Working capital management and firm’s valuation, profitability and risk
Evidence from a developing market

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Abstract

Purpose – The purpose of this paper is to examine the effects of working capital management on firm valuation, profitability and risk.

Design/methodology/approach – The paper uses a panel data set of 497 firms covering the period 2007 to 2016. The authors test the effects of working capital management on firm valuation, profitability and risk using the panel data methodology that includes firm and year fixed effects regressions.

Findings – The authors find a significantly negative relationship between net working capital (NWC) and firm valuation, profitability and risk. The results suggest that, in managing working capital, firm managers must make a trade-off between their objectives for profitability and risk control. Working-capital management is of particular importance in firms with less access to capital; it is also important when firms are expanding their investments during periods of economic recovery.

Originality/value – This paper contributes to the literature in several ways. First, to my knowledge, it provides the most comprehensive investigation, to date, on the relationship between working capital management and firm valuation, profitability and risk in an emerging market. Second, this study documents the existence of an optimal level of NWC in an emerging market. Third, firm performance, as measured in both market and accounting value, can be improved with efficient working capital management. Finally, the study includes the impact of the business cycle in an analysis of the effects of working capital management on firm performance.

Keywords Vietnam, Firm performance, Business cycle, Risk, Working capital management, Access to capital

1. Introduction

The literature on working-capital management (WCM) has found that efficient management can enhance profitability and increase firm value. Shin and Soenen (1998) are one of many studies that have found a negative relationship between the cash conversion cycle (CCC) and firm profitability. The results imply that a reduction in the CCC is directly associated with an increase in profitability. Havoutis (2003) argues that firms have control over their WCM and that, with efficient control, they can increase their economic value. One measure of firm value is the total present value of its expected future free cash flows (FCF). Net working capital (NWC) is a determinant of FCF. Berk et al. (2009) note that efficient WCM can increase FCF, and consequently enhance the value of a firm. Few studies investigate the relationship between NWC and firm value. Wasiuzzaman (2015) documents a negative relationship between the level of NWC and firm value for firms in Malaysian markets. Aktas et al. (2015) find a negative relationship between firm value and excess NWC in firms with abnormally high levels of NWC in US markets. However, this relationship is positive in firms with low levels of NWC.

Jensen Michael (2001) notes that a firm’s goal is to maximize its total market value, and that it is impossible for a firm to have multiple goals. Maximizing a firm’s value is not always the same as maximizing its profits. Unfortunately, current studies only test the influence of WCM on either a firm’s profitability or its value by using separate data sets.
There is a lack of research that examines the effects of WCM on firm profitability and firm valuation, using the same data set. Further, few studies address the effect of a change in NWC on firm risk.

The results of existing studies imply that a firm can increase its profitability by reducing its CCC. A lower CCC is usually associated with a lower level of NWC. This paper attempts to answer the following questions: in a market, if the CCC is negatively related to profitability, then will a decrease in NWC be associated with a higher firm value? What is the effect on firm risk of reducing NWC?

On a global equity-investment perspective, emerging markets have been attracting considerable attention from international investors. This paper aims to extend the research of WCM on an emerging economy and provide to the literature new evidence on the impact of WCM on firm value. In particular, this study uses a panel data set from stock markets in Vietnam over the period 2007 to 2016 to investigate the effects of WCM on firms' value, profitability and risk over the most recent decade for which data is available. Vietnamese stock exchanges present a unique opportunity for a case study on WCM. Over this period, current assets represent 62.06 percent of firms' total assets and current liabilities represent 80.78 percent of their total liabilities; these values, in turn, are equal 98.00 percent of their total equity. Vietnamese firms are heavily dependent on short-term financing and short-term assets account for the major portion of these firms' balance sheets. Hence, appropriate WCM and financing policies are tools a firm can use to increase their valuation.

Campos and Kinoshita (2003) note that former communist countries provide an extremely valuable but are underutilised opportunity for research. As a former communist country, Vietnam opened its economy in the early 1990s, which was a decade of market liberalization globally. The country now has two stock exchanges: the Ho Chi Minh Stock Exchange, which was established in 2000, and the Hanoi Stock Exchange, which was launched in 2005. Demigurc-Kunt and Maksimovic (2002) find that the development of a country's legal system as it pertains to capital markets predicts its firms' access to external capital: “[T]he development of securities markets is related more to the availability of long-term financing, whereas the development of the banking sector is related more to the availability of short-term financing.” Vietnam's securities markets have only recently been established. The country's firms have limited alternative sources of external capital, a situation that is consistent with their very high percentages of short-term liability to total liability.

In November 2006, Vietnam joined the World Trade Organization. Since 2007, the country's firms have become more integrated into global markets. The market-value-weighted foreign ownership of Vietnamese listed firms was 27.56 percent, on average, during the period 2007 to 2016, the US ranking second among the countries investing in Vietnamese stock markets[1]. Foreign investment provides an important source of capital to domestic firms. Their integration into global markets provides benefits but also pushes these firms' management to improve their firms' performance. In addition to foreign investors providing financing, the government also finances several Vietnamese listed firms. During the period 2007 to 2016, the government-owned 50.00 percent or more of the total shares outstanding of over 36 percent of all listed firms, accounting for an important source of these firms' capital.

This paper contributes to the WCM literature in several ways. First, to my knowledge, it provides the most comprehensive investigation, to date, on an emerging market and the relationship between working capital management and firm performance as measured by firm valuation, profitability and risk. Second, this study documents the existence of an optimal level of NWC in an emerging market. This finding is comparable with Baños-Caballero et al. (2014) and Aktas et al. (2015), who documented the existence of optimal working-capital-investment levels in UK and US markets, respectively. However, this paper uses different research methods.
First, whereas Aktas et al. (2015) use abnormal returns as a measure of firm value, this paper uses the market-to-book ratio; it also tests for the effects of NWC on firm profitability. Second, whereas Baños-Caballero et al. (2014) utilize a non-linear model to examine the effects of the net trade cycle on a firm’s market-to-book ratio, this paper uses a linear model that includes firm and year fixed effects in all of the regression analyses.

Third, this paper indicates that firm performance, as measured in both market and accounting value, can be improved with efficient WCM. Finally, the study includes the impact of the business cycle in an analysis of the effects of WCM on firm performance.

The remainder of the paper is organized as follows: Section 2 reviews the existing literature. Section 3 includes the models and hypotheses, Section 4 provides a description of the data. Section 5 discusses the results and Section 6 concludes.

2. Literature review

WCM is important to a firm’s overall management. The level of NWC influences a firm’s profitability and value; it is determined by the inventory level, the value of accounts receivable and accounts payable. Blinder and Maccini (1991), Fazzari and Petersen (1993) and Corsten and Gruen (2004), among others, argue that a high inventory level (thus, a high NWC) increases profits by lowering supply costs and the potential loss of sales due to stock outages; it also provides a hedge against variations in the prices of inputs. With respect to the management of accounts receivable, on the one hand, Brennan et al. (1988), Long et al. (1993) and Summers and Wilson (2002), among others, propose that granting credit to customers and, thus, increasing the level of accounts receivable can foster long-term relationships with customers, which can potentially increase sales and profits. On the other hand, Kieschnick et al. (2013) argue that an increase in NWC requires additional financing. Firms that hold too much working capital may incur high-interest expenses and potentially the risk of bankruptcy (see, Aktas et al., 2015). Eljelly (2004) includes the concept of an efficient WCM that requires a current asset level that is sufficient to meet short-term obligations but also to avoid excessive investment in current assets. Berk et al. (2009) imply that efficient WCM redeploy FCF or underutilised resources to pursue higher-value projects so as to create value for the firm.

The effects of the CCC, and its components, on profitability are well documented. Most studies find a negative relationship between CCC and the profitability of firms around the world, for example, for the USA (see Jose et al., 1996; and Shin and Soenen, 1998); for Japan and Taiwan (see Wang, 2002); for Greece (see Lazaridis and Tryfonidis, 2006); for Spain, during the period 1996 to 2002 (see Garcia-Teruel and Martinez-Solano, 2007); for Pakistan (see Raheman and Nasr, 2007); for Turkey (see Karaduman et al., 2010); and for Germany, see (Wöhrmann et al., 2012). Deloof (2003) finds a negative relationship between CCC and profitability in Belgian markets; however, these results are insignificant. He also finds a negative impact on profitability of days sales outstanding (DSO), days sales inventory (DSI), and days payable outstanding (DPO). However, Baños-Caballero et al. (2012) use data on Spanish firms for the period 2002 to 2007 and Baños-Caballero et al. (2014) use data on UK firms for the period 2001 to 2007 and find a concave relationship between CCC and profitability and argue that there exists an optimal level of NWC that maximizes a firm’s value.

Cash holdings is a component of NWC. Existing studies provide different effects of cash holdings on firm value. On the one hand, Luo and Hachiya (2005), Pinkowitz et al. (2006), Kalcheva and Lins (2007), Harford et al. (2008) and Lee and Lee (2009) find a negative relationship between cash holdings and firm value. On the other hand, Faulkender and Wang (2006), Bates et al. (2009) and Isshaq et al. (2009) find positive results from cash holdings on firm value. Martinez-Sola et al. (2013) find a concave relationship between cash holdings and firm value, and verify the existence of an optimum level of cash holdings.
Although there are numerous studies on the effects of cash holdings on firm value, there is little research related to the effects of NWC on firm value. Wang (2002) finds that, in the Japanese and Taiwanese markets, higher-valued firms invest less in NWC than lower-valued firms. Wasiuzzaman (2015) finds that a reduction in NWC increases firm value in Malaysian markets. In US markets, using a model similar to that in Faulkender and Wang (2006), Kieschnick et al. (2013), Wasiuzzaman finds that the incremental dollar held in cash is worth more than the incremental dollar invested in NWC. For US markets, Aktas et al. (2015) show that, among firms that underinvest in working capital, there is a positive relationship between the level of NWC and stock performance. However, for firms with abnormally high levels of NWC, excess NWC is negatively related to stock performance.

3. Model and hypotheses
Firm value can be estimated by discounting its expected future FCF. Brigham et al. (2015) note that firm value can be estimated by discounting the FCF the firm generates, as follows:

\[ V_0 = \sum_{t=1}^{\infty} \frac{FCF_t}{(1+WACC)^t}, \]

where \( FCF_t = EBITDA_t - CAPEX_t - \Delta NOWC_t \). WACC is the weighted average cost of capital. CAPEX is the total cost of long-term assets and \( \Delta NOWC \) is the change in net operating working capital. Wasiuzzaman (2015) notes that “NWC is an important component of free cash flow.” Existing studies typically measure firm value, using either the market-to-book ratio (Fama and French, 1998, among others) or the stock’s excess return (Faulkender and Wang, 2006, among others). In this paper, I modify the models used by Fama and French (1998) and Wasiuzzaman (2015), and use the market-to-book ratio as the dependent variable that measures firm valuation as follows:

\[
MTB_{i,t} = \beta_0 + \beta_1 CAPEX_{i,t} + \beta_2 INTEREST_{i,t} + \beta_3 CASHD_{i,t} + \beta_4 GROWTH_{i,t} + \beta_5 CFOSALES_{i,t} + \beta_6 \log (SIZE)_{i,t} + \beta_7 WC_{i,t} + \beta_8 f e_{i,t} + e_{i,t},
\]

where MTB is the market-to-book ratio and WC is the interest variable that is either NWC = (accounts receivable + inventory – accounts payable)/total book assets or CCC. Table I presents the descriptions and calculations of the variables.

In Equation (2), the MTB is the ratio between the year-end market value per share and the book value per share. A firm’s goal is to maximize its market value. In this model, I focus on the effects of a change in NWC on a firm’s value. The CAPEX is capital expenditure scaled by total book assets; INTEREST represents the interest expenses a firm incurs during a year, scaled by total book assets; CASHD is the total cash dividends paid out during a year, scaled by total book assets; GROWTH represents the growth rate of sales; CFOSALES is the operating cash flow, divided by sales for the year; SIZE is the total book value of assets that controls for firm size. Cash dividends, cash flows from operations, and sales growth rate represent the firm’s generated cash flows. In all of the regressions, I include \( fe_{i,t} \), which represents firm and year fixed effects, to control for the time-invariant firm characteristics and to reduce issues related to missing variables (see also, Aktas et al., 2015). The focus of my model is the effects of NWC and CCC on firm value.

In order to examine the effects of WCM on a firm’s profitability, this paper uses the following model:

\[
ROIC_{i,t} = \beta_0 + \beta_1 CAPEX_{i,t} + \beta_2 GROWTH_{i,t} + \beta_3 LEV_{i,t} + \beta_4 \log (SALES)_{i,t} + \beta_5 VOL_{i,t} + \beta_6 WC_{i,t} + \beta_7 f e_{i,t} + e_{i,t},
\]
In Equation (3), the dependent variable is the return on invested capital (ROIC); WC is the focused variable, that is, CCC, NWC or the components of CCC, including DSO, DSI and DPO (where $\text{CCC} = \text{DSO} + \text{DSI} - \text{DPO}$). Shin and Soenen (1998) and Baños-Caballero et al. (2014), among others, use CCC to test the effects of WCM on firm profitability. Stock-return volatility (VOL) is utilized to control for firm risk. Following Deloof (2003), I use total revenue (SALES) to control for firm size. Table I provides descriptions and calculations of these variables:

$H1$. A lower NWC and CCC positively affect firm performance.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Unit</th>
<th>$n$</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE</td>
<td>The number of months from IPO to date</td>
<td>Months</td>
<td>3,358</td>
<td>57.905</td>
<td>36.291</td>
</tr>
<tr>
<td>CAPEX</td>
<td>Capital expenditure. Total amount spent for purchasing capital assets</td>
<td>Percent</td>
<td>3,358</td>
<td>6.047</td>
<td>7.891</td>
</tr>
<tr>
<td>CASHD</td>
<td>Total cash dividend paid during the year scaled by total book assets</td>
<td>Percent</td>
<td>3,358</td>
<td>2.574</td>
<td>4.385</td>
</tr>
<tr>
<td>CCC</td>
<td>Cash conversion cycle = $\text{DSO} + \text{DSI} - \text{DPO}$</td>
<td>Days</td>
<td>3,358</td>
<td>143.94</td>
<td>138.08</td>
</tr>
<tr>
<td>DPO</td>
<td>Days payable outstanding = (Accounts payable $\times$ 365)/cost of goods sold</td>
<td>Days</td>
<td>3,358</td>
<td>52.91</td>
<td>50.04</td>
</tr>
<tr>
<td>DSI</td>
<td>Days sales inventory = (Inventory $\times$ 365)/cost of goods sold</td>
<td>Days</td>
<td>3,358</td>
<td>108.935</td>
<td>103.088</td>
</tr>
<tr>
<td>DSO</td>
<td>Days sales outstanding = (Accounts receivable $\times$ 365)/sales</td>
<td>Days</td>
<td>3,358</td>
<td>87.911</td>
<td>89.404</td>
</tr>
<tr>
<td>DUMMY</td>
<td>Equal 1 for period 2007–2012 (financial crisis period), 0 otherwise</td>
<td></td>
<td>3,358</td>
<td>0.558</td>
<td>0.497</td>
</tr>
<tr>
<td>CFOSALES</td>
<td>Net operating cash flows scaled by sales</td>
<td>Percent</td>
<td>3,358</td>
<td>7.98</td>
<td>14.596</td>
</tr>
<tr>
<td>GOV</td>
<td>Government ownership = Percentage of shares owned by the government</td>
<td>Percent</td>
<td>3,358</td>
<td>28.77</td>
<td>23.48</td>
</tr>
<tr>
<td>GROWTH</td>
<td>Growth rate of sales = (Current year sales–previous year sales) $\times$ 100/previous year sales</td>
<td>Percent</td>
<td>3,358</td>
<td>13.338</td>
<td>36.713</td>
</tr>
<tr>
<td>INTEREST</td>
<td>Total interest expenses of the year scaled by total book assets</td>
<td>Percent</td>
<td>3,340</td>
<td>2.2605</td>
<td>2.1088</td>
</tr>
<tr>
<td>LEV</td>
<td>Leverage = (Debt/equity) $\times$ 100</td>
<td>Percent</td>
<td>3,358</td>
<td>98.015</td>
<td>149.88</td>
</tr>
<tr>
<td>MTB</td>
<td>Market to Book ratio = Market value/Book value per share</td>
<td></td>
<td>3,358</td>
<td>1.175</td>
<td>1.32</td>
</tr>
<tr>
<td>NWC</td>
<td>Net working capital scaled by total book assets. Net working capital = accounts receivable + inventories – accounts payable</td>
<td>Percent</td>
<td>3,358</td>
<td>32.27</td>
<td>19.26</td>
</tr>
<tr>
<td>OWN$^a$</td>
<td>Percentage of shares owned by foreigners</td>
<td>Percent</td>
<td>3,358</td>
<td>9.458</td>
<td>13.047</td>
</tr>
<tr>
<td>ROIC</td>
<td>Return on invested capital = (Net income + interest expenses) $\times$ 100/(total capital + short term debt + current portion of long term debt)</td>
<td>Percent</td>
<td>3,358</td>
<td>11.487</td>
<td>9.545</td>
</tr>
<tr>
<td>SALES</td>
<td>Total revenue of a year</td>
<td>VND billion</td>
<td>3,358</td>
<td>1,416.14</td>
<td>3,370.96</td>
</tr>
<tr>
<td>SIZE</td>
<td>Firm size, equal total book assets</td>
<td>VND billion</td>
<td>3,358</td>
<td>1.574</td>
<td>5.604</td>
</tr>
<tr>
<td>VOL</td>
<td>Stock return volatility = Standard deviation of stock return</td>
<td>Percent</td>
<td>3,079</td>
<td>11.984</td>
<td>5.775</td>
</tr>
</tbody>
</table>

Notes: This table summarizes the statistics all of the variables used in this paper. The sample includes non-financial firms from DataStream over a decade from 2007 to 2016. The data are obtained from DataStream. The data are winsorised at the 1 percent level for the following variables: NWC, CCC, DSO, DSI and DPO. The final data set includes 497 unique firms over 10 years, with a total of 3,358 firm-year observations, except for interest expenses (3340 observations) and stock return volatility (3,079 observations).$^a$This is the equally weighted average foreign ownership. The market capitalization value weighted average of foreign ownership is 27.56 percent. The evidence shows that foreigners invest more in firms with large market capitalization.

Table I.
Summary statistics
Firm performance is measured using either market value (in this paper, I use market-to-book ratio) or accounting value (profitability). I expect that a reduction in NWC or CCC is associated with an increase in MTB and ROIC. WCM is related to a firm’s management of its FCF, inventory and accounts payable; thus, WCM affects firm value and profitability. A higher FCF increases firm value. Current research has found significant effects of CCC on firm profitability and also effects of NWC on firm value. In markets in Vietnam, I also expect that CCC and NWC have significant influences on firm profitability and value.

There is a direct relationship between NWC and CCC. Controlling for other information, an increase in inventory and accounts receivable, and/or a decrease in accounts payable are associated with an increase in DSI and DSO and a decrease in DPO. Consequently, both NWC and CCC increase. Suppose a firm has excessive NWC; that is, levels of inventory and accounts receivable are higher and/or accounts payable are lower than necessary. In either case, both NWC and CCC are too high. We may expect a negative relationship between the level of NWC and firm value and a negative association between firm profitability and CCC. A firm can improve its performance by reducing the level of its NWC level and its CCC:

\[ H2. \] For firms with better access to capital, firm value is less sensitive to changes in NWC.

Wasiuzzaman (2015) uses firm size as a proxy for constraints on financing. He argues that large firms are more reputable and, therefore, have better access to capital markets than small firms. In this paper, I utilize the total percentage of government and foreign ownership \((\text{GOVOWN} = \text{foreign ownership} + \text{government ownership})\) of a firm as a proxy for ease of access to sources of financing. Sun and Tong (2003) find for China and Le et al. (2018) find for Vietnam that the cost of borrowing is lower for state-owned enterprises (SOEs) (either implicit or explicit cost) than for other firms because SOEs carry government guarantees. Blenman and Le (2014) find that foreigners that invest in Vietnam target a long-term horizon, thereby helping provide financing to the firms they invest in. However, Teach notes the negative effect of easy capital access; he coins the term barely working: “The availability of cheap debt has reduced companies’ incentive to improve working-capital management” (2015). Hence, I expect firm value is less sensitive to changes in NWC in firms that have higher GOVOWN.

The following model is used to test the effects of NWC on firm risk:

\[
\text{VOL}_{i,t} = \beta_0 + \beta_1 \text{LOG (SIZE)}_{i,t} + \beta_2 \text{MTB}_{i,t} + \beta_3 \text{LOG (AGE)}_{i,t} + \beta_4 \text{NWC}_{i,t} + \beta_5 \text{OWN}_{i,t} \\
+ \beta_6 \text{GROWTH}_{i,t} + \beta_7 \text{LEV}_{i,t} + \beta_8 \text{DUMMY} + \beta_9 \epsilon_{i,t} + \epsilon_{i,t},
\] (4)

In Equation (4), the volatility of daily stock returns (VOL) is the dependent variable; AGE is the number of months, to date, since a firm’s IPO; OWN is the percentage total ownership of foreign investors at year end; NWC is scaled by the book value of total assets. Table I provides descriptions and calculations of the variables:

\[ H3. \] The relationship between stock-return volatility and the level of NWC is negative.

As discussed in studies, a high inventory level can reduce potential stock outages, provide protection against input price variations and foster long-term relationships with customers by granting them credit (Blinder and Maccini, 1991; Fazzari and Petersen, 1993; Corsten and Gruen, 2004; Brennan et al., 1988; Long et al., 1993; Summers and Wilson; 2002). I also expect a negative relationship between volatility and firm size and age.

In the above equations, the subscript \(i\) means firm \(i\), and \(t\) means year \(t\).
4. Description of the data

The sample data were obtained from DataStream, which consists of financial information for the Vietnamese companies listed on the Ho Chi Minh and the Hanoi stock exchanges. The Hanoi Stock Exchange launched in 2005 with only seven listed stocks; its number of stocks increased to 105, in 2007. The sample data cover the period 2007 to 2016. Financial institutions are excluded from the sample. The data are winsorised at the 1.00 percent level for the following variables: NWC, CCC, DSO, DSI and DPO. The final data set includes 497 unique firms, over 10 years, with a total of 3,358 firm-year observations, except for interest expenses (3,340 observations) and stock-return volatility (3,079 observations).

Table I summarizes the statistics of all of the variables used in the paper. I refer to the period 2007 to 2012 as it was a period of financial crisis and stock markets in Vietnam saw prices drop over these six years. The stock market then started to recover in 2013, so I refer to 2013 to 2016 as the recovery period. The ratio of NWC to sales, on average, is 37.15, 35.33 and 39.45 percent, for the full sample, the crisis period, and the recovery period, respectively. Among the 3,358 observations, 3,279 firm-years show positive NWCs, and 79 firm-years show negative NWCs. NWC over sales amounted to 38.16 and $-4.54$ percent for the positive and negative NWC firm-years, respectively. In comparison with total assets, over the period 2007 to 2016, on average, NWC was $32.37$ percent. The average NWC was $33.18$ percent for positive NWC firms, and $-5.77$ percent for negative NWC firms.

Figure 1 presents the variations of the CCC and its components, from 2007 to 2016. On average, DSI and DSO are significantly higher than DPO, causing CCC to almost triple DPO. Among the three components of CCC, DSI is the longest. The CCC tends to increase from 2007 to 2013 and then decrease in 2013.

![Figure 1. Cash Conversion Cycle and Its Components 2007–2016](image-url)

**Notes:** This figure presents yearly average CCC, DSO, DSI and DPO. The sample includes 497 unique non-financial firms with 3,358 firm-year observations, obtained from DataStream over a decade from 2007 to 2016. The descriptions of CCC, DSO, DSI and DPO are summarised in Table I.
5. Regression analysis

5.1 The effects of WCM on firm profitability and value

Table II reports the effects of NWC, CCC and other factors on the firm valuation for the period 2007 to 2016. Firm and year fixed effects are included in all models. The market-to-book ratio at year end is the dependent variable. The evidence shows that CASHD, GROWTH, CFOSALES and CAPEX have positive impacts on firm value. The coefficient of CASHD and CFOSALES are statistically significant at the one percent level, in all of the regression models. The results suggest that firms with higher cash flows have higher values. The interest variables NWC and CCC have negative coefficients that are significant at the one percent level, in all of the specifications. The empirical evidence suggests that a decrease in NWC is strongly associated with an increase in firm value. As a one-period lagged value of NWC is included in the model, this coefficient is also negative and significant at the one percent level, but the magnitude is lower than that of NWC. The $R^2$ is higher for the NWC models than for the NWC model with a one-period lag.

Table III documents the effects of NWC and CCC and its components on firm profitability. The dependent variable is ROIC. Table III shows evidence of a strong negative relationship between profitability and NWC, and CCC and its components, including DSO, DSI and DPO. On average, as a firm reduces its CCC by 100 days, its ROIC[2] increases by 1.05 percent. A reduction of 100 days in DSO, DSI and DPO is associated with an increase in ROIC by 1.35, 1.17 and 1.23 percent, respectively. A decrease of 1.00 percent in NWC is associated with an increase of 2.03 percent in ROIC.

The results in Tables II and III verify $H1$. The results are consistent with Shin and Soenen (1998), among others, in finding a negative association between firm performance and CCC. The results are also consistent with Aktas et al. (2015) in that this study finds a negative relationship between firm performance and NWC. More importantly, the evidence in this paper indicates that firm performance, as measured by either market or accounting value, is negatively associated with a firm’s investment in NWC. The results imply a significant necessity of reducing the NWC level and the CCC in markets in Vietnam.

<table>
<thead>
<tr>
<th>MTB</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPEX</td>
<td>0.19187 (0.129)</td>
<td>0.18276 (0.154)</td>
<td>0.174269 (0.174)</td>
<td>0.25655 (0.004)</td>
</tr>
<tr>
<td>INTEREST</td>
<td>−3.07332 (0.00)</td>
<td>−2.80802 (0.00)</td>
<td>−2.8668 (0.003)</td>
<td>−2.5585 (0.00)</td>
</tr>
<tr>
<td>CASHD</td>
<td>1.28688 (0.00)</td>
<td>1.37024 (0.00)</td>
<td>1.351732 (0.00)</td>
<td>1.7418 (0.00)</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.000062 (0.821)</td>
<td>0.000263 (0.330)</td>
<td>0.000251 (0.352)</td>
<td>0.000285 (0.074)</td>
</tr>
<tr>
<td>CFOSALES</td>
<td>0.00197 (0.005)</td>
<td>0.00197 (0.005)</td>
<td>0.00197 (0.005)</td>
<td>0.00338 (0.00)</td>
</tr>
<tr>
<td>LOG(SIZE)</td>
<td>−0.02622 (0.068)</td>
<td>−0.035856 (0.013)</td>
<td>−0.03600 (0.013)</td>
<td>−0.02754 (0.015)</td>
</tr>
<tr>
<td>CCC</td>
<td>−0.04154 (0.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NWC</td>
<td></td>
<td>−0.243358 (0.001)</td>
<td>−0.22856 (0.003)</td>
<td></td>
</tr>
<tr>
<td>LAG (NWC)</td>
<td></td>
<td></td>
<td></td>
<td>−0.14875 (0.005)</td>
</tr>
</tbody>
</table>

Firm- and year-fixed effects | Yes | Yes | Yes | Yes

$R^2$ | 0.4123 | 0.4098 | 0.4088 | 0.2443

Number of observations | 3,317 | 3,317 | 3,317 | 2,659

Notes: This table reports the fixed effects regression results of firm’s market to book ratio against net working capital and other factors. MTB the market to book ratio = market value divided by book value per share at year-end. CAPEX total capital expenditure of the year scaled by total book assets. INTEREST the total interest expenses scaled by total book assets. CASHD total cash dividend paid during the year scaled by total book assets. GROWTH the growth rate of sales. CFOSALES the ratio of net operating cash flow over sales. SIZE the total book assets. CCC the days of cash conversion cycle divided by 100. NWC = (accounts receivable + inventory - accounts payable)/total book assets. LAG (NWC) is one period lagged value of NWC. Numbers in parentheses represent the p-value.

Table II.
Net working capital and firm valuation
5.2 The effects of ease to capital and business cycle

In order to examine the effects of access to capital, I divide the full sample into two groups, based on the firm’s total government and foreign ownership. Due to government support, firms with high government ownership have better access to capital and lower borrowing costs (see, Sun and Tong, 2003; Le et al., 2018). In addition, foreign investment in Vietnam’s listed companies targets a long horizon. The availability of combined government and foreign ownership (GOVOWN) provides firms with access to capital.

Table IV shows evidence of a strong negative effect of NWC and CCC on firm value for firms whose GOVOWN is less than 50.00 percent. In the sub-sample of these firms, the coefficient of CCC is negative and significant at the one percent level, and the coefficient of NWC is negative and marginally significant at the one percent level. Nevertheless, these coefficients are insignificant in models that consist of firms whose GOVOWN is equal to or more than 50.00 percent. The absolute magnitudes of these coefficients are significantly higher for models of firms with a GOVOWN level that is less than 50.00 percent. The results verify H2 and are consistent with Teach (2015). The results in this paper are also similar to findings in Malaysian markets (see Wasiuzzaman, 2015).

Table V includes regression results for ROIC as it is influenced by the business cycle. Stock markets in Vietnam declined from 2007 to 2012, and then recovered beginning in 2013. DUMMY is a dummy variable equal to 1 for the period 2007 to 2012 and zero for the period 2013 to 2016. I examine the effects of the business cycle by multiplying all of the explanatory variables on Table III by DUMMY; the regression results are summarized on Table V. All of the coefficients except for CAPEX × DUMMY and NWC × DUMMY are significant at the one percent level. The absolute magnitudes of product variables NWC × DUMMY, and CCC × DUMMY and its components are lower in Table V than are the variables themselves on Table III. For instance, the evidence in Table III shows that a decrease in CCC by 100 days is associated with an increase of 1.05 percent in ROIC.

Table III. Cash conversion cycle, net working capital and profitability
The results on Table V suggest that, during a downturn, a reduction in CCC by 100 days is associated with an increase in ROIC of only 0.89 percent. The evidence implies that a reduction in NWC, CCC, operating cycle and DPO have a lower effect on profitability during a crisis than during a recovery.
5.3 The effects of WCM on stock-return volatility
Following Coles et al. (2006) and Aktas et al. (2015), I use the annualized standard deviation of a firm’s daily stock returns as a proxy for firm risk. In this section, I run a regression of stock-return volatility against NWC and a set of determinants. In all of the models, firm size, foreign ownership and NWC have strong and negative influences on stock-return volatility. The results imply that an additional investment in working capital reduces firm risk. Therefore, H3 is verified. The result of a strong negative effect of foreign ownership on volatility is broadly consistent with previous studies (see, e.g. Li et al., 2011). Sales growth rate and market-to-book ratio show strong positive impacts on stock-return volatility. The results show a lower fluctuation in stock prices during periods of stock-price declines than during periods when stock prices increase. The negative effects of investment in NWC on stock-return volatility found in this paper are consistent with Aktas et al. (2015) (Table VI).

6. Conclusion
This paper uses a panel data set on markets in Vietnam, for the period 2007 to 2016, to document comprehensive evidence of the relationship between WCM and firm value, profitability and risk in an emerging market. The findings of this paper are important to firms’ managers, investors and researchers. The paper shows that, in managing working capital, a firm’s managers must trade-off between the objectives of profitability and risk control. Similarly, each investor has different return objectives and levels of risk tolerance. Hence, the levels of NWC that affect firms’ performance should be considered in investors’ decision making process. The results also imply that there exists an optimal level of NWC that balances firm profitability and risk. Figuring out an optimal NWC level is worthy of future research.

The direct relationship between the effects of NWC and the CCC on firm profitability and valuation suggests that when the levels of NWC or the CCC are reduced, firm performance, as measured by either market value or accounting value, also improves. The results of this paper also confirm the importance of efficient WCM, particularly in firms with less access to external financing, or during periods of economic recovery when firms expand their investments. This is also consistent with Teach (2015). Barely working: “The availability of cheap debt has reduced companies’ incentive to improve working capital management.”

<table>
<thead>
<tr>
<th>Volatility</th>
<th>I</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOG(SIZE)</td>
<td>−0.73705 (0.00)</td>
<td>−0.72076 (0.00)</td>
</tr>
<tr>
<td>MTB</td>
<td>0.10130 (0.06)</td>
<td>0.09890 (0.071)</td>
</tr>
<tr>
<td>LOG(AGE)</td>
<td>−0.38563 (0.132)</td>
<td>−0.38414 (0.134)</td>
</tr>
<tr>
<td>NWC</td>
<td>−1.61876 (0.002)</td>
<td>−1.61653 (0.002)</td>
</tr>
<tr>
<td>OWN</td>
<td>−0.03631 (0.00)</td>
<td>−0.03661 (0.00)</td>
</tr>
<tr>
<td>GROWTH</td>
<td>0.00497 (0.002)</td>
<td>0.00497 (0.002)</td>
</tr>
<tr>
<td>LEV</td>
<td>−0.00027 (0.648)</td>
<td>−0.00027 (0.648)</td>
</tr>
<tr>
<td>DUMMY</td>
<td>−13.3535 (0.00)</td>
<td>−13.3535 (0.00)</td>
</tr>
</tbody>
</table>

Firm- and year-fixed effects Yes Yes

\( R^2 \) 0.6463 0.6454
Number of observations 3,078 3,078

Notes: This table reports the fixed effects regression results of stock volatility against net working capital and other factors. Stock volatility is stock return’s standard deviation using daily return. SIZE the year-end total book assets. MTB the market to book ratio at year-end. AGE the months from firm’s IPO to the date. NWC = (accounts receivable + inventory – accounts payable)/total book assets. OWN the percentage of shares owned by foreigners. GROWTH the growth rate of sales, LEV leverage. DUMMY equal to one for the period 2007-2012 during which stock markets declined by time, and equal zero for the period 2013–2016 where stock markets recovered. Numbers in parentheses represent the p-value.

Table VI.
Net working capital and firm risk
1. See Blenman and Le (2014).

2. To test for robustness, I also ran a fixed-effects regression of the net profit margin (net income/sales) against NWC, and CCC and its components. The results also show a strong negative relationship between the net profit margin and NWC, CCC and DSO and DPO. The coefficient of DSI is negative but insignificant.

References


**About the author**

Ben Le is Assistant Professor of Finance at Kean University. He received PhD in Finance from the University of North Carolina at Charlotte, NC. Ben is an active Wisconsin CPA and he passed CFA Level II exam. His research was presented at FMA Annual Meeting, American Real Estate and Urban Economics Association National Conference, American Real Estate Society Annual Meeting where he won the best real estate finance paper and Urban Economics Association Meeting. He has published articles in *Quarterly Journal of Finance and Accounting*. Ben Le can be contacted at: ble@kean.edu