HOW DOES PROFITABILITY GET AFFECTED BY WORKING CAPITAL MANAGEMENT IN FOOD AND BEVERAGES INDUSTRY?

Priya Darshini Pun THAPA
London School of Commerce, **United Kingdom**
pdpthapa@gmail.com

Abstract:

This study examines the working capital management of the Food and Beverage Corporations from the USA and Canada during the 10 years study period from year 2000 to 2009. Firstly, unlike previous studies which advocate a linear relationship between the working capital management and profitability, it investigates the existence of a possible non-linear relationship. Secondly, the efficiency of working capital management was checked using performance index, utilization index and efficiency index rather than using the conventional turnover ratios. Thirdly, the distribution of working capital measure i.e. cash conversion cycle and factors affecting viz. leverage, growth, size, age, cash flow and fixed assets to total assets ratio has been studied. The results suggest the existence of concave relationship between the working capital management and profitability. The findings also revealed that the corporations were efficient during the study period.

Keywords: working capital management, profitability, food and beverage industry, optimal level of working capital.

JEL Classification: M40.

1. Introduction

The food and beverage industry has registered growth even during the economic slowdown in comparison to other industries. And, due to large populations and rising per capita income, the industry is expected to grow in future as well. However, the industry may face problems due to price hikes of fuel and recent droughts in some countries. Therefore, efficient working capital management is crucial for the corporations in the Food and Beverage industry.

Working Capital refers to the portion of total fund which is used to finance the day – to – day working expenses of an organization. Working capital is needed to finance current assets which include stock, debtors, marketable securities, short term loans and advances, payment of advance tax and so on. The efficient working capital management is the most important factor in maintaining liquidity, profitability, survival and solvency of the organization. Smith (1980) pointed out the importance of the balance between the profitability and liquidity goals of working capital management. The decision to maximize profitability reduces adequate liquidity. On the other hand, the profitability of the firm is reduced when the focus is on liquidity. A firm's current assets may not meet its current liabilities if it does not manage its liquidity properly.

Previous research on working capital management and firm performance analyzed a linear relationship between investment in working capital and firm's profitability (Garcia-Teruel and Martinez-Solano (2007), Deloof (2003) and Wang (2002)). The studies pointed out that more profitability is

achieved with lower investment in working capital. On the other hand, the study conducted by Banos-Caballero *et al.* (2010) pointed out that companies have an optimal working capital level which balances costs and benefits to maximize profitability. Their study suggested that there is a concave relationship between working capital level and profitability.

Maximizing shareholders' wealth is the ultimate objective of any profit-firm. Along with that preserving liquidity is also an important objective. The study aims to examine how the working capital management affects the profitability of the Food and Beverage corporations. The study focuses on analyzing how working capital management affects the profitability for a sample of 30 Food and Beverage corporations from USA and Canada. Hence, it examines the effect of profitability, leverage, growth, size, age, fixed assets and cash flow on the cash conversion cycle. The study also attempts to find out the relationship between working capital management measure, the cash conversion cycle and profitability for 30 Food and Beverage Corporations in USA and Canada over a period of 10 years. And, it also examines the efficiency of working capital management of the Food and Beverage Corporations. Besides, the study investigates the presence of other unobserved factors affecting the profitability and working capital management.

2. Literature Review

2.1. Working capital policy and profitability

Working capital can have a significant impact on the profitability and risk of loss of business and interruptions in the production process. Blinder and Maccini (1991) advocated that larger inventories can prevent possible interruptions in production process and loss of business due to unavailability of products. And extending trade credit increases sales since buyers can check the product and service quality before payment (Long *et al.*, 1993). Emery (1987) pointed out that the trade credit encourages customers to purchase at times of low demand. Besides, trade credit might also help to strengthen long-term supplier customer relations. Hence, a high investment in working capital is expected to increase the profitability. On the other hand, Deloof (2003) theorize that if firms reduce their received trade credit period then it might not verify the quality of the products. Besides Soenen (1993), pointed out that high investments in working capital might also lead firms to bankruptcy. Moreover, holding inventories is also associated with warehouse cost, insurance and security expenses. Hence, additional investment in working capital might also negatively affect the profitability of firm. Therefore, an inverted U shaped relationship between firm's profitability and working capital level may exist (Banos-Caballero *et al.*, 2010a).

2.2 Factors affecting the working capital management

Cash flow: The Pecking Order Theory (Myers (1984); Myers and Majluf (1984)) postulates that firms give priority to the internally generated resources over debt and equity, due to the asymmetric information between the shareholders and outsiders i.e. debt holders and new shareholders. And therefore, the availability of internal funds affects the investments in working capital. Fazzari and Peterson (1993) found a positive relationship between working capital and cash flow which suggests that firms which are more capable to generate internal funds have more investment in current assets.

Leverage: Again due to asymmetric information between the insiders and outsiders of a firm, the cost of external financing is higher. And accordingly the cost of funds invested in cash conversion cycle is higher when a firm has larger leverage. Chiou *et al.* (2006) in their study on companies from Taiwan found a decrease in the investment in working capital with increase in leverage. Hence, a negative relationship between leverage ratio and cash conversion cycle is expected.

Growth: Companies with growth opportunities are expected to have lower cash conversion cycle, since according to Emery (1987), firms might give more credit to their customers to increase the sales. Cunat (2007) pointed out that firms with high growth are inclined to using more trade credit from suppliers as they have difficulty in getting other forms of finance. Furthermore, Peterson and Rajan

(1997) theorized that suppliers opt to finance firms with high sales growth and offer them more credit compared to firms with declining sales.

Size: Chiou *et al.* (2006) and Keischnick (2006) discovered that size and cash conversion cycle were positively associated since larger companies are more diversified and are less likely to fail and this reason could affect the trade credit granted to the firm. Niskanen and Niskanen (2006) and Peterson and Rajan (1997) pointed out that firms with better access to capital markets offer more trade credit. Accordingly the size of the firm is expected to be positively related to the cash conversion cycle.

Age: A positive relationship was found between the age and cash conversion cycle by Chiou *et al.* (2006). Berger and Udell (1998) theorized that since older firms can get external financing easily and therefore the cost of financing it working capital is lower for older firms. Besides, Peterson and Rajan (1997) pointed out that firms with better access to capital market use less credit from their suppliers and grant more credit to their customers.

Tangible fixed assets: When firms observe financial constraints, then the investment in working capital competes for fund with fixed investments (Fazzari and Peterson, 1993). Banos – Caballero *et al.* (2010b) advocated that intangible assets generate more asymmetric information than tangible assets and therefore have lower residual value. As a result, more tangible fixed assets might give a benefit of lower cost of funds due to which cash conversion cycle and tangible fixed assets could be positively associated.

Profit: Shin and Soenen (1998) suggested that firms with higher returns have larger bargaining power with supplier and customers and therefore have better working capital management. According to Peterson and Rajan (1997) the firms with higher returns receive more credit from suppliers.

2.3 Efficiency of working capital management

Ganesan (2007) used days sales outstanding, days inventory outstanding, days payable outstanding, current ratio, cash conversion efficiency (cash flow from operations/ sales) income to total assets and income to sales ratio to study the efficiency of working capital management. Efficiency of the working capital have also been studied by Shin and Soenen (1998) using net trade cycle and Raheman *et al.* (2010) using cash conversion cycle as a measure of efficiency of working capital management. Both the measure uses the turnover periods for the calculation of the measures. Bhattacharya (1997) developed performance index, utilization index and efficiency index to measure the efficiency of working capital management which is used in the study.

3. Research methodologies

3.1 Data and variables

The population of the present study is top 100 food and beverage companies in the US and Canada. The ranking was based on the sales during the year 2008. The sampling method used for the study is purposive. Out of the 100 companies 26 companies were excluded since they are private companies and their financial data was not available. And therefore, the remaining 74 companies become the population for the study. Out of the 74 top food and beverage corporations, 30 top companies were selected whose data were available for 10 years i.e., from 2000 to 2009. Hence, the sample represents 40.5% of the top 74 food and beverage corporations. The study used secondary data for literature review and data analysis. Various journals and internet has been used for the literature review. Besides, the analysis is based on the financial statements of the companies of 10 years' time period from 2000 to 2009. The data has been taken from OSIRIS.

Vishnani and Shah (2007) conducted a multiple regression analysis by using; current ratio, inventory holding periods, debtor's collection period and net working capital cycle as the independent variable les and the return on capital employed as the dependent variable. While, Uyar (2009) examined the relationship of cash conversion cycle with size of the firm and profitability. Total assets and sales revenue were taken as measures of firm size and return on assets and return on equity as measures of profitability. Huynh and Su (2010) used number of days account receivable, number of days inventories

and number of days accounts payable as proxy for collection policy, inventory policy and payment policy respectively. Cash conversion cycle was used as independent variable. The size of the firm measured by logarithm of sales, leverage measured by debt ratio and ratio of fixed financial assets to total assets were used as control variables. On the basis of the previous studies conducted by various researchers the variables used in the study are as follows:

- *Cash conversion cycle* (CCC). The cash conversion cycle has been used as the measure of working capital management.
- *Cash flow* (CFLOW). In order to consider the capability to generate internal resources, the variable cash flow has been used. It is calculated as the ratio of net profit plus depreciation to total assets.
- *Leverage* (LEV). Leverage is measured as the ratio of debt to total assets. And, a negative relationship between leverage ratio and cash conversion cycle is expected.
- *Growth.* The variable growth is measured as the ratio of increase in sales to last year's sales.
- *Size*. The size is measured as natural logarithm of assets. And the size of the firm is expected to be positively related to the cash conversion cycle.
- *Age*. This variable has been used as a proxy for the time an organization may have known and build relationship with customers and suppliers. The variable is calculated as the natural logarithm of the number of years since incorporation. And a positive relationship is expected between the age and cash conversion cycle.
- *Tangible fixed assets.* The variable is calculated as ratio of tangible fixed assets to total assets.
- *Profit.* The variable Return on assets has been used in the analysis. It is measured by earnings before interest and tax over total assets.

3.2 Data analysis techniques

Unlike most of the previous studies which used ratios to examine the efficiency of working capital management, the present study uses performance index, utilization index and efficiency index proposed by Bhattacharya (1997). He advocated that the choice of ratios to examine the efficiency of working capital management is a difficult task as there is no proper theory of ratio analysis. Hence, he developed an alternative ratio model of performance index, utilization index and efficiency index to measure and monitor, the working capital management which has been used in the current study to measure the efficiency of the working capital management. The model proposed by Bhattacharya (1997) was used by Ghosh and Maji (2004) and Ramachandran and Janakiraman (2009) in their study to measure the efficiency of working capital management.

Performance index epitomize the average performance index of various components of current assets such as stock, debtors, cash etc. When the proportionate increase in sales is greater than the proportionate increase in current assets during a particular period, then the organization can be said to have managed its working capital efficiently.

On the other hand, the utilization index symbolizes ability of the organization in utilizing its current assets as a whole for the purpose of generating sales. It reflects the operating cycle of an organization. The proportionate increase in sales should be more than the proportionate increase in the current assets to be efficient in working capital management.

The ultimate measure of efficiency of working capital management, the efficiency index is the product of the performance index and the utilization index. It reflects the combined effects of both the performance index and the utilization index.

To further investigate the relationships, regression analysis has been used. The study tests for a concave relationship between profitability and investment in working capital. And therefore, firm's profitability is regressed against cash conversion cycle and its square. Furthermore, control variables viz. firm size, growth opportunities and leverage were used following Deloof (2003) and Garcia- Teruel and Martinez-Solano (2007). So, the profitability model used in the study was as follows:

$$PRO = b_0 + b_1 CCC + b_2 CCC^2 + b_3 LEV + b_4 GROWTH + b_5 SIZE + e \tag{1}$$

where: PROF = Profitability of firm;

CCC = Cash Conversion Cycle;

CCC^2 = Square of cash conversion cycle;

SIZE = Size of the firms as natural logarithm of total assets;

GROWTH = Growth opportunities represented by sales growth;

LEV = Leverage.

Differentiating the firm profitability variable with respect to the CCC variable and equating it to 0 gives the break point of equation 1 and is equal to $CCC = - b_1 / (2b_2)$. And this point it should be a maximum implying an inverted U-shaped relationship between working capital level and profitability. And the point would be maximum if the second partial derivative of the profitability with respect to the cash conversion cycle variable $(2b_2)$ is negative i.e. b_2 is negative. And to check if there exists an optimal working capital level and profitability, the deviations on both sides of optimal working capital level i.e. above and below optimal working capital level have been regressed to analyze the effect on profitability.

A benchmark regression for the determinants of CCC, following Banos-Caballero *et al.* (2010b) has been used.

$$CCC = b_0 + b_1 CFLOW + b_2 LEV + b_3 GROWTH + b_4 SIZE + b_5 AGE + b_6 FA + b_7 ROA + e \tag{2}$$

where: CCC is the optimal cash conversion cycle, AGE is natural logarithm of age of the firm, FA is the tangible fixed assets to total assets ratio, ROA is the return on assets, CFLOW is the cash flow calculated as (net earnings before interest and tax plus depreciation)/total assets.

But a firm's present CCC may not be optimum due to uncertainties for example regarding how much sale is possible in the future or if organizations give discounts to the customers to increase sales, they may not necessarily pay. Another possible reason could be a low bargaining power with suppliers and customers. Due to these reasons, the residuals from the regression model 2 were used as proxy for deviations from optimal cash conversion cycle and the mean CCC has been considered as the optimal CCC.

In order to check if the deviations from the optimum level negatively affect the profitability, Tong's (2008) two staged methodology has been used. Following Tong's two staged methodology the variable Deviation has been defined as the absolute value of the residuals from the model 2. A dummy variable AOD which is equal to 1 when residuals are positive and 0 otherwise has also been defined. Then the dummy variable is allowed to interact with the Deviation variable the following profitability equations which were formed by removing CCC variable and its square and introducing deviation variable and interaction term has been used:

$$PROF = b_0 + b_1 Deviation + b_2 LEV + b_3 GROWTH + b_4 SIZE + e \tag{3}$$

$$PROF = b_0 + b_1 Deviation + b_2 Deviation * AOD + b_3 LEV + b_4 GROWTH + b_5 SIZE + e \tag{4}$$

4. Empirical findings

A cursory look at the descriptive statistics for the sample which is shown in Table 1 of the variables under study points out that the mean of the profitability of the sample Food and Beverage Companies was 11.3%. But the distribution was highly skewed towards the right tail and a significant positive kurtosis was also noticed. The non-normal distribution can be due to the fact that some of the corporations with very strong brand name e.g. PepsiCo, Nestle, The Coca Cola Company and Kraft Inc.

are experiencing a spectacular growth in sales and hence very large profits are made by them compared to the rest in the sample.

The working capital management measure, cash conversion cycle had a mean of 52.3 days, the distribution was showing a significant positive skewness which means that the most of the data were towards the left of the mean and has an elongated right tail of the distribution curve. Besides, the kurtosis of the distribution cash conversion cycle was greater than zero, implying the curve is leptokurtic i.e. a steeper curve compared to a normal curve. Again, the possible reason for the distribution could that some of the very large corporations with very strong brand name have very high demand of their product which sells very fast, can collect their receivables at a faster rate and get better credits form the suppliers.

The other variables under study i.e. leverage growth, size, age, cash flow and fixed assets to total assets ratio were having average value of 26.2%, 7.9%, and 15.08 %, 3.13, 0.146 and 0.2821:1 respectively.

The variable leverage was found to have normal distribution. The reason could be the industry standards due to creditor's terms and conditions or legislations imposed by the Government.

However, the variable growth, cash flow and fixed assets to total assets ratio were found to have significant positive skewness and kurtosis. The recent growth of the Food and Beverage demand due to increase in the income of people in developing countries and changing life-styles, better management of cash flows in the face of rising fuel prices and scarcity of raw materials and increase in fixed assets investments to fulfill the growing demand can be the possible reason for the very high growth, cash flow and increase in fixed assets investments of few very large and powerful brand corporations and hence positive skewness in the data.

On the other hand, the variable size and age were negatively skewed. The possible reason could be that only a few Food and Beverage corporations in the sample are very young and have smaller investment in fixed assets compared to the rest of the corporations in the sample which distorted the average statistics.

Table 1. Descriptive statistics

	N	Min.	Max.	Mean	Std. Dev.	Skewness		Kurtosis	
	Stat.	Stat.	Stat.	Stat.	Stat.	Stat.	Std.Err.	Stat.	Std.Err.
PROF	300	-44.27	154.63	11.3094	15.76217	4.805	.141	36.069	.281
CCC	300	-58.87	242.87	52.3107	47.23239	1.384	.141	2.809	.281
LEV	300	.00	.75	.2626	.14063	-.086	.141	-.455	.281
GROWTH	300	-.34	1.21	.0794	.15949	2.131	.141	10.938	.281
SIZE	300	9.65	18.56	15.0807	1.81594	-.823	.141	.902	.281
AGE	300	.00	4.92	3.1358	1.11322	-.478	.141	-.490	.281
CFLOW	300	-.10	1.81	.1469	.20136	4.364	.141	23.509	.281
FA	300	.10	.62	.2821	.09640	.775	.141	.234	.281
Valid N (listwise)	300								

The performance index of the sample of Food and Beverage Corporations was greater than 1 during the whole study period as can be seen in Figure 1. The distribution of the performance indices was highly and positively skewed again which can be due to the fact that the few very large and famous corporations are experiencing an increase in sales which is much higher than the increase in current assets investments. Similarly, the utilization index was greater than 1 in 9 periods out of 10. It can be concluded that the food and beverage corporations managed their current assets efficiently. The results

of the present study can't be compared to the result of the study conducted by Ghosh and Maji (2004) due to difference in the industry type.
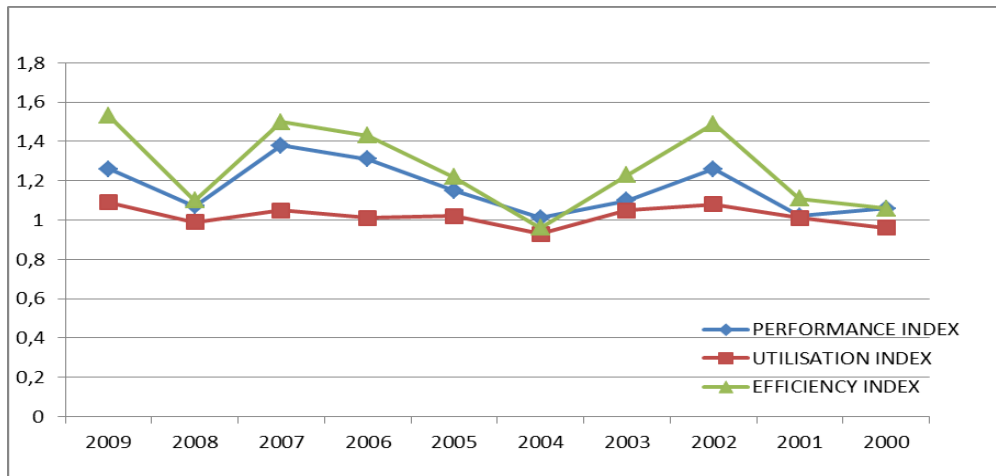

Figure 1. Working capital management efficiency

The correlation analysis showed that the profitability was positively associated to cash conversion cycle and size. The reason could be that as the cash conversion cycle increases implying increase in credit granted to customers, the sales will increase which ultimately increases the profitability. Also, larger inventories can prevent possible interruptions in production process and loss of business due to unavailability of products due to unavailability of products as advocated by Blinder and Maccini (1991).

The working capital management measure cash conversion cycle was showing a negative relation with leverage as pointed out by Chiou *et al.* (2006) in their study on companies from Taiwan. Due to asymmetric information between the creditors and insiders of a corporation, the cost of externally borrowed fund is higher and therefore firms with higher leverage are inclined to have lower investment in cash conversion cycle.

Similarly, the growth was also found to be negatively related to the cash conversion cycle. The possible reason attributed could be that the firm experiencing growth asks for more credit from suppliers as they may find difficulty in getting funds to finance their growth (Cunat, 2007).

Likewise, the size of the corporation was negatively associated to cash conversion cycle. The result is opposite to the findings of previous studies conducted by Chiou *et al.* (2006), Keischnick (2006) and Niskanen and Niskanen (2006) and Peterson and Rajan (1997). The possible reason could be that since the Food and Beverage industry is experiencing growth, and to manage the funds for growth, the larger corporations are asking for longer payment periods from the suppliers or due to increase in demand the larger corporations are decreasing their credit granted to the customers.

Again a negative relation was found between age and cash conversion cycle. The result is opposite to the findings of previous study by Chiou *et al.* (2006), Berger and Udell (1998), Peterson and Rajan (1997). One possible reason could be that older corporations have better goodwill and long-term relationship with their customers than younger firm and hence can sell their inventories faster and collect their receivables faster due to higher demand of their product. Hence, the older firms have shorter cash conversion cycle.

Another negative relation was found between fixed assets to total assets ratio and cash conversion cycle. The finding supports the theory that when firms observe financial constraints, then the investment in working capital competes for fund with fixed investments (Fazzari and Peterson, 1993). Hence, cash conversion cycle is negatively associated with the fixed assets to total assets ratio. The only variable with positive relation to cash conversion cycle was cash flow which is similar to the findings of the study conducted by Fazzari and Peterson (1993) who found a positive relationship between

working capital and cash flow which suggests that firms which are more capable to generate internal funds have more investment in current assets.

Table 2. Correlation matrix

	PROF	CCC	CCC2	LEV	GROWTH	SIZE	AGE	CFLOW	FA
PROF	1	.142	.105	-.169	-.065	.109	.226	.220	.176
CCC	.142	1	.905	-.052	-.125	-.194	-.190	.034	-.212
CCC2	.105	.905	1	-.105	-.085	-.106	-.173	-.013	-.197
LEV	-.169	-.052	-.105	1	.045	.064	-.076	-.021	-.072
GROWTH	-.065	-.125	-.085	.045	1	.053	-.139	-.168	-.009
SIZE	.109	-.194	-.106	.064	.053	1	.386	.152	-.075
AGE	.226	-.190	-.173	-.076	-.139	.386	1	.176	-.133
CFLOW	.220	.034	-.013	-.021	-.168	.152	.176	1	-.016
FA	.176	-.212	-.197	-.072	-.009	-.075	-.133	-.016	1

Regression analysis pointed out that profitability was positively and significantly associated with cash conversion cycle. The result again confirms the association found in the studies by Long *et al.* (1993), Emery (1987) and Blinder and Maccini (1991). And the result was statistically significant implying that the positive association can be accepted with 95% confidence level. Besides, the regression coefficient of square of the cash conversion cycle was also found negative and statistically significant meaning it suggests a non-linear relationship of the cash conversion cycle with profitability as suggested by Banos-Caballero *et al.* (2010). And the inflexion point of the quadratic function is CCC= -b_1 / ($2b_2$) which means the optimal level of CCC is 76.96 days for Return on assets. Therefore, the result suggests an existence of a possible inverted U shaped relationship between firm's profitability and working capital level (Banos-Caballero *et al.*, 2010a).

Similarly, the regression of the cash conversion cycle with cash flow, profitability, leverage, growth, size, age and fixed assets as independent variable was done. A positive association was established with cash flow and cash conversion cycle. On the other hand leverage, growth, size, age and fixed assets to total assets ratio. The regression results confirm the results of correlation analysis of the present study and previous studies conducted by Cunat (2007), Chiou *et al.* (2006) and Keischnick (2006), Niskanen and Niskanen (2006) and Peterson and Rajan (1997), Berger and Udell (1998), Fazzari and Peterson (1993), Blinder and Maccini(1991).

Further, the regression of deviations from the optimum cash conversion cycle suggested that the deviation was positively associated with that of the profitability but the association could not be accepted with 95% confidence level and therefore, further studies with larger sample could give a possible significant association between the variables. But when the regression of deviations from optimum cash conversion cycle was done with interaction variable, the above optimal deviation from cash conversion cycle was found to be negatively and significantly associated with the profitability as found in the study by Banos-Caballero *et al.* (2010).

Table 3. Regression analysis:

Model	PROF = b_0+ b_1CCC+b_2CCC^2 +b_3LEV+b_4GROWTH +b_5SIZE +e							
β	b_1=0.391	b_2= -0.254	b_3= -0.185	b_4= -0.039	b_5 = 0.172			
t-value	2.853	-1.814	-3.25	-0.681	2.973			
Model	CCC = b_0+b_1CFLOW+b_2LEV+b_3GROWTH+b_4SIZE+b_5AGE+b_6FA+b_7ROA + e							
β	b_1= -0.016	b_2=-0.035	b_3=-0.136	b_4=-0.138	b_5 = -0.259	b_6=-0.305	b_7 =0.251	b_1 = -0.016

Model	PROF = b_0+ b_1CCC+b_2CCC^2 +b_3LEV+b_4GROWTH +b_5SIZE +e							
t-value	0.297	-0.660	-0.251	-2.378	-4.321	-5.606	4.425	0.297
Model	PROF = b_0+ b_1Deviation+ b_2LEV+b_3GROWTH +b_4SIZE+e							
β	b_1= 0.017	b_2= -0.172	b_3=-0.063	b_4= 0.123				
t-value	0.291	-2.996	-1.110	2.151				
Model	PROF = b_0+ b_1Deviation+b_2Deviation*AOD +b_3LEV+b_4GROWTH +b_5SIZE+e							
β	b_1=-0.242	b_2= 0.313	b_3= -0.179	b_4= -0.042	b_5 = 0.169			
t-value	-2.391	3.082	-3.155	-0.741	2.906			

Conclusion

With the growth in the demand which is going to sustain in the future also, the Food and Beverage corporations need to manage its fund to support its growth. Besides, the rising price of fossil fuels and raw materials due to recent droughts in some countries makes proper management of its working capital a crucial area. In this perspective, the main objective of the study is to analyze the impact of working capital management on profitability. Besides, the study examines if there exists a non-linear relationship of profitability with working capital management. Furthermore, the efficiency of working capital management of the Food and Beverage corporations is examined using index values which represents the average performance of the components of current assets, the degree of utilization of the total current assets in proportion to sales and the efficiency of working management have been calculated over the ten-year study period.

It was observed that the working capital measure, the cash conversion cycle was positively related to the profitability and cash flow. On the other the cash conversion cycle was negatively associated with leverage, growth, size, age and fixed assets to total assets ratio. The study also examined for the non-linear relationship between profitability and the cash conversion cycle. The positive and significant regression coefficient of regression of cash conversion cycle and its square could suggest the non-linear relation. Besides, the analysis in the study also pointed out that the corporations were efficient during the study period.

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Appendix: Samples of the study

1) Nestle US
2) Tyson Food Inc.
3) Pepsico Inc.
4) Kraft Foods Inc.
5) Antieuser - Bush InBev.
6) Dean Foods Co.
7) General Mills Inc.
8) Smithfield Foods Inc.
9) Kellog Co.
10) The Coca-Cola Co.

11) Conagra Foods Inc.
12) Dole Food Co. Inc.
13) Sara Lee Corp.
14) Hormel Foods Corp.
15) Unilever North America
16) Saputo Inc.
17) Campbell Soup Co.
18) Maple Leaf Foods.
19) Hershey Co.
20) H.J. Heinz Co.

21) Group Bimbo
22) J.M. Smucker Co.
23) Del Monte
24) Chiquita
25) Brown- Forman Corp.
26) Ralcorp Holdings
27) Flowers Foods Inc.
28) Constellation Brands
29) Seneca Foods Inc.
30) Lancaster Colony Corp.