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EFFECTS OF WORKING CAPITAL MANAGEMENT ON PROFITABILITY: EVIDENCE FROM THE TOPFIVE BEER BREWERY FIRMS IN THE WORLD

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ABSTRACT

The impact of working capital management on the profitability of manufacturing firms has attracted the attention of researchers in different countries of the world in recent times. This research expands the horizon of knowledge in this area by shedding more light on working capital management as measured by the cash conversion cycle (CCC), and how the individual components of the CCC influence the profitability of world leading beer brewery firms. Multiple regression equations were applied to a cross sectional time series data of five world leading beer brewery firms after ensuring that the data are stationary and co-integrated. The outcome of the analysis clearly pinpoint that working capital management as represented by the cash conversion cycle, sales growth and lesser debtors' collection period impacts on beer brewery firms' profitability.

Key Words: Working capital management, Cash conversion cycle, Profitability, Top world leading beer brewers, Multivariate regressions, Debtors collection period.

INTRODUCTION

Over the last five to ten years, the world brewery market has become increasingly concentrated with a wave of business combinations among brewery giants as well as diversification of investments outside their geographical location. All these are in the quest to dominate the market as well as the maximization of shareholders wealth. Increasing market domination that will enhance

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the maximization of shareholders wealth depends largely on certain firm specific factors such as persistent profitability. Profit maximization for any firm depends on efficient management of cost and process of production as well as increases in sales resulting from firm's market domination. One factor that is deduced to influence firm profitability grossly is the firm's working capital.

Working capital is the stock stored that has a conversion or resale value in order to gain profit. It represents the largest cost of a firm especially the manufacturing firms. In normal circumstances, working capital consists of about 30% - 40% of a firm's total investment. Investment in working capital to a large extent determines the returns earned by a firm. Nevertheless, excessive levels of current assets can easily result in a firm realizing a substandard return on investment while firms with too few current assets may incur shortages and difficulties in maintaining smooth operations (Van Horne and Wachowicz, 2000). As a result,working capital management is a very important component of corporate finance as it directly affects the liquidity and profitability of a firm. It centers on current assets and current liabilities of a firm. For one thing, the current assets of a typical manufacturing firm accounts for over half of its total assets (Abdul and Mohamed, 2007).

One reason why managers spend considerable time on day-to-day management of working capital is that current assets are short-lived investments that are continually being converted into other asset types (Rao, 1989). Liquidity for the on-going firm is not reliant on the liquidation value of its assets, but rather on the operating cash flows generated by those assets (Soenen, 1993). Working Capital Management is therefore a sensitive area in the field of financial management (Joshi, 1994). It involves the decision of the amount and composition of current assets and the financing of these assets.

Efficient working capital management involves planning and control of current assets and current liabilities in a manner to strike a balance between liquidity and profitability. Harris (2005) pointed out that working capital management is a simple and straightforward concept of ensuring the ability of the firm to fund the difference between the short term assets and short term liabilities. The ultimate objective of any firm is to maximize shareholders wealth and maximizing shareholders wealth can be achieved by a firm maximizing its profit. A firm that wishes to maximize profit must strike a balance between current assets and current liabilities and hence keeping abreast of the liquidity and profitability trade-off. Preserving liquidity and profitability of the firm is an important objective as increasing profit at the expense of liquidity can bring serious problems to the firm and vice-versa. Working capital management is considered to be a very important element to analyze the firm's performance while conducting day to day operations. There are chances of imbalance of current assets and current liability during the life cycle of a firm and profitability will be affected if this occurs. This is why the study of influence of working capital on firm's profitability is drawing scholars' attention in recent times.

Numerous studies on the drivers and financial impact of working capital management for different manufacturing firms for different countries of the world have been published in recent times. However, inter-country studies of world leading firms in a given industry are sparse. Attempting to fill this knowledge gap, this study sets out to examine the drivers and financial impact of working capital management on profitability of top world leading beer brewers.

This research while focusing on working capital management (as measured by the cash conversion cycle (CCC) and it's influence on profitability aims at establishing a relationship between firms' management of the liquidity - profitability trade-off for the world leading beer brewery firms. Also since the CCC captures management of working capital, the third objective of this paper is to examine how the individual components of the CCC affect world leading beer brewers' profitability. This study is organized as follows: Section two reviewsempirical literature on working capital management and its effect on profitability. Section three presents the methodological framework which includes sample, model and the variables. Section four portrays and discusses the empirical analyses and discussion of statistical results and findings while section five presents the conclusion.

REVIEW OF RELATED LITERATURE

There have been significant mergers and acquisition in recent times in the world beer industry. The industry has been awakened by competition as top firms struggle to maintain the lead. In 2008, InBev took over Anheuser-Busch to form the world's largest brewer, AB InBev. In response, SABMiller and Milson Coors combined their US operations to better compete with the new brewing giant also in 2008. In Nigeria in 1993, Nigeria Breweries Plc the largest brewer in the country acquired monarch Breweries. The other major players in the industry, Heineken and Carlsberg, have also been active over the past five years, jointly acquiring Scottish and Newcastle before splitting its global assets. Global leading industry consolidation and domination has increased in recent years. In 1998, the top 10 companies reportedly accounted for 34% of the global beer market, with this share increasing to over 60% in 2012 (IBISWorld, 2012). IBISWorld (2012) rates the level of industry concentration as medium, with the top four players accounting for about 50% of the industry revenue. The top four players are Anheuser-Busch InBev, SABMiller plc, Heineken N.V and Carlsberg. Accounting for the minority share holdings that these major players have in other brewers would produce a somewhat higher ratio. However, concentration in the industry is also increasing. It is expected that concentration will increase in the future given the Chinese brewing industry. Since China is the largest beer market in terms of consumption, a significant increase in concentration in this market may have significant effects on the entire market.

Many researchers have studied working capital from different views and in different environments. The following ones were very useful for our research:

Abbasali and Milda (2012) with a view to finding the empirical evidence about the impact of working capital management on profitability and market evaluation studied a sample of companies listed on the Tehran Stock Exchange for a period from 2006 to 2010. Return on assets and return on invested capital ratio were used to measure the profitability of firms, and Tobin Q ratio to measure the market value of companies. The variables of cash conversion cycle as working capital management criteria, current ratio, current assets to total assets ratio, current liabilities to total assets ratio and total debt to total assets ratio were used. Their result indicates that there is a significant relationship between working capital management and profitability.

Melita, Maria and Petros (2010) empirically investigated the effect of working capital management on firm's financial performance in an emerging market. They hypothesized that working capital management leads to improved profitability. Their data set consists of firms listed on the Cyprus Stock Exchange for the period of 1998 - 2007. Using multivariate regression analysis, their results specifically indicate that the cash conversion cycle and all its major components namely - days in inventory, days' sales outstanding and creditors' payment period – are associated with the firm's profitability.

Mary, John and Laurie (2010) examined the effect of inventory on firms' profitability before and after two catastrophic supply chain disruptions of the September 11, 2001 terrorist attacks and Hurricane Katrina, with the objective of determining whether there is evidence that inventory has been used as a means of developing supply chain resiliency and the stability of any such relationship. Using separate three-year periods surrounding the disruptions, they applied univariate analysis to examine the macro-level effects on firms' profitability, selected growth measures, and inventory levels across manufacturers, wholesalers, and retailers. Utilizing balance sheet and income statement data, regression models were applied to isolate the effect of inventory on profitability and also to test whether a change in the relationship between inventory and firms' profitability can be detected. The findings indicate the effect of inventory on firms' profitability and shows a significant decline for manufacturing in the post - September 11 period with no significant change in the post Katrina period.

In Nigeria, Abdulrasheed, Khadijat,Sulu and Olanrewaju (2011) assessed inventory management in selected small businesses in Kwara State, Nigeria. Using a regression model to explain the effect of inventory value on performance proxy by profit over a period of ten years, the study revealed that a Naira change in stock would cause almost a Naira (92 Kobo) change in profitability of selected businesses. This result indicated a strong positive relationship between inventory and profitability of small businesses in Kwara State of Nigeria. They thus concluded that small businesses are likely to generate higher profit if an effective inventory management is put in place.

Hassan, Liaqat, Ch. Abdul and Muhammad (2011) set out to examine the impact of working capital management on the profitability of the firm without compromising the liquidity of the firm. Using

data for sixty five companies randomly selected from Karachi Stock Exchange, and a set of variables Tobin's Q, proxy used for determining the market value of the firm, return on assets & return on invested capital, were used to measure financial performance of the firm. Five financial ratios, cash conversion cycle, current ratio, current asset to total asset ratio, current liabilities to total asset ratio and debt to asset ratio, were used as variables against which changes in dependent variables were measured by applying correlation and multiple regression techniques. Their findings revealed that significant correlations exist between working capital components with firms' market value and firms' profitability.

Hasan, Halil, Arzu and Salih (2011) studied panel data of companies in the Istanbul Stock Exchange for the period of 2005 – 2009 to shed light on the empirical relationship between efficiency of working capital management and corporate profitability. The findings revealed that reducing the cash conversion cycle (CCC) a measure of working capital management positively affects return on assets (ROA) a measure of profitability.

Vida, Seyed, and Rezvan (2011)studied the relationship between working capital management and corporate profitability of 101 listed companies on Tehran Stock Exchange (TSE) during the period of 2004-2008. Multivariate regression and Pearson correlation were used to test hypotheses. Findings revealed that cash conversion cycle, a key measure of working capital management, has a relationship with corporate profitability. Findings also show that a positive significant relationship exists between logarithm of sales and profitability, and a negative significant relationship exists between financial debt ratio and profitability.

Abdul and Mohamed (2007) studied the effect of different variables of working capital management and current ratio on the net operating profit of Pakistani firms. Their sample was made up of 94 Pakistani firms listed on Karachi Stock Exchange for a period of 6 years from 1999 – 2004. Pearson's correlation, and regression analysis (Pooled least square and general least square with cross section weight models) were used for the analysis. Their results show that there is a strong negative relationship between variables of the working capital management and profitability of the firmmeaning that as the cash conversion cycle increases profitability decreases. They also found a significant negative relationship between liquidity and profitability, that there is a positive relationship between size of the firm and its profitability, also, that there is a significant negative relationship between debt and profitability.

Muhammad and Syed (2011) investigated the impact of working Capital Management on firms' performance for non-financial institutions listed in Karachi Stock Exchange (KSE-30) Index. A panel data of 21 firms listed in KSE-30 Index for a period of years 2001 to 2010 was analysed. Results were obtained using canonical correlation analysis for identifying the relationship between working capital management and firms' performance. The findings show that working capital management has a significant positive impact on firms' performance. They concluded that

managers can increase value of shareholder and return on asset by reducing their inventory size, cash conversion cycle and net trading cycle.

Okwo, Ugwunta and Agu(2012) examined the factors that determine the profitability of the Nigerian beer brewery firms. Multiple regressions were applied to annual data generated from the annual reports of the sampled beer brewery firms covering a period of 2000 to 2011.The results show that the ratios of inventory to cost of goods sold, account receivable to sales, and sales and general expenses to sales have significant impact on gross profit margin.

Habib, Syed and Igbal (2012) investigated the impact of investor sentiments on mean variance trade off with respect to Pakistani market. They found out that stock markets returns is not significantly related to low sentiments period variance rather it is negatively related to high sentiments period variance.

Sania (2012) studied the relationships between economic, behavioral, demographic and lifestyle. It incorporated 30 variables from diverse decision criteria including contemporary concerns. The finding suggests that individuals base their stock purchase decisions on wealth maximization criteria combined with past and present stock performance.

METHODOLOGICAL FRAMEWORK

The Sample

The focus of this study is on an industry in a distinct nature of operation which process is the most important driver for work in progress inventory and finished goods but located in various continents of the world. Reuters (2010) notes that the world's four biggest brewers (Anheuser-Busch InBev, SABMiller, Heineken and Carlsberg) accounts for over half of the global market beer production. All the four brewery firms are public limited liability companies quoted across world continental stock exchanges. Our sample therefore consists of the top four largest brewers as acknowledged by Reuters Reporters, The Barth Report, and eHow.com in their respective 2010 top world largest brewers' reports. The inclusion of these companies in our sample is also justified by their meeting the data availability criteria needed for the study period of 12 years (2000 – 2011). Also, their operations span across major continents of the world - Europe, America, and Asia.

Table-1. The Top Five Largest Brewing Companies in the World as at 2009.

S/N	Company	Country	Production Volume (in Million Hectoliter)	% of World Beer Production
1	Anheuser-Busch InBev	Belgium	358.8	19.8
2	SABMiller	U.K.	174.0	9.6
3	Heineken	Netherlands	159.1	8.8
4	Carlsberg	Denmark	116.0	6.4
5	China Resources Brewery Ltd.	China	84.0	4.6

Source: The Barth Report, 2010.

China Resources Brewery Ltd was excluded from the sample since it is a private limited liability company and replaced by Molson Coors Brewery Company (MCBC) the sixth ranked brewer in the world as ranked by eHow.com (2010) and acknowledged by Reuters (2010). All data were financial data collected from the annual reports of each firm as downloaded from the firms various official websites.

The Model

The functional form of the regression equation adopted is the linear equation (model) stated in a multiple form as utilized by notable studies, including (Deloof, 2003; Teruel& Solano, 2007; Muhammad and Syed, 2011; Hasan et al 2011; Abbasali andMilad, 2012; and Melita et al 2010). The model is designed to investigate the relationship between profitability, the cash conversion cycle (CCC) and other explanatory variables as well as determining their impact on profitability. The regression equation, thus, takes the following form:

$$BP_{it} = \beta_0 + \beta_1\, CCC_{it} + \beta_2\, CR_{it} + \beta_3\, SG_{it} + \beta_4\, DR_{it} + e_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(1).$$

Return on asset (ROA) was used as the major metric for measuring profitability while the CCC the focal variable captures the working capital management.

Where:

BP: Brewers Profitability measured by ROA.

CCC: Cash Conversion Cycle (Stockholding Period + Debtors Collection Period – Creditors Payment Period).

CR: Current Ratio = Current Asset/ Current Liabilities.

SG: Sales Growth = $(Sales_t – Sales_{t-1})/Sales_{t-1}$

DR: Debt Ratio = Total Liabilities/Total Asset.

Furthermore, since the CCC captures management of working capital, we extended our study by examining how the individual component of the CCC (the amount of time needed to sell inventory, the amount of time needed to collect receivables, and the length of time affordable for the company to pay its bills) affect firms' profitability. To aid this objective, we modeled another functional regression equation to measure the relationship between the individual cash conversion cycle components as well as the extent to which they influence brewers' profitability as follows:

$$BP_{it} = \beta_0 + \beta_1 + SP_{it} + \beta_2 + DCP_{it} + \beta_3 + CPP_{it} + e_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots..(2).$$

Where:

BP: Brewers Profitability measured by ROA.

SP: Stockholding Period = Stock/Cost of Sales*365

DCP: Debtors Collection Period = Stock/Sales*365

CPP: Creditors Payment Period = Creditors/Cost of Sales*365

Creditors Payment Period = Creditors/Cost of Sales*365

The Variables

To analyze the effect of working capital management on profitability, we operationalize profitability as Return on Assets (ROA). ROA shows the profit earned per currency of assets which

reflects the management ability to utilize the financial and real investment resources to generate profit (Naceur, 2003). The ROA, a functional indicator of firm's profitability is calculated by dividing net income by total assets (Ugwunta, Ani, Ugwuanyi and Ugwu, 2012).

According to literature, the cash conversion cycle (CCC) is a measure of working capital management. This cycle is extremely important for manufacturers especially the brewery industry as the industry has the same type of production of which it's process is the most important driver for work in process, inventory and finished goods. Usually firms sometimes acquire inventory on credit, which results in accounts payable. A firm also often times sell products on credit, which results in accounts receivable. Cash therefore is not involved until the company collects its debts and pays its credits. The cash conversion cycle measures the time between the outlay of cash and cash recovery. CCC is a metric that expresses the length of time in days that it takes for a company to convert resource inputs into cash flows (Investopaedia, 2012). This metric looks at the amount of time needed to sell inventory, the amount of time needed to collect receivables, and the length of time affordable for the company to pay its bills. CCC highlights how quickly a company can convert its products into cash through sales. A downward trend is positive, indicating that the operating cycle is shortening, while an upward trend is negative, indicating that the cycle is lengthening, that is tying up cash for a longer period (Christopher, 2009).

Other explanatory variables include: CR, Sales Growth, Debt Ratio, ARP, APP, SP.
Current ratio is computed by dividing the current assets by the current liabilities of a firm. Both assets and liabilities with maturities of one year or less are considered to be current for financial statement purposes. A low current ratio (low relative to industry norms) may indicate that a company faces difficulty in paying its bills. A high value for the current ratio, however, does not necessarily imply greater liquidity. It may suggest that funds are not being efficiently employed within the firm.

Sales growth rate is the increase in sales over a specific period of time, often, but not necessarily, annually. Measuring sales growth is one way to gauge how well a company is doing, as well as the company's potential for future growth. Investors typically look favorably on higher growth rates, which can increase a company's cash flow and thus profitability.

Debt ratio is computed by dividing the total debt or total liabilities of a firm by its total assets. This ratio shows the portion of the total assets financed by all creditors and debtors. Debt Ratio is a financial ratio that indicates the percentage of a company's assets that are provided via debt. It is the ratio of total debt (the sum of current liabilities and long-term liabilities) tototal assets (the sum of current assets, fixed assets). The higher the ratio, the greater the risk that will be associated with a firm's operation. In addition, high debt to assets ratio may indicate low borrowing capacity of a firm, which in turn will lower the firm's financial flexibility. If the ratio < 0.5, most of the company's assets are financed through equity.If the ratio > 0.5, most of the company's assets are

financed through debt (Wikipaedia, 2012).Companies with high debt/asset ratios are said to be "highly leveraged.

Accounts receivable period measures the average number of days that accounts receivable are outstanding. It measures the average number of days between sending invoices to customers and collecting payments from them. To calculate this ratio, the average accounts receivable are divided by the average daily sales in the period. The lower the accounts receivable period ratio the more liquid is the firm. Deloof (2003) found that firms can increase their profitability by reducing the debtors' collection period.

Accounts payment period compare creditors with the total credit purchases. It signifies the credit period enjoyed by the firm in paying creditors. Accounts payable include both sundry creditors and bills payable. The longer the period the more advantageous for the firm as such fund can be put to other uses. However, longer accounts holding period can erode a firm's credit worthiness.

Stock holding period or Inventory Days, or Days Inventory Outstanding (DIO), measures how quickly stocks flow in a brewery firm from production to sale. It is an excellent measure of how efficiently a company is managing its inventory(Christopher,2009). The trade-off comes in deciding how little cash is tied up in inventory while still meeting the needs of the customer.

Table-2.A priori Expectation for the Independent Variables.

Independent Variable	Expected Behaviour	Expected Sign
CCC	Downward Trend	Positive
Sales Growth Rate	Increasing Trend	Positive
Debt Ratio	Moderate. < 50%	Negative/Positive
Current Ratio	High. Ideally 2:1	Positive

Two Measures

Two approaches are employed. The first is to ensure that the cross-sectional time series data are stationary. If a cross-sectional time series data is non-stationary, the regression analysis carried out in a conventional way will produce spurious results. A spurious regression occurs when after regressing a time series variables on others, the tests statistics show a positive relationship between these variables even though no such relationship exist (Johannes, Njong and Cletus 2011). We test for the order of integration using the augmented dickey-fuller test (ADF). The test is based on the following models:

$$p$$
$$\Delta Xt = \square Xt - 1 + \sum \phi \Delta Xt - j + mt \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (3)$$
$$j=2$$

$$p$$
$$\Delta Xt = \square Xt - 1 + \sum \phi \Delta Xt - j + bt + mt \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (4)$$
$$j=2$$

$$p$$

$$\Delta Xt = \Box Xt - 1 + \sum_{j=2} \omega \Delta\ Xt - j + bt + c + mt\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.(5)$$

The principle of this test is, if the Ho hypothesis that p =1 is accepted in any of the three equations, then, the process is not stationary. The value p of lags is determined with the aid of the Akaike information criterion. The lag chosen correspond to the one that minimizes this criterion.

Johansen cointegration test

This test is appropriate only when all the variables are integrated of same order. Cointegration signifies the existence of one or many equilibrium long run relationship(s) that can be combined with the short term dynamics of the other variables in an error correction model. The relationship is as follows;

$$DYt = PYt\text{-}\ 1 + \sum GiDYt\text{-}\ i + \Box t\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots ..\ (6)$$

Yt: Vector of variables that we need to study their dynamics

Gi: a matrix number and

P: A matrix whose rank determines the number of cointegration relationships. The number of optimal lags is determined using the Akaike and Schwarz criteria.

Causality test

Granger (1969) defines causality between two variables Y and X as follows; Y causes X if the predictability of X increases when Y is taken into consideration. The procedure used for the test of causality is that of the P-order vector autoregressive representation.

$$Y1t = c1 + P11\ (L)\ Y1t\text{-}1 + P12\ (L)\ Y2t\text{-}1 + \mu 1t\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

$$Y2t = c2 + P21\ (L)\ Y1t\text{-}1 + P22\ (L)\ Y2t\text{-}1 + \mu 2t\ \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(8)$$

Where c1 and c2 are constants and Pij represent polynomials of order p-1. L is the lag operator. As such, Y2t does not granger cause Y1t when the Ho hypothesis is accepted, that is, if the polynomial P12 (L) = 0. Likewise, Y1t does not granger cause Y2t when the polynomial P21 (L) = 0. This formulation supposes that the variables are stationary.

FINDINGS

The study revealed that there is a usual report forthe top ten beer brewing companies in the world. The top ten brewing companies in the world span continents and countries from United States to Europe, Mexico to China, Japan to Africa. Becoming one of the top ten does not come easy (Cheryl, 2012). The beer breweries that continually make it to the top ten list including the studied five companies are: Anheuser Bush In-Bev, SABMiller, Heineken, Carlsberg, Molson and Coors Brewery Company (MCBC), Modelo, Tsingtao Brewery, Beijing Yanjing/China Resources Brewery Ltd., Femsa and Kirin.

The table below shows the sampled beer brewery companies' operation performances in certain calculated ratios as employed in the analysis. The ratios include Return on Asset, Debtors' Collection Period, and the Stockholding Period for the sampled firms.

Table-3.ROA for the Sampled Firms in Percentages.

Year	AbInbev	Carlsberg	Molson	SAB Miller	Heineken	Total	Av.
2011	5.207824	4.712361	10.48322	6.538304	9.448819	36.39053	7.278106
2010	3.521016	4.550201	10.96955	5.549481	9.806844	34.3971	6.879419
2009	5.222839	3.820783	5.992796	6.212558	5.659068	26.90804	5.381609
2008	2.76246	2.22954	3.646044	6.388742	1.68553	16.71232	3.342463
2007	10.62058	4.842464	2.884415	6.552756	7.495373	32.39559	6.479118

Authors' Computation.

Table-4. Debtors' Collection Period for the Sampled Firms in Days.

Yrs	AbInbev	Carslberg	Molson	SAB Miller	Heineken
2011	22.86508	18.34383	20.05755	23.621187	0
2010	24.22473	18.81684	19.58405	26.230577	0
2009	23.37478	17.36832	28.43062	24.218842	38.20207
2008	45.07572	24.92548	14.68624	23.014946	47.63196
2007	28.30457	23.18328	21.79175	18.191192	45.03247

Authors' Computation.

Table-5. Stockholding Period for the Sampled Firms in Days.

Yrs	AbInbev	Carlsberg	Molson	SAB Miller	Heineken
2011	53.70812	49.94809	32.58213	98.801724	0
2010	54.44152	52.78155	31.63754	103.54326	0
2009	49.95988	43.52634	49.92356	87.058428	38.20207
2008	102.515	61.06499	24.68196	83.958085	47.63196
2007	68.80644	62.14913	36.43199	68.331652	45.03247

Authors' Computation.

A cursory look at table 2 above reveals that all the firms maintain certain degree of profitability as measured by ROA during the immediate five past year period. As can be seen, Molson Coors had the highest ROA of 10.48% and 10.96% followed by Heineken that recorded 9.45% and 9.80% given the average ROA for the combined sample of 7.27% and 6.87% in year 2011and 2010 respectively. The effect of lesser stock holding period on profit can be confirmed by Molson and Coors stock holding periods for years 2011 and 2010 which stood at 33 and 32 days. A look at table 4 shows that SAB Miller has the highest stock holding period of 99 and 104 days for years 2011 and 2010 respectively while recording ROA below the sample average ROA.

Econometric Results

Table-6. Augmented Dickey Fuller Unit Root test results.

Variables	ADF Test Statistic	Critical value*
ROA	-4. 628365	-3.5457
SGR	-5.194222	-3.5457
DR	-5.746309	-3.5457
CCC	-6.045331	-3.5478
CR	-6.593456	-3.5478

Authors' Eviews.

Observing the critical values and the observed t*, we conclude that there is no unit root problem with the data. Unit root test for ROA, DR and SGR was conducted at the level, while CCC and CR were conducted at 1st difference.

Cointegration Test Result

Johansen (1992) proposes maximum likelihood estimators for the test of the cointegration of series. He carries out a rank cointegration test. This test can be used only when the variables are integrated of same order. From the unit root test results in Table 3 above, we notice that all the variables are integrated of order 1 and therefore we can apply the test. The cointegration test result for the equation is shown in the table below.

Table-7. Johansen Cointegration Test Results.

Series: ROA CCC CR DR SGR. Lags interval: 1 to 2				
Eigenvalue	Likelihood ratio	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0.392156	64.62016	68.52	76.07	None
0.282046	36.24346	47.21	54.46	At most 1
0.125560	17.35654	29.68	35.65	At most 2
0.098643	9.708750	15.41	20.04	At most 3
0.064314	3.789085	3.76	6.65	At most 4 *

*(**) denotes rejection of the hypothesis at 5% (1%) significance level L.R. rejects any cointegration at 5% significance level. Test assumption: Linear deterministic trend in the data.

The cointegration test results for the equation indicate that there exists a cointegration relationship between the measure of profitability ROA and the explanatory variables. The relationships are shown in Table 8.

Correlation Matrix

Table-8. Correlation Coefficient.

	ROA	CCC	CR	DR	SGR
ROA	1				
CCC	0.195724193517	1			
CR	0.0629531260888	0.00682301577561	1		
DR	0.702198120757	-0.0514236837176	-0.0584805028302	1	
SGR	0.72326937337	-0.020324612561	-0.130525928944	0.973710535623	1

The above test reveals the relationship between the variables, their strength and weakness. The signs are positive with respect to ROA indicating a positive relationship. However, the degrees of their strength of relationship vary among the variables. "CCC and CR" (0.195 and 0.062, which are 19.5% and 6.29% respectively); for "DR and SGR" (0.702 and 0.723, which are 70.2% & 72.3% respectively). Though CCC's relationship with ROA is positive but weak, the unbiased result of the regression (t-test) states that it is statistically significant considering its effect on ROA.

Multiple Linear Regression Result.

Table-11. Multiple Regressions.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013158	0.030797	0.427248	0.6709
CCC	0.000226	9.56E-05	2.362402	0.0217
CR	0.057616	0.031111	1.851954	0.0694
DR	-0.024251	0.070595	-0.343518	0.7325
SGR	0.052985	0.024166	2.192501	0.0326
R-squared	0.593199	Mean dependent var		0.075143
Adjusted R-squared	0.563614	S.D. dependent var		0.092468
S.E. of regression	0.061084	Akaike info criterion		-2.673476
Sum squared resid	0.205220	Schwarz criterion		-2.498947
Log likelihood	85.20427	F-statistic		20.05032
Durbin-Watson stat	0.957997	Prob(F-statistic)		0.000000

$t_{0.025}$: 2.000.

The R^2 indicates how much of the dependent variable, profitability, can be explained by the independent variables and in this case, 59.3% of the variation in the dependent variable can be explained by the predictor variables in our model while the remaining 31.3% could be explained by other factors such as the size of a brewer. We discovered from the multiple linear regressions that both CCC and SGR had statistically significant effect on ROA (as 2.362402 > 2.000 & 2.192501 > 2.000 respectively). Also the +ve sign indicates a direct relationship between CCC & ROA, and SGR & ROA, which means that as CCC or SGR increases, ROA also increases and vice versa. Therefore, the cash conversion cycle and sales growth rate impacts on brewery firms' profitability. This result is in line with apriori expectations. The multiple regression models are thus written as: ROA = 0.01315775477 + 0.0002258656504*CCC + 0.05761636058*CR - 0.02425052861*DR + 0.05298488256*SGR.

Granger Causality Test

Table-9. Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Probability
CCC does not Granger Cause ROA	57	1.40679	0.25174
ROA does not Granger Cause CCC		2.12708	0.10851
CR does not Granger Cause ROA	57	0.12878	0.94257
ROA does not Granger Cause CR		1.31176	0.28094
DR does not Granger Cause ROA	57	2.55959	0.06540
ROA does not Granger Cause DR		0.15216	0.92782
SGR does not Granger Cause ROA	57	1.03891	0.38348
ROA does not Granger Cause SGR		0.37171	0.77374

Looking at the F-statistics and probability result of the granger causality test, we discover that CCC granger cause ROA. CR does not cause ROA and ROA does not cause DR and SGR. However, ROA causes CCC and CR while DR and SGR causes ROA.

The third objective of this study which is to examine how the individual components of the CCC (stock holding period; creditors payment period; and debt collection period) affect world leading beer brewers' profitability is achieved thus:

Table-12. Unit Root Test.

Variables	ADF	Critical value*
ROA	-4.303624	-3.5457
SP	-8.259266	-3.5478
CPP	-7.184138	-3.5478
DCP	-4.303624	-3.5457

An observation of the critical values, the result shows that there is no unit root problem with the data.

Table-13. Cointegration Result

Series: ROA SP DCP CPP. Lags interval: 1 to 2

Eigenvalue	Likelihood Ratio	5 % Critical Value	1 % Critical Value	Hypothesized No. of CE(s)
0.307459	44.46297	47.21	54.46	None
0.220796	23.52187	29.68	35.65	At most 1
0.120478	9.301366	15.41	20.04	At most 2
0.034206	1.983876	3.76	6.65	At most 3

*(**) denotes rejection of the hypothesis at 5% (1%) significance level L.R. rejects any cointegration at 5% significance level Test assumption: Linear deterministic trend in the data. The cointegration test results for the equation indicate that there exist a cointegration relationship between profitability and the explanatory variables.

Table-14. Correlation Matrix

	ROA	SP	DCP	CPP
ROA	1			
SP	0.192657945564	1		
DCP	0.409840349241	0.704572402983	1	
CPP	0.170716831271	0.655625532106	0.406058557732	1

The above table reveals the relationship between the variables. The signs are positive with respect to ROA thus indicating a positive relationship. The debt collection period (DCP) has the highest relationship strength of 40.98% while stock holding period (SP) and creditor's payment period (CPP) recorded strength of 19.26% and 17.07% respectively.

Table-15. Pairwise Granger Causality Tests.

Null Hypothesis:	Obs	F-Statistic	Probability
SP does not Granger Cause ROA	57	2.44667	0.07463
ROA does not Granger Cause SP		3.56744	0.02041
DCP does not Granger Cause ROA	57	0.75926	0.52228
ROA does not Granger Cause DCP		0.66906	0.57503
CPP does not Granger Cause ROA	57	1.09546	0.35975
ROA does not Granger Cause CPP		2.53061	0.06765

It is evident from the Granger causality test that DCP does not granger cause ROA and vice versa. However, all other variables granger causes each other.

Table-16. Multiple Linear Regressions.

Dependent Variable: ROA				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.005921	0.028679	0.206452	0.8372
SP	0.000628	0.000614	1.022928	0.3107
DCP	0.002692	0.000877	3.071141	0.0033
CPP	-0.000243	0.000130	-1.872458	0.0664
R-squared	0.245071	Mean dependent var		0.075143
Adjusted R-squared	0.204628	S.D. dependent var		0.092468
S.E. of regression	0.082467	Akaike info criterion		-2.088509
Sum squared resid	0.380841	Schwarz criterion		-1.948886
Log likelihood	66.65526	F-statistic		6.059708
Durbin-Watson stat	2.004752	Prob(F-statistic)		0.001200

$t_{0.025}$: 2.000

The R^2 indicates how much of the dependent variable, profit, can be explained by the independent variables and in this case, 24.5% of the variation in the dependent variable can be explained by the explanatory variables of our model. Given the above multiple regressions analysis, only DCP has statistically significant effect on ROA as (3.071141 > 2.000). Its +ve sign indicates that a reduction in the debt collection period (DCP) causes an increase in profitability (ROA). This result is in consonance with the findings of Deloof (2003) who found that firms can increase their profitability by reducing the debtors' collection period. It is worthy to note that though DCP has a significant effect on ROA and its effect is direct, result of the granger causality test show that neither does DCP cause ROA nor does ROA cause DCP. Furthermore, result from the correlation matrix above show that though the relationship between DCP and ROA is weak, it is positive (0.409840349241) i.e. 40.98%. However, this is BLU (Best Linear and Unbiased).

CONCLUSION AND RECOMMENDATIONS

This research focused on an industry in a distinct nature of operation which process is the most important driver for work in progress inventory and finished goods but located in various continents of the world. While focusing on the working capital management of world leading beer brewery firms and its effect on profitability we aimed at establishing a relationship between the working capital management ability of a firm as measured by the firms' cash conversion cycle (CCC). More so, since the CCC captures firm's management of working capital, we objectively contributed to knowledge by examining how the individual components of the CCC affect the profitability of the world leading beer brewers'. The empirical results show that the relationship between world leading firms' cash conversion cycle, sales growth rate and profitability is positive and therefore, that cash conversion cycle and sales growth rate are effective determinants of the sector's profitability. This result is strengthened by the multiple regressions which confirm statistically that the cash conversion cycle and sales growth rate significantly impacts on the world top five leading beer brewing companies' profitability. The implication here is that a reduction in the cash conversion cycle and an increase in sales greatly improve world leading beer brewers' profitability. Therefore, efficient management of working capital for world leading beer brewers'

not only has a positive relationship with profitability but significantly impacts on such firm's profitability.

The policy implication of this research is that in-as-much as brewery firms' world all over strive to keep raw materials, production, selling, distribution, general and administrative costs low, they should endeavor to bring about a drastic reduction in their respective stock holding and debtors' collection periods. Stockholding period could be reduced to a maximum of thirty days and debtors' collection period reduced to a maximum of fifteen days. These will surely enhance brewers' profitability and aid the maximization of firm's shareholders wealth. This is imperative as some of the sampled firms recorded stock holding period of close to ninety eight days and debtors' collection period of close to thirty days.

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