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Working Capital Management Aggressiveness and Its Performance: Evidence from Agro-Food Industry in Thailand

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Abstract

The primary objective of this research study was to empirically examine the association between the efficiency of working capital management (WCM), comprising measures such as the Cash Conversion Cycle (CCC), Efficiency Index (EI), Aggressiveness Index (AGGR), and Accounts Receivable Aggressiveness (ARAGGR), and the financial performance (FP) metrics, including Earnings on Assets (EOA) and Return on Assets (ROA). Additionally, this study aimed to compare the efficiency of WCM across various models of publicly listed companies operating in Thailand's Agro & Food Industry. The study utilized a dataset spanning a period of 11 years, from 2007 to 2018, encompassing a sample of 53 enterprises listed within the Agri-business and Food & Beverage sectors. The data was sourced from the SETSMART database, a reputable financial data repository. To investigate the relationship between WCM efficiency and financial performance, the study employed multiple regression analysis. The empirical findings from this research indicate that all the independent variables associated with WCM have a statistically significant impact on financial performance. Notably, the variable AGGR exhibited the most substantial influence on financial performance, as evidenced by its beta coefficient of 0.485. These findings suggest that a model incorporating a combination of performance metrics provides a more comprehensive explanation of the interplay between working capital management and financial performance.

Keywords: Working capital, Management, Aggressiveness, Performance, Agro-food

Introduction

Working capital is one of the essential factors for business management. It serves primarily to promote competitiveness. Vahid et al. (2012) promote a good image of the business, enhance employee morale, strengthen the credit and confidence of partners, and most importantly, prevent businesses from short-term liquidity problems (Sagner, 2014). However, it has been found that maintaining a high level of working capital in the business is only sometimes beneficial. Companies can use this working capital to invest in several investment projects. Instead of being reserved for operations (Ross et al.,2005), financing also has costs. High working capital will cause the business to bear the high financial costs.

The agricultural and food industry is considered the country's primary industry, with the potential to compete globally. It is regarded as a significant precursor industry for many industries in the country. This affects determining the amount of working capital that must be

reserved. In addition, there are limitations of agricultural products that are different from ordinary goods, namely, the period of spoilage or the shelf life of the produce, which is shorter than that of common goods, which makes storage costs increase, so it is a challenge for businesses to manage working capital appropriately enough for the operation of the company. It supports fluctuations in inputs and can enable the business to achieve the goal of creating wealth for shareholders. Therefore, we are interested in measuring the efficiency of working capital management on performance. Using performance indicators along with financial ratios measures the impact on operations.

Research objectives
　　　1. Test the relationship between WCME and FP of listed companies in Thailand's agricultural and food industries.
　　　2. Compare the WCME of each model.

Literature reviews
　　　Working capital is money an entity must provide for normal operating activities. It is like the blood that nourishes the body to function normally (Padachi et al.,2012). Working capital management policy is the relationship between using working assets and providing working capital. It can be divided into three types (Wongweerawut & Riw-in, 2013): 1. Middle Line Management, 2. Risk Management, and 3. Careful Management. Proper working capital management will affect the long-term growth prospects of the business. If the business can maintain an appropriate working capital level according to the nature of its business, it can reduce internal and external costs (Filbeck & Krueger 2005). The nature of management's management is one factor that determines the direction of operations. If management is aggressive, it will have low working capital reserves. This allows the business to invest money in other projects. On the other hand, if the management is risk-averse (Conservative), there will be a high level of working capital reserves for fear of lack of liquidity, which will affect the lousy image of business partners and may cause the business to file for bankruptcy (Brigham &; Gapenski,1997).
　　　Previous studies on the relationship between working capital management and financial performance. It was found that the variables used to measure performance consisted of the following. 1) Return on Asset (ROA) (Shin & Soenen, 1998; Falope & Ajilore, 2009). 2) Return on Capital Employed: ROCE (Smith &; Begemann, 1997; Vishnani & Shah, 2007). 3) Return on Equity: ROE (Afza & Nazir, 2008; Azam & Haider, 2011. 4) Gross Operating Profit (GOP) (Shin & Soenen,1998; Abuzayed,2012; Vural et al, 2012; Napompech, 2012). 5) Net Operating Profit (NOP) (Raheman & Nasr, 2007; Ramchandran & Janakiraman, 2009). 6) Tobin's Q ratio (Lamberson, 1995). Research also uses liquidity ratios to measure the effectiveness of working capital management consisting of the Current Ratio (CR) (Lamberson, 1995; Nilsson, 2010) and the Quick Ratio (QR) (Emery, 1984; Valipour et al, 2012). There are also capital management performance metrics, combining multiple financial ratios to measure liquidity in the time dimension. Such ratios include the Cash Conversion Cycle (CCC) (Samiloglu & Demirgunes, 2008; Mehmet & Eda, 2009; Mohamad & Saad, 2010; Alipour, 2011; Vural et al., 2012; Tauringana & Afrifa, 2013). The components of a cash cycle consist of three sub-ratios: 1) Days' Inventories (DI) (Smith & Begemann, 1997; Vishnani & shah, 2007; Napompech, 2012) is the average time for goods to be sold, 2) Days' Receivables (DR) Ramachandran and Janakiraman, 2009; Sharma & Kumar, 2011; Dong & Su, 2010) is the collection period, and 3) Days' Payables (DP) (Azam & Haider, 2011; Abuzayed, 2012) is the time it takes to receive credit from creditors with the relation of CCC = DI + DR - DP. The

lower the CCC value, the better because it shows how quickly the invested cash turns around. The more negative CCC can be managed, the more the business can receive cash in advance and invest in generating returns.

At the same time (Shin & Soen, 1998; Ganesan, 2007; Raheman & Nasr, 2007), working capital management efficiency metrics have been created that are similar to CCCs but are sales-based. Subsequently, working capital management efficiency measurements were developed. By removing dimensional constraints to be more comprehensive. In Bhattacharya's (1997) work, an index was developed to measure the effectiveness of working capital management comprising the Performance Index (PI), Utilization Index (UI) and Total Efficiency index (EI), PI demonstrates the ability to use different groups of working capital to generate sales, which is a comparative measure of efficiency between input and output. If the calculated PI and UI index values are greater than 1, it indicates the efficiency of working capital management. By the way, the EI index shows the overall synergy of two indices (EI = PI*UI). The operating results are as follows.

Table 1 The direction of the relationship between the independent and dependent variables, which is a performance

Independent variables	Relationship with Performance	Related literatues
CR	+	(Azam & Haider,2011; Zubairi,2010)
	-	(Lamberson,1995; Nilsson,2010)
QR	-	(Emery,1984; Valipour et al.,2012)
CCC	-	(Mohammad and Saad,2010; Alipour,2011; Vural et al.,2012;Tauringana & Afrifa,2013)
DI	+	(Smith & Begemann,1997; Gill et al.,2010; Abuzayed,2012)
	-	(Dong & Su,2010; Karaduman et al.,2010; Alipour,2011;Azam & Haider,2011; Ching et al., 2010; Sharma and Kumar, 2011; Napompech,2012)
DR	+	(Ramachandran and Janakiraman,2009; Sharma and Kumar,2011; Abuzayed,2012)
	-	(Dong &Su,2010; Gill et al., 2010;Karaduman et al.,2010; Mathuva, 2010; Alipour,2011; Abuzayed,2012;Napompech,2012; Vural et al.,2012; Akoto et al.,2013)
DP	+	(Ramachandran and Janakiraman,2009; Dong & Su,2010; Mathuva,2010; Alipour,2011; Azam & Haider,2011; Abuzayed,2012)
	-	(Deloof,2003; Raheman & Nasr,2007 ; Charitou et al., 2010; Karaduman et al.,2010; Sharma and Kumar, 2011)
PI	+	(Bhattacharya,1997; Kasiran, Mohamad & Chin,2015)
UI	+	(Bhattacharya,1997; Kasiran, Mohamad & Chin,2015)
EI	+	(Bhattacharya,1997; Kasiran, Mohamad & Chin,2015)

From Table 1, the effectiveness of working capital management on the performance of the business is measured in three ways as follows.

1. Direct ratio measurement found that most research uses operational efficiency measurement ratios (DI, DR, DP, CCC), primarily focusing mainly on accounts receivable management. In addition, liquidity ratios are used as a metric.

2. Measuring the efficiency of working capital management by measuring the cash cycle (CCC)

3. Index measurement (PI, UI, EI), is a comparative performance measure between input factors and output. It is calculated as an index value.
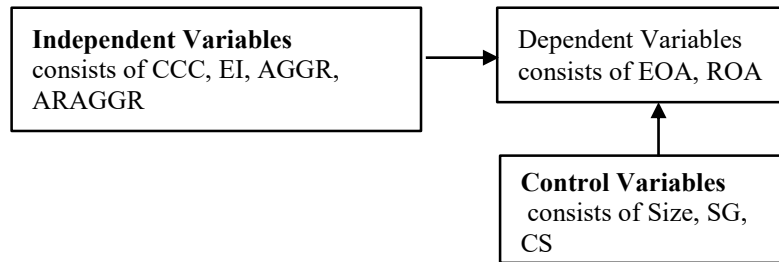
The research conceptual framework

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┌─────────────────────────┐          ┌─────────────────────────┐
│ Independent Variables   │   ──▶    │ Dependent Variables     │
│ consists of CCC, EI, AGGR, │        │ consists of EOA, ROA    │
│ ARAGGR                  │          │                         │
└─────────────────────────┘          └─────────────────────────┘
                                                  ▲
                                                  │
                                      ┌─────────────────────────┐
                                      │ Control Variables       │
                                      │  consists of Size, SG,  │
                                      │ CS                      │
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Figure 1 The research conceptual framework (Source: Researcher, 2023)

Methodology

Population and sample: The study's population comprises companies listed on the Stock Exchange of Thailand within the Agro-food industry, which maintains active status and has not undergone delisting. This population encompasses 11 companies in the agro-industry group and 42 in the food industry group, totaling 53 companies. To minimize potential disruptions from the COVID-19 pandemic, which could affect daily operations, this study decided to use data from a period prior to the occurrence of COVID-19. This method focuses on companies listed in the industry with consistent financial standing and operational performance over an extensive 11-year period, spanning from 2007 to 2018. Additionally, these selected companies meet the specified financial liquidity criteria and are not undergoing business rehabilitation.

Data Collection Method: This study relies on the collection of secondary data sourced from the SETSMART database of the Stock Exchange of Thailand.

Data Analysis:

Multicollinearity Test: Multicollinearity denotes a scenario in which multiple explanatory variables within a multiple regression model display high linear interrelationships. To assess multicollinearity, this study employs the correlation coefficient (r). When the correlation coefficient (r) surpasses 0.8, it indicates the presence of severe multicollinearity (Rangkakulnuwat, 2013).

Multiple Regression Analysis: Multiple regression analysis is employed to investigate the relationships between dependent variables (ROA and EOA) and independent variables (CCC, EI, AGGR, and ARAGGR) at a significance level of 0.05.

Variables and assumptions: The variables used in this study are divided into three groups as follows. 1. Independent variables consisting of 1.1 Cash Conversion Cycle (CCC), 1.2 Aggressiveness (AGGR), 1.3 Efficiency Index of Working Capital Management (EI(WCM), and 1.4 The impacts between Accounts Receivable Aging and Aggressiveness (ARAGGR). 2. Dependent variables consist of 2.1 Efficiency of Assets (EOA), and 2.2 Return on Assets (ROA). 3. Control variables consist of 3.1 Sales Growth (SG), 3.2 Financial Structure (FS), and 3.3 Firm Size (SIZE). Whereas, the variables can be measured by the following formula, as shown in Table 2.

Table 2 The variable data and measurement details

Variables	Formula
CCC	DI+DR-DP DI = Item shelf life in days, calculated from <div align=center>$\dfrac{365/\text{timesAverage Value of Inventory}}{\text{cost of sales}}$</div>DR = Accounts Receivable in days, calculated from <div align=center>$\dfrac{365/\text{imesAverage Account Receivable}}{\text{Circulation/Net Credit Sales}}$</div>DP = Accounts payable aging in days, calculated from <div align=center>$\dfrac{365/\text{timesAverage Payable Receivable}}{\text{purchases ledger}}$</div>
EI	$EI_{(WCM)} = PI_{(WCM)} \times UI_{(WCM)}$ While $PI_{(WCM)} = I_s \dfrac{\sum\limits_{i=1}^{n} \dfrac{W_{i(t-1)}}{W_{i(t)}}}{N}$ I_s = Sale Index = $S_t / S_{(t-1)}$ W_i = Individual group of current assets $UI_{(WCM)} = \dfrac{A_{t-1}}{A_t}$ N = Number of current asset group I = 1,2,3…N A = Current Asset /Sales
ARAGGR	AR x AGGR Is the impacts between Accounts Receivable Aging and Aggressiveness equal to the multiply of AR and AGGR. If its value equal to 1 indicated that there is an impact between Accounts Receivable Aging and Aggressiveness to the operating results. On the other hand, if AGGR is 0, it stated that no impact of capital management on operating results.
ROA	NI/TA While NI = Net Income TA = Total assets It is a measure of the return on the use of assets. Is the profit worth investing in assets?
EOA	EBIT/TA While EBIT = Earning before Interest and Tax TA = Total assets It is a measure of the return on the use of an asset, but by the amount of cash whether the asset is being used worthwhile. By cutting off the influence of acquisition of capital.
FS	TDB /TA Measure financial structure. Overall, how much financing does the company have from the source of debt? Which reflects the total risk of the company.
Size	LN(TA) It is a measure of the size of business based on the size of its assets by finding the natural log of total assets

AGGR	TCA/TA – TD/TA
	While TCA = Total Current Assets
	    TA = Total Assets
	    TD = Total Debts
	AGGR Variables, management style is measured by the difference between the ratio of investment in current assets compared to total assets and the ratio of financing from debt. If the value of TCA/TA – TD/TA > 0, its value is equal to 0 which means that money from debt sources is used to invest in fixed assets. Instead of sourcing from sources of capital. When TCA/TA – TD/TA =< 1, its value is equal to 0 means that it is other than Non-Aggressive.

Hypothesis to test the relationship between working capital management efficiency and operating results.

$H_{1.1}$: The CCC has a negative correlation with its performance statistically significant because if the CCC has a shorter cash cycle, the better the impact on the business.

$H_{1.2}$: AGGR is positively correlated with performance statistically significant. Due to the risk-taking management, there is an opportunity to generate returns for the business.

$H_{1.3}$: ARAGGR negatively correlates with operating results statistically significant because the risk-taking management will result in better business profitability.

H_1: EI is correlated with financial performance statistically significant because if the business can manage working capital effectively will affect the company's financial performance.

Methods of data analysis and statistics used in data analysis

Analysis of data and statistics used in data analysis is divided into two parts as follows:

Part 1 Descriptive Data Analysis, Statistics used in data analysis include Mean, Standard Deviation, Skewness, and Kurtosis. Part 2: Inferential Data Analysis, the statistics used in the data analysis are Multiple Regression Analysis to test the relationship between working capital management efficiency and operating results. The equation used to test the relationship is as follows:

$$\text{Performance}_{i,t} = B_0 + B_1\text{CCC}_{i,t} + B_2\text{SG}_{i,t} + B_3\text{CS}_{i,t} + B_4\text{SIZE}_{i,t} + e_{i,t}$$

$$\text{Performance}_{i,t} = B_0 + B_1\text{CCC}_{i,t} + B_2\text{AGGR}_{i,t} + B_3\text{SG}_{i,t} + B_4\text{CS}_{i,t} + B_5\text{SIZE}_{i,t} + e_{i,t}$$

$$\text{Performance}_{i,t} = B_0 + B_1\text{CCC}_{i,t} + B_2\text{AGGR}_{i,t} + B_3\text{ARAGGR}_{i,t} + B_4\text{SG}_{i,t} + B_5\text{CS}_{i,t} + B_6\text{SIZE}_{i,t} + e_{i,t}$$

$$\text{Performance}_{i,t} = B_0 + B_1\text{CCC}_{i,t} + B_2\text{AGGR}_{i,t} + B_3\text{ARAGGR}_{i,t} + B_4\text{EI}_{i,t} + B_5\text{SG}_{i,t} + B_6\text{CS}_{i,t} + B_7\text{SIZE}_{i,t} + e_{i,t}$$

There are two variables used to measure the financial performance of the business: Efficiency of Assets (EOA) and Return on Assets (ROA).

Results

The Descriptive Data Analysis found that the dependent variables, EOA and ROA have a mean of 0.09 and 0.0698, with standard deviations of 0.10417 and 0.09, respectively. The independent variables, CCC, EI, AGGR, and ARAGGR have a mean of 71.70, 3.61, 0.41, and 18.65, with standard deviations of 107.97, 46.6, 9, 0.49, and 35.89, respectively. The control variables, SG CS and size, have a mean of 0.0510, 0.4134, and 22.3428, with standard deviations of 0.21, 0.21, and 1.25, respectively.

This study used Skewness and Kurtosis as dispersion statistics to test the distributions of various variables whether normality distribution or non-normal distribution The values for asymmetry and kurtosis between -2 and +2 are considered acceptable in order to prove normal univariate distribution (George & Mallery, 2019) When considering the data distributions of various variables, the EOA and ROA found that apart from George & Mallery (2019) which were slightly dominant (Kurtosis statistics>2). The independent variables, CCC and AGGR have normal distributions, while the EI and ARAGGR are highly dominant. The control variable, CS has a normal distribution, and the variables SG and Size are slightly dominant. So, researchers do the log transform to improve data to a normal distribution (Hair, et al,1998), as shown in Table 3.

Table 3 The Descriptive Data Analysis

Variables	N	Mean	Std. Deviation	Skewness		Kurtosis	
				Statistics	Std. Error	Statistics	Std. Error
Dependent Variables							
EOA	370	.0907	.10417	1.785	.126	5.624	.252
ROA	370	.0698	.08719	1.729	.126	6.260	.252
Independent Variables							
CCC	370	71.7003	107.97370	-.091	.122	1.843	.243
EI	370	3.6132	46.68579	19.236	.126	370.660	.252
AGGR	370	.4144	.49323	.349	.122	-1.888	.243
ARAGGR	370	18.6516	35.88730	3.308	.122	14.814	.243
Control Variables							
SG	370	.0510	.21298	.639	.126	5.096	.252
FS	370	.4134	.21143	.347	.127	-.463	.253
Size	370	22.3428	1.24456	1.089	.122	2.249	.243

Multicollinearity Test

Results from the test of Linear Relationship between the pairs of independent variables found that none of them had correlation values exceeding the norm 0.8 (Rangkakulnuwat, 2013). It stated that there was no Collinearity between independent variables. The highest correlation is the AGGR and FS, which had a value of 0.619 at a significant level of .01, which did not exceed the norm.

According to the findings on WCME and FP, as measured by ROA (equations 1-4), the CCC variable has a negative relationship to performance at a significant level of .05, it consistent with the hypothesis, expressed as beta coefficients of -0.237, -0.269, -0.254, and -0.257 in equations 1-4, respectively. The variable AGGR positively correlates to performance at a significant level of .05, it consistent with the hypothesis, expressed as beta coefficients of 0.354, 0.460, and 0.45 in equations 2-4, respectively. The ARAGGR variable negatively correlates to performance at a significant level of .05, consistent with the hypothesis, expressed as beta coefficients are -0.1 54, and -0.157 in equations 3 and 4, respectively. Whereas the EI variable negatively correlates with a performance at the significant level of .05, it is inconsistent with the hypothesis, expressed as the beta coefficient is -.103. The SG is the only control variable, statistically significant in all equations, and size is the only control variable that does not affect the relationship between working capital management efficiency and performance. The results of the WCME and FP studies found that the EOA showed indifference from the ROA model, in which the CCC variable had a negative relationship to performance at the significant level of .05, consistent with the hypothesis, expressed as beta coefficients of -0.264, -0.299, -0.283 and -0.286 in equations 1-4, respectively. The variable AGGR positively correlates with a performance at the significant level of .05, consistent with the hypothesis, expressed as beta coefficients of 0.377, 0.485, and 0.471 in equations 2-4, respectively. The ARAGGR variable negatively correlates to performance at a significant level of .05, consistent with the hypothesis. The beta coefficients are -0.157 and -0.160 in equations 3 and 4. While the EI variable has a negative correlation with a performance at the significant level of .05, it is inconsistent with the hypothesis, expressed as the beta coefficient is -.093. The SG is the only control variable statistically significant in all equations, and size is the only control variable that does not affect the relationship between working capital management efficiency and operating results, as shown in Table 4.

Table 4 The efficiency of working capital management and operating results

Dependent variables /Equation		Independent variables				Control variables			Adj R^2
		CCC	AGGR	ARAGGR	EI	SG	FS	SIZE	
Model 1 ROA	1	-.237*				.154*	-.324*	-.042	20%
	2	-.269*	.354*			.119*	-.083	-.011	26.5%
	3	-.254*	.460*	-.154*		.122*	-.067	-.006	27.7%
	4	-0.257*	0.45*	-.157*	-.103*	.138*	-.080	-.010	28.6%
Model 2 EOA	1	-.264*				.163*	-.276*	-.060	19%
	2	-.299*	.377*			.126*	-.021	-.027	26.4%
	3	-.283*	.485*	-.157*		.129*	-.004	-.472	27.7%
	4	-.286*	.471*	-.160*	-.093*	.144*	-.015	-.026	28.3%

* Statistical significance level at .05

Discussions

According to the study result, all dependent variables except size significantly influenced a firm's FP and followed the hypothetical; CCC (-), AGGR (+), and AGGR (-) to FP. CCC indicates how long it takes from the time the cash is paid out until the cash is returned. Particularly, the Agro-food industry, which has higher storage costs than other industries, must have sufficient working capital. A shorter CCC makes lower opportunity costs and higher FP.it was consistent with (Samiloglu & Demirgunes, 2008; Mehmet & Eda,2009; Mohammad and Saad,2010; Alipour,2011; Vural et al.,2012; Tauringana & Afrifa,2013). Management style (AGGR) which, is the most significant influence on FP (the beta value was the highest of all equations) indicates the level of debt financing funding for investment projects is a positive sign (+) that means more aggressively is more debt funding let to be higher FP. It was consistent with (Chancharat & Kumpamool, 2020) and it was contrasted with (Wichitsathian, 2022; Al-Mawsheki, 2022). Besides, account receivable management under risk appetite (ARAGGR) is one factor that indicates FP; shorter accounts receivable aging means to get paid off faster let higher FP. From above implies that a firm with a working capital aggressiveness is better in FP, In addition, measuring the relationship between WCME and FP, models combining performance metrics can explain the relationship between working capital management efficiency and operating results (Model 1, Equation 4, Adj R2= 28.6%) and (Model 2, Equation 4, Adj R2 = 28.3%). Compared to using a measurement model with only one element.

Conclusion and suggestions

This research aims to study the effect of Aggressiveness WCME and its OP. Using 10-year financial ratio in the Agro-Food Industry of Thailand. Multiple linear regression was employed to test the relationship between WCME and OP, then comparing its efficiency among models. The result found that there is a negative relationship between WCME and its OP; CCC (-), ARAGGR (-), EI (-), and a positive relationship AGGR (+) which indicate that aggressive

characteristic lead to better performance. The model with a combination of CCC, ARAGGR, and EI is the best in prediction; and the highest Adjust R^2 in both models. However, size is not affected for all models.

Recommendations from the study.

1. In the context of the Agri-Food Industry, debt financing led to the higher FP. Financing debt sources will improve the operating results without depending on the business size.

2. The Efficiency Index (EI) results are contrary to the FP, showing There are other factors besides working capital management that affect financial performance, such as long-term asset management. sub-investment projects, etc. Entrepreneurs or interested parties should use the research results with caution.

Recommendations for further study.

To study the efficiency of measuring working capital management for the agro-food industry to cover more dimensions, interested persons can learn the measurement of efficiency in inventory management along with the performance measured through Tobin's Q ratio.

New knowledge and the effects on society and communities

In this study, the interaction effects of aggressive working capital management policy and account receivables management (ARAGGR) were investigated within the context of the Agro-Food industry, the results found that there is a negative relationship between ARAGGR and FP, meaning that debt financing together with accelerating the collection period (shortening the debtor's age) could make the performance better.

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