate financial structure. Entropy statistics provide a quantitative measure of how diversified capital structures actually are across the range of potential financing instruments, Baldwin, et al<sup>29</sup>. Mathematically, entropy takes the general form:

$$E(s) = \sum_{i=1}^N S_i \log(1/S_i) \quad (11)$$

where  $S_i$  is the share of the capital structure represented by instrument  $i$ . This expression is typically described as a "log-entropy" measure. The antilog of this expression converts log entropy into its "numbers-equivalent" counterpart. A numbers-equivalent value of 2.0 indicates that a firm is about as diversified as one that distributes its financing equally between two instruments (e.g., long-term secured debt and retained earnings). Differences in average entropy suggest that firms with more robust growth histories develop more diversified (i.e. less specialised) capital structures.

Two other dimensions of the theoretical framework are noteworthy. First, Gorton<sup>30</sup> argues that explanations aimed at understanding the causes of variations in small business performance have tended towards either behavioural factors or structural explanations. Gorton shows that this behavioural-structural dichotomy replicates the traditional structure-agency divide in social theory and consequently sets up artificial and unhelpful oppositions between agent-centred (behaviouralist) models that ignore social formations and structuralist theories that negate the role of human agency in dealing with social exigencies. Gorton endeavours to transcend this limiting dichotomy by drawing on the social theory of Pierre Bourdieu, to offer a more convincing framework for research on the small business sector. Second, Trovato and Alfo<sup>31</sup> analyse the effects of public subsidies on the development path of Italian small and medium enterprises (SMEs). Public subsidies to SMEs have been often used with the aim of favouring economic growth in less developed regions. The main theoretical arguments justifying this intervention are related to the idea that public subsidies can solve lack-of-capital problems deriving from asymmetric information. According to Stiglitz and Weiss<sup>32</sup>, public subsidies to rationed firms can reduce their financial constraints and to increase their investment levels.

### Model Specifications

Five regression models are estimated to assist us in testing our hypotheses – three multiple regression models and two simple regression models:

$$\text{GPM} = \alpha + \beta_1 \text{CR} + \text{WCG} + \varepsilon_i \quad (12)$$

$$\text{GPM} = \alpha + \beta_1 \text{TATR} + \beta_2 \text{FATR} + \varepsilon_i \quad (13)$$

$$\text{CR} = \alpha + \beta_1 \text{BLR} + \beta_2 \text{CRR} + \beta_3 \text{LTDR} + \varepsilon_i \quad (14)$$

$$\text{DER} = \alpha + \beta \text{CR} \quad (15)$$

$$\text{DAR} = \alpha + \beta \text{CR} \quad (16)$$

In Equation 12, the specified dependent variable is gross profit margin (GPM), while the independent variables are current ratio (CR) and working capital gap (WCG). The independent variables in Equation 13 are total assets turnover ratio (TATR) and Fixed assets turnover ratio (FATR). In Equation 14, the dependent variable is current ratio (CR) while the independent variables are commercial bank liquidity ratio (BLR), cash reserve ratio (CRR), and loan-to-deposits ratio (LTDR). The dependent variable in Equation 15 is the debt-equity ratio (DER), and the independent variable is current ratio (CR). However, in Equation 16, the dependent variable is the debt-assets ratio (DR) while the independent variable is also the current ratio (CR).

In Equation 12 we speak of the multiple regression of the Gross Profit Margin (GPM) on current ratio (CR) and working capital gap (WCG), and  $\beta_1$  and  $\beta_2$  are known as partial regression coefficients. The coefficient  $\beta_1$  measures the amount of change in the mean value of GPM that we can expect if CR changes by one unit, the value of WCG remaining unchanged, and similarly for  $\beta_2$ . The relationship between GPM and the explanatory variables (CR and WCG) involve random error  $\varepsilon_i$  and the  $\varepsilon_i$  are assumed to be independently distributed random variables, each with mean zero and variance  $\delta^2$ . The same line of explanations can also be made for Equations 13-16.

The following equations are equally defined in the Software Package for Social Sciences (SPSS) employed in obtaining our regression results in this study. In our three variable or four-variable case, the coefficient of determination ( $R^2$ ) is defined as Equation 17:

$$R^2 = 1 - \frac{\sum e^2 / N-3}{\sum Y^2 / N-1} = 1 - \left[ \frac{\sum e^2}{\sum Y^2} \right] \quad (17)$$

where Y represents the dependent variable and N is the number of SMEs employed in this study (N=16).

As a measure of absolute dispersion GPM, CR, DER and DAR values about fitted regression plane, Equation 18 shows the standard error of estimate ( $s_e$ ), while Equation 19 shows the extent of intercorrelations between or among the independent variables (CR, WCG, TATR, FATR, BLR, CRR, LTDR). To test whether the coefficients  $\beta_1$  and  $\beta_2$  are significantly different from zero, we proceeded in a manner analogous to Equations 20 and 21. By assumption, the  $\varepsilon_i$  are distributed with mean zero, ie  $E(\varepsilon_i) = 0$ . Hence, Equations 22 and 23 apply for  $\beta_1$  and  $\beta_2$ . The derivation of the variances of  $\beta_1$  and  $\beta_2$  depends crucially on the assumptions that the  $\varepsilon_i$  are independent and have constant Variance  $\delta_e^2$ . Equations 24 and 25 then apply for  $\text{Var}(\beta_1)$  and  $\text{Var}(\beta_2)$ .

$$S_e = \sqrt{\frac{(1-R^2) \sum Y^2}{N-3}} \quad (18)$$

$$Y_{12} = \frac{\sum x_1 x_2}{\sqrt{\sum x_1^2 \sum x_2^2}} \quad (19)$$

$$\beta_1 = \frac{\sum C_{1i} Y_i}{D} \quad (i=1,2, \dots, N) \quad (20)$$

where  $C_{1i} = x_{1i} \sum x_2^2 - x_{2i} \sum x_{1i} x_{2i}$

$$\beta_2 = \frac{\sum C_{2i} Y_i}{D} \quad (i=1,2, \dots, N) \quad (21)$$

where  $C_{2i} = x_{2i} \sum x_1^2 - x_{1i} x_{2i}$

$$E(\beta_1) = \mu\beta_1 = \beta_1 + \sum C_{1i} E(\varepsilon_i) \quad (22)$$

$$E(\beta_2) = \mu\beta_2 = \beta_2 + \sum C_{2i} E(\varepsilon_i) = \beta_2 \quad (23)$$

$$\text{Var}(\beta_1) = \text{Var}\left(\beta_1 + \sum C_{1i} E(\varepsilon_i)\right) = \sum C_{1i}^2 \text{Var}(\varepsilon_i) = \delta_e^2 \sum C_{1i}^2 \quad (24)$$

where  $\sum C_{1i}^2$  can be shown to reduce to  $\frac{\sum x_2^2 i}{D}$

Thus, we have shown that

$$\text{Var}(\beta_1) = \delta_{\beta_1}^2 = \frac{\delta^2 \sum x_2^2}{\sum D}$$

$$\text{Var}(\beta_2) = \delta_{\beta_2}^2 = \frac{\delta^2 \sum x_1^2}{\sum D} \quad (25)$$

In practice, we do not know  $\sigma_e$  and we must use as an estimate. The estimated standard errors of  $\beta_1$  and  $\beta_2$  are then computed as in **Equations 26 and 27**. To test whether  $\beta_1$  and  $\beta_2$  differ significantly from zero, ie whether or not the sample results are consistent with the hypotheses  $H_0: \beta = 0$  and / or  $H_0: \beta_2 = 0$ , we used the t-test, referring to **Equations 28 and 29** subject to  $N-3$  degrees of freedom. If  $\beta_1$  is significantly different from zero, 95 per cent confidence limits for  $\beta_1$  can be ascertained in the usual manner and will be  $\beta_1 \pm t_{0.025} s / \beta_1$ , and similarly for  $\beta_2$ . We also tested the significance of the multiple regression as a whole using the F-ratio based on **Equation 30**. In the case of two explanatory variables as in **Equation 12**, the null hypothesis to be tested is that neither current ratio (CR) nor working capital cap (WCG) has a statistically significant effect on gross profit margin (GPM). If the null hypothesis is true, the ratio specified in **Equation 31** has the F-distribution with  $V_1 = 2$  and  $V_2 = N-3$  degrees. But if the sample value of the F-ratio is so large that it exceeds the critical value of  $F_{0.05}$ , it is unlikely that it could have been drawn from an F-distribution. We then reject hypothesis

$H_0: \beta_1 = \beta_2 = 0$  and conclude that the dependent variable (Y) is likely related to  $X_1, X_2 + \dots X_n$ .

$$S \beta_1 = S_e \frac{\sum x_1^2}{D} \quad (26)$$

$$S \beta_2 = S_e \frac{\sum x_2^2}{D} \quad (27)$$

$$t = \frac{\beta_1}{S \beta_1} \quad (28)$$

$$t = \frac{\beta_2}{S \beta_2} \quad (29)$$

$$F = \frac{(\text{Explained variation in Y}) / k}{(\text{Unexplained variation in Y}) / (N-k-1)} \quad (30)$$

$$= \frac{SSR / k}{SSE / (N-k-1)}$$

which is the test statistic for the null hypothesis  $\beta_1 = \beta_2 \dots \beta_k = 0$

$$F = \frac{(\beta_1 \sum Yx + \beta_2 \sum Yx^2) / 2}{\sum e^2 / N-3} \quad (31)$$

### Research Findings

Data in **Table 7** show the collinearity diagnostics of our leading models. The aim is to verify the extent we can rely on our beta coefficients in establishing the predictive values of models 12 to 16. The highest variance constant of 0.99924 corresponds to an Eigenvalue of 0.00153, which is less than 0.5. The largest conditional index of 36.1950 corresponds to an Eigenvalue of less than 0.5. Hence, we can say that for most of the correlates the problem of collinearity does not arise.

The liquidity-profitability relationship in Nigerian quoted manufacturing SMEs is shown in **Table 8**. With gross profit margin (GPM) as the dependent variable, the current ratio at zero produces an alpha coefficient of 403.0 per cent, perhaps due to the exceptional performance of a few of the quoted SMEs in 2001. The alpha coefficient is significantly different from zero since the computed t-test of 1.3740 exceeds the critical values of  $\pm 0.2413$  at the 5 per cent level. A beta coefficient of  $-0.3709$  shows a weak inverse correlation between gross profit margin (GPM) and current ratio (CR). However, a t-test value of  $-0.7990$  falls outside the critical of  $\pm 0.4692$  at the 5 per cent level. Hence, there is a significantly negative association between gross profit margin and current ratio, holding the working capital gap (WCG) constant. The F-ratio confirms the same result as the computed value of 0.6380 exceeds the critical region of  $\pm 0.4690$ .

The alpha coefficient of the gross profit margin when the working capital gap is zero is given as  $-644.3$  per cent. A beta Tolerance value of 2.6507 is far away from zero, hence confirming further the non-existence of collinearity among the independent variables. However, a t-test value of  $-1.9070$  exceeding the critical region of  $\pm 0.1291$  confirms that the alpha coefficient is significantly different from zero. The beta coefficient (b) is 0.8019 indicates a positive correlation between working capital gap (WCG) and gross profit margin. This positive correlation is significant as the computed t-test of 2.6840 exceeds the critical region of  $\pm 0.0550$  at the 5 per cent level of significance. A F-ratio of 7.2050 falls outside the critical region of  $\pm 2.49063$ , hence we equally accept a significantly positive correlation between GPM and WCG. The coefficient of determination ( $R^2$ ) of 0.6430

**TABLE 7**  
**COLLINEARITY DIAGNOSTICS**

Model	Eigenval	Cond.Index	Variance Constant	Proportions
GPM/CR				
1	1.812	1	0.09399	0.0399
2	0.188	3.105	0.90601	0.90601
GPM/WCG				
1	1.9454	1	0.02731	0.02731
2	0.0546	5.968	0.97269	0.97269
GPM/TATR				
1	1.9731	1	0.01343	0.01343
2	0.0269	8.571	0.98657	0.98657
GPM/FATR				
1	1.9308	1	0.0346	0.0346
2	0.0692	5.282	0.9654	0.9654
DER/CR				
1	1.812	1	0.09399	0.09399
2	0.188	3.105	0.90601	0.90601
DAR/CR				
1	1.812	1	0.09399	0.09399
2	0.188	3.105	0.90601	0.90601
CR/BLR				
1	1.9965	1	0.00175	0.00175
2	0.0035	23.907	0.99825	0.99825
CR/CRR				
1	1.9985	1	0.00076	0.00076
2	0.0015	36.195	0.99924	0.99924
CR/LTDR				
1	1.9941	1	0.00296	0.00296
2	0.0059	18.34	0.99704	0.99704

**Notes :** GPM = Gross Profit Margin, CR = Current Ratio, WCG = Working Capital Gap, TATR = Total Assets Turnover Ratio, FATR = Fixed Assets Turnover Ratio. DER = Debt-Equity Ratio, DAR = Debt-Assets Ratio, BLR = Bank Liquidity Ratio, CRR = Cash Reserves Ratio, and LTDR = Loan-to-Deposits Ratio.

**Source:** Software Package for Social Sciences (SPSS) Print-Out.

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shows that a one per cent increase in working capital gap ratio brings about a significant increase in SMEs' gross profit margin (GPM).

The profitability-efficiency relationship in Nigerian quoted SMEs is summarised in Table 9. A weak beta

coefficient of 0.2617 confirms a weak correlation between gross profit margin (GPM) and total assets turnover ratio (TATR). This coefficient is significant at the 5 per cent level since the computed t-test of 0.5420 falls within the critical region of  $\pm 0.6164$ . A one per cent increase in the total assets turnover ratio has an no significant effect on

**TABLE 8**  
LIQUIDITY-PROFITABILITY RELATIONSHIP IN  
NIGERIAN QUOTED SMES: MULTIPLE  
REGRESSION RESULTS WITH GROSS PROFIT  
MARGIN (GPM) AS DEPENDENT VARIABLE

Model Parameters	INDEPENDENT VARIABLES	
	Current Ratio (CR)	Working Capital Gap (WCG)
a (Alpha)	403.0224	-644.2832
b (Tolerance)	-1.5788	2.6507
SE b (VIF)	1.9768	0.9875
95% Confidence Interval b	-7.0673	-0.0911
b (Beta)	3.9096	5.3924
SE Beta	-0.3709	0.8019
Corr. Part.	0.4643	0.2987
R <sup>2</sup>	-0.3709	0.8019
Adjusted R <sup>2</sup>	0.1375	0.643
T-test (b)	-0.0781	0.5538
Sig. T (b)	-0.799	2.684
T-test (a)	0.4692	0.055
Sig. T (a)	1.374	-1.907
F-Ratio	0.2413	0.1291
Sig. F(0.05)	0.638	7.205
Durbin-Watson Test	0.469	0.055
	2.1805	2.49063

Source: Software Package for Social Sciences (SPSS) Print-Out

the gross profit margin ( $R^2=0.0685$ ). The adjusted  $R^2$  is -0.1614. The F-ratio of 0.2940 falls within the critical region of  $\pm 0.6160$  at the 5 per cent level. Similarly, the fixed assets turnover ratio (FATR) is not significant in determining the level of the gross profit margin, holding the total assets turnover ratio constant. A beta coefficient of -0.1151 shows a very weak inverse correlation between FATR and GPM. Both the t-test and F-ratio show that FATR is insignificant in determining levels of GPM. A slight increase in FATR has no material impact on GPM.

More interesting results are summarised in Table 10. First, a beta coefficient of -0.4275 shows an inverse correlation between the debt-equity ratio (DER) and current ratio (CR). Since the computed t-test of -0.9460 falls outside the critical region of  $\pm 0.3979$ , we accept the hypothesis that there is a significantly negative

**TABLE 9**  
PROFITABILITY-EFFICIENCY RELATIONSHIP IN  
NIGERIAN QUOTED SMES:  
REGRESSION RESULTS WITH GROSS PROFIT  
MARGIN (GPM) AS DEPENDENT VARIABLE

Model Parameters	INDEPENDENT VARIABLES	
	Total Assets Turnover Ratio (TATR)	Fixed Assets Turnover Ratio (FATR)
$\alpha$ (Alpha)	-194.9	320.8806
$\beta$ (Tolerance)	1.2719	-0.237
SE $\beta$ (VIF)	2.3451	1.0227
95% Confidence Interval $\beta$	-5.239	-3.0765
$\beta$ (Beta)	7.7829	2.6025
SE Beta	0.2617	-0.1151
Corr. Part.	0.4826	0.4967
R <sup>2</sup>	0.2617	-0.1151
Adjusted R <sup>2</sup>	0.0685	0.0151
T-test ( $\beta$ )	-0.164	-0.2334
Sig. T ( $\beta$ )	0.542	-0.0232
T-test ( $\alpha$ )	0.6164	0.8281
Sig. T ( $\alpha$ )	-0.252	0.641
F-Ratio	0.8133	0.5566
Sig. F(0.05)	0.294	0.054
Durbin-Watson Test	0.616	0.828
	2.8362	2.3287

Source: Software Package for Social Sciences (SPSS) Print-Out

association between DER and GPM at the 5 per cent level. An F-ratio of 0.8940 falls outside the critical region of  $\pm 0.3146$ , hence the case of a significantly negative relationship between DER and CR is sustained. A 1 per cent increase in the current ratio would reduce drastically the debt-equity ratio in Nigerian quoted SMEs. A one per cent increase in current ratio brings a significant increase in the debt-equity ratio. When the dependent variable is the debt-assets ratio (DAR), we still obtain a beta coefficient of -0.6298. There is an inverse correlation between debt-assets ratio (DAR) and current ratio (CR). Since the computed t-value of -1.6220 falls outside the critical region of  $\pm 0.1802$ , we accept the hypothesis of a significantly negative relationship between CR and DAR. The F-ratio results confirm this finding. A one per cent increase in current assets would produce a 39.67 per cent increase in the debt-assets ratio.

**TABLE 10**  
**EFFECTS OF CORPORATE LIQUIDITY ON**  
**THE CAPITAL STRUCTURE OF NIGERIAN**  
**QUOTED SMES: REGRESSION RESULTS**

Model Parameters	INDEPENDENT VARIABLES*	
	Debt-Equity Ratio (DER)	Debt-Assets Ratio (DAR)
$\alpha$ (Alpha)	453.1926	193.9825
$\beta$ (Tolerance)	-1.5614	-0.5694
SE $\beta$ (VIF)	1.6512	0.3511
95% Confidence	-6.1458	-1.5442
Interval $\beta$	3.0229	0.4055
$\beta$ (Beta)	-0.4275	-0.6298
SE Beta	0.4521	0.3884
Corr. Part.	-0.4275	-0.6298
R <sup>2</sup>	0.1827	0.3967
Adjusted R <sup>2</sup>	-0.0216	0.2458
T-test ( $\beta$ )	-0.946	-1.622
Sig. T ( $\beta$ )	0.3979	0.1802
T-test ( $\alpha$ )	1.85	3.725
Sig. T ( $\alpha$ )	0.1379	0.0204
F-Ratio	0.894	2.63
Sig. F (o.o5)	0.398	0.18
Durbin -Watson Test	3.1476	3.0531

\* The independent variable here is current ratio (CR)  
 Source: Software Package for Social Sciences (SPSS) Print-Out

The effects of the banking sector on the liquidity of Nigerian quoted SMEs is shown in Table 11. Bank liquidity ratio (BLR), which has continued to be at variance with monetary policy targets for Minimum Liquidity Ratio (MLR), correlates positively with SME current ratios ( $b = 0.8557$ ). With SME current ratio as our dependent variable, we find that a one per cent increase in banking liquidity ratio (BLR) increases the current ratios of Nigerian quoted SMEs by 72.22 per cent ( $R^2=0.7322$ ). Since the computed t-test of 3.3070 falls outside the critical region of  $\pm 0.0297$ , we have every reason to accept the hypothesis of a significantly positive correlation between BLR and CR. The computed F-ratio is 10.9360 which falls outside the critical region of  $\pm 0.0300$ .

There is also evidence the current ratios (CRs) of Nigerian quoted SMEs correlates negatively with the cash reserve ratio (CRR). The beta coefficient of  $-0.4749$  is significant at the 5 per cent level since the computed t-test of 1.0790 falls outside the critical region of  $\pm 0.3412$ . The F-ratio of 1.1650 also exceeds the critical region of 0.3410. An increase of the CRR by one per cent brings about a reduction of 22.5 per cent in SMEs' CRs. The inverse correlation between current ratio (CR) and loan-to-deposits ratio (LTDR) is  $-0.9363$ , holding BLR and CRR constant. At the 5 per cent level, this inverse

**TABLE 11**  
**EFFECTS OF BANKING SECTOR LIQUIDITY ON THE PERFORMANCE OF NIGERIAN QUOTED SMES:**  
**MULTIPLE REGRESSION RESULTS WITH CURRENT RATIO (CR) AS THE DEPENDENT VARIABLE**

Model	INDEPENDENT VARIABLES		
	Bank Liquidity Ratio (BLR)	Cash Reserve Ratio (CRR)	Loan-to-Deposits Ratio (LTDR)
$\alpha$ (Alpha)	-763.4953	863.9755	861.5524
$\beta$ (Tolerance)	15.4581	-68.6331	-12.0407
SE $\beta$ (VIF)	4.6744	63.5852	2.2581
95% Confidence	2.4800	-245.1711	-18.3101
Interval $\beta$	28.4361	107.9048	-5.7712
$\beta$ (Beta)	0.8557	-0.4749	-0.9363
SE Beta	0.2588	0.4400	0.1756
Corr. Part.	0.8557	-0.4749	-0.9363
R <sup>2</sup>	0.7322	0.2256	0.8767
Adjusted R <sup>2</sup>	0.6652	0.0320	0.8458
T-test ( $\beta$ )	3.3070	-1.0790	-5.332
Sig. T ( $\beta$ )	0.0297	0.3412	0.0060
T-test ( $\alpha$ )	-2.8460	1.2520	6.1620
Sig. T ( $\alpha$ )	0.0466	0.2787	0.0035
F-Ratio	10.9360	1.1650	28.4320
Sig. F (o.o5)	0.0300	0.3410	0.0060
Durbin -Watson Test	2.7017	1.3788	2.6954

Source: Software Package for Social Sciences (SPSS) Print-Out



relationship between LTDR and CR is significant since the computed *t* and *F*-values exceed the critical regions. A one per cent increase in LTDR will bring about an increase of 87.67 per cent in SME current ratio (CR).

### Conclusions

Our empirical results may be summarised as follows. First, there is a significantly inverse correlation between the gross profit margin and the current asset ratios of Nigerian quoted SMEs, holding the working capital gap ratio constant. However, we observe a significantly positive correlation between working capital gap and gross profit margin, holding the current ratio constant. Second, neither the total assets turnover nor the fixed assets turnover ratio is significant in determining the gross profit margin in Nigerian quoted SMEs. Third, a one per cent increase in the current ratio brings about a more than proportionate decrease in the debt-equity ratios and the debt-asset ratios of the investigated Nigerian quoted SMEs. Fourth, monetary policy outcomes have varying effects on SME liquidity profiles in Nigeria. SME current asset ratios are sensitive to commercial bank' liquidity ratio (BLR), cash reserve ratio (CRR) and the loan-to-deposits ratio (LTDR). Holding the CRR and the LTDR constant, the evidence shows a significantly positive association between CR and BLR. However, a 1 per cent increase in the CRR brings about a significant reduction in SMEs', current ratio (CR). There is also an inverse relationship between LTDR and CR. The beta coefficient is significant at the 5 per cent level.

These findings have far-reaching financial policy implications. In terms of the current ratio, Nigerian SMEs are still confronted with the cross purposes of balancing adequate liquidity with adequate profitability or dealing with what is often described as the "financial management dilemma." Under regimes of increasing current assets, we should expect profitability declines due to increasing portfolios of cash and bank balances, and bad accounts receivables. Most times finance executives of these SMEs may have to deal with adequate provisions for bad debts, lost income and idle cash, and loan

amortisation. One way is resolving this "financial management dilemma" could involve the Chief Financial Officer (CFO) taking the position of the "man-in-the-middle" by synchronising optimally between cash inflows and outflows in line with the transactions, speculative and precautionary motives for holding cash balances. The positive correlation between working capital gap and gross profit margin could explain the positive impact of increasing net current assets over total current liabilities. Under regimes of declining working capital gap, we should expect the SME sector to groan under financial stress factor.

The evidence also shows that Nigerian quoted SMEs give less attention to efficiency issues, as the selected turnover ratios are significantly insensitive to variations in the gross profit margin. Roberto and Gustavo (2003) show evidence that small firms are less productive than larger ones. They found that efficiency is positively associated with the experience of workers, modernisation of physical capital, and innovation of products. There is no doubt that most Nigerian SMEs still have to battle rising cost profiles, obsolete technology and poor perks which hinder the inflow of value-adding senior executives.

When the liquidity profiles of quoted SMEs increase, we should expect their capital structure ratios to decline. Most specifically, the debt-equity ratios and debt-assets ratios decline in response to improving corporate liquidity. The financial policy implications for SMEs include (1) amortisation of debt contracts proceeds unrestrained, (2) the pecking order by which debt financing precedes equity financing is reversed due to superior cost advantages, and (3) finance gaps narrow under a regime of prudent current asset management. However, under regimes of reducing cash flow profiles, we should expect rational SMEs to depend more on internally generated funds and reserves in financing current liabilities and asset growth. Mounting cash flow constraints could necessitate technical insolvency as the market value of assets decline below the market value of liabilities, such that net worth becomes negative.

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