The cash conversion cycle and liquidity Analysis: A study on Malaysian Companies

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Abstract: **This study examined the cash conversion cycle (CCC) as a liquidity indicator of the Consumer products and Industrial Products companies in Malaysia and tries to establish its relationship with the current and the quick ratios, with its component variables, and investigates the implications of the CCC in terms of profitability, Indebtness and firm size. Therefore, five hypotheses are formed to investigate the contemporary liquidity measure of the CCC.**

The data covering the period of 2009-2011, 130 of firms whose Stocks are listed on the Bursa Malaysia Stock Exchange. The companies selected on the random basis from the Consumer products and Industrial Products companies of Malaysia, which is a representative sector of the Malaysian industry as a whole and a very crucial industry for the whole economy, with rapid growth and expansion domestically and internationally. The methodology that was followed included correlation analysis, as well as t-tests of two independent sample means.

The results indicated that there is a significant positive relationship between the cash conversion cycle and the traditional liquidity measures of current and quick ratios except 2010 Industrial products companies negatively correlated for cash conversion cycle and quick ratio. The cash conversion cycle was positively related to the net profit margin, except 2009 and 2011 Consumer products companies negatively correlated for cash conversion cycle and net profit margin. The cash conversion cycle was positively related to the return on assets, except 2009 Consumer products and 2010 Industrial products companies negatively correlated for cash conversion cycle and the return on assets. The cash conversion cycle was negatively related to leverage ratios, except 2010 Consumer products, CCC- TIE and 2009, 2010 CCC-DR and CCC-TIE Industrial products companies positively correlated for cash conversion cycle and leverage ratios.

On the other hand, the current and quick ratios had negative relationship with the debt to equity ratio, and a positive one with the times interest earned ratio, except 2010 CR-TIE and 2010, 2011 QR-TIE Consumer products negatively correlated for current and quick ratios and the times interest earned ratio. Finally, there is no difference between the current and quick ratios of large and small firms.

1. INTRODUCTION

Working capital management (WCM) and liquidity management hold a significant position among the financial decisions because these affect the firm's profitability, risk and its market value. Researchers have studied working capital management in different areas and in different ways, as several studies have been conducted on the relationships among the inventory management, account receivables, accounts payable and the cash conversion cycle. Cash conversion cycle (CCC) have three main components receivable conversion period, payment deferral period and the inventory conversion period. The firms always attempt to works to seek the most suitable combination of these variables so that the firm's liquidity is kept intact as well as the firm's profitability is also ensured at its optimal level. The CCC length relates to the number of days the cash resources are tied up in the working capital components. A larger CCC turn over definitely results in the unprofitable use of the firm's resources and eventually it can hurt the firm's profitability. The firms usually set appropriate policies of collection and discounts of the accounts receivables and resultantly these policies have much to do with the firm's profitability. The firms have to make a very appropriate choice between the CCC length and offering discounts to their customer. On the other side of the credit payments, the firms have to ensure their adequate solvency as well as to delay the time period for the payment towards their creditors and the suppliers for the items and materials purchased on credit.

1.1 Background of the study:

Malaysian firms have evolved in a different economic and political environment than US firms and it is expected for them to have some different financial characteristics. Some differences might be explained by the differences in the capital markets that the companies have access to, by different management's view towards risk, by different growth demands placed upon a Malaysian company versus a US one, by different cultural factors, etc. Therefore, it will be interesting and useful information the relationship between various liquidity indicators and

their implications for the working capital management of Malaysian businesses, in view of the transitional stage of the Malaysian economy.

1.2: Problem statement:

The statement of the problem to be analyzed is: Are the firm size and profitability affected by the cash conversion cycle time period?

1.3: Purpose of the study:

The purpose of this study is to examine the cash conversion cycle as an indicator of the Company's liquidity, to determine the relationship of the cash conversion cycle with the current and the quick ratios and with its component variables, so that we will identify the most important variable that affects the CCC and therefore, the liquidity of the firm, in order to improve working capital practices for Malaysian firms and to investigate the implications of the cash conversion cycle for Malaysian businesses in terms of profitability and firm size.

1.4: Organization of the study:

To accomplish the purpose of the study, the paper is divided into five sections. The next section of the paper reviews the literature while the third section describes the testable hypotheses and the data. The fourth section presents the results and the analysis. Finally, there is a summary and concluding remarks.

2. LITERATURE REVIEW

2.1 Review of the Literature:

The issue of a cash conversion cycle was initially presented by Hager (1976). Richards and Laughlin (1980) suggested that a cash conversion cycle analysis should be used to supplement the traditional but static liquidity ratio analysis because it provides dynamic insights. They concluded that there is a positive relationship between the current and quick ratios and the cash conversion cycle. Nordgren (1981) introduced a cash cycle analysis, based on the asset conversion cycle and the liability cycle. Emery (1984) described the characteristics that are required of a good liquidity measure, reviewed and evaluated the traditional ratios with respect to those characteristics. Emery suggested a new liquidity measure, lambda. Lambda is the ratio of cash flow resources to potential cash flow requirements,

indicating the extent to which the firm's resources cover its potential cash obligations. The larger the value of lambda, the higher the liquidity of the firm. Belt (1985) examined for US companies the trends of cash conversion cycle and its components during the period 1950-1983, for those lines of businesses for which Quarterly Financial Report for Manufacturing, Mining and Trade Corporations (QFR) data exists. He found that retailing and wholesaling firms both had cash conversion cycles shorter than those of manufacturing firms. Mining firms had the shortest cash conversion cycle because this type of industry has the longest payment deferral period of all the major business types. Finally, Belt found that cyclical phenomena were apparent. The cash conversion cycle increased during periods of recession. The non-durable goods cash conversion cycle has declined persistently, while the durable goods cash conversion cycle has been unstable but declining for the examined time period. Besley and Meyer (1987) evaluated empirically the interrelationships among the working capital accounts and cash conversion cycle, the firm's industry classification and the rate of inflation for US companies for the period 1969-1983. Using the Spearman rank correlation coefficient they found that the cash conversion cycle was most correlated with the average age of inventory and least correlated with the age of spontaneous credit. This conclusion suggests that inventory activity is the most important input to the cash conversion cycle. The age of inventory, the average collection period and the age of spontaneous credit proved to be highly correlated. The cash conversion cycle and its components for the examination period differed from industry to industry, but did not vary from year to year. Finally, the authors found that there was no significant correlation between the value of cash conversion cycle and the rate of inflation. Kamath (1989) tested empirically the hypothesis of conflicting signals between current and quick ratio analysis and cash conversion cycle analysis. He also examined whether the net trade cycle is a good approximation of the cash conversion cycle and the relationships between the three above liquidity measures and a measure of firm's profitability. Focusing on US large firms in six retail industries for the period 1970-1984 he found that: 1) current and quick ratios are negatively correlated with the cash conversion cycle; 2) current and quick ratios were not negatively related to the profitability; 3) the net trade cycle provided the same information as the cash conversion cycle and 4) both cycles were found to be

negatively correlated with the profitability measure. Concluding, Kamath stated that each measure can provide both useful information and misleading clues regarding the firm's liquidity position, therefore, it is suggested to use all three measures and get better insight and efficiency of working capital management. Gentry, Vaidyanathan and Lee (1990) developed a weighted cash conversion cycle. They defined the weighted cash conversion cycle as the measure of the weighted number of days funds are tied up in receivables, inventory and payables, less the weighted number of days cash payments are deferred to suppliers. The weighted cash conversion cycle (WCCC) focuses on the real resource commitment of working capital, and decomposes inventories into three parts instead of one as Richards and Laughlin (1980) and the others have done before. The results of their study pointed out that the weighted cash conversion cycle and the cash conversion cycle are not directly comparable, since the weighted cash conversion cycle was highly sensitive to the size of payables. They concluded that the weighted cash conversion cycle can be considered as a more refined liquidity measure. More recently, Lyroudi and McCarty (1993) examined the empirical relationship of the cash conversion cycle and the current and quick ratios for small (capitalization under $1 million) US companies, for the period 1984 to 1988. Their results indicated that the cash conversion cycle was negatively related to the current ratio, to the inventory conversion period and to the payables deferral period, but positively related to the quick ratio and to the receivables conversion period. Furthermore, their results showed differences between the concept of CCC in manufacturing, retail, wholesale and service industries, with the latter having the higher CCC. Moss and Stine (1993) examined the relationship between the length of the CCC and the size of US retail firms from 1971 to 1990, based on the Standard and Poor's COMPUSTAT data. They also examined the relationship of the CCC and the other liquidity measures. Their results indicated that larger retail firms had shorter CCCs, which implies that smaller companies should try to manage better their CCC. The relationship between the CCC and the current and quick ratios was found positive and significant, indicating that although strong current and quick ratios are generally desirable, they could imply a large investment in working capital which could lead to problems if not taken into consideration. Schilling (1996) supports that the cash conversion cycle is a

working capital evaluation technique which depicts a company's average liquidity position. The advantage of this technique is that it can be used to evaluate changes in circulating capital and thereby facilitate the monitoring and controling of its components. Gallinger (1997) stands up to scrutiny, and finally suggests to drop these traditional liquidity measurements and select the cash conversion cycle. He argues that longer operating policies that result in a longer cash conversion cycle produce a larger commitment to cash and noncash current asset investments and a lesser ability to finance these investments with current liabilities. The implication is that higher values for the current and quick ratios are usually the result of a greater commitment of resources to less liquid forms of working capital.

3. MODEL, TESTABLE HYPOTHESIS, DATA AND METHODOLOGY

3.1 Introduction:

Traditionally, the main indicators of liquidity are the current (CR) and the quick (QR) ratios. High current and quick ratios indicate a firm with a good liquidity position. A high current or quick ratio can be achieved by having either high level of current assets (CA) or low level of current liabilities (CL). The cash conversion cycle (CCC), is another liquidity indicator providing dynamic insights.

3.2 Model:

Based on the model developed by Richards-Laughlin (1980), CCC is defined as the sum of the receivables conversion period (RCP), plus the inventory conversion period (ICP), minus the payment deferral period (PDP), that is:

$CCC = RCP + ICP - PDP$
Where:
RCP = receivables conversion period
$RCP = 360 * ($Accounts Receivables$/$sales$)$
[Accounts receivables = Debtors]
Where:
ICP = inventory conversion period
$ICP = 360 * ($Inventory $/$ COGS$)$
[Inventory = Stock]
Where:
PDP = payment deferral period
$PDP = 360 * ($Accounts payable $/$ COGS$)$
[Accounts payable = Creditors]

There for the cash conversion cycle shows that the smaller its value, the quicker the firm can recover its cash from the sales of its products, the more cash the firm will have, hence the more liquid the firm. If the cash conversion cycle is high, it takes the company longer to recover cash. Thus, a high cash conversion cycle would indicate a liquidity problem. A priori, there has to be a relationship between the current and quick ratios and the cash conversion cycle but the relationship may be positive as Richards-Laughlin (1980) argue, or negative as Lyroudi-McCarty (1993) have found. A reduction in the cash conversion cycle can be obtained by decreasing the average collection period or the average inventory age or by increasing the average accounts payable period. Suppose accounts receivable were to decrease; because accounts receivable appear in the numerator of the current ratio, quick ratio and cash conversion cycle, then all three should fall. For a reduction in inventory, the same results occur. For example, a reduction in either inventory or receivables may also suggest a reduction in short-term financing. If short-term financing is reduced, then current ratio, quick ratio and cash conversion cycle may or may not fall. Any change must depend on the relative magnitudes of change in short-term asset and liability changes. A change as suggested by Richards-Laughlin [1980] could occur only if receivables and inventory were totally financed with long-term funds. When managerial decisions about working capital are required, the CR, QR and CCC will likely change. Management might decide to reduce short-term financing by increasing long-term financing. In this case, the CR, QR and CCC will rise but different liquidity implications result; the traditional ratios suggests an improvement in liquidity but the CCC indicates a reduction in the firm liquidity. Any change in credit standards, terms of sale or collection policy and/or inventory variables that change the levels of receivables or inventory require a management decision. Unless an off-setting decision is made to other assets or liabilities, changes in CR, QR and CCC are not predictable. Likewise, the relationships between these liquidity ratios and profitability must depend on a careful analysis. If one assumes firms use the optimal order quantity models for assets level determination, then any managerial decision that changes receivables, inventory and/or current liabilities must decrease profitability ratios regardless of the impact on liquidity ratios.

3.3 hypothesis development:

There are five basic hypotheses that are empirically tested in this study: The "CCC and Current/Quick Ratios" hypothesis, the "CCC and its Component Variables", the "CCC and profitability" the "CCC and Leverage" and the "CCC and Size Effect" hypotheses.

The first hypothesis tries to investigate the relationship of CCC and the current and quick ratios. It tests for a positive relationship between the current-quick ratios and the cash conversion cycle of the firm. If this hypothesis is accepted, then there is a contradiction between the traditional current-quick ratios view and the CCC.

That is:

H_{10} : There is expected to be no linear relationship between the current ratio and The cash conversion cycle and between the quick ratio and the cash conversion cycle.

Or H_{10}: $r_{CR,CCC} = 0$; $r_{QR,CCC} = 0$

H_{1A} : There is a positive relationship between the current ratio and the cash conversion Cycle and Between the quick ratio and the cash conversion cycle.
Or H_{1A} : $r_{CR, CCC} > 0$; $r_{QR,CCC} > 0$

The second hypothesis examines the relationship of the cash conversion cycle with each of its components variables to see how changes in accounts receivable or in accounts payable or in the level of inventory affect the liquidity of the firm. It requires the cash conversion cycle to be positively related to the receivables and inventory conversion periods and negatively related to the payables deferral period.

That is:

H_{20} : There is expected to be no linear relationship between the receivables conversion period and the cash conversion cycle, between the inventory conversion period and the cash conversion cycle and between the payables deferral period and the cash conversion cycle.

Or H_{20}: $r_{RCP,CCC} = 0$; $r_{ICP,CCC} = 0$; $r_{PDP,CCC} = 0$

H_{2A}: There is expected to be a positive relationship between the receivables conversion period and the cash conversion cycle, between the inventory conversion period and the cash conversion cycle and a negative relationship between the payables deferral period and the cash conversion cycle.

Or H_{2A} : $r_{RCP,CCC} > 0$; $r_{ICP,CCC} > 0$; $r_{PDP,CCC} > 0$

The third hypothesis investigates the relationship of the three liquidity measures under examination with the company's profitability. It allows a positive relationship between the current-quick ratios and profitability, according to Kamath (1989) and between the cash conversion cycle and profitability. The results of these tests will be helpful guides for managers because they will be able to see which variables are affected, if any, by managerial decisions.

That is:

H_{30} : There is expected to be no linear relationship between the variables: current ratio, quick ratio and the cash conversion cycle, as indicators of liquidity and each of the variables: return on investment (ROI), return on equity (ROE) and net profit margin (NPM), as indicators of profitability.

Or H_{30} : $r_{CR,ROI} = 0$; $r_{CR,ROE} = 0$; $r_{CR,NPM} = 0$
$r_{QR,ROI} = 0$; $r_{QR,ROE} = 0$; $r_{QR,NPM} = 0$
$r_{CCC,ROI} = 0$; $r_{CCC,ROE} = 0$; $r_{CCC,NPM} = 0$

H_{3A} : There is expected to be a positive relationship between the variables: current ratio, quick ratio and the cash conversion cycle, as indicators of liquidity and each of the variables: return on investment, return on equity and net profit margin, as indicators of profitability.

Or H_{3A} : $r_{CR,ROI} > 0$; $r_{CR,ROE} > 0$; $r_{CR,NPM} > 0$
$r_{QR,ROI} > 0$; $r_{QR,ROE} > 0$; $r_{QR,NPM} > 0$
$r_{CCC,ROI} > 0$; $r_{CCC,ROE} > 0$; $r_{CCC,NPM} > 0$

The fourth hypotheses investigation the relationship of the three liquidity measures under consideration with the company's debt position. The more liquid a firm is, the lower its short-term debt obligations should be and the higher its short-term debt capacity. This issue is very useful for the managers of the firms, to guide them for their financial planning, as well as for the various financial institutions that are considering to grant loans or credit to the examined firms.

That is:

H_{40} : There is expected to be no linear relationship between the variables: current ratio, quick ratio and the cash conversion cycle, as indicators of liquidity and each of the variables: debt to assets ratio (DAR), debt ratio (DR) and times to interest earned ratio (TIE), as indicators of financial leverage.

Or H_{40} : $r_{CR,DAR} = 0$; $r_{CR,DR} = 0$; $r_{CR,TIE} = 0$

$r_{QR,DAR} = 0$; $r_{QR,DR} = 0$; $r_{QR,TIE} = 0$
$r_{CCC,DAR} = 0$; $r_{CCC,DR} = 0$; $r_{CCC,TIE} = 0$

H_{4A} : There is expected to be a negative relationship between the variables; current ratio, quick ratio and the cash conversion cycle as indicators of liquidity and each of the leverage ratios such as the debt to assets ratio (DAR), the debt ratio (DR) and a reverse (positive) relationship between the three liquidity ratios and the times interest earned ratio (TIE).

Or H_{4A} : $r_{CR,DAR} < 0$; $r_{CR,DR} < 0$; $r_{CR,TIE} < 0$
$r_{QR,DAR} < 0$; $r_{QR,DR} < 0$; $r_{QR,TIE} < 0$
$r_{CCC,DAR} < 0$; $r_{CCC,DR} < 0$; $r_{CCC,TIE} < 0$

The last hypothesis examines the size effect in terms of liquidity within the sample of Greek businesses, by testing the three liquidity measures of two sale size levels of the sample firms. It states that there is a positive relationship between the size of the firm, based on sales volume and the liquidity position of the firm. This statement is the result from the fact that smaller sized firms employ bank and trade credit, whereby larger sized firms have further access to the stock market and to other sources of funds, hence they should have higher liquidity.

That is:

H_{50} : There is expected to be no significant difference of the following variables' means: current ratio, quick ratio and the cash conversion cycle, as indicators of liquidity, between the two groups of firms differentiated by sales size, (large versus small).

or H_{50} : $AVG_L (CR) = AVG_S (CR)$;

$AVG_L (QR) = AVG_S (QR)$;

$AVG_L (CCC) = AVG_S (CCC)$

H_{5A} : There is expected to be a positive significant difference of the following variables' means: current ratio, quick ratio and the cash conversion cycle, as indicators of liquidity, between the two groups of firms differentiated by sales size, (large versus small).

Or H_{5A} : $AVG_L (CR) > AVG_S (CR)$;

$AVG_L (QR) > AVG_S (QR)$;

$AVG_L (CCC) > AVG_S (CCC)$

3.4 Research design:

To explore liquidity concepts of Malaysian firms I selected the Consumer and Industrial products industry firms to create my sample, for the following reasons: This industry in Malaysia is one of the most crucial and representative sector of the Malaysian businesses, consumer products covering 24.4 % (232 firms out of 950 industrial corporations) and industrial products 25.8 % (246 firms our of a total 950 Malaysian Industrial firms) that are listed in the Bursa Malaysia Stock Exchange. The sample companies were the largest companies in the consumer and Industrial products industry sector. My aim was to have a most representative sample of the Malaysian industries and a very important and critical industrial sector for the future growth of the Malaysian economy. There were examined 246 Industrial and 232 Consumer companies. The final sample contains 130 companies, after deleting all those that

we did not have comparable data. In order to test the last hypothesis, the data are divided into two subsets by sales size, for the year 2009 consumer companies as follows: Fifty percent of the sales distribution has the observation where sales equal 79.571 million dollars. The median of the distribution is 78.264 million dollars (Table 9). Therefore, I created two groups: a) the subset of small size firms with sales from 0 –79.571 million dollars and b) the subset of large size firms with sales from 79.571 and above million dollars. This same method of calculation is followed for 2010 2011 consumer companies and 2009 2010 2011 Industrial products companies.

Variable Descriptive Statistics for Consumer companies 2009

Table 9

Statistics for 2009 for Consumer Products

Variables	Mean	Standard Deviation	Median	Minimum	Maximum	N
CCC	96	98.40861274	70	-103	456	130
CR	2.33	2.277190128	1.75	0.31	22.16	130
QR	1.61	1.668539167	1.26	0.19	15.17	130
RCP	49	35.66165933	41	0	209	130
ICP	94	84.58380109	62	2	412	130
PDP	47.15350665	35.83636287	36.80411729	8.701590659	209.4048399	130
ROI	5.43	6.033251815	4.51	-3.02	51.78	130
ROE	9.82	16.41560494	8.11	-13.93	170.00	130
NPM	8.92	7.735113248	7.92	-3.96	36.10	130
DAR	0.412179386	0.180525032	0.377833142	0.081446625	0.839378518	130
DR	0.951202478	0.914435366	0.60728629	0.088668365	5.225817308	130
TIE	51.64485298	211.7396858	8.411112224	0.073976222	2249.454545	130
Sales	266,078	596591.4476	78,264	2,946	4,144,918	130

Variable Descriptive Statistics for Consumer companies 2010

Table 10

Variable Descriptive Statistics for 2010 for Consumer Products

Variables	Mean	Standard Deviation	Median	Minimum	Maximum	N
CCC	47	551.8087086	73	-6,037	780	130
CR	2.27	2.000719245	1.88	0.11	16.78	130
QR	1.64	1.521691737	1.27	0.07	11.28	130
RCP	51	33.38080901	45	0	173	130
ICP	100	29.06149754	24	1	266	130
PDP	105	595.891618	34	1	6,812	130
ROI	4.28	8.739989418	4.50	-32.28	46.59	130
ROE	6.56	21.70987699	8.17	-101.15	149.08	130
NPM	7.53	13.08433003	7.71	-50.52	48.30	130
DAR	0.423186646	0.18835502	0.382913096	0.079873356	0.865938392	130
DR	1.015058026	0.977940127	0.620546782	0.086806916	6.459257093	130
TIE	43.8698221	168.9767926	6.656993232	-279.6791768	1266.75658	130
Sales	308,244	742365.2754	76,266	2,037	4,926,946	130

Variable Descriptive Statistics for Consumer companies 2011

Table 11

Variable Descriptive Statistics for 2011 for Consumer Products						
Variables	Mean	Standard Deviation	Median	Minimum	Maximum	N
CCC	52	537.1367059	79	-5,901	565	130
CR	2.17	1.697831099	1.77	0.08	13.42	130
QR	1.51	1.273330258	1.13	0.06	8.48	130
RCP	50	36.90169649	43	0	199	130
ICP	109	133.4705401	73	1	1,203	130
PDP	106	630.2359789	38	6	7,218	130
ROI	4.42	8.483122642	4.46	-23.08	45.91	130
ROE	8.12	22.05143818	7.65	-98.55	166.68	130
NPM	7.76	15.58208692	6.61	-60.16	56.45	130
DAR	0.418357918	0.174974931	0.409235558	0.07784842	0.845266573	130
DR	0.935919329	0.81004722	0.692722059	0.084420416	5.462727678	130
TIE	245.0125683	1883.034024	6.667462703	-80.36871508	21178.17398	130
Sales	340,241	892903.9657	80,764	5,699	6,156,437	130

Variable Descriptive Statistics for Industrial companies 2009

Table 12

Variable Descriptive Statistics for 2009 for Industrial Products						
Variables	Mean	Standard Deviation	Median	Minimum	Maximum	N
CCC	114	204.0530798	83	-664	987	130
CR	2.29	1.874297052	1.64	0.39	9.93	130
QR	1.77	1.460183568	1.34	0.30	8.46	130
RCP	97	49.27783849	89	8	343	130
ICP	109	166.7840315	58	2	1,081	130
PDP	92	109.3118223	65	2	939	130
ROI	1.86	7.900448524	2.76	-42.61	19.13	130
ROE	2.37	19.30301999	5.60	-131.08	35.45	130
NPM	5.22	13.79429698	5.56	-43.62	34.32	130
DAR	0.449359748	0.199000128	0.436468865	0.084339905	1.06414148	130
DR	0.985921949	1.883883727	0.759852699	-16.59053511	5.678579339	130
TIE	-36.31859447	743.3101526	3.839863894	-8310.194444	945.5652174	130
Sales	204,284	804397.3015	57,135	3,156	8,804,514	130

Variable Descriptive Statistics for Industrial companies 2010

Table 13

Variable Descriptive Statistics for 2010 for Industrial Products						
Variables	Mean	Standard Deviation	Median	Minimum	Maximum	N
CCC	125	243.5814987	80	-602	2,114	130
CR	2.19	1.697795521	1.64	0.13	12.38	130
QR	1.70	1.423537599	1.32	0.09	12.06	130
RCP	108	207.9115345	87	7	2,411	130
ICP	103	136.2027676	64	0	1,023	130
PDP	86	88.15854468	69	4	741	130
ROI	1.92	7.972255027	2.75	-44.95	18.37	130
ROE	1.95	19.61264995	6.09	-95.53	33.32	130
NPM	6.21	13.50127588	6.54	-47.10	43.29	130
DAR	0.459926942	0.199965851	0.448212186	0.042524358	1.256966684	130
DR	1.123910845	1.299494967	0.810296522	-4.89155506	7.122938559	130
TIE	57.08978895	427.3759978	5.26007705	-728	4740	130
Sales	239,672	928281.7673	62,028	2,453	10,116,992	130

Variable Descriptive Statistics for Industrial companies 2011

Table 14

Variable Descriptive Statistics for 2011 for Industrial Products						
Variables	Mean	Standard Deviation	Median	Minimum	Maximum	N
CCC	104	158.92889	75	-537	821	130
CR	2.27	1.705494451	1.74	0.16	10.68	130
QR	1.78	1.40448503	1.37	0.16	9.44	130
RCP	91	52.64163007	84	1	405	130
ICP	99	131.6584794	50	0	751	130
PDP	86	101.1127309	59	2	700	130
ROI	2.15	8.516826502	2.93	-59.88	18.86	130
ROE	3.27	16.43933472	5.90	-114.69	27.46	130
NPM	6.21	12.94360115	6.17	-49.78	49.14	130
DAR	0.447731156	0.20798299	0.447127266	0.102377586	1.251006839	130
DR	0.950660197	1.225696098	0.779331111	-5.00255597	5.870552846	130
TIE	118.1536544	1039.435836	4.564606407	-251.6015038	11828.25	130
Sales	269,099	1285404.626	70,005	5,838	14,246,151	130

3.5 Methodology:

In order to test the first four hypotheses, the Pearson correlation coefficient (r) was used. In order to test the fifth hypothesis, parametric tests of two independent sample means were used. T-tests of two sample means were performed between the two groups as determined based on the sales size, for each of the three liquidity indicators, namely: the cash conversion cycle, the current and the quick ratios.

4. RESULTS AND ANALYSIS

4.1 The Cash Conversion Cycle and Current Quick ratios:

The results from testing the first hypothesis are presented in Tables 1 for consumer companies and Table 2 for Industrial products companies.

Table 1

Consumer companies			
Table 1	Pearson Correlation Coefficients		
Results from the Tests of the First and Second Hypotheses			
Variables	2009	2010	2011
CCC-CCC	1	1	1
CCC- RCP	0.3896	-0.0297	-0.0637
CCC-ICP	0.884	-0.2494	-0.5916
CCC-PDP	-0.2716	-0.9764	-0.9813
CR-CCC	0.3783	0.0785	0.0913
CR-RCP	0.1288	0.103	0.0878
CR-ICP	0.3233	0.1534	0.1373
CR-PDP	-0.1474	-0.0368	-0.0436
QR-CCC	0.1861	0.0159	0.0133
QR-RCP	0.1451	0.0756	0.0876
QR-ICP	0.113	0.0228	-0.0046
QR-PDP	-0.0997	-0.0059	-0.0072

Table 2

Industrial products companies			
Table 2	Pearson Correlation Coefficients		
Results from the Tests of the First and Second Hypotheses			
Variables	2009	2010	2011
CCC-CCC	1	1	1
CCC- RCP	0.1855	0.732	-0.0122
CCC-ICP	0.8257	0.5369	0.811
CCC-PDP	-0.523	-0.205	-0.522
CR-CCC	0.2313	0.132	0.29
CR-RCP	-0.0618	-0.0474	-0.0869
CR-ICP	0.1382	0.147	0.1715
CR-PDP	-0.2488	-0.251	-0.278
QR-CCC	0.0234	-0.0068	0.0272
QR-RCP	-0.0637	-0.0245	-0.0386
QR-ICP	-0.0797	-0.0915	-0.113
QR-PDP	-0.1941	-0.18	-0.21

Table 9 reports the descriptive statistics of the variables for consumer companies 2009. I Observed that the average CCC was 96 days, which means that it takes 96 days on average for the firms in industry to collect their cash from their realized sales, while the current and quick ratios were 2.33 and 1.61 respectively.

Table 10 reports the descriptive statistics of the variables for consumer companies 2010. I observed that the average CCC was 47 days, current and quick ratios were 2.27 and 1.64 respectively. Table 11 reports the descriptive statistics of the variables for consumer companies 2011. I observed that the average CCC was 52 days, current and quick ratios were 2.17 and 1.51 respectively. Table 12 reports the descriptive statistics of the variables for Industrial products companies 2009. I observed that the average CCC was 114 days, current and quick ratios were 2.29 and 1.77 respectively. Table 13 reports the descriptive statistics of the variables for Industrial products companies 2010.I observed that the average CCC was 125 days, current and quick ratios were 2.19 and 1.70 respectively. Table 14 reports the descriptive statistics of the variables for Industrial products companies 2011. I observed that the average CCC was 104 days, current and quick ratios were 2.27 and 1.78 respectively. Among all the years from two industry I found that consumer products Industry average have short CCC time 65 days compare to 114 days Industrial products companies.

Table 1 and Table 2 presents the Pearson correlation coefficient result for the first and second hypothesis Based on the results shown in both tables, I observe that there is a significant positive relationship between the CCC and the current and quick ratios.

From Table 1 and 2, The Pearson coefficient between the CCC and the CR is equal to r= 0.3783 for the year 2009 consumer, r= 0.0785 for the year 2010 consumer, r= 0.0913 for the year 2011 consumer and The Pearson coefficient between the CCC and the CR is equal to r= 0.2313 for the year 2009 Industrial, r= 0.132 for the year 2010 Industrial, r= 0.29 for the year 2011 Industrial. The Pearson coefficient between the CCC and the QR is equal to r= 0.1861 for the year 2009 consumer, r= 0.0159 for the year 2010 consumer, r= 0.0133 for the year 2009 consumer. The Pearson coefficient between the CCC and the QR is equal to r= 0.0234 for the year 2009 Industrial, r= -0.0068 for the year 2010 Industrial, r= 0.0272 for the year 2011 Industrial products companies.

Therefore, my result support the first alternate hypothesis, agreeing with the studies of Richards - Laughlin (1980), Moss-Stine (1993) for US firms, and Lyroudi-McCarty-Lazaridis-Hatzigayos (1999) for UK firms. My result imply that high current and quick ratios are indicators of good liquidity position and desirable, however, since they lead to high cash conversion cycle having a positive

relationship with it, it could imply a large investment in working capital which could lead to future liquidity problems.

4.2 The Cash Conversion Cycle and its Component Variables:

The results from testing the second hypothesis are presented also in Tables 1 and 2.

Table 1

	Consumer companies		
Table 1	Pearson Correlation Coefficients		
Results from the Tests of the First and Second Hypotheses			
Variables	2009	2010	2011
CCC-CCC	1	1	1
CCC- RCP	0.3896	-0.0297	-0.0637
CCC-ICP	0.884	-0.2494	-0.5916
CCC-PDP	-0.2716	-0.9764	-0.9813
CR-CCC	0.3783	0.0785	0.0913
CR-RCP	0.1288	0.103	0.0878
CR-ICP	0.3233	0.1534	0.1373
CR-PDP	-0.1474	-0.0368	-0.0436
QR-CCC	0.1861	0.0159	0.0133
QR-RCP	0.1451	0.0756	0.0876
QR-ICP	0.113	0.0228	-0.0046
QR-PDP	-0.0997	-0.0059	-0.0072

Table 2

	Industrial products companies		
Table 2	Pearson Correlation Coefficients		
Results from the Tests of the First and Second Hypotheses			
Variables	2009	2010	2011
CCC-CCC	1	1	1
CCC- RCP	0.1855	0.732	-0.0122
CCC-ICP	0.8257	0.5369	0.811
CCC-PDP	-0.523	-0.205	-0.522
CR-CCC	0.2313	0.132	0.29
CR-RCP	-0.0618	-0.0474	-0.0869
CR-ICP	0.1382	0.147	0.1715
CR-PDP	-0.2488	-0.251	-0.278
QR-CCC	0.0234	-0.0068	0.0272
QR-RCP	-0.0637	-0.0245	-0.0386
QR-ICP	-0.0797	-0.0915	-0.113
QR-PDP	-0.1941	-0.18	-0.21

Based on the results reported in both tables, we observe that the second alternate hypothesis is Supported by the data. In other words, there is a significant positive relationship between the CCC and the RCP (Pearson correlation coefficient equal to r=0.3896 for the year 2009 consumer, r = -0.0297 for the year 2010 consumer, r = -0.0637 for the year 2011 consumer. The Pearson coefficient between the CCC and the RCP is equal to r= 0.1855 for the year 2009 Industrial, r= 0.732 for the year 2010 Industrial, r= -0.0122 for the year 2011 Industrial), and between the CCC and the ICP (Pearson correlation coefficient equal to r = 0.884 for the year 2009 consumer, r = -0.2494 for the year 2010 consumer, r = -0.5916 for the year 2011 consumer. The Pearson coefficient between the CCC and the ICP is equal to r= 0.8257 for the year 2009 Industrial, r= 0.5369 for the year 2010 Industrial, r= 0.811 for the year 2011 Industrial) and a significant negative relationship between the

CCC and the PDP (Pearson correlation coefficient equal to r = - 0.2716 for the year 2009 consumer, r = -0.9764 for the year 2010 consumer, r = -0.9813 for the year 2011 consumer. The Pearson coefficient between the CCC and the PDP is equal to r= -0.523 for the year 2009 Industrial, r= -0.205 for the year 2010 Industrial, r= -0.522 for the year 2011 Industrial) In contrast to the study of Besley-Meyer (1997) where the ICP was found to be the most important variable for the determination of the CCC, indicating that the inventories were the most crucial current assets for the firm's management of its working capital in my study I found that the CCC was most sensitive to the receivables conversion period and the average collection period. I observe also that in the cases that the CCC is negative, the payables deferral period is very high. The firms are stretching their accounts payable as much as they can, and since there are no severe penalties for payment delay among businesses as they are among the government and businesses in Malaysia, yet, the managers are taking a great advantage of this situation.

4.3 The Cash Conversion Cycle and Profitability:
The results from testing the third hypothesis are depicted in Tables 3 and 4.

Table 3

	Consumer companies			
Results from the Tests of the Third and Fourth Hypotheses				Table 3
Variable	2009	2010	2011	
CCC-ROI	-0.0066	0.031	0.0285	
CCC-ROE	-0.0654	0.0128	0.0073	
CCC-NPM	-0.001	0.0016	-0.0141	
CCC-DAR	-0.2833	-0.0411	-0.0431	
CCC-DR	-0.2477	-0.0184	-0.0126	
CCC-TIE	-0.0699	0.022	-0.0038	
CR-ROI	0.1107	0.2286	0.1388	
CR-ROE	-0.0107	0.1253	0.0204	
CR-NPM	0.2422	0.245	0.2241	
CR-DAR	-0.5165	-0.6089	-0.6661	
CR-DR	-0.3685	-0.4337	-0.4874	
CR-TIE	0.1563	-0.0707	0.0123	
QR-ROI	0.0975	0.2563	0.1383	
QR-ROE	-0.0236	0.1415	0.0235	
QR-NPM	0.2895	0.3008	0.2858	
QR-DAR	-0.5007	-0.5964	-0.6619	
QR-DR	-0.349	-0.415	-0.4713	
QR-TIE	0.1969	-0.0858	-0.0213	

Table 4

	Industrial products companies			
Results from the Tests of the Third and Fourth Hypotheses				Table4
Variable	2009	2010	2011	
CCC-ROI	0.0205	-0.246	0.0076	
CCC-ROE	0.0091	-0.392	-0.062	
CCC-NPM	0.0205	0.0499	0.0741	
CCC-DAR	-0.332	-0.209	-0.408	
CCC-DR	0.0782	0.0468	-0.0047	
CCC-TIE	0.0199	0.0043	-0.0188	
CR-ROI	0.1525	0.254	0.2241	
CR-ROE	0.1046	0.185	0.1349	
CR-NPM	0.0848	0.298	0.313	
CR-DAR	-0.6974	-0.706	-0.693	
CR-DR	-0.182	-0.355	-0.286	
CR-TIE	0.0968	0.2207	0.0357	
QR-ROI	0.1942	0.2548	0.209	
QR-ROE	0.1274	0.185	0.127	
QR-NPM	0.1555	0.3318	0.352	
QR-DAR	-0.6007	-0.573	-0.574	
QR-DR	-0.148	-0.278	-0.226	
QR-TIE	0.0945	0.2298	0.0477	

The relationship between the three liquidity measures mentioned above and the three profitability measures such as the return on assets (ROI), the return on equity (ROE) and the net profit margin (NPM) is not statistically very significant.

From table 3 and 4 I observe that there is no linear relationship between the CCC and the ROI (Pearson correlation coefficient equal to r = - 0.0066 for the year 2009 consumer, r = 0.031 for the year 2010 consumer, r = 0.0285 for the year 2011 consumer. The Pearson coefficient between the CCC and the ROI is equal to r= 0.0205 for the year 2009 Industrial, r= - 0.246 for the year 2010 Industrial, r= 0.0076 for the year 2011 Industrial) and between the CCC and the NPM (Pearson correlation coefficient equal to r = - 0.001 for the year 2009 consumer, r = 0.0016 for the year 2010 consumer, r = - 0.0141 for the year 2011 consumer. The Pearson coefficient between the CCC and the NPM is equal to r= 0.0205 for the year 2009 Industrial, r= 0.0499 for the year 2010 Industrial, r= 0.0741 for the year 2011 Industrial) and between the CCC and the ROE (Pearson correlation coefficient equal to r = - 0.0654 for the year 2009 consumer, r = 0.0128 for the year 2010 consumer, r = 0.0073 for the year 2011 consumer. The Pearson coefficient between the CCC and the ROE is equal to r= 0.0091 for the year 2009 Industrial, r= -0.392 for the year 2010 Industrial, r= - 0.0062 for the year 2011 Industrial). For the other two liquidity measures (CR, QR) positively correlated with Profitability measures (ROE, ROI, NPM).

4.4 The Cash Conversion Cycle and Leverage:
The results from testing the fourth hypothesis are depicted in Tables 3 and 4.

Table 3

	Consumer companies			
Results from the Tests of the Third and Fourth Hypotheses				Table 3
Variable	2009	2010	2011	
CCC-ROI	-0.0066	0.031	0.0285	
CCC-ROE	-0.0654	0.0128	0.0073	
CCC-NPM	-0.001	0.0016	-0.0141	
CCC-DAR	-0.2833	-0.0411	-0.0431	
CCC-DR	-0.2477	-0.0184	-0.0126	
CCC-TIE	-0.0699	0.022	-0.0038	
CR-ROI	0.1107	0.2286	0.1388	
CR-ROE	-0.0107	0.1253	0.0204	
CR-NPM	0.2422	0.245	0.2241	
CR-DAR	-0.5165	-0.6089	-0.6661	
CR-DR	-0.3685	-0.4337	-0.4874	
CR-TIE	0.1563	-0.0707	0.0123	
QR-ROI	0.0975	0.2563	0.1383	
QR-ROE	-0.0236	0.1415	0.0235	
QR-NPM	0.2895	0.3008	0.2858	
QR-DAR	-0.5007	-0.5964	-0.6619	
QR-DR	-0.349	-0.415	-0.4713	
QR-TIE	0.1969	-0.0858	-0.0213	

Table 4

		Industrial products companies		
Results from the Tests of the Third and Fourth Hypotheses				Table4
Variable	2009	2010	2011	
CCC-ROI	0.0205	-0.246	0.0076	
CCC-ROE	0.0091	-0.392	-0.062	
CCC-NPM	0.0205	0.0499	0.0741	
CCC-DAR	-0.332	-0.209	-0.408	
CCC-DR	0.0782	0.0468	-0.0047	
CCC-TIE	0.0199	0.0043	-0.0188	
CR-ROI	0.1525	0.254	0.2241	
CR-ROE	0.1046	0.185	0.1349	
CR-NPM	0.0848	0.298	0.313	
CR-DAR	-0.6974	-0.706	-0.693	
CR-DR	-0.182	-0.355	-0.286	
CR-TIE	0.0968	0.2207	0.0357	
QR-ROI	0.1942	0.2548	0.209	
QR-ROE	0.1274	0.185	0.127	
QR-NPM	0.1555	0.3318	0.352	
QR-DAR	-0.6007	-0.573	-0.574	
QR-DR	-0.148	-0.278	-0.226	
QR-TIE	0.0945	0.2298	0.0477	

According to the results of the Pearson correlation coefficients, I observe that the CCC has no linear relationship with the leverage ratios of debt to assets (DAR), debt to equity (DR) and times interest earned (TIE). The null hypothesis is supported by the data in this case. On the other hand, the CR and the QR have shown a significant negative relationship only with the debt to equity ratio, (Pearson correlation coefficient between CR and DAR equal to r = - 0.5165 for the year 2009 consumer, r = -0.6089 for the year 2010 consumer, r = - 0.6661 for the year 2011 consumer. The Pearson coefficient between the CR and DAR is equal to r= - 0.6974 for the year 2009 Industrial, r= -0.706 for the year 2010 Industrial, r= - 0.693 for the year 2011 Industrial). (Pearson correlation coefficient between QR and DAR equal to r = - 0.5007 for the year 2009 consumer, r = - 0.5964 for the year 2010 consumer, r = -0.6619 for the year 2011 consumer. The Pearson coefficient between the QR and DAR is equal to r= - 0.6007 for the year 2009 Industrial, r= -0.573 for the year 2010 Industrial, r= - 0.574 for the year 2011 Industrial). Liquidity ratios have positive relationship with the TIE ratio (Pearson correlation coefficient between CR and TIE is equal to r = 0.1563 for the year 2009 consumer, r= 0.2207 for the year 2010 Industrial. The Pearson coefficient between the QR and TIE is equal to r= 0.1969 for the year 2009 Consumer, r = .2298 for the year 2010 Industrial). Hence, the fourth alternate hypothesis is partially supported by the data. It implies that a high current ratio, or quick ratio, indicating a good liquidity position of the firm will be associated with low debt ratio and high leverage capacity of the firm. The data also imply that high liquidity measured by the traditional indicators (high current and quick ratios), is associated with high time to interest earned ratios, which means that the firm's operating earnings are covering satisfactorily the interest expenses.

4.5 The Cash Conversion Cycle and the Size Effect:
The results from testing the fifth hypothesis are depicted in Table 5 and 6.

Table 5

	Consumer companies		
The Test of the Fifth Hypotheses			Table 5
Variable	2009	2010	2011
SMALL SIZE-CCC	118	46	41
SMALL SIZE-CR	2.59	2.48	2.34
SMALL SIZE-QR	1.78	1.72	1.56
LARGE SIZE-CCC	80	-4	-4
LARGE SIZE-CR	1.99	2.09	2.04
LARGE SIZE - QR	1.39	1.58	1.49

Table 6

	Industrial products companies		
The Test of the Fifth Hypotheses			Table 6
Variable	2009	2010	2011
SMALL SIZE-CCC	133	149	135
SMALL SIZE-CR	2.57	2.45	2.63
SMALL SIZE-QR	1.95	1.86	1.78
LARGE SIZE-CCC	83	102	76
LARGE SIZE-CR	1.93	1.83	1.94
LARGE SIZE - QR	1.58	1.5	1.59

The Average CCC for the small sized group is equal to 68.3 days for consumer companies and 139 days for the Industrial products companies. The Average CCC for the Large sized group is equal to 24 days for consumer companies and 87 days for the Industrial products companies. However, there is not a statistically significant difference between the two sets of firms regarding their CCC, since the t-test is equal to 0.0082 for the year 2009 consumer, 0.6388 for the year 2010 consumer, 0.707 for the year 2011 consumer and the t-test of CCC is equal to 0.5624 for the year 2009, 0.232 for the year 2010, 0.0361 for the year 2011. The CR t-test is equal to 0.0495 for the year 2009 consumer, 0.1791 for the year 2010 consumer, 0.273 for the year 2011 consumer and 0.0174 is the result of CR for the year 2009 Industrial, 0.006 for the year 2010, 0.0141 for the year 2011 Industrial companies. Hence, the CR t-test data support the alternate hypothesis. It appears that both sets of firms despite their size, have similar liquidity indicators.

V. SUMMARY AND CONCLUSION

5.1 Introduction:

This paper examined several studies of liquidity measures with an emphasis on the cash conversion cycle (CCC) and tested empirically the traditional and the above mentioned contemporary liquidity measures

for the consumer and Industrial products company in Malaysia, for the year 2009 2010 2011. This study suggests that a priori, it is impossible to predict the impact on the current ratio, quick ratio, cash conversion cycle, profits and leverage when a change in sales causes a change in working capital variables. Likewise, a managerial decision that changes components of working capital will cause an unpredictable change in the liquidity, profitability and leverage ratios. The Pearson correlation coefficient was estimated between the CCC and the CR and QR, as well as between all three liquidity measures and the profitability ratios ROI, ROE and NPM, and the leverage ratios DAR, DR and TIE. Finally, it was examined the size effect on the firm's liquidity. This study gives useful insights for both academicians and managers of Malaysian companies about the working capital management in Malaysia, informing them as well about the practices and the results in other more sophisticated and mature markets, such as the US and the UK. 5.2 Findings: Overall, the cash conversion cycle was significantly positively related to the current and quick ratios, to the receivables and to the inventory conversion period.

It was also as hypothesized, significantly negatively related to the payables deferral period. Regarding the relationship between liquidity and profitability, the results indicated that there is no linear relationship except in the case of CCC and the ROI and the NPM, which is significant and positive, as hypothesized. Regarding the relationship between liquidity and leverage, the results indicated that there was no linear relationship between the indicated that there was no linear relationship between the CCC and the leverage ratios, but there was a negative relationship between the CR and the QR and the debt to equity ratio, and a positive with the times interest earned ratio. According to the results the CCC does not show any linear relationship with the leverage ratios, while the traditional liquidity measures, show the hypothesized associations. Finally, the results indicated that there are not any significant differences among the liquidity measures between large and small sized firms of our sample. The former are in most of the cases in a better liquidity position since they have more opportunities and sources to raise funds. However, based on this results, it does not appear to be so. It should be noted however, that the sample contained in general the most known and large sized firms of the Consumer and Industrial products sector and maybe that is the reason why there were no significant differences.

5.3 Study Limitations:

In this study relatively a sample data has been used relating to the period 2009-2011 Secondly, the future longitudinal research may well focus on the related aspects of liquidity management to gain a deep insight into the determinants and impact of CCC on firm performance at large.

5.4 Suggestions for Future Research:

Further research could usefully test the points raised in this study across a large representative sample of firms representing a larger set of industries. In particular, to identify the circumstances in which the firms change their attitudes towards particular sources of working capital, and that in the different phases of growth cycle, the longitudinal studies may prove more helpful. Research may also be conducted from the perspective of designing a growth oriented optimal working capital financing policy for firms.

REFERENCES

[1] http://www.ukessays.com/dissertation/literature-review/cash-conversion-cycle-with-firm-size-and-profitability.php#ixzz2OfGlR0zo

[2] Aziz, A. and Lawson, G., "Cash Flow Reporting and Financial Distress Models: Testing of Hypotheses," Financial Management, Spring 1989, pp 55-63.

[3] Belt, Brian, "The Trend of the Cash Conversion Cycle and its Components," Akron Business and Economic Review, Fall 1985, pp 48-54.

[4] Besley, Scott and R. L. Meyer, "An Empirical Investigation of Factors Affecting the Cash Conversion Cycle," presented at the Annual Meeting of the Financial Management Association, Las Vegas, Nevada, October 1987.

[5] Emery, Gary., "Measuring Short-Term Liquidity," Journal of Cash Management, July/August 1984, pp. 25-32.

[6] Financial Research Associates, Financial Studies of the Small Business, l2th Edition, 1989.

[7] Gentry, James A., R. Vaidyanathan and Hei Wee Lee, "A Weighted Cash Conversion Cycle," Financial Management, Spring 1990, pp 90-99.

[8] George Schilling, "Working Capital's Role in Maintaining Corporate Liquidity", TMA Journal, September/October 1996, p. 4-7.

[9] George W. Gallinger, "The Current and Quick Ratios: Do they Stand up to Scrutiny?: Drop the Current Ratio-Pick up the CCC", Business Credit, May 1997, p: 24-25.

[10] Gitman, Larry J. and K. S. Sachdera, "A Framework for Estimating and Analyzing the Required Working Capital Investment," Review of Business and Economic Research, Spring 1982, pp. 32-

[11] Hager, H. C., "Cash Management and Cash Cycle,"Management Accounting, March 1976, pp19-21.

[12] Kamath, R., "How Useful are Common Liquidity Measures?," Journal of Cash Management, January/February 1989, pp 24-28.

[13] Largay, James. A. III. and Cycle P. Stickney, "Cash Flows Ratio Analysis and the W. T. Grant Company Bankruptcy," Financial Analysts Journal, July/August 1980, pp 51-54.

[14] Lawrence J. Gitman, "Principles of Managerial Finance", Eighth Edition, Addisson-Weslty Longman, 1997.

[15] Lyroudi, K. And D. McCarty, "An Empirical Investigation of the Cash Conversion Cycle of Small Business Firms", The journal of Small Business Finance, Vol. 2, 2, 1992/1993, pp. 139-161.

[16] Lyroudi, K.; McCarty, D.; Lazaridis, J. and Chatzigagios, T., "An Empirical Investigation of Liquidity: The Case of UK Firms", presented at the Annual Financial Management Association Meeting in Orlando, October 1999.

[17] Miller, Jeffrey W., "Working Capital Theory Revisited," The Journal of Commercial Bank Lending, May 1979, pp. 15-31.

[18] Moss, D.J. and B. Stine, "Cash Conversion Cycle and Firm Size: A Study of Retail Firms", Managerial Finance, Vol. 19, Issue 8, 1993, pp. 25-34.

[19] Nordgren, R. K., "The Cornerstone of Liquidity Analysis: Working Capital," The Journal of Commercial Bank Lending, April 1981, pp. 11-19.

[20] Richards, Verlyn. D. and Eugene J. Laughlin, "A Cash Conversion Cycle Approach to Liquidity Analysis," Financial Management, Spring 1980, pp 32-38.

[21] Shulman, J. M. and R. A. K. Cox, "An Integrative Approach Shulman, J. M. and R. A. K. Cox, "An Integrative Approach to Working Capital Management," Journal of Cash Management, November/December 1985, pp 64-67.

[22] Shulman, J.M. and R.A.K. Cox, "An Integrative Approach to Working Capital Management," Journal of Cash Management, November/December 1985, pp 64-67.

[23] Walker, David A., "An Empirical Analysis of

Financing the Small Firm," Advances in Small Business Finance, Kluwer Academic Publishers, 1991, pp 47-61.

[24] Walker, Ernest. W. and J. William Petty II.

"Financial Differences Between Large and Small Firms," Financial Management, Winter 1978, pp 61-68.

Appendix:

Results from the Tests of the First and Second Hypotheses

Results from the Tests of the Third and Fourth Hypotheses

The Test of the Fifth Hypotheses
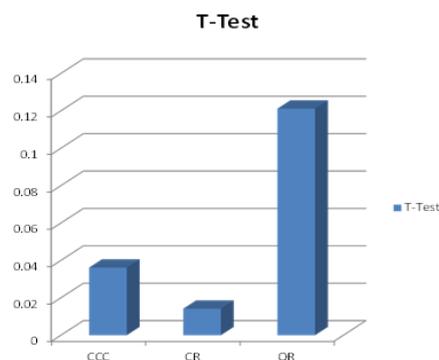
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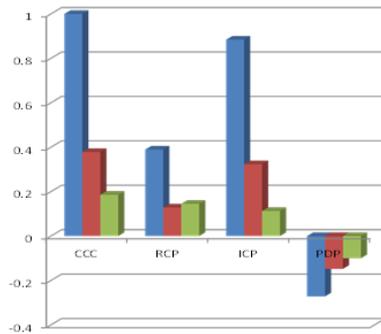
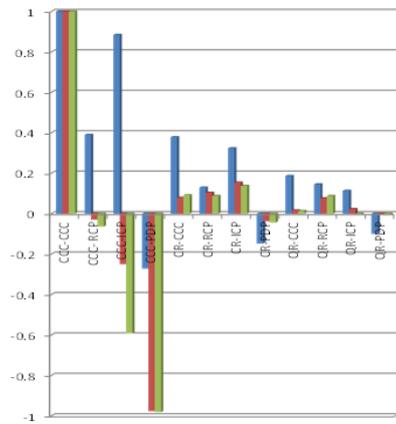### Consumer products, 2009   Industrial products, 2009
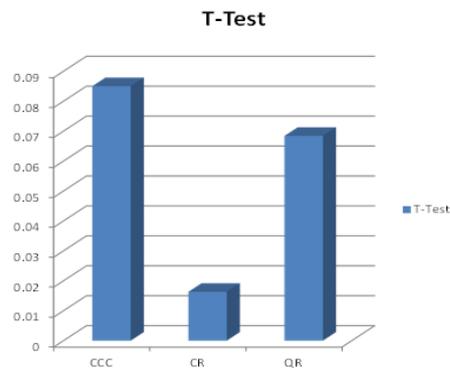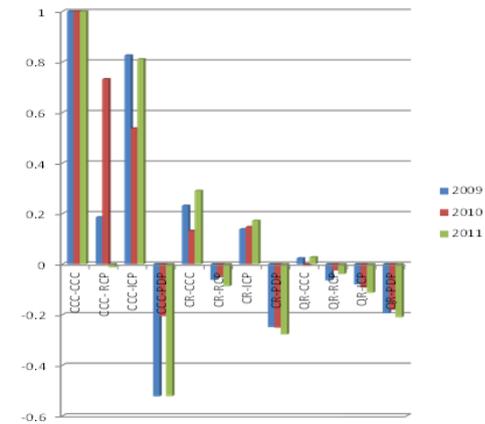

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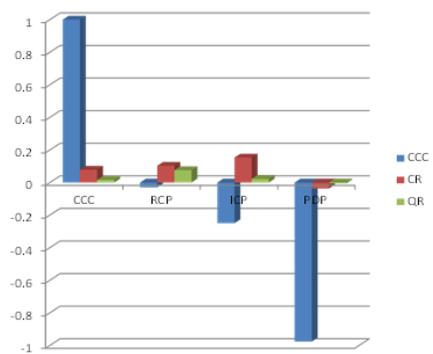
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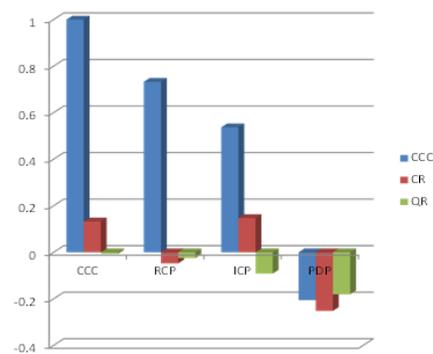
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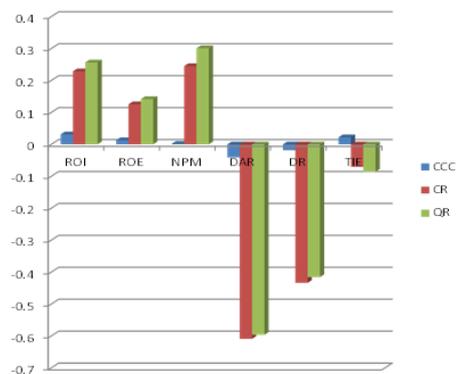
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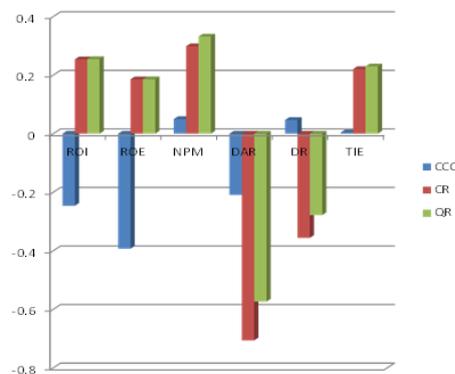
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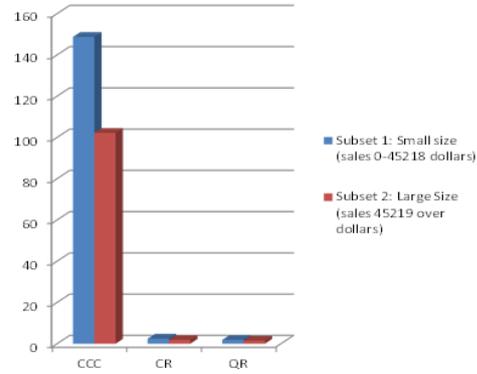
Consumer products, 2010

Industrial products, 2010

T-Test

Consumer products, 2010
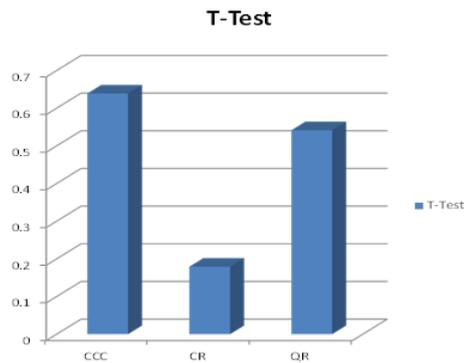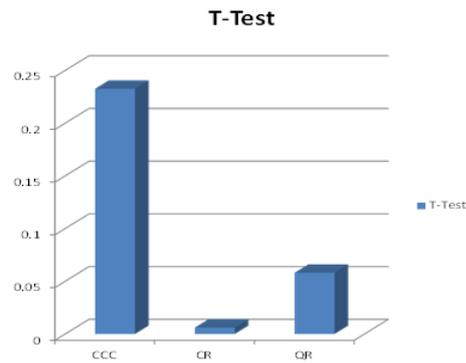
Industrial products, 2010

# Results from the Tests of the First and Second Hypotheses

Consumer products, 2011
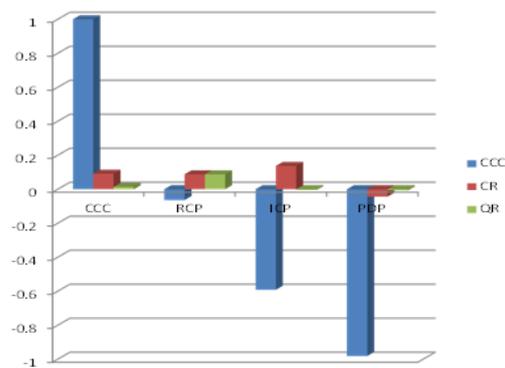
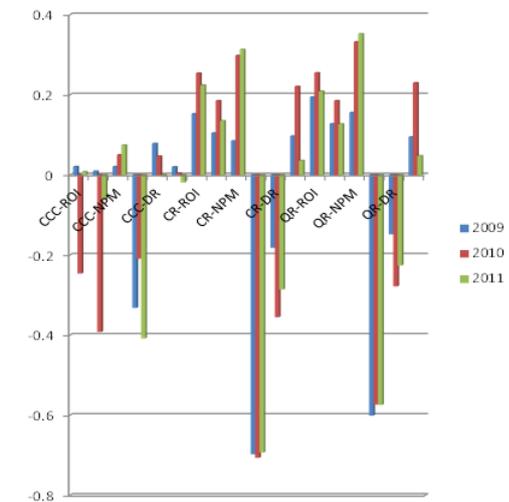### Industrial products, 2011
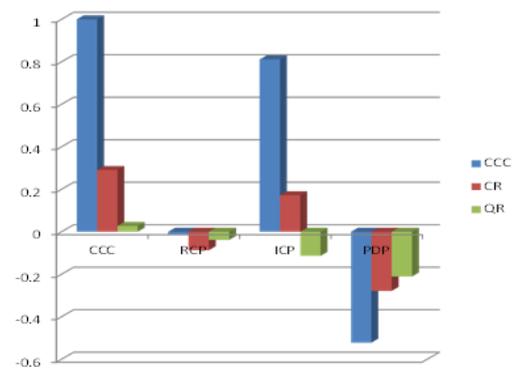
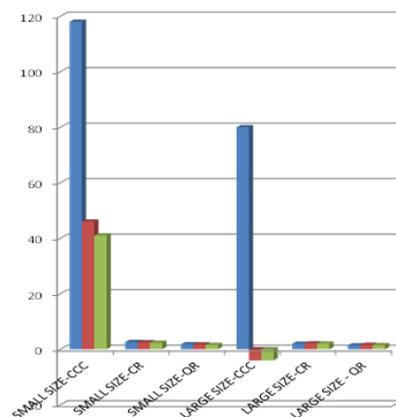# Results from the Tests of the Third and Fourth Hypotheses

Consumer products, 2011
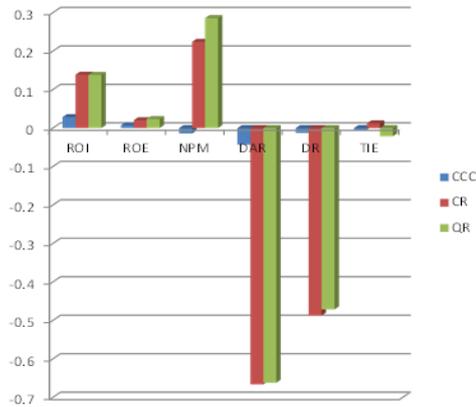
Industrial products, 2011
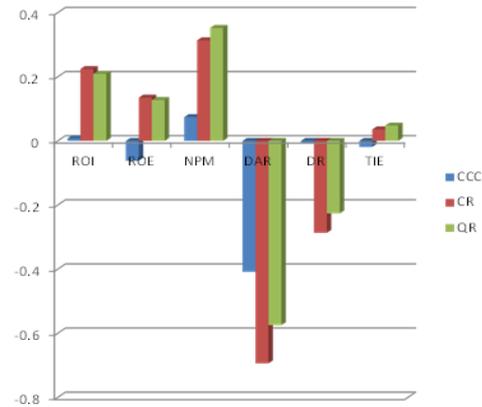
The Test of the Fifth Hypotheses
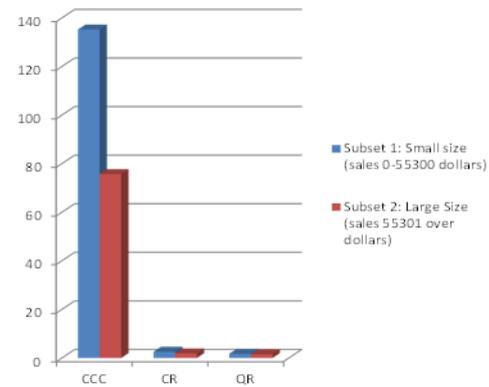
Consumer products, 2011

Industrial products, 2011

T-Test

Consumer products, 2011
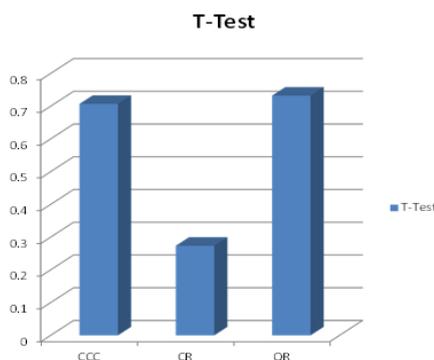
Industrial products, 2011

Results from the Tests of the First and Second Hypotheses

Consumer products

Industrial products

Results from the Tests of the Third and Fourth Hypotheses
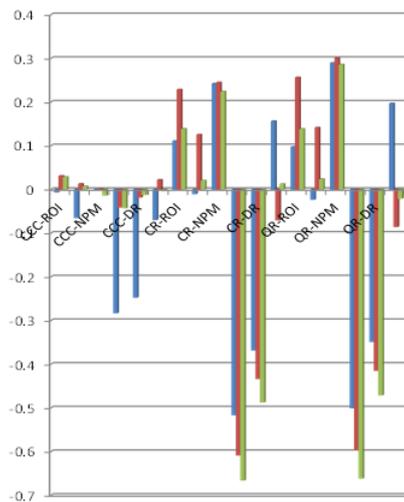
Consumer products

Industrial products

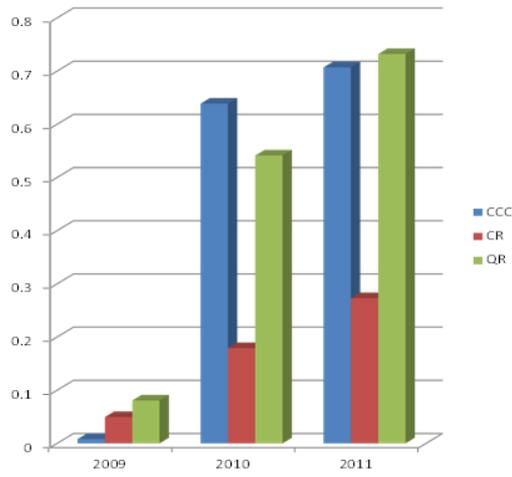# The Test of the Fifth Hypotheses

Consumer products

Industrial products