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Working Capital Management and Profitability Relationship: The Role of Macroeconomic Indicators

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ABSTRACT

The aim of this article is to search for the relationship between working capital management (WCM) and profitability under different macroeconomic conditions. The dataset includes 179 companies from Gulf Cooperation Council (GCC) countries for a six-year period. Results reveal a nonlinear relationship between CCC and profitability in a way that, shorter CCC periods have opposite direction with profitability yet as the period increases this relation turns to be positive. The partial effect of CCC has a more significant influence than those of its components. However, overall significances of the components are higher. Gross profit and operating profit margins have high responsiveness against WCM changes. Among macroeconomic indicators, inflation and unemployment are distinctive in models yet GDP per capita has a moderate influence on profitability. To the best of our knowledge, this is the first study to examine the WCM-profitability relationship with a focus on macroeconomic variables in the GCC region.

Keywords: cash conversion cycle (CCC); profitability; working capital management; macroeconomic indicators

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ОРИГИНАЛЬНАЯ СТАТЬЯ

Взаимосвязь между управлением оборотным капиталом и рентабельностью: роль макроэкономических показателей

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АННОТАЦИЯ

Цель исследования — поиск взаимосвязи между управлением оборотным капиталом (УОК) и прибыльностью в различных макроэкономических условиях. Набор данных включает 179 компаний из стран Совета сотрудничества стран Персидского залива (ССЗ) за шестилетний период. Результаты доказывают нелинейную взаимосвязь между показателем цикла конверсии денежных средств (ЦКД) и рентабельностью. При этом более короткие периоды ЦКД обратно взаимосвязаны с рентабельностью, но по мере увеличения периода эта связь становится положительной. Частичный эффект ЦКД имеет более значительное влияние, чем влияние его отдельных компонентов. Сделан **вывод**, что валовая и операционная рентабельность имеют высокую чувствительность к изменениям в оборотном капитале. Среди макроэкономических показателей в моделях выделены инфляция и безработица, а ВВП на душу населения оказывает умеренное влияние на рентабельность. Насколько нам известно, это первое исследование, в котором изучается взаимосвязь между оборотным капиталом и рентабельностью с акцентом на макроэкономические переменные в регионе Персидского залива.

Ключевые слова: цикл конверсии денежных средств (ЦКД); рентабельность; управление оборотным капиталом; макроэкономические показатели

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INTRODUCTION

As the business environment becomes more competitive, the pressure on the firms to manage the resources as effectively and efficiently as possible increases. To gain and sustain a competitive advantage, the managers must focus on the margins and effective cost control. In addition to several operating cost items, financing costs may have a critical effect on the profitability and therefore long-term survival of the firm. In this context, the minimization of financing costs and making the best use of operating cash flows deserve a detailed examination and an appropriate policy development. Proper planning of collections from customers and payments for purchases and the synchronization between them may make a profound impact on the performance of the firm. Management of cash and cash equivalents, credit policy for the customers, and relationships with suppliers are all within this category. Even though long-term financial decisions are attached more importance, WCM is crucially important for the success or even the survival of the firms. Especially for the firms operating in an environment with limited sources of external finance or for the firms with their own credibility problems, the effective management of working capital becomes more important. The policies adopted for managing working affect and are affected by the operating activities of the company.

Mainly, it is aimed to investigate the relationship between WCM and firm performance. This relationship is reciprocal because an efficient WCM is expected to improve firm performance. Similarly, a firm with good financial performance is expected to have more flexibility in managing working capital accounts. Moreover, the liquidity-profitability trade-off makes them more interdependent. For instance, a firm aiming to boost sales needs to extend more trade credit to its customers by allowing a longer collection period. Due to the trade-off between profitability and liquidity, the firms may have an optimal working capital maximizing value [1]. Most of the previous studies analyzed and found a linear relationship between WCM and profitability [1–5]. However, due to the interdependence between working capital and performance, and several other factors which might potentially affect both of them, the relationship is expected to be non-linear. There are some studies which found non-linear relationships [6–8]. The nature of the relationship between working capital and financial performance gives rise to potential endogeneity problems. For this reason, we use a generalized method of moments (GMM). By using the data for a sample of 179 companies from GCC countries for a six-year period of 2010–2015, we introduce new evidence on the working capital-financial performance relationship.

The article is structured as follows; the next Section makes a short review of related literature. Section 3 gives details about the data, sample and methodology used in the study. Section 4 provides analysis results and the findings. The last Section makes the conclusion.

LITERATURE REVIEW

In the literature of accounting and finance, one of the most studied topics is WCM, and a significant number of those studies aimed to figure out the relationship between WCM and profitability. Firms may adopt a conservative or an aggressive WCM policy, depending on the amount they invest in working capital accounts. The conservative policy includes the investment of increased amounts into inventories and receivables; providing some benefits such as lower risk of inventory shortages and increases in sales due to extended collection period for customers [1]. The aggressive policy requires the minimization of the amounts invested in those accounts. The lower investment in inventories decreases storage and insurance costs, the lower investment in receivables enables the firm to use those funds for other investment opportunities. [1, 4, 9]. However, both policies have some potential disadvantages and risks; an aggressive policy may cause interruptions in the operations, adversely affect sales due to shorter periods of trade credit for the customers, and a conservative policy may increase finance costs. Therefore, an aggressive policy may bring higher returns and higher risks, whereas a conservative policy may bring lower returns and lower risks.

The previous studies used several indicators to be the measure of WCM, one of the most used indicators is the cash conversion cycle (CCC). Richards and Laughlin [10] describe CCC as the net time interval between a firm's actual cash outflows for the purchase of productive resources and the cash inflows from sales of products. It is a financial metric used to evaluate the management's effectiveness and whether the firm needs external financing [11, 12]. It provides a better understanding of liquidity compared to static ratios calculated based on balance sheet data. Even though aggressive or conservative policies are dealt with the amounts of investment in working capital accounts, it is equally important to convert those

invested amounts into cash. The inability to convert into cash may cause liquidity problems [13].

It is a commonly accepted argument that the aim of a firm's WCM is to minimize CCC, however, this should not be a blindly followed target and the related operating policies should not be affected negatively by the policy of WCM. In other words, while reducing the period of collections, relationships with customers must be considered and while extending the period of payments for purchases, relationships with suppliers must be considered. Those policies have an impact on the profitability of the firm. Previous studies reported different views on whether a shorter or a longer CCC is better. Some studies claim that a longer CCC affects profitability positively [14–17], while some other studies claim that a shorter CCC is better and it affects profitability positively [18–22]. The conflicting results might be attributed to several reasons such as country conditions, macroeconomic situation, and so on. The firms with a longer CCC would need more short-term, external financing in order to finance their operating cycle, such firms perform worse in financial crisis periods [23, 24]. Moreover, those results indicate that the relationship between WCM and firm profitability is affected by many factors and is a complex relationship. Even though many studies proposed a linear relationship, there are some studies based on the assumption that there is an optimal level of working capital, stating that the relationship is non-linear and there is an inverted U-shape [6–8].

DATA AND METHODOLOGY

The dataset includes 179 non-financial companies listed in GCC countries for the six-year period of 2010–2015. *Table 1* presents the distribution of companies among countries. The majority of companies belong to Saudi Arabia and it is followed by Oman, UAE (United Arab Emirates), Kuwait, Bahrain and Qatar.

We constructed models for which profitability measures are taken as dependent variables and working capital measures as well as country specific and company specific control variables are considered as independent variables. Gross Profit Margin (GPM) and Operating Profit Margin (OPM) are selected as dependent variables. On the other side, Cash Conversion Cycle (CCC), and components of CCC which can be stated as Accounts Receivable Days (ADAY), Days Inventory Held (IDAY), and Accounts Payable Days (PDAY) are selected as independent variables. To control for company specific deviations, we added natural logarithm of total assets (A), sales growth (SG), Operating Cash Flows divided by Sales (OCF),

Table 1

Distribution of Companies among Countries

	Frequency	Percent
Bahrain	9	5.03
Kuwait	27	15.08
Oman	38	21.23
Qatar	7	3.91
Saudi Arabia	68	37.99
United Arab Emirates	30	16.76
Total	179	100%

Source: compiled by the authors based on sample data.

Capital Expenditures divided by Total Assets (CPX), and gearing ratio — debts divided by total assets — (GEAR). To control for country specific deviations we added country dummies. These dummies are selected from macroeconomic indicators to control for country differences as well as macroeconomic changes in years. We selected unemployment rates (unmp), inflation rates (inf), and GDP per capita (gdppc). To avoid dummy variable trap, we added five country dummies and excluded Saudi Arabia dummy variables because Saudi Arabia has the biggest share of companies and it is worth being selected as a benchmark. We used Stata software to perform statistical functions.

We constructed 16 models including two dependent variables — GPM and OPM, which are shown as PR (Profitability Ratios) in models below. GPM stands for Gross Profit Margin and it is derived as the gross profit divided by sales, OPM represents Operating Profit Margin and is computed as Operating Profit divided by Sales. Each profitability measure has been regressed upon Cash Conversion Cycle (CCC) and components of CCC — Accounts Receivables Days (ADAY), Days Inventory Held (IDAY), and Account Payable Days (PDAY) — along with their second powers, separately. CCC and components are shown in the equations below as WCMI (Working — Capital Management indicators).

To control for company specific deviations, we added five different measures; Natural Logarithm of Total Assets (A) for controlling company size, Sales Growth (SG) for growth potential, gearing ratio (GEAR) for capital structure, Operating Cash Flows ratio (OCF) for cash inflow for sales, and Capital Expenditure ratio (CPX) for changes in fixed asset and investments. All these control variables are stated as COMPC in framework models.

Table 2

Summary Statistics of Variables

Variable	Observation	Mean	Std. Dev.	Min	Max
GPM	1,074	0.240	0.237	–1.795	0.842
OPM	1,074	0.108	0.195	–2.041	0.640
CCC	1,074	113.8	101.3	–274.3	434.18
RDAY	1,074	84.2	61.6	0.6	444.04
IDAY	1,074	91.6	70.9	1.2	355.88
PDAY	1,074	62.0	47.5	0.7	409.15
A	1,074	19.54	1.64	15.55	25.23
GEAR	1,074	0.207	0.187	0.000	1.062
OCF	1,074	0.169	0.280	–4.580	1.913
CPX	1,074	0.053	0.069	0.000	0.747
SG	1,074	0.085	0.321	–0.808	5.940

Source: compiled by the authors based on statistical output.

A general framework of models is presented below:

Model 1:

$$PR_{i,t} = \beta_0 + \beta_1 PR_{i,t-1} + \beta_2 WCMI_{i,t} + \\ + \beta_3 WCMI_{i,t}^2 + \partial COMPC_{i,t} + \varepsilon_{i,t}$$

Model 2:

$$PR_{i,t} = \beta_0 + \beta_1 PR_{i,t-1} + \beta_2 WCMI_{i,t} + \\ + \beta_3 WCMI_{i,t}^2 + \partial COMPC_{i,t} + \gamma unmp_{i,t} + \varepsilon_{i,t}$$

Model 3:

$$PR_{i,t} = \beta_0 + \beta_1 PR_{i,t-1} + \beta_2 WCMI_{i,t} + \\ + \beta_3 WCMI_{i,t}^2 + \partial COMPC_{i,t} + \gamma \inf_{j,t} + \varepsilon_{i,t}$$

Model 4:

$$PR_{i,t} = \beta_0 + \beta_1 PR_{i,t-1} + \beta_2 WCMI_{i,t} + \\ + \beta_3 WCMI_{i,t}^2 + \partial COMPC_{i,t} + \gamma gdppc_{i,t} + \varepsilon_{i,t},$$

where PR — Profitability Ratios (GPM, OPM); *WCMI* — Working Capital Management Indicators (CCC, or components of CCC — ADAY, IDAY, PDAY); *COMPC* — Company Specific Control Variables (A, Gear, OCF, CPX, SG); *unmp* — unemployment rate; *inf* — Inflation rate; *gdppc* — GDP per capital; *i* — company identifier; *t* — time.

We constructed four different sets of models in order to see the effects of various macroeconomic indicators (unemployment, inflation, GDP Per Capita, and plain model including none) on the profitability. We used dummy variables for these indicators in a way that each country's economic indicator changes in time. Hence, we not only control for country differences, but we have a chance to account for economic changes in time.

The dataset includes cross section and time dimensions so that we used panel data models. Because of the dynamic patterns of dependent variables, we added the first lag of each regressand to the model to control for endogeneity. Furthermore, we assumed a two-direction relation between working capital measures and profitability measures. Prior literature [7, 8] has suggested a bilateral relation between profitability and working capital. Hence, we used Arellano-Bond Dynamic Panel Model. Secondly, as documented in prior literature [8, 9, 21], we assume a non-linear relationship between working capital and profitability, and we tested whether the relationship between dependent and independent variables is non-linear and we added CCC 2 and squares of its components (ARD 2, DIH2 and, APD 2) to the models. We tested for homoskedasticity and our dataset shows a heteroskedastic pattern, therefore we used robust standard errors. We had tested for autocorrelation and they do not show any serial correlation in second and more order conditions. Multicollinearity has been tested and there is no evidence for multicollinearity among independent variables.

Table 3

Correlation Coefficients among Variables

	GPM	OPM	CCC	RDAY	IDAY	PDAY	A	GEAR	OCF	CPX	SG
GPM	1										
OPM	*0.57	1									
CCC	*–0.15	0.03	1								
RDAY	*–0.23	*–0.12	*0.53	1							
IDAY	*0.08	*0.10	*0.78	*0.12	1						
PDAY	*0.14	*–0.08	*–0.28	*0.34	–0.02	1					
A	*0.07	*0.17	–0.06	*0.06	0.00	*0.20	1				
GEAR	–0.02	–0.03	0.04	*0.19	0.00	*0.16	*0.29	1			
OCF	*0.45	*0.55	*–0.06	*–0.15	0.02	–0.03	*0.07	*–0.07	1		
CPX	*0.10	*0.07	*–0.16	*–0.16	*–0.12	–0.06	–0.05	0.05	*0.21	1	
SG	0.05	*0.10	*–0.12	*–0.09	*–0.12	–0.04	0.03	*0.09	0.06	*0.07	1

Source: compiled by the author based on statistical output.
Note: * Significant at 5%.

RESULTS AND DISCUSSION

In this section, we firstly present descriptive statistics and they are followed by the analysis of models, then we discuss the findings.

Summary statistic of variables in *Table 2* reveals that 24% of sales return as gross profit, around 11% as operating profit. Companies have an average of 114 days of CCC. Days sales outstanding is almost 22 days higher than account payable days and average inventory conversion takes around three months for companies. Besides, companies finance 21% of their assets with long- and short-term debt as gear ratio is around 21%. OCF rate shows us 17% of sales return as net cash inflow to the company. The difference between OPM and OCF may come from the weight of non-cash expenses, such as depreciation and amortization, on operating profit. Companies invest around 5% of their assets as capital expenditures whereas, their growth in sales reaches to almost 9%.

Table 3 exhibits the correlations among variables. Starred numbers show a significant correlation at 5%. Results show that all dependent variables have a significant correlation with many of the explanatory variables. Secondly, we did not encounter any evidence for multicollinearity among independent variables because the coefficients are less than 0.9.

Firstly, we consider models with no economic indicators and country differences which are presented in Model 1. In this model, we assumed six regression models; two regressions dealing with profitability ratios and CCC, two regressions dealing with profitability ratios and components of CCC (ADAY, IDAY, PDAY).

The first two regressions between profitability and CCC are presented below:

$$1 —$$

$$GPM_{i,t} = \beta_0 + \beta_1 GPM_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \varepsilon_{i,t}$$

$$2 —$$

$$OPM_{i,t} = \beta_0 + \beta_1 OPM_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \varepsilon_{i,t}$$

The results reported in *Table 4* reveal that CCC has a strong impact on GPM and is followed by OPM. There is a negative significant relation between CCC and CCC^2 suggesting a parabolic relation between CCC and profitability. We can clearly see this in GPM and OPM. Overall significances are sufficient at 1% for both equations; however, equation 2 has higher explanatory power. Equation 1 has only one variable losing significance (GEAR).

Secondly, the relationship between components of CCC and profitability measures without any country differences are taken into account. The following two models are constructed and tested for this relationship.

Table 4

Regression Results of Equations 1–2

	Equation 1: GPM–CCC		Equation 2: OPM–CCC	
Values	**Coefficients**	**Std. Error**	**Coefficients**	**Std. Error**
Constant (β_0)	–1.0096	*0.5663	0.4059	0.6559
LAG PR	0.3419	**0.1424	0.2256	*0.1192
CCC	–0.0011	**0.0005	–0.0012	*0.0007
CCC^2	0.0000	***0.0000	0.0000	*0.0000
a	0.0648	**0.0292	–0.0132	0.0321
gear	–0.0667	0.0733	–0.0911	0.0698
ocf	0.0624	***0.0189	0.1034	***0.0270
cpx	–0.3111	***0.0767	–0.0240	0.0503
sg	0.0616	*0.0354	0.0643	0.0614
Significance	***48.79		***77.59	

Source: compiled by the authors based on statistical analyses.
Note: *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

3 —

$$GPM_{i,t} = \beta_0 + \beta_1 GPM_{i,t-1} + \beta_2 RDAY_{i,t} + \beta_3 RDAY_{i,t}^2 + \\ + \beta_4 IDAY_{i,t} + \beta_5 IDAY_{i,t}^2 + \beta_6 PDAY_{i,t} + \beta_7 PDAY_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \varepsilon_{i,t}$$

4 —

$$OPM_{i,t} = \beta_0 + \beta_1 OPM_{i,t-1} + \beta_2 RDAY_{i,t} + \beta_3 RDAY_{i,t}^2 + \\ + \beta_4 IDAY_{i,t} + \beta_5 IDAY_{i,t}^2 + \beta_6 PDAY_{i,t} + \beta_7 PDAY_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \varepsilon_{i,t}$$

In the proceeding part of the analysis for the model with no country dummies, presented in *Table 5*, we did not observe any significant effect of individual components on profitability measures. Furthermore, overall significances show a non-systematic pattern compared to the first two equations. The significance of Equation 4 (164.43) is considerably higher than that of Equation 2 (77.59), yet for Equation 3, there is no evidence of a crucial difference among its counterpart (equations 1).

Unemployment is one of the main indicators of the economy of a country and as the companies' performance gets worse and capacity utilization needs to be decreased, they lay off employees. Therefore, the unemployment rate gives insight into the trend in the macroeconomic outlook. Hence, we constructed Model 2 for testing the effects of WCMI on profitability and for controlling country-wise differences using unemployment. We constructed four equations, including 2 profitability ratios as dependent variables and CCC with its components as independent variables. The following two equations are set for the relations between PR and CCC. The results are given in Table 6 for these equations.

5 —

$$GPM_{i,t} = \beta_0 + \beta_1 GPM_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \\ + \partial_5 sg_{i,t} + \gamma unmp_{j,t} + \varepsilon_{i,t}$$

6 —

$$OPM_{i,t} = \beta_0 + \beta_1 OPM_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \\ + \partial_5 sg_{i,t} + \gamma unmp_{j,t} + \varepsilon_{i,t}$$

The results for equation 5 show CCC and CCC^2 have significant effects on GPM with opposite signs. CCC has an inverse relation whereas its square is positively related. Among countries, Kuwait and UAE differ from others significantly. Unemployment has a significant negative effect on profitability in Kuwait and UAE compared to other countries. CCC and CCC^2 lack a significant effect on OPM, which can be seen in *Table 6* (Equation 6). Unlike equation 5 results, only UAE has a distinctive pattern among countries in case of the effect of unemployment on OPM.

Table 5

Regression Results of Equations 3–4

	Equation 3: GPM–CCC Components		Equation 4: OPM–CCC Components	
Values	**Coefficients**	**Std. Error**	**Coefficients**	**Std. Error**
Constant (β_0)	–0.7053	0.6424	0.4436	0.9957
LAG PR	0.2615	**0.1324	0.2549	***0.0887
RDAY	0.0003	0.0004	0.0000	0.0006
RDAY^2	0.0000	0.0000	0.0000	0.0000
IDAY	–0.0001	0.0008	0.0007	0.0015
IDAY^2	0.0000	0.0000	0.0000	0.0000
PDAY	0.0002	0.0006	0.0009	0.0007
PDAY^2	0.0000	0.0000	0.0000	**0.0000
a	0.0456	0.0342	–0.0217	0.0518
gear	–0.0842	0.0768	–0.1229	0.0902
ocf	0.0774	***0.0281	0.1101	***0.0232
cpx	–0.2431	**0.1109	–0.0068	0.0655
sg	0.0618	**0.0310	0.0653	*0.0378
Significance	***46.59		***164.43	

Source: compiled by the authors based on statistical analyses.
Note: *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Table 6

Regression Results of Equations 5–6

	Equation 5: GPM–CCC		Equation 6: OPM–CCC	
Values	**Coefficients**	**Std. Error**	**Coefficients**	**Std. Error**
Constant (β_0)	–0.9638	*0.5840	0.2162	0.8716
LAG PR	0.3893	***0.1455	0.2164	*0.1141
CCC	–0.0011	**0.0005	–0.0011	0.0008
CCC^2	0.0000	*0.0000	0.0000	0.0000
a	0.0631	**0.0302	–0.0026	0.0424
gear	–0.0711	0.0726	–0.0959	0.0688
ocf	0.0607	***0.0178	0.0997	***0.0231
cpx	–0.2911	***0.0835	–0.0241	0.0534
sg	0.0677	*0.0356	0.0456	0.0535
BAH	0.0253	0.2173	–0.3801	0.2905
KWT	–0.0168	**0.0075	0.0207	0.0193
OMN	–0.0036	0.0142	0.0142	0.0193
QTR	–0.0416	0.1922	0.1360	0.1272
UAE	–0.0328	*0.0191	0.0445	*0.0229
Significance	***63.82		***107.79	

Source: compiled by the authors based on statistical analyses.
Note: *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Table 7

Regression Results of Equations 7–8

	Equation 7: GPM–CCC Components		Equation 8: OPM–CCC Components	
Values	**Coefficients**	**Std. Error**	**Coefficients**	**Std. Error**
Constant (β_0)	−0.5662	0.6228	0.4635	1.0926
LAG PR	0.2971	***0.1282	0.2337	***0.0895
RDAY	0.0002	0.0004	−0.0002	0.0006
RDAY^2	0.0000	0.0000	0.0000	0.0000
IDAY	0.0000	0.0008	0.0010	0.0016
IDAY^2	0.0000	0.0000	0.0000	0.0000
PDAY	0.0003	0.0006	0.0009	0.0008
PDAY^2	0.0000	0.0000	0.0000	*0.0000
a	0.0392	0.0327	−0.0211	0.0567
gear	−0.0779	0.0636	−0.0969	0.0844
ocf	0.0756	***0.0264	0.1117	***0.0241
cpx	−0.2334	**0.1156	−0.0157	0.0671
sg	0.0695	**0.0300	0.0490	0.0426
BAH	0.0085	0.1834	−0.5029	0.3652
KWT	−0.0132	0.0092	0.0029	0.0154
OMN	−0.0062	0.0130	0.0052	0.0145
QTR	−0.0815	0.1812	0.1291	0.1504
UAE	−0.0498	***0.0180	−0.0731	*0.0431
Significance	***71.85		***164.43	

Source: compiled by the authors based on statistical analyses.
Note: *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

Overall significances of equations in model 2 are higher than those of model 1 which has no dummies. As we compare the overall significances of Equations 1 and 5, Equation 5 (63.82) has a substantial superiority over Equation 1 (48.79). We see a similar pattern in the comparison of the overall significance of OPM equations (Equation 2, 77.59 and Equation 6, 107.79).

The second part of model 2 takes components of CCC with their squares and unemployment rates of countries and we generated the following equations.

7 —

$$GPM_{i,t} = \beta_0 + \beta_1 GPM_{i,t-1} + \beta_2 RDAY_{i,t} + \beta_3 RDAY_{i,t}^2 + \\ + \beta_4 IDAY_{i,t} + \beta_5 IDAY_{i,t}^2 + \beta_6 PDAY_{i,t} + \beta_7 PDAY_{i,t}^2 + \partial_1 a_{i,t} + \\ + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \gamma unmp_{j,t} + \varepsilon_{i,t}$$

8 —

$$OPM_{i,t} = \beta_0 + \beta_1 OPM_{i,t-1} + \beta_2 RDAY_{i,t} + \beta_3 RDAY_{i,t}^2 \\ + \beta_4 IDAY_{i,t} + \beta_5 IDAY_{i,t}^2 + \beta_6 PDAY_{i,t} + \beta_7 PDAY_{i,t}^2 + \partial_1 a_{i,t} + \\ + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \gamma unmp_{j,t} + \varepsilon_{i,t}$$

As shown in *Table 7*; partial significances of CCC components do not satisfy at least a 10% level for GPM and OPM. Another minor exception is the effect of PDAY 2 on OPM. Country differences show almost the same pattern, yet UAE disperses significantly in estimation of GPM and OPM from others.

Overall significances in these equations (7–8) do not differ from those of Model 1 except for the difference between Equation 3 (46.59) and Equation 7 (71.85).

Table 8

Regression Results of Equations 9–10

	Equation 9: GPM–CCC		Equation 10: OPM–CCC	
Values	**Coefficients**	**Std. Error**	**Coefficients**	**Std. Error**
Constant (β_0)	–0.8967	*0.5327	0.2999	0.6482
LAG PR	0.3582	**0.1625	0.2779	**0.1203
CCC	–0.0010	*0.0006	–0.0009	0.0005
CCC^2	0.0000	*0.0000	0.0000	0.0000
a	0.0587	**0.0277	–0.0085	0.0321
gear	–0.0784	0.0696	–0.0846	0.0672
ocf	0.0609	***0.0180	0.1004	***0.0203
cpx	–0.3009	***0.0832	–0.0434	0.0482
sg	0.0686	0.0431	0.0651	0.0656
BAH	–0.0071	0.0057	–0.0035	0.0364
KWT	0.0062	0.0064	–0.0096	0.0124
OMN	–0.0045	0.0055	0.0000	0.0050
QTR	0.0008	0.0262	–0.0016	0.0193
UAE	0.0055	0.0036	0.0045	0.0047
Significance	***66.41		***116.38	

Source: compiled by the authors based on statistical analyses.
Note: *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

In the third model, we added inflation as the primary control variable to distinguish country differences. Inflation is another important indicator of a country's economic situation and the changes in the inflation rate show us whether a country has a downturn or boost or stability. We set the following equations to see the impact of CCC on different profitability ratios.

9 —

$$GPM_{i,t} = \beta_0 + \beta_1 GPM_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \gamma \inf_{j,t} + \varepsilon_{i,t}$$

10 —

$$OPM_{i,t} = \beta_0 + \beta_1 OPM_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \gamma \inf_{j,t} + \varepsilon_{i,t}$$

Results in *Table 8* show that CCC has a nonlinear influence on GPM. CCC and its square have shown no significant influence on OPM. In equations 9–10, we did not observe any difference resulting from the inflation rates of countries. Overall significances of equations are higher than those of no dummy model, they are slightly higher than equations reported in the unemployment model.

The next analysis takes CCC components as independent variables and inflation as a differentiating variable among countries. This part includes the last two equations of the third model. The regression equations followed are in *Table 9* which shows the results of these equations.

11 —

$$GPM_{i,t} = \beta_0 + \beta_1 GPM_{i,t-1} + \beta_2 RDAY_{i,t} + \beta_3 RDAY_{i,t}^2 + \\ + \beta_4 IDAY_{i,t} + \beta_5 IDAY_{i,t}^2 + \beta_6 PDAY_{i,t} + \beta_7 PDAY_{i,t}^2 + \partial_1 a_{i,t} + \\ + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \gamma \inf_{j,t} + \varepsilon_{i,t}$$

12 —

$$OPM_{i,t} = \beta_0 + \beta_1 OPM_{i,t-1} + \beta_2 RDAY_{i,t} + \beta_3 RDAY_{i,t}^2 + \\ + \beta_4 IDAY_{i,t} + \beta_5 IDAY_{i,t}^2 + \beta_6 PDAY_{i,t} + \beta_7 PDAY_{i,t}^2 + \partial_1 a_{i,t} + \\ + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \gamma \inf_{j,t} + \varepsilon_{i,t}$$

Table 9

Regression Results of Equations 11–12

	Equation 11: GPM–CCC Components		Equation 12: OPM–CCC Components	
Values	**Coefficients**	**Std. Error**	**Coefficients**	**Std. Error**
Constant (β_0)	–0.5009	0.5569	0.6701	0.8598
LAG PR	0.2886	**0.1423	0.2345	**0.0947
RDAY	0.0004	0.0005	–0.0002	0.0004
RDAY^2	0.0000	0.0000	0.0000	0.0000
IDAY	0.0000	0.0008	0.0010	0.0011
IDAY^2	0.0000	0.0000	0.0000	0.0000
PDAY	0.0003	0.0005	0.0010	0.0007
PDAY^2	0.0000	0.0000	0.0000	**0.0000
a	0.0332	0.0297	–0.0341	0.0459
gear	–0.0877	0.0635	–0.0839	0.0740
ocf	0.0739	***0.0260	0.1063	***0.0181
cpx	–0.2332	**0.1092	–0.0117	0.0667
sg	0.0709	**0.0320	0.0538	0.0399
BAH	–0.0039	0.0057	0.0428	0.0554
KWT	0.0042	0.0072	–0.0071	0.0103
OM	–0.0039	0.0038	–0.0017	0.0048
QTR	0.0101	0.0177	–0.0220	0.0288
UAE	0.0087	0.0032	0.0133	*0.0069
Significance	***78.8		***285.5	

Source: compiled by the authors based on statistical analyses.
Note: *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

These equations fail to have a significant effect of CCC components on dependent variables. A minor exemption is noticed in PDAY 2 on OPM with 5% significance. Further, we could not witness any significant difference among countries in terms of inflation rates. Only UAE differs from others with a 10% significance level in explaining OPM. This effect implies that an increase in inflation will increase OPM by around 1.33%, which is an expected result. Because inflation shows an increase in general price levels and it will inevitably affect sales and operating income.

Overall significances show the highest scores in these two equations. Particularly, Equation 12 shows a very high significance (285.5) making it distinct from its counterparts.

Model 4 takes GDP per Capita (gdppc) as a distinguishing measure among countries. Instead of total GDP, we took GDP per capita since it reduces variance among countries with higher population and countries with lower population. Secondly, by taking GDP per capita, we standardize the data, and it is a more precise measurement of economic development compared to total GDP. We constructed six equations; the first two (13–14) take CCC as an independent variable and the proceeding two (15–16) take components as regressors. The analyses of CCC and profitability relationship are presented in the following equations.

13 —

$$GPM_{i,t} = \beta_0 + \beta_1 GPM_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \\ + \partial_5 sg_{i,t} + \gamma gdppc_{j,t} + \varepsilon_{i,t}$$

Table 10

Regression Results of Equations 13–14

	Equation 13: GPM–CCC		Equation 14: OPM–CCC	
Values	**Coefficients**	**Std. Error**	**Coefficients**	**Std. Error**
Constant (β_0)	–0.9578	0.5966	0.0440	0.5766
LAG PR	0.3286	**0.1349	0.2691	**0.1079
CCC	–0.0010	**0.0005	–0.0010	0.0007
CCC^2	0.0000	*0.0000	0.0000	*0.0000
a	0.0628	**0.0309	0.0021	0.0281
gear	–0.0626	0.0732	–0.1058	0.0748
ocf	0.0633	***0.0198	0.1018	***0.0219
cpx	–0.3100	***0.0815	–0.0602	0.0427
sg	0.0608	*0.0361	0.0649	0.0635
BAH	0.0000	0.0000	0.0000	0.0000
KWT	0.0000	0.0000	0.0000	*0.0000
OMN	0.0000	0.0000	0.0000	0.0000
QTR	0.0000	0.0000	0.0000	0.0000
UAE	0.0000	0.0000	0.0000	0.0000
Significance	***52.07		***111.22	

Source: compiled by the authors based on statistical analyses.

Note: *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

14 —

$$OPM_{i,t} = \beta_0 + \beta_1 OPM_{i,t-1} + \beta_2 CCC_{i,t} + \beta_3 CCC_{i,t}^2 + \\ + \partial_1 a_{i,t} + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \\ + \partial_5 sg_{i,t} + \gamma gdppc_{j,t} + \varepsilon_{i,t}$$

Results show a significant effect of CCC and its square on GPM, however, it lacks impact on OPM, and instead CCC^2 is significant on this variable (*Table 10*). We observe a non-linear relation referred from opposite signs of CCC and CCC^2. We observed no difference among countries in GPM, however, in OPM estimation Kuwait differs from others. Both relations are positive, implying that an increase in per capita GDP would boost OPM in these countries. Overall significances are relatively higher than those of model 1 however they are lower than models 2 and 3.

The second part of model 4 is composed of two equations testing the potential effect of CCC components on PR under different per capita GDP. The equations and results follow.

15 —

$$GPM_{i,t} = \beta_0 + \beta_1 GPM_{i,t-1} + \beta_2 RDAY_{i,t} + \beta_3 RDAY_{i,t}^2 + \\ + \beta_4 IDAY_{i,t} + \beta_5 IDAY_{i,t}^2 + \beta_6 PDAY_{i,t} + \beta_7 PDAY_{i,t}^2 + \partial_1 a_{i,t} + \\ + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \gamma gdppc_{j,t} + \varepsilon_{i,t}$$

16 —

$$OPM_{i,t} = \beta_0 + \beta_1 OPM_{i,t-1} + \beta_2 RDAY_{i,t} + \beta_3 RDAY_{i,t}^2 + \\ + \beta_4 IDAY_{i,t} + \beta_5 IDAY_{i,t}^2 + \beta_6 PDAY_{i,t} + \beta_7 PDAY_{i,t}^2 + \partial_1 a_{i,t} + \\ + \partial_2 gear_{i,t} + \partial_3 ocf_{i,t} + \partial_4 cpx_{i,t} + \partial_5 sg_{i,t} + \gamma gdppc_{j,t} + \varepsilon_{i,t}$$

Table 11 demonstrates to what extent components of CCC affect profitability with given GDP per capita differences of countries. The components have no significant impact on profitability ratios. Only PDAY 2 has an impact on OPM. GDPs per capita of countries except UAE are indifferent. UAE deviates from the group in GPM tests.

CONCLUSION

This study aimed to shed light on the relationship between profitability and WCM indicators in

Table 11

Regression Results of Equations 15–16

	Eq. 15: GPM–CCC Comp.		Eq.16: OPM–CCC Comp.	
Values	**Coefficients**	**Std. Error**	**Coefficients**	**Std. Error**
Constant (β_0)	–0.6040	0.6077	0.2626	0.8831
LAG PR	0.2503	*0.1353	0.2239	**0.0936
RDAY	0.0003	0.0004	0.0000	0.0005
RDAY^2	0.0000	0.0000	0.0000	0.0000
IDA	0.0000	0.0008	0.0007	0.0011
IDAY^2	0.0000	0.0000	0.0000	0.0000
PDAY	0.0004	0.0006	0.0005	0.0006
PDAY^2	0.0000	0.0000	0.0000	**0.0000
a	0.0410	0.0322	–0.0138	0.0457
gear	–0.0775	0.0685	–0.0852	0.0884
ocf	0.0794	***0.0296	0.1091	***0.0254
cpx	–0.2417	**0.1127	–0.0277	0.0675
sg	0.0635	*0.0344	0.0301	0.0342
BAH	0.0000	0.0000	0.0000	0.0000
KWT	0.0000	0.0000	0.0000	0.0000
OMN	0.0000	0.0000	0.0000	0.0000
QTR	0.0000	0.0000	0.0000	0.0000
UAE	0.0000	*0.0000	0.0000	0.0000
Significance	***51.52		***183.98	

Source: compiled by the authors based on statistical analyses.
Note: *** Significant at 1%, ** Significant at 5%, *Significant at 10%.

changing macroeconomic conditions across time and countries. Four models are constructed and tested whether two profitability ratios are related to CCC or its components. Additionally, we selected three macroeconomic indicators and added them to the model as control variables to include country specific as well as period-wise differences among observations. We added company specific control variables to have more accurate results which are aimed to be unbiased. We used a dynamic panel data model as there is endogeneity in the independent variables.

CCC has a significant partial effect on profitability itself. Components of CCC generally lack partial significance. The components of CCC have no significant influence on profitability but their combination makes aggregation and thus CCC itself has a much more meaningful impact on dependent variables. It can be concluded that the companies must adopt a comprehensive working capital approach covering all components of CCC. The responsiveness of GPM is more significant to CCC than that of OPM. In most equations, the partial significance of CCC and its square on GPM is higher than OPM.

Firstly, equations taking OPM as regressand bear the highest overall significance and they are followed by those with GPM. Second, the equations with components of CCC provide considerably higher overall significances than those with CCC itself in explaining OPM. For the equations taking GPM as a dependent variable, though CCC components have relatively higher overall significances, these differences are not sharp as OPM. The conflict between partial significances and overall significances in regressions shows us control variables have more

power in explaining variations in OPM rather than GPM since OPM has lower partial significance but higher overall significances. Company specific variables are selected to control for sources of variations for each company. Among the company specific variables, OCF disperses from others in significant effect. Almost all regressions show the same pattern, especially in all profitability ratios.

One of the models has no economic indicator and the other three include one indicator namely, unemployment, inflation, and GDP per capita. Firstly, all models with economic indicators provide higher overall significances compared to the plain model. Among economic indicators, unemployment and inflation provide the best results in explaining variations among countries and changes in economic conditions in time. GDP per capita has a moderately significant effect on profitability. Saudi Arabia has the biggest number of companies in the dataset; hence we took Saudi Arabia as the benchmark and tested how other companies deviate from companies in Saudi Arabia. We noticed that UAE disperses significantly from Saudi Arabia and in some models; we see Kuwait differs. Oman, Qatar and Bahrain companies follow the same pattern as Saudi Arabia Companies. We verified the relationship between cash conversion cycle and profitability and our models present a non-linear relationship between profitability and cash conversion cycle since the signs of CCC in models are opposite whereas signs of CCC^2 are positive.

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