Impact of working capital management on profitability: the case of Canadian firms

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Abstract

Impact of working capital management on profitability: the case of Canadian Firms

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This paper evaluated the relationship between firm profitability and the quality of working capital management by investigating the Canadian equity market. Through correlation and regression analysis, a negative relationship between working capital management and profitability was observed. Moreover, a strong positive relationship between firm size and profitability was discovered.

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Chapter 1

Introduction

1.1 Background of the study

In the world of corporate finance, it is widely believed that the primary financial objective of a company is to maximize the firm value thus maximize the shareholder's value. To pursue this objective, it is necessary for management to ensure that the capital of the firm is properly invested in projects that could yield positive cash in-flows or net present value.

Working capital management, which involves the relationship between a company's short-term assets and short-term liabilities, is an essential function of the firm's financial management. In the finance literature, numerous empirical analysis has been conducted to elaborate on the effect of financing and investing activities on the value of a firm.

Net working capital, from an accounting basis, refers to the difference between current assets and current liabilities. Components of net working capital that have direct impact on relevant ratios include accounts receivable, inventory, accounts payable and the current portion of the firm's long-term debt (Erasmus, 2010) .

Investment in net working capital is necessary to ensure normal business operations and to generate revenue. Insufficient net working capital may cause a liquidity problem for the firm as there is less cash flow to pay for short-term debt or to purchase raw materials. Insufficient cash or inventory could damage daily operations, sales and eventually affect profitability. Also the firm will be unable to take on new investment opportunities or to adapt to quick changes in market or economic conditions. On the other hand, an over-invested new working capital will decrease the over-all utilization of capital as more funds are locked in business operations. The opportunity cost of investment would rise and the cost of capital will also rise if the firm has a considerable amount of capital from external financing (Mansoori & Datin, 2012).

There are three major classifications of working capital management according to Weinraub & Visscher (1998). They are aggressive, moderate and conservative working capital management strategies based on the risk and return characteristic of the firm's capital investment policy.

An aggressive policy requires a lower than industry-average working capital which consequently yields a high liquidity risk and high return on investment. A conservative policy is focused on keeping more than sufficient working capital to ensure great liquidity, but the return on investment will be lower. The moderate policy

tries to accompany an average risk and return trade-off by managing working capital

in a way that liquidity risk and return on investment are all kept within an acceptable

range. The nature and intensity of working capital management policy among

different industries is significantly different.

1.2 Rationale of the study

Traditionally, net working capital measurement is more focused on the liquidity

perspective, ratios such as current and quick ratio, along with accounts receivable and

inventory turnover ratio, are all monitored to evaluate working capital management

(Erasmus, 2010). One famous standard performance measure is called the Cash

Conversion Cycle (CCC), which was introduced by Richards & Laughlin (1980). It

represents the time-period between the purchase of necessary resources, including raw

material to the final recovery of cash receipts or account receivable. By examining

CCC and other variables specified in Chapter 3, this paper will conduct both

descriptive and correlation analysis with the help of regression techniques.

1.3 Objective of the study

The objective of the study is to determine the relationship between firm profitability and the quality of working capital management by investigating the Canadian equity market.

It is believed that this study will enrich the existing literature, bring insights to market participants and help managers understand the importance of working capital management.

1.4 Limitation of the study

Besides internal factors that could affect the efficiency of working capital management, external factors such as corporate governance, foreign policy and the intensity of working capital management cannot be neglected. Gill & Biger (2013) pointed out that the efficiency of working capital management is connected to several features of corporate governance as the conflict between managers and shareholders has profound impact on firm's profitability. This paper is limited by the fact that the magnitude of external factors cannot be captured by our model.

1.5 Chapter organization

Following this brief introduction regarding the basics of this study in this chapter,
Chapter 2 will focus on previous research concerning working capital management in
the literature. Chapter 3 will cover the data sources and research methodology applied
in this study. Finally, research analysis, results and conclusions will be presented in
both Chapters 4 and 5.

Chapter 2

Literature review

A fast growing literature on the relationship between working capital management and profitability has been evident in the past few decades. The definition of CCC by Gitman et al (1979) along with the following investigation of CCC and profitability among Belgian firms by Deloof (2003) provide a foundation that leads to a field of in-depth research. In these previous studies, there is sufficient evidence to support the hypothesis that some critical indicators of working capital management quality have impact on firm's profitability.

Among these relevant studies, three major approaches are identified attempting to measure the efficiency of working capital management. The first approach tries to look at the performance side of the working capital of a company by examining variables such as growth rate, sales, return on asset and operating cash-flow. Another way to understand how working capital is managed is to investigate the utilization process, which can be demonstrated by debt ratio, investment ratio and operating leverage. Lastly and most importantly, the approach to evaluate overall efficiency is generally accepted. Numerous studies have adopted the concept of Cash Conversion

Cycle and Net Trading Cycle as standard measurement of working capital management efficiency, such as the investigation by Erasmus (2010) on South African industrial firms; the investigation by Mansoori & Datin (2010) on Singapore firms; the investigation by Nobanee et al (2010) on Japanese firms.

Ratio and performance analysis is the foundation of the literature regarding profitability and working capital. Inventory, account receivables, account payables are the major components of net working capital and their impact on profitability has been examined.

Although large inventory and credit sale may stimulate total sales, the time it takes to sell and replace inventory will get longer, moreover, large amount of capital investment will have to be kept in working capital. Inventory turnover ratio, which represent the efficiency of inventory management, is expected to be high for firms with greater profitability. A low inventory turnover ratio could indicate either poor sales or an excess amount of inventory. Account payables also played a critical role in managing working capital because delaying bill payments is one of the tools for management to have access to an inexpensive source of financing. However, the opportunity cost of keeping high account payables will hurt the business if an early payment discount is offered. In the research of Deloof (2003), statistically significant negative relationship between the profitability of Belgian firms and the number of

days accounts receivable/inventories were discovered.

In other studies, the impact of payable and receivable is more thoroughly explored. Porta et al. (1997) concluded that payment period tend to be longer for countries in insufficient and smaller capital markets. Bank financing and credit sale are more attractive when there is asymmetric information and agency problem. Solano & Pedro (2007) investigated the empirical evidence on the effects of working capital management on profitability in Small and Medium size firms (SME) in Spain. By using panel data and fix effect models, they confirmed the importance of managing inventory and current liabilities because these firms rely heavily on external financing. Ratio and performance analysis from an accounting perspective is readily available in the literature. For example, Raheman et al (2011) performed a comprehensive analysis of profitability and the basic components of accounting measures such as receivable turnover in days, inventory turnover in days and payable turnover in days.

Although ratio analysis is viewed as key indicator of a firm's working capital position and it is also used in many capital asset pricing models, caution is still needed. Richards & Laughlin (1980) argued that static indicators have limitations as they do not take consideration of the amount and timing of cash inflows and outflows. Gitman et al. (1979) first defined the Total Cash Cycle (TCC) as the time interval between first cash outflow and final cash inflow in the production process. This concept was

later redefined by Richards & Laughlin (1980) as the Cash Conversion Cycle as discussed in the previous chapter. CCC successfully summarized the operating cycle by incorporating the individual effects of inventory conversion period, receivables conversion period and payables deferral period. Firms with lower CCC are faster collecting cash from customer and paying trade credit to suppliers and they are more efficient handling operation and do not rely heavily on bank financing (Erasmus, 2010). Therefore, these firms will have higher present value of cash flow and more efficient working capital management.

However, CCC has also caused some considerable controversies and critics. First, CCC only applies to industries that are involved in the actual production of consumer goods. Banking and service sectors will not benefit from CCC analysis since they are conducting business in a completely different model and they do not have actual inventory on hand or inventory. Moreover, as pointed out by Gentry et al. (1990), CCC only focuses on the operating process associated with the firm's capital, but not the amount invested in other related area such as equipment, supply chain, manufacture systems. The refined version of CCC, Weighted Cash Conversion Cycle is defined to give a more comprehensive view of how total capital related to a certain product is utilized.

Many international studies have been conducted in the recent years. To name a few, studies have been conducted for Pakistani firms on Karachi stock Exchange for a five year period using constant coefficients model (Usama, 2012); for companies listed on the Thailand Stock Exchange using multiple regression models (Appuhami, 2008); for firms listed on Tokyo Stock Exchange in the period from 1990 to 2004 (Nobanee et al, 2010). The majority of these similar studies have confirmed the same finding as Deloof (2003) that corporate profitability is negatively associated with the Cash Conversion Cycle, which indicates that improving working capital management efficiency has a positive impact on the firm's overall return on capital.

Chapter 3

Data sources and Research methodology

3.1 The sources of data

The Canadian equity market is a fairly mature market and the Toronto Stock Exchange is the largest stock exchange in Canada and the third largest in North America. The S&P/TSX Composite Index, which comprises more than seventy percent of total market capitalization of all Companies listed on Toronto Stock Exchange, is generally viewed as a comprehensive index for the Canadian economy. Adequate sources of data on S&P/TSX Composite Index are available, such as the Canadian Financial Markets Research Centre (CFMRC), Data-Stream, Research Insight, Bloomberg and other investment resources providers dedicated to the Canadian stock market.

Extracted from Bloomberg platform, relevant firm-specific data in this study include return on common equity, financial leverage, inventory turnover, current market capital, current ratio, annual growth rate, and cash convention cycle.

Since the data used in this study are panel data where observations for the every firm will be collected repeatedly during the sample period, both time-series and cross-sectional comparison is necessary. In order to generate a robust conclusion, only firms with more than five years data are included in this study.

The S&P/TSX Composite Index is continually changing in composition because companies that fail to meet the listing criteria will be delisted. Stocks delisted from an Index are generally viewed as "losers" and those continue to be listed are viewed as "winners". Including only up to date data will result in a "survivorship bias" that a disproportional weight will be assigned to those better performance firms while firms with poor performance are dropped out, consequently, research finding will be biased (Bu & Lacey, 2007) . To avoid survivorship bias, both listed and delisted firms are included in this study.

The firm specific data are collected from the following sectors: consumer goods, consumer services, industrials, basic materials and health care. Utilities sector and financial service sectors are excluded because utilities and financial service firms have unique business models in which working capital is not significantly involved. As a result, a total sample of 115 Canadian companies listed on the S&P/TSX Composite Index with 10 years observation from 2001 to 2011 are included in this study.

3.2 Limitation of the data

In order to achieve a highly balanced multi-dimensional panel data, high frequency of individual firm data collection over the sample period is preferred considering a large magnitude of firms included in the study. In this case, quarterly data is preferred than annual data. However, many Canadian firms do not report their 10-Q form (quarterly report) publicly and corresponding data are not available on the Bloomberg system. Therefore, individual firm data were collected only on a yearly basis from their annual audited report. It is believed that if complete 10-Q data were available, the research findings would be more accurate and precise.

3.3 Variables

The dependent variable used to indicate profitability in this study is the return on common equity (RETURN_COM_EQY), calculated as net income divided by total shareholder's equity. Return on common equity is viewed as a measurement of how much value the firm created with the investment of shareholder's money and it is the ultimate goal of working capital management. In the literature, return on asset, net operating income are also used as profitability measurement.

A number of independent variables are also used. In this study the Cash Convention Cycle (CASH_CONVERSION_CYCLE) is used as a comprehensive measure of working capital management efficiency. Other variables included in this study are: financial leverage (FNCL_LVRG) as a measurement to evaluate the impact of capital budgeting decision, calculated as total assets divided by total shareholder's equity; inventory turnover (INVENT_TURN) and current ratio (CUR_RATIO) to indicate the influence of firm's liquidity; annual sales growth (SALES_GROWTH) as a measurement for growth; and finally the current market capitalization (CUR_MKT_CAP) as a measurement of firm size.

3.4 Hypotheses testing and Model specifications

To examine the relationship between working capital management and profitability, a set of testable hypotheses are made for this study:

Hypothesis 1:

H_1: There exists a significant positive relationship between working capital management efficiency and Canadian firm's profitability. Firms with better managed working capital demonstrate great earning potential.

H_0: No relationship between firm's profitability and working capital management efficiency exists.

Hypothesis 2:

H_1: There exists a significant positive relationship between firm size and Canadian firm's profitability. Firms with larger market capitalization are able to generate greater income.

H_0: No relationship between firm's profitability and firm size exists.

Hypothesis 3:

H_1: There exists a significant negative relationship between liquidity and Canadian firm's profitability. Firms with greater liquidity are expected to have lower profitability as more capital is tied up in the working capital.

H_0: No relationship between firm's profitability and liquidity exists.

By utilizing regression analysis of both cross-sectional and time series data, the first test is a general pool regression which will provide a general view of the research findings. Then the fixed effect model and random effect analysis will be conducted.

Chapter 4

Analysis of Results

4.1 Descriptive statistics

The descriptive statistics of variables are summarized in Table 4.1.

Table 4.1

Variable	Obs	Mean	Std. Dev.	Min	Max
return_com~y	1116	6.112247	22.05721	-94.2293	139.9565
fncl_lvrg	1147	2.354516	2.556965	1.004	50.8269
invent_turn	673	9.834003	13.98867	0	159.817
cur_mkt_cap	1192	3457.554	6229.401	.17	52910.04
cur_ratio	1184	3.537985	6.607662	.0004	89.9333
sales_growth	982	33.28838	127.3857	-97.2283	1962.771
cash_conve~e	660	45.25448	92.52151	-836.0141	666.1073

Note: Table 4.1 summaries the total observations, mean value, standard deviation,

minimum value and maximum value of both dependent and independent variables used

in this study.

At a first glance of Table 4.1, decent observations of return on common equity,

leverage, market capitalization and current ratio are observed. However, a

significantly low amount of observation of inventory turnover, sales growth and Cash

Convention Cycle are noticeable. Overall, the mean value of return on common equity

for all firms is 6.11% with standard deviation of 22.05. The mean value of financial

leverage for all firms is 2.35 with a relatively low standard deviation of 2.55, which

indicate a quite stable capital structure in the whole economy over the sample period.

However, an average leverage value of 2.35 is associated with explicit financial risk.

The mean value of inventory turnover for all firms is 9.83 and the mean value of the

current ratio for all firms is 3.53, Both numbers reveal a healthy liquidity condition

for Canadian firms over the sample period. The average current market capitalization

is 3457.554 with a standard deviation of 6229.4. The high standard deviation for this

variable is understandable considering that both listed firms and delisted firms are

included. The mean value of annual sales growth is 33.29% and the mean value of

Cash Convention Cycle is 45.35: both fall in the range of expectation.

4.2 Correlation analysis

The result of correlation analysis is summarized in Table 4.2.

Table 4.2

	return~y	fncl_l~g	invent~n	cur_mk~p	cur_ra~o	sales_~h
return_com~y	1.0000					
fncl_lvrg	0.1396	1.0000				
invent_turn	0.0221	0.1705	1.0000			
cur_mkt_cap	0.2355	0.0460	-0.2290	1.0000		
cur_ratio	-0.0479	-0.5612	-0.4175	0.0370	1.0000	
sales_growth	0.1693	-0.1600	-0.0557	0.0445	0.1293	1.0000
cash_conve~e	0.0073	-0.0895	-0.7561	0.1505	0.3586	0.0585

Note: Table 4.2 summarizes the analysis of Spearman's Rank Correlation of the full data set. Variables included are: return on common equity (RETURN_COM_EQY), financial leverage (FNCL_LVRG), inventory turnover (INVENT_TURN), current market capitalization (CUR_MKT_CAP), annual sales growth (SALES_GROWTH) and Cash Convention Cycle (CASH_CONVERSION_CYCLE).

To investigate the relationship between variables and the potential influence of autocorrelation, a Spearman's Rank Correlation analysis was conducted. The significant level for the testing was set at 5% level. Based on 608 observations, statistically significant positive correlations were discovered for the return on common equity and financial leverage, current market capitalization and annual growth. As for independent variables, statistically significant negative correlations were discovered for financial leverage and current ratio, inventory turnover ratio and Cash Convention Cycle. However, the Cash Convention Cycle does not show a statistically significant relationship with return on common equity.

4.3 Regression analysis

The results of general pooled regression are summarized in Table 4.3.

Table4.3

Source	SS	df	MS		Number of obs =	608
					F(6, 601) =	2.63
Model	6783.75123	6	1130.6252		Prob > F =	0.0160
Residual	258781.879	601	430.585489		R-squared =	0.0255
					Adj R-squared =	0.0158
Total	265565.63	607	437.505157		Root MSE =	20.751

return_com_eqy	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
fncl_lvrg	.7667564	.2757249	2.78	0.006	.225255	1.308258
invent_turn	.0055506	.0629326	0.09	0.930	-.1180441	.1291452
cur_mkt_cap	.0003464	.0001249	2.77	0.006	.0001012	.0005916
cur_ratio	.0466001	.2602567	0.18	0.858	-.464523	.5577232
sales_growth	2.36e-06	.0059843	0.00	1.000	-.0117503	.011755
cash_conversion~e	-.0054275	.0098472	-0.55	0.582	-.0247666	.0139116
_cons	5.807337	1.682973	3.45	0.001	2.502115	9.11256

General pooled regression is easy to perform and useful in providing a general idea regarding regression result. It is seen that the regression coefficients for the two variables FNCL_LVRG and CUR_MKT_CAP are all positive and statistically highly significant. These results indicate that a positive relationship exists between the measurement of profitability of Canadian firms and these two variables. FNCL_LVRG indicates the capital structure and solvency of a firm, while CUR_MKT_CAP measures the firm size. Based on the above observation, one would

conclude that the financing decision is important, especially the long/short term debt

financing affecting leverage significantly. Also, it appears that Canadian firms that are

large in firm size continue to demonstrate great earning ability.

To take account of the "individuality" of each firm or each cross-sectional unit,

an assumption of the intercept is necessary. Thus, both fixed effect and random effect

model are conducted.

The results of fixed effect pooled regression are summarized in Table 4.4.

Table 4.4

```
Random-effects GLS regression                 Number of obs      =        608
Group variable: code                           Number of groups   =         89

R-sq:  within  = 0.0201                         Obs per group: min =          1
       between = 0.0086                                        avg =        6.8
       overall = 0.0119                                        max =         11

                                                Wald chi2(6)       =       9.94
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =     0.1273
```

return_com_eqy	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
fncl_lvrg	.0944868	.3744138	0.25	0.801	-.6393508	.8283244
invent_turn	-.0513041	.0738515	-0.69	0.487	-.1960504	.0934421
cur_mkt_cap	.0004264	.0001494	2.85	0.004	.0001335	.0007192
cur_ratio	.2179182	.2604759	0.84	0.403	-.2926052	.7284417
sales_growth	.0045646	.0055055	0.83	0.407	-.006226	.0153553
cash_conversion~e	-.0040301	.0106028	-0.38	0.704	-.0248112	.016751
_cons	6.963871	2.153265	3.23	0.001	2.743549	11.18419
sigma_u	10.838695					
sigma_e	17.341633					
rho	.28090539	(fraction of variance due to u_i)				

The fixed effect model assumes that the intercept for each firm does not vary over time. Under this model, the fluctuations in the explanatory variable are treated in a way that is not random. The fixed effect is more strict and precise than the general pool model. As a result, the measurement of profitability of Canadian firms is still positively related to CUR_MKT_CAP and highly statistical significant. Interestingly, INVENT_TURN and CUR_RATIO began to show significance and FNCL_LVRG are no longer significant under the fixed effect model.

The results of the random effect pooled regression are summarized in Table 4.5.

Table 4.5

```
Fixed-effects (within) regression              Number of obs     =        608
Group variable: code                           Number of groups  =         89

R-sq:  within  = 0.0320                         Obs per group: min =          1
       between = 0.0110                                        avg =        6.8
       overall = 0.0000                                        max =         11

                                               F(6,513)          =       2.82
corr(u_i, Xb)  = -0.3861                        Prob > F          =     0.0104
```

return_com_eqy	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
fncl_lvrg	-.9149202	.5073401	-1.80	0.072	-1.91164	.0817996
invent_turn	-.1407727	.1012045	-1.39	0.165	-.339599	.0580536
cur_mkt_cap	.000482	.0001726	2.79	0.005	.000143	.0008211
cur_ratio	.5049768	.3017927	1.67	0.095	-.0879249	1.097879
sales_growth	.0077459	.0059066	1.31	0.190	-.0038582	.0193499
cash_conversion~e	.0078563	.0144032	0.55	0.586	-.0204403	.0361529
_cons	8.651186	2.125931	4.07	0.000	4.474584	12.82779
sigma_u	14.951143					
sigma_e	17.341633					
rho	.4263779	(fraction of variance due to u_i)				

In contrast to the fixed effect model, the random effect model assumes that individual specific effects are uncorrelated with the independent variables, thus the intercept for each firm varies on a random basis. Under this model, there is a strong statistically significant positive relationship between profitability and CUR_MKT_CAP and it is still consistent as the Z value is 2.85, which is the highest among all three models. The Z value for FNCL_LVRG is only 0.25, which is lower than other models. This could indicate that under the random effect assumption, specific firm conditions could contribute to profitability. For example, firms with less tangible assets are more risky to asymmetric information and are more likely to have debt financing.

The main objective of this study, the relationship between profitability and working capital management, however, is not clear under the regression models. In accordance with other research work in this field, general pool and random effect models are indicating a negative relationship between profitability and Cash Convention Cycle. Coefficient of Cash Convention Cycle under fixed effect model is observed as 0.007 with T-value of 0.55. R-Squares for each model are 0.025, 0.03 and 0.02 respectively. A lower R-Square value indicates that our model is less effective explaining the effect of independent variables on dependent variable. Also, the P-values for three models employed are 0.016, 0.127, and 0.010, respectively.

A significant P-value gives a signal that multi-collinearity condition exists in our findings because of the effect of correlated variables.

Based on the regression models employed in this study, we do not accept H_1 in Hypothesis 1 as a negative relationship was discovered in this study, though not statistically significant. We accept H_1 in Hypothesis 2 as the positive relationship between Canadian firm's size and profitability is obvious in all three models. As for Hypothesis 3, only fixed effect model could conclude that H_1 should be accepted that liquidity has a negative effect on profitability. The general pool regression and random effect models do not generate statistically significant results.

Chapter 5

Conclusions and Recommendations

5.1. Conclusions

To examine the relationship between working capital management and profitability of Canadian firms, 115 Canadian companies are investigated in this paper with individual data on return on common equity, financial leverage, current market capitalization, current ratio, annual sales growth and Cash Convention Cycle for a period from 2001 to 2011. The results demonstrate that in all three models employed in this study, a negative relationship between working capital management and profitability is observed, though not statistically significant. Besides, a strong positive relationship between firm size and profitability was discovered.

5.2 Recommendations and improvements

Firstly, with the data of the sample 115 Canadian firms that was collected from the TSX composite index, it neglected many small and start-up Canadian firms by the Index's nature. A more functional data set could be available if those eligible firms are also included in this study. Secondly, by including both listed and delisted companies,

data collection is enriched. However, it resulted in an unbalanced panel. Only 608

observations were generated from regression models because of the unbalanced data

set. To separate the data group into listed firms and delisted firms could help with this

problem. However, the robustness of result could be compromised. Lastly, as stated in

Chapter 3, the magnitude of our panel data was affected by the fact that only annual

data were collected. If quarterly data were available for each firm, the research

findings could be more accurate.

Moreover, to fully understand the nature between working capital management

and profitability, more work needs to be done as there are a few potential issues that

were discovered in this study. These include correlation and multi-colinearity. Also,

refined models and more dependent variables are needed to increase the accuracy of

model predictions and hypothesis testings.

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