

Working Capital Management, Liquidity and Corporate Profitability among quoted Firms in Nigeria Evidence from the Productive Sector

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ABSTRACT

Working capital management is very crucial in this period of global financial turmoil. This is because illiquidity is prevalent world wide necessitating that effective and efficient management of any available cash will be needed to ensure that company breaks even and survives this distressed time since credit is not easily come by. This article presents empirical evidence of the effect of working capital management and liquidity on corporate profits using a cross-sectional time series data for the period 2005-2006. This micro-data were analyzed using descriptive statistics and an OLS methodology. The authors find a positive effect of inventory conversion period (ICP), debtors collection period (DCP); and a negative effect of cash conversion period (CCP), creditors payment period (CPP), on return on assets (a mirror of corporate profitability). We discover that CCP with a wrong sign is the most significant precision variable in influencing profits and leads corporate profitability in Nigeria. It is closely followed by ICP and then CPP is third in importance in affecting profitability and liquidity in Nigeria. The paper therefore recommends (1) that firms should promptly collect cash from credit sales, (2) that excess cash should be reinvested in short-term securities (assets) to generate profits and (3) that since there exists high sales turnover in the Nigerian emerging markets, government policy should target multinational companies (MNCs) for invitation to participate in investing in Nigeria by creating the right legal and regulatory framework to enable them enter the market for possible FDI, IPI, and FPI injections into the Nigerian domestic economy.

KEY WORDS

Working capital, liquidity, profitability, return on assets, inventory management, debtors management, creditors management, cash management

JEL CODES

G32, G33, F23, D5, E32, M14, M41, X5

1. Introduction

No time has ever arisen in world history than now when greater need has equally arisen for prudent working capital management among global firms than in this period of global financial meltdown ravaging world economies and when liquidity crises has affected virtually all corporate entities (Nigerian firms inclusive). Working capital management is an embodiment of balancing liquidity with profitability usually from two different angles: cash (i.e. liquidity) management and inventory (i.e. stock) management in a bid to ensure that survival of the corporate enterprise is achieved.

Cash pays no interest. In equilibrium all assets in the same risk class are priced to give the same expected marginal benefit. The benefit from holding treasury bills, for instance, is the interest that you receive; the benefit from holding cash is that it gives you a convenient store of value of liquidity. In equilibrium the marginal value of this liquidity is equal to the marginal value of the interest on an equivalent investment in Treasury bills (Brealey and Myers, 1996). Furthermore, the marginal value of liquidity declines as you hold increasing amounts of cash. When you have only a small proportion of your assets in cash, a little extra can be extremely useful, when you have a substantial holding; any additional liquidity is not worth much. Therefore, as a financial manager you would want to hold cash balances up to the point where the marginal value of the interest is equal to the value of the interest forgone. Similarly, production managers must make a similar trade-off in the management of the inventories of raw materials they carry. They are not obliged to do so; they could simply buy materials day-by-day, as needed. But then they would pay higher prices for ordering in small quantities, and they would risk production delays if the materials were not delivered on time (Brealey and Myers, 1996).

But there is a cost to holding inventories. Interest is lost on the money that is tied up in inventories, storage must be paid for, and often there is spoilage and deterioration. Therefore production managers try to strike a sensible balance between the costs of holding too little inventory and those of holding too much (Brealey and Myers, 1996). Uremadu (2004) and Brockington (1987) state that the principle requirement is that "stock levels should be optimal, that is, neither too large nor too small... and that we should be aware, in general terms, of the penalties for a business lying divergence from the optimum".

Therefore, the trade-off between the benefits and cost of liquidity is one essential part of cash management. The other part is making sure that the collection and disbursement of cash are as efficient as possible. Cash is just another raw material that you require to carry on production. An efficient working capital management policy means that financial manager should equally keep an eye on the amount of cash he is keeping just as production manager does on the stock of inventories he is holding to maintain steady uninterrupted operations (Brealey and Myers, 1996). They further say that:

A company's liquidity position is an important factor in determining the appropriate capital structure. Investors and creditors are interested in a company's all season ability to generate cash to service debt. Ability to service debt both under favorable as well as adverse circumstance is important. Of more concern to debt-holders is the extent the company is able to meet debt obligations under adverse conditions.

What all these portend is that working capital is an all important function of the financial manager if the business is to survive in the midst of intense competition and make profit.

Management must therefore endeavor to monitor and appropriately manage the company's periodic cash flow position through the cash flow statement analysis. Pandey (1999) asserts that cash is the most important current asset for the operation of the business firm and it is therefore seen as the basic input needed to keep a business running on a day-to-day basis. Kurfi (2003) adds that cash then becomes the lifeblood of any business enterprise". To have cash as the life wire of every firm, the management of cash or working capital management as a tool to achieve optimal goal of business becomes paramount. The effective and efficient management of working capital which will therefore have favorable impact on both short-run and long-run organizational goals and objectives of the firm one of which is profit maximization.

However, both excessive as well as inadequate working capital positions are dangerous from the firm's point of view (Pandey, 2000). This is because excessive working capital means idle funds which earn no profits for the firm (Brealey and Myers, 1996). Also true is that paucity of working capital not only impairs the firms profitability but also results in production interruptions and inefficiencies. No wonder, Pandey (2000) and Ramamoorthy (1976) rightly suggest the dangers of excessive working capital on a firm's performance as follows: (1) It results in unnecessary accumulation of inventories, thereby leading to chances of inventory mishandling, waste, theft and losses increase. (2) It is an indication of defective credit policy and slack collection period. Consequently, this result into higher incidence of bad debts, which adversely affects profits (3) Excessive working capital, makes management complacent which degenerates into managerial inefficiency. (4) Finally, tendencies of accumulating inventories tend to make speculative profits grow. This may tend to make dividend policy liberal and difficult to cope with in future when the firm is unable to make speculative profits.

On the other hand, inadequate working capital is also bad and has the following six dangers, according to the same authors, as: (1) It stagnates growth in that it becomes difficult for the firm to undertake profitable projects due to non availability of working capital funds. (2) It becomes difficult to implement operating plans and achieve the firm's profit target (3) Operating inefficiencies creep in when it becomes difficult even to meet day-to-day commitments. (4) Fixed assets are not efficiently utilized for the lack of working capital funds hence leading to deterioration of the firm's profitability. (5) Paucity of working capital funds renders the firm unable to avail it of attractive credit opportunities and so forth. (6) Finally, the firm loses its reputation when it is not in a position to honor its short-term obligations. As a result, the firm faces tight credit terms.

The foregoing discussions have gone a long way to demonstrate the need to balance working capital position of the business enterprise in order to maintain adequate liquidity, minimize risks and raise profitability, at all times, and more especially in periods of intense financial crises as it exists at the global level today. An enlightened top management should therefore, maintain the right proportion of working capital on a continuous basis. Only then a proper functioning of business operations will be ensured. Sound financial and statistical techniques, supported by judgment, should be used to predict the quantum of working capital needed at different time periods (Pandey, 2000).

It should be well noted that a firm's net working capital position is not only important as an index of liquidity but it is also used as a measure of the firm's risk. Risk, in this regard, means chances of the firm being unable to meet it's obligations on due date. The lender considers a positive net working capital as a measure of safety. All other things being equal, the more the net working capital a firm has, the less likely that it will default in meeting its current financial obligations. Lenders such as commercial banks insist that the firm should maintain a minimum net working capital position (Pandey, 2000).

So far, we have made a comprehensive introduction on the meaning, scope and definitions of different aspects of working capital management, namely, cash (liquidity) management and inventory (stock) management. We have also established the need to pay much attention to effective working capital management by firms not only in Nigeria but also globally in this period that most economies are facing financial turmoil, arising from previous bad working capital management of most business firms. Various authors have researched and documented on working capital management generally but a few have empirically published on the effect working capital and liquidity management has on corporate profitability of the business entity either at global level or at national level.

Back home in Nigeria, not much has been studied and published on working capital management theories and concepts especially from the empirical point of view except for the works of Egbide and Enyi (2008) from which the present research takes a cue. Most contributors on this subject before now have been textbook writers and theorists. Hence the compelling need to embark on the present study in order to fill the large vacuum created due to dearth of empirical studies on the subject matter mainly from this part of the globe. The study is equally timely in that there is an on going global financial crisis urgently begging for solutions from output of serious researches on liquidity management of corporate firms, conducted by recognized financial economists' world wide. The current study will complement these by the time it is completed.

2. Literature review and theoretical framework

Theoretical framework

We shall, foremost, in this section, present conceptual framework on which the study leans and then pursue empirical literature thereafter.

There are two concepts to working capital: gross and net, and they are explained and discussed here under. *First*, gross working capital refers to the firm's investment in current assets. Current assets are the assets which can be converted into cash within an accounting year (known as operating cycle) and they include cash, short-term securities, debtors (accounts receivable or book debts), bills receivable and stock (inventory). *Second*, net working capital refers to the difference between current assets and current liabilities. Current liabilities are those claims of outsiders which are expected to mature for payment within an accounting year and include creditors (accounts payable), bills payable, and outstanding expenses. Net working capital can be positive or negative. A positive net working capital will arise when current assets exceed current liabilities while a negative net working capital occurs when current liabilities are in excess of current assets (Pandey, 2000).

The two concepts of working capital (i.e. gross and net) are not exclusive; rather they have equal significance from the management viewpoint. The gross working capital focuses attention on two aspects of current assets management. (i) How to optimize investment in current assets? (ii) How should current assets be financed?

On point (i) above, we conceptualize that the consideration of the level of investment in current assets should avoid two danger points; excessive and inadequate investment in current assets. Investment in current assets should be just adequate, not more, not less, to the needs of the business firm. Excessive investment in current assets should be avoided because it impairs the firm's profitability, as idle investment earns nothing. On the other hand, inadequate amount of working capital can threaten solvency of the firm because of its inability to meet its current obligations. It should be realized that the working capital needs of the firm may be fluctuating with changing business activity. This may cause excess or shortage of working capital frequently. The management should be prompted to initiate an action and correct imbalances (Pandey, 2000).

Another aspect of the gross working capital points to the need of arranging funds to finance current assets. Whenever a need for working capital funds arises due to the increasing level of business activity or for any other reason, financing arrangement should be made quickly. Similarly, if suddenly, some surplus funds arise they should not be allowed to remain idle, but should be invested in securities. Thus, the financial manager should have knowledge of the sources of working capital funds as well as investment avenues where idle funds may be temporarily invested.

Net working capital is a qualitative concept and as such it indicates the liquidity position of the firm and suggests the extent to which working capital needs could be financed by permanent sources of funds. Current assets should be sufficiently in excess of current liabilities to constitute a margin or buffer for maturing obligations within the ordinary operating cycle of a business. In order to protect their interest, short-term creditors would always like a company to maintain current assets at a higher level than current liabilities and in most cases, twice the level of current liabilities (Pandey, 2000). However, the quality of current assets should be considered in determining the level of current assets vis-à-vis current liabilities. A weak liquidity position poses a threat to the solvency of the company and makes it unsafe and unsound. A negative working capital means a negative liquidity, and may prove harmful for the company's reputation. Excessive liquidity is also bad. It may be due to mismanagement of current assets. Therefore, prompt and timely action should be taken by management to improve and correct the imbalances in the liquidity position of the firm (Pandey, 2000).

Net working capital concept also covers the question of judicious mix of long-term and short-term funds for financing current assets (Pandey, 2000). For every firm, there is a minimum amount of net working capital which is permanent. Therefore, a portion of the working capital should be financed with the permanent sources of funds such as equity share capital, debentures, long-term debt, preference share capital or retained earnings. Management must, therefore decide the extent to which current assets should be financed with equity capital and or debt capital (Uremadu, 2009).

In sum, it may appear that both gross and net concepts of working capital are equally important for the efficient management of working capital. There is no precise way to determine the exact amount of gross or net working capital for any firm. The data and problems of each company should be analyzed to determine the amounts of working capital. There is no specific rule as to how current assets should be financed. It is also not feasible in practice to finance current assets by short-term sources only. Keeping in view the constraints of the individual firm, a judicious mix of long and short-term finances should be invested in current assets. Since current assets involve cost of funds they should be put to productive use (Pandey, 2000).

Empirical works cited

It is said that the essence of management and planning at any level and function is to achieve stated corporate objectives of the business firm, which presumably is the goal of profit maximization (Brockington, 1987 and Uremadu, 2002). In the same way, effective and efficient working capital management should therefore enhance the achievement of operational, tactical and strategic goals of the firm (Egbide and Enyi, 2008).

Smith (1973), Anand and Gupta (2002) and Egbide and Enyi (2008) agree to the importance of working capital which is evidenced in the time and efforts most CEOs (Chief Executive Officers) devote to its management. Their findings established that a large number of business failures have been traced to mismanagement of working capital composition and application by most firms. In support of this line of reasoning, Shin and Soenen (1998) and Kieschruck, LaPlante and Moussawi (2006) in separate studies, find that poor management of working capital has contributed to

bankruptcy of many firms. For example, Kmart had to face an additional \$198.3 millions per year in financing litigation and other expenses; while, on the other hand, firms such as Dell Corporation and Wal-Mart, attribute their enhanced value to their effective working capital management (Egbide and Enyi, 2008).

In recognition of role played by efficient working capital management, Enyi (2006), says that efficient management of a firm's stock of working capital determines the extent to which its financial fortune can be turned around as it affects its going concern status. A readily example in Nigeria is Oando, Plc, which is reported to have recorded an up of 42 percent in its operating profit from \$29.77m in 2006 to \$42.35m in 2007, due to its effective, and efficient management of working capital) according to Deutsche securities Limited (2007), in (Egbide and Enyi 2008).

Furthermore, Eriki (2004) enjoins that top management must manage the working capital in such a way as to take care of the fluctuations in the current assets. This, according to him, will help the management make decisions with respect to the level of current assets considered optimal, the firm's credit policies and the financing of its current assets given cognizance to its associated costs and benefits for the organization. Reasoning along similar vein, Uremadu (2004), posits that the importance of working capital can be seen from the time devoted by the financial manager to the day-to-day working capital decisions, the proportion of current assets in the total assets of the firm (more than half) and the significant and direct relationship between current assets and sales growth. Consistent with this view-point is Van-Horne and Wachowicz (2005), who add that the effect of working capital decisions on the company's risk, return and share price is of more fundamental significance to working capital management among corporate firms at a global dispensation than it has been before now.

At this juncture, empirical literature will mainly centre on the relationships between working capital components (inventory, debtors, creditors, and cash) and profitability, the effect of cash conversion cycle on profitability as well as issues that border on trade-off between liquidity and profitability. We shall now concentrate discussions along these above mentioned channels of determining a firm's profitability profile through effective liquidity management.

2.1. Liquidity and Profitability Trade-off

Liquidity is a flow concept and as such refers to ability of a firm to generate adequate cash from both internal and external sources to meet its cash requirements (Egbide and Enyi, 2008). It is technically known as solvency meaning the firm's continuous ability to meet maturing obligations. While profitability refers to the firm's ability to generate revenues in excess of the cost of generating such revenues. Most empirical studies have established liquidity and profitability as the most important goals of working capital management and have been found to be universally associated with each other (Raheman and Nasir 2007, Shin and Soenen, 1998; Pandey, 2005) Van-Horne and Wachowicz, 2005). Trade-off between the dual goals of working capital management as shown in Smith (1980) which is similar to risk-return trade-off has increasingly been supported by many empirical findings (Nguyena, 2007; Eljelly, 2004 and Raheman and Nasir, 2007).

For example, Yunq-Janq (2002) examines relationship between liquidity and profitability for firms in Japan and Taiwan and discovers that aggressive liquidity management enhances operating performance which leads to achievement of higher corporate values for both countries despite differences in both their structural characteristics and financial systems. Along the same line of investigation, Eljelly (2004), examines a sample of 29 joint stock companies in Saudi Arabia and finds a strong negative relationship between liquidity and profitability. These two studies evidence the need to balance profitability with liquidity. This is because policies that tend to maximize profitability tend to reduce liquidity and vice versa for the particular business firm under

consideration (Raheman and Nasir, 2007 and Uremadu, 1998, 2000, 2001). Although profitability target is seen as the ultimate objective of an enterprise but preserving liquidity is equally important. Hence, increasing profitability at the expense of liquidity or vice versa can bring serious problems to the firm. Therefore there arises the need to balance profitability goal with liquidity goal of business enterprise in order to maintain a balanced working capital position of the particular firm and (to) ensure its survival at all times.

To have higher profitability, a firm will have to maintain a relatively low level of current assets (Pandey, 2005; Van-Horne, and Wachowicz, 2005, Egbide and Enyi, 2008). The implication of this is to ensure that fewer funds are tied up in idle current assets, but the firm adopting this strategy will be sacrificing solvency thereby exposing itself to greater risk of cash shortage and stock outs. On the other hand, to ensure solvency, a firm has to be very liquid which means maintaining a relatively large investments in current assets. The latter policy ensures that the firm is able to meet its short term obligations as well as fills sales orders and ensures smooth production schedule. This will, however, reduce profitability since a large proportion of funds are tied up in current assets (Egbide and Enyi, 2008 and Uremadu, 2004).

Nonetheless, profitability and liquidity objectives should not be mistaken to be permanently mutually exclusive as there may arise situations where both move in the same direction. For example, Lyrودي and Lazaridis (2000) demonstrate through a study that there exists no linear relationship between liquidity and profitability among the Greek food industry. In support of this view, Byrnes (2003) reports that Dell Corporation generated huge amount of liquidity and extraordinary high returns at the same time. His study reveals that while it took Dell forty five days to pay its vendors, its debtor's collection period was four days. That this strategy has crafted a sort of cash engine which enabled them to finance the company's rapid growth and limited its external financing needs as well as has yielded high returns.

Finally, this argument can equally be supported by a view that liquidity is a matter of degree and lack of it can limit advantages of favorable discounts, profitable opportunities, management actions and coverage of current obligations (Egbide and Enyi, 2008). In the same way, illiquidity often precedes lower profitability, restricted opportunities, loss of owner control, loss of capital investment, insolvency and bankruptcy (Anon, 2003).

2.2. Inventory Management and Profitability

Inventory management is a part of investment decisions and like every other investment, investment in inventories is expected to yield a return higher than the cost of that investment, that is, investment in inventories is expected to positively impact on the company's profitability. (Egbide and Enyi, 2008). Pandey (2005) rightly states that inventory policy will maximize a firm's value at a point in which incremental or marginal return from that investment in inventory equals the incremental or marginal cost of funds used to finance it.

Consistent with the above proposition, Lazaridis and Tryfonidis (2005) state that the optimum level of inventories will have a direct effect on profitability since it will release working capital resources which, in turn, will be converted into business cycle or that will raise inventory level in order to respond to higher demands. Byrnes (2003) reports that inventory management of Dell Corporation focused on lowering inventory by 50 percent, improving lead time by 50 percent, reducing assembly costs by 30 percent, and reducing obsolete with its reducing variance between supply and demands, launched the company to higher levels of liquidity and profitability. It thereby led to the slogan "*Dell Manages Profitability, Not Inventory*".

2.3. Debtors' Management and Profitability Objective

All efforts the financial manager makes in setting credit standard, credit terms and credit collection periods are geared towards establishing an optimal credit policy for the firm. An optimal credit policy is one which maximizes a firm's value, and it is a point where Pandey (2005) asserts that the incremental or marginal rate of return of an investment is equal to the incremental or marginal cost of funds used to finance that investment. Optimal credit policy invariably translates into an optimal investment in receivables which, in turn, maximizes firm's value or net-worth. Usually a firm lengthens its credit period to raise its operating profit through expanded sales turnover program. However, there will be net increase in operating profit only when the cost of extended credit period is less than the incremental operating profit (Pandey, 2005 and Egbide and Enyi, 2008).

The foregoing captures consensus of experts' on views on the relationship between receivables management and profitability objective of most business firms. Hence, Damilola (2005) opines that the purpose of offering credit is to maximize profits. Similarly, Lazaridis and Tryfonidis (2005) maintain that credit periods whether from suppliers or granted to customers, in most cases, have a positive impact on profitability. However, due to associated risks inherent in credit policy, financial managers, most often, vary the level of receivables in keeping with the trade-off between profitability and risk. Pike and Chang (2001) maintain that given a significant investment in accounts receivables by most large firms, credit management policy choices and practices may have important implications on corporate value and that successful management of resources will often lead to higher corporate profitability. Hence, there should be a guided flexibility introduced in managing a firm's customers (debtors) credit extension policy.

2.4. Creditors Management and Profitability

The main purpose of effective management of the various components of working capital (accounts payable inclusive), as earlier said, is due to the likely influence each component will have on the company's performance (measured here by profitability) and on the company's stability (measured by liquidity). Therefore, three different components of cash conversion cycle could be managed differently to enhance both profitability and growth of the enterprise (Lazaridis and Tryfonidis, 2005 and Egbide and Enyi, 2008).

Accounts payables are largely dependent on the firm's purchases which, in turn, will depend on the volume of production. Thus, a decision as to whether to take trade discount or not, or to stretch accounts payables or not, should be based on the cost and benefits analysis of a firm's credit policy in relation to profitability and or liquidity of the enterprise. Van-Horne and Wachowicz (2005) put it this way, "the firm must balance the advantages of trade credit against the cost of foregoing a possible cash discount, any possible late payment, penalties, the opportunity cost associated with any possible deterioration in credit reputation and the possible increase in the selling price the seller imposes on the buyer". Therefore, the ultimate effect of efficiently managing accounts payables is to optimize the cash outflow that ensures that a firm's liquidity is not adversely affected so that a company's profitability will not also be affected in the long run (Egbide and Enyi, 2008).

2.5. Cash Management and Profitability

The ultimate goal of the financial manager in the management of cash is similar to the management of other current assets (e.g. stocks and debtors). The objective is to attain an optimal balance and turnover of cash that maximizes the market value of the firm (Agrawal, 2007). Attaining the optimal balance of cash means that effective and efficient management of cash should impact on both the firm's liquidity and profitability (Egbide and Enyi, 2008). Pandey (2005)

and Gundayelli (2005) agree that effective cash inflow and outflow factors in such a way as to maintain adequate control over cash position to keep the firm sufficiently liquid while investing excess cash in some profitable opportunities.

It should be recalled, as we stated earlier somewhere in this paper, that excess cash implies inefficiency of management in applying funds to profitability projects as idle cash earns no income. Similarly, inadequate cash exposes the firm to risk of illiquidity since it would not be able to meet its short-term maturing obligations nor can it take advantage of viable investment opportunities. Therefore, it behoves the financial manager to formulate a cash strategy that will ensure cash management style which optimally enhances liquidity at all times and leverages cash surpluses on profitability operations (Egbide and Enyi, 2008).

2.5.1. The Cash Conversion Cycle (CCC) and Profitability

Another aim of working capital management is to maximize time outflows and inflows of cash otherwise known as the cash conversion cycle while simultaneously optimizing process costs and process quality (KPMG, 2005). Usually the process from when you spend money to when you get money is undoubtedly the single most important process to optimize for any business. It is therefore not surprising why most researchers adopt cash conversion cycle or period as the most comprehensive measure of working capital management as well as testing its impact on profitability (Deloof, 2003 and Reheman and Nasir, 2007).

Nonetheless, the relationship between cash conversion period and profitability does not have a clear demarcation as two schools of thought have emerged namely: the traditional belief that a short cash conversion period favours profitability and the contrary view that a longer cash conversion period can lead to improvement of profitability (Shin and Soenen, 1998). Consequently, researchers around the world have subjected this relationship to empirical examinations at different platforms and their findings and conclusions are in support of the conventional school of thought.

For instance, Shin and Soenen (1998) in a study of a large sample of 58985 firms for a period of twenty years, find a strong negative relationship between the net trade cycle and corporate profitability of listed companies in America. They therefore conclude that financial managers can increase the value of firms for their shareholders by reducing the conversion period to a reasonable minimum.

Deloof (2003) also investigates this relationship on a sample of 1009 large Belgian non-financial firms and finds a significant negative relation between these two variables and concludes that managers can increase corporate profitability by reducing average collection period and inventory conversion period, and thus invariably reduce cash conversion period (CCP). Eljelly (2004) also discovers that the CCC was a more important measure of liquidity and that its effects on profitability are more than current ratio among joint stock companies in Saudi Arabia.

Furthermore, the study of the effect of working capital management on profitability which examines a sample of 8872 small and medium size Spanish companies also reveals that a shorter CCC can improve a firm's profitability profile (Garcia-Teruel and Martinez-Salano, 2004). In line with the above findings, KPMG (2000) asserts that a reduction in the CCC releases liquidity and impacts directly on the company's financial position thereby leading to rise in returns. In Athens, Lazaridis and Tryfondis (2005) study a sample of 131 listed firms covering 2001-2004, and find a strong negative relationship between profitability and CCC. They thus advise that financial managers can create profits for their companies by correctly handling the cash conversion cycle (CCC) and keep each component of CCC at optimal level. In India, the findings of Akella (2006) are

not different as Indian firms were advised to strive to improve their working capital system as a way of enhancing their profitability status.

Moreso, Reheman and Nasir (2007) study a sample of 94 Pakistan firms and find a strong negative relationship between components of working capital and profitability thereby indicating that as cash conversion cycle increases it leads to decreasing profitability. Sadlovska and Viswanathan (2007)'s further survey in a related study reveals that the best performing companies have CCC in the range of 5-6 times shorter than the average and low performing ones.

Conversely, a number of arguments could arise in favour of a direct and positive relationship between a longer cash conversion cycle and profitability. For example, Shin and Soenen (1998) argue that a firm could have larger sales with a generous credit policy that extends cash cycle. In that case, the longer cash conversion cycle may result in higher profitability. Besides, Deloof (2003) says that a longer cash conversion cycle might increase profitability because it leads to higher sales. The above arguments are in tan-dem with the findings of Lyroudi and Lazaridis (2002) that study this relationship among food industries in Greece and find a positive and significant relationship between CCC and profitability (measured by return on investment, ROI and net profit margin). These above cited studies and their results outstandingly demonstrate that a longer cash conversion cycle can equally improve corporate profits.

Although, Lavelly (1996) states that high sales volume does not necessarily equate to high profitability and he further argues that a firm losing money each time it sells cannot make it up in volume. Besides, corporate profitability might as well decrease with cash conversion cycle if the costs of higher investment in working capital rise faster than the benefits of holding more inventories and/or granting more trade credits to customers. Nonetheless, these two schools have abandoned their divergent beliefs after further empirical investigations reveal the contrary, yet, the sense in their arguments requires further empirical investigation (Egbi and Enyi, 2008).

3. Methodology of research

The methodology deals with model specification, data requirements and sources of data. Two analytical tools will be applied in this study, namely: descriptive statistics and multiple regression analytical models. Multiple analytical models will be used to estimate the relationship (or otherwise) between level of corporate profitability (mirrored by return on asset) and the identified financial variables of influence such as inventory conversion period, debtors collection period, creditors payment period and cash conversion period. Besides, the descriptive statistics will be used to conduct economy analysis on these financial and economic precision variables of interest. Empirical implementation of the model will make use of a cross-sectional time series data covering 2005-2006 to determine the effect of working capital management and liquidity on corporate profits among Nigerian quoted firms. The study will apply data on an ordinary least squares (OLS) approach to conduct our investigations and analysis.

3.1. Model specification

We shall adopt and modify the model of Egbi and Enyi (2008) in determining the effect of working capital management and liquidity on corporate profitability among Nigerian firms. The relevance of the model is that it fits perfectly well into the present study. However, the major difference of our model from theirs is that while they used Pearson Correlation coefficient analysis and OLS to perform their tests using SPSS – computer package, we concentrate on use of OLS method applied in a disaggregated data to 50 observations assembled in a pooled fashion using E-views computer package. We believe this method will afford us a better opportunity and an improved results to assess the performance of each variable more directly and precisely than

doing so in a lumped fashion. Hence, that necessitated the modifications introduced in our model. The multivariate specification of this probabilistic model will assume the form of

$$ROA = \beta_0 + \sum_{i=1}^n \beta_i X_{it} + e \tag{1}$$

Where:

ROA = the measure of profitability which is return on assets employed;

β_0 = the regression constant (or intercept of the equation);

β_i = the change coefficient for X_{it} variables;

X_{it} = the different independent variables for profitability or liquidity of the corporate firms i and t .

The general least squares equation (1) above will now be restated with the specified variables thus below;

$$ROA = f(\underset{(+)}{ICP}, \underset{(-)}{DCP}, \underset{(+)}{CPP}, \underset{(-)}{CCP}, \underset{(+)}{NLS}) \tag{2}$$

The final equation to be estimated from equation 2 is:

$$ROA = b_0 + b_1 ICP - b_2 DCP + b_3 CPP - b_4 CCP + b_5 NLS + e \tag{3}$$

Where:

ROA = defined as operating profit before interest and tax divided by total assets.

Mathematically expressed as:

$$ROA = \frac{\text{Profit before interest and tax}}{\text{Total assets}} \tag{4}$$

ICP = is inventory conversion period and the data used in deriving this were from closing stock, opening stock and cost of sales per annum. Mathematically expressed as:

$$ICP = \frac{\text{Average inventory}}{\text{Cost of sales}} \times 365 \text{ days} \tag{5}$$

DCP = debtors collection period and mathematically expressed as:

$$DCP = \frac{\text{Average debtors}}{\text{Creditsale per annum}} \times 365 \text{ days} \tag{6}$$

The data used to arrive at the average collection period (ACP) were the opening debtors, the closing debtors and the annual sales figures.

CPP = creditors payment period, mathematically expressed as:

$$CPP = \frac{\text{Average creditors}}{\text{Creditors purchases per annum}} \times 365 \text{ days} \tag{7}$$

CCP = is cash conversion period. It is a composite index derived from the aggregation of ICP, DCP and CPP. CCP is invariably a vital index and it is used to proxy working capital management in this study. Mathematically,

$$CCP = ICP + DCP - CPP \quad (8)$$

NLS = natural logarithms of sales

e = corresponds to random error term.

3.2. Data nature and characteristics

The following data were employed in the course of our analysis and they are explained thus below:

1. Return on Assets (ROA)

It is one of the profitability ratios. It measures the overall effectiveness of the firm in generating profit with available assets. It is equivalent to return on investment (ROI), but it is a more appropriate measure of the operating efficiency of a firm. As stated above, it is measured as operating profit divided by total assets. It forms the dependent variable in this study (see Van-Horne and Wachowicz, 2005 and Pandey, 2005).

2. Inventory Conversion Period (ICP)

It represents the period it takes to convert inventories into debtors or cash sales. It is computed here as average inventories divided by cost of sales multiplied by 365 days.

3. Debtors Collection Period (DCP)

It represents the length of time it takes the companies to collect proceeds of sales from their debtors.

4. Creditors Payment Period (CPP)

This is the time lapsed between when the credit purchases are made and when the companies make payment for them.

5. Cash Conversion Period (CCP)

This connotes the number of days it takes for the firm to collect the proceeds of sales, measured from when the actual payment for inventory was made. It is a comprehensive measure of how effective a company is managing its working capital portfolio.

6. Natural Logarithms of Sales (NLS)

This is a measure of company size, under the assumption that the larger the company the larger will be the volume of its sales, which will consequently have a significant impact on the profits (Egbide and Enyi, 2008). It is used in this study as a control variable. It is computed as annual sales multiplied by the natural logarithms.

3.3. Data requirements, sources and limitations

The data used for this research include annual reports and statement of accounts of 25 manufacturing companies for the years 2005-2006, as outlaid in Tables 3 and 4 of appendices, retrieved from *The Nigeria Stock Exchange Fact Book (2006)* published by the *Nigerian Stock Exchange and the Corporate Affairs Commission (CAC)* as compiled by Egbide and Enyi (2008).

It should, however, be stated, here and now that the data used in this study are limited to those available and accessible within official statistical limitation.

4. Estimation results and discussions

The results of descriptive and quantitative analysis from regression of our model equation 1, are presented in Tables 1 and 2 below.

Table 1. Modeling ROA by OLS (with 40 observations included)

Variable	Coefficient	Std. error	t-statistic	Prob.
C(intercept)	0.056086	0.142168	0.394507	0.6957
ICP	0.003156	0.000870	3.628678*	0.0009
DCP	0.000676	0.000579	1.168230	0.2508
CPP	-0.002087	0.000587	-3.556710*	0.0011
CCP	-0.002699	0.000706	-3.823419*	0.0005
NLS	0.003615	0.007981	0.452983	0.6534

$R^2 = 36.66\%$; Adj. $R^2 = 27.35\%$; Durbin-Watson Stat = 2.06

F-Statistic = 3.935859; Prob (F-statistic) = 0.006363*

Source: Author's computations

Key: *Significant at 1% level.

Table 2. Modeling ROA by OLS (with 50 observations included)

Variable	Coefficient	Std. error	t-statistic	Prob.
C(intercept)	0.106245	0.151794	0.699930	0.4877
ICP	0.001731	0.000834	2.076774**	0.0437
DCP	0.000418	0.000578	0.7235	0.4731
CPP	-0.002030	0.000634	-3.20153*	0.0025
CCP	-0.001780	0.000737	-2.413563**	0.0200
NLS	0.003245	0.008452	0.383947	0.7029

$R^2 = 32.63\%$; Adj. $R^2 = 24.98\%$; Durbin-Watson = 2.17;

F-Statistic = 4.263093; Prob (F-statistic) = 0.003013*

Source: Author's computations

Key: *Significant at 1% level; **Significant at 5% level

4.1. Structural analysis

We shall now examine the results of our model equation estimations and analyze the explanatory variables to determine the nature of their effects on the corporate profitability of the Nigerian corporate firms.

Looking at both Tables 1 and 2, results of model equation 1 estimated using the 40 observations and 50 observations, respectively; reveal that the descriptive statistics (R^2 , F-statistic and DW-Statistic) are moderately significant being relatively free from estimation problems. With DW-Stat results of 2.06 and 2.17 in Tables 1 and 2, respectively, the model can be said to be free from error of multicollinearity. Quantitatively, the estimates of ICP and NLS bear the right signs while DCP, CPP and CCP exhibited wrong signs and the model itself is highly explanatory.

4.2. Findings

Our observations from Tables 1 and 2 which included 40 and 50 observations, respectively, when the model was estimated shows:

(1) That CCP (cash conversion periods) has wrong sign (-) and that it is the most significant precision variable in influencing corporate profitability, and therefore leads profits in Nigeria. It ranked 1st and 2nd in Tables 1 and 2 respectively, in impacting on firms' profits in Nigeria. Two plausible reasons why it assumed negative effect on profits are (1) companies have not been promptly collecting cash from credit sales made or (2) that collected cash (liquidity) were not being effectively and efficiently managed via re-investment in profitable projects (opportunities) chancing out.

(2) We also discovered that CPP (creditors payment period) in both Tables 1 and 2 above had wrong signs (-), and it is very significant in influencing profitability in Nigeria as it ranks the most influential variable in impacting on profits in Table 2, and 3rd in Table 1, respectively. All these go to show that (i) either delayed payments were left idle not invested for increased yields (profits); or (ii) that delayed payments have made defaults from credit purchases, hence most firms cannot meet up demands for supplies of goods ordered by customers due to shortage of stock of raw materials as such reducing sales turnover or volume and profits there-from.

(3) We equally observed that ICP (Inventory conversion period) had the right signs in both Tables 1 and 2 results and it is ranked 2nd and 3rd in Tables 1 and 2, respectively, in impacting on profits. Therefore it is the second most significant precision factor in influencing corporate profitability among manufacturing companies in Nigeria. That it is positively signed portends that there exists high sales turnover potentials among real asset goods or firms in Nigeria. It then implies that Nigeria has large sales and buyers market yearning for patronage or rather to be saturated with goods by MNCs in the emerging markets of 21st century world.

(4) We also found out that DCP (debtors collection period) had wrong (+) sign but it is significant in impacting on corporate profits among manufacturing companies in Nigeria.

(5) Finally, we discovered that NLS (natural logarithms of sales, which are a mirror for corporate size, had the right (+) signs in both Tables 1 and 2) however, it is not significant in influencing profitability among quoted firms in Nigeria. NLS measures *corporate size* on the assumption that big companies will command high sales volume or the market. Size here is seen in the context of commanding large market or sales volume, since if there exist high sales turnover, it will definitely lead to rise in firm's profits. That it (NLS) is not significant, judging from results of our tests, would mean that corporate size viewed from different perspective, may not necessarily portend effective working capital management or liquidity management for corporate outfits, for that matter. At times size may not command high sales volume or turnover per unit of quantity produced and sold as per firm size.

5. Recommendations and conclusions

The following are recommendations arising from the findings of the paper on factors determining liquidity and profitability among corporate firms in Nigeria. For the fact that conversion period has significant impact on firm's profitability, we make quick to recommend that:

1. A. Companies should hasten up collection of cash for (from), credit sales made to customers.

B. Besides, cash collected should be reinvested into short-term investments (securities) to generate profits, and (iii) funds left idle in the cash till or excessive liquidity is costly and do not lead to growth in yields or profitability.

2. Since creditors' payment period is also significant in affecting corporate liquidity and profitability, (A) financial managers should ensure that idle funds are immediately turned productive via repeated investments in short-term assets. (B) They should not delay payments for credit purchases to creditors in order not to damage company's reputation and goodwill which usually result in cut off of supplies outlets for new materials thereby leading to shortages and non supplies of orders from customers.

3. Since inventory (stock) conversion period (ICP) is significant in influencing corporate profitability among manufacturing firms in Nigeria, we thus recommend proper injection of Foreign Direct Investments (FDIs), International Portfolio Investments (IPIs), Foreign Private Investments (FPIs) into the Nigerian market due to its potentials for high sales turnover as well as high yields. A recent study revealed that Nigeria is the only country in the world with the highest return on investment (ROI) (Saghana, 2009). Mr. Remi Babalola, Nigeria's Finance Minister of State, disclosed this in Abuja at the 31st African Reinsurance Corporation Annual General Meeting. According to him, "With the financial crisis biting hard all over the world, Nigeria is still the highest in return on investment (ROI)" (Saghana, 2009). Being so, we should invite MNCs to come, take advantage of this positive development and participate in the market by creating the right legal and regulatory framework or environment for them to enter the market. As one of the emerging economics in Africa now her commodity markets as well as financial markets are well ripped for entry.

4. Study also established distorted and non-significant relationship of debtors' collection period (DCP) with the level of corporate profitability cum liquidity among quoted companies in Nigeria. Hence, we recommend that firms should be very apt in collecting proceeds of credit sales from their debtors as good working capital management urges for quick cash collection from credit sales for quick reinvestment in short-term securities in order to boost profitability. Otherwise, if slack develops it can lead into bad debts and credit defaults in future via accumulated credit sales and accounts receivables not followed up for prompt collection of cash (Anyafu, 2002).

5. Finally, Nigerian firms should endeavor to manage their size with a view to maximization of shareholder wealth and profitability by cutting costs and trimming down their sizes in a bid to raise their profits and maintain liquidity at all times, and even in this critical period of global financial crisis.

In conclusion, paper has empirically established that a number of some key variables affect corporate liquidity and profitability among manufacturing firms in Nigeria. These include inventory conversion period (ICP), cash conversion period (CCP) and corporate size or sales (NLS). These factors will either positively affect profitability depending on how effective and efficient firm's liquidity management has been piloted by corporate finance managers. Therefore, in this period of ravaging global financial crisis, working capital management becomes paramount and very crucial in maintaining both liquidity and profitability of the corporate enterprise. Besides, since

Nigeria has a beckoning large market size that promises the highest return on investment (ROI) in the world today, according to the most recent study, as earlier stated in Saghana (2009), we strongly enjoin MNCs and other global investors and market players to surge into this emerging global market with their accumulated savings (mobilized cash or liquidity) to provide needed investments and or loanable funds in form of FDIs, International Portfolio Investments (IPIs) and Foreign Private Investments (FPIs) so as to partake in reaping from these potential yields that exist in the Nigerian market in this 21st century world.

Notes:

1. This section is indebted to I.M. Pandey (2000) for his elaborate contributions on the concepts of working capital. We appreciate so much for your works in diverse fields of corporate finance and financial management.

2. This section profoundly profited from the works of B.C. Egbide and P.E. Enyi (2008) most especially in the area of literature review. Hence, we, here and now, state that we appreciate efforts of these Nigerian researchers whose work has formed one of the pioneer studies on working capital management and corporate profitability of quoted Nigeria firms.

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Appendix I

Table 3. 2005 Data for 25 Selected Manufacturing Firms

	Firm Observation	ROA	ICP	DCP	CPP	CCP	NLS
1	Oando	0.102	18	13	27	4	18.616
2	Mobil	0.280	23	10	37	-4	17.746
3	Total	0.157	18	14	36	-4	18.658
4	AP Oil	-0.067	16	34	84	-34	17.571
5	7 Up	0.132	103	17	43	77	16.669
6	NBC	0.082	95	2	25	72	17.831
7	UNILIVER	0.127	79	49	30	98	17.324
8	Nig. Afprint	-0.116	128	95	224	-1	14.014
9	Academy Press	0.109	137	61	12	187	20.503
10	Nestle	0.327	73	6	28	51	17.352
11	Flour Mill of Nig.	0.118	55	17	36	35	17.747
12	Okomu Oil	0.108	118	36	19	135	14.718
13	Nig. Cutix	0.177	90	28	77	41	20.168
14	Con Oil	0.141	37	19	25	31	18.140
15	Chevron	0.115	10	5	12	2	17.766
16	DN Meyer	-0.097	68	31	16	82	14.130
17	First Aluminum	0.135	38	8	3	43	15.768
18	Nig. Enamel Ware	0.204	54	13	2	66	14.390
19	Alum Extrus	0.064	36	0	10	25	20.474
20	CAP	0.152	76	21	8	88	14.238
21	Nig. Dunlop	0.005	106	12	30	88	15.432
22	PZ	0.128	104	2	5	101	17.346
23	Challarams	0.116	31	14	4	41	15.868
24	UAC	0.092	10	7	18	-1	16.648
25	UTC	-0.293	22	90	71	41	13.325

Source: Author adopted from Annual Reports Statement of Account (various) compiled by Egbide & Enyi (2008).

Appendix 2

Table 4. 2005 Data for 25 Selected Manufacturing Firms

	Firm Observation	ROA	ICP	DCP	CPP	CCP	NLS
1	Oando	0.106	25	12	19	18	18.701
2	Mobil	0.157	22	8	29	1	17.744
3	Total	0.124	23	14	40	-3	18.656
4	AP Oil	0.149	19	27	15	31	18.221
5	7 Up	0.122	94	15	34	75	16.910
6	NBC	0.055	89	2	36	55	17.904
7	UNILIVER	-0.062	105	74	37	142	17.056
8	Nig. Afprint	0.111	56	125	426	-245	13.175
9	Academy Press	0.102	148	58	7	199	20.652
10	Nestle	0.305	80	4	25	59	17.464
11	Flour Mill of Nig.	0.161	54	14	37	32	17.988
12	Okomu Oil	0.107	136	36	22	150	14.824
13	Nig. Cutix	0.232	93	15	110	-2	20.387
14	Con Oil	0.134	37	25	21	41	18.321
15	Chevron	0.101	18	6	21	2	18.004
16	DN Meyer	0.140	83	64	41	106	14.513
17	Eviot Aluminum	0.065	106	14	8	111	15.844
18	Nig. Enamel Ware	0.123	108	32	3	136	14.269
19	Alum Extrus	0.106	47	0	18	30	20.577
20	CAP	0.187	83	28	19	92	14.502
21	Nig. Dunlop	-0.025	146	7	46	107	15.438
22	PZ	0.104	166	9	8	167	17.588
23	Challarams	0.447	64	32	8	88	15.939
24	UAC	0.110	21	17	35	5	16.678
25	UTC	-0.017	45	117	82	80	13.766

Source: Author adopted from Annual Reports Statement of account (various) compiled by Egbide & Enyi (2008).