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Working Capital Management: evidence from Norway

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Abstract

Purpose – The purpose of this paper is to provide empirical evidence of whether working capital management has an effect on the profitability of small and medium-sized Norwegian firms.

Design/methodology/approach – The data comprise 21,075 Norwegian small and medium-sized enterprises and 84,300 observations made between 2010 and 2013. Panel data regressions were applied with fixed effects and a two-stage least squares analysis was employed to control for endogeneity.

Findings – The results indicate that reducing inventories held, time spent paid for receivables and settling own accounts payable will increase profitability. Even though endogeneity may exist, this does not affect the results from the previous analysis. Similar results are also obtained when industry-specific effects are controlled for, supporting the robustness of the results obtained. The relevance of quadratic dependencies of the profitability on independent variables was also identified and suggests a decreasing trend of return on assets with increasing values of the working capital management characteristic variables.

Research implications – Drawing on similar studies, this study confirms that working capital management is relevant for firms' profitability.

Practical implications – The practice of aggressive working capital policy in Norwegian firms is confirmed by the results of this study.

Originality/value – This study contributes to the current research on the relationship between working capital management and profitability by using a large dataset to add further robustness to results, and thus see whether results in previous studies may be confirmed or not. Also this is among the first published study of this relationship among Norwegian firms from different industries, filling a gap in similar research conducted in other European countries.

Key words: Working Capital Management, Cash Conversion Cycle, Return on Assets, Profitability, Small and Medium-Sized Enterprises

1. Introduction

For decades, the Norwegian economy has been heavily dependent on the petroleum industry, which now accounts for approximately 20% of gross domestic product (GDP). However, only 0.1% of Norwegian firms have more than 250 employees and thus they are mostly small and medium-sized enterprises (SMEs) in terms of the European Union (EU) definition. In this situation, in which the Norwegian economy may have to make the transition from a strong dependence on petroleum to economic diversification, SMEs will play a vital role.

One important factor regarding a firm's financial management is working capital management (WCM). Due to WCM's alleged influence on a firm's profitability (see, for instance, Knauer and Wöhrman, 2013), SMEs need to pay special attention to it for the following reasons: (i) current liabilities are the most important aspect of their external funding (Fazzari and Petersen, 1993; Whited,1992); (ii) current assets constitutes most of their total assets (García-Teruel and Martínez-Salano, 2007), (iii) their risk profile compared to larger firms meaning more trouble getting long-term funding (Petersen and Rajan, 1997); thus, (iv) they have difficulty facilitating long-term growth, profitability and survival.

Therefore, our motivation for conducting this study is to see whether Norwegian SMEs can benefit from WCM to enhance their profitability, and ensure longevity of Norwegian SMEs when Petroleum based industry is in such a decline. This is important and of relevance because all managerial tools in firms should be selected with a cost-benefit approach in mind. If the WCM contributes to a firm's financing in general, it enables them to better predict future cash flows, which in turn is a basic assumption for enabling future growth.

This paper contributes to recent studies by (i) using large dataset to increase robustness in results, and thus (ii) confirming/not confirming results from similar studies conducted in Europe, and (iii) attempts to provide a broad overview of the relationship between working capital management and profitability in Norway, which to the authors knowledge, is not published before.

Furthermore, according to the European Payment Report 2015 from Intrum Justitia, in Norway are approximately 1/3 reporting that they may end up in a liquidity crisis if they are not receiving payment, and 72 % of the firms hand over invoices overdue for collection. The similar number for European firms is 36 %. This indicates an aggressive WCM as a part of Norwegian firms' payment collecting strategy for reducing their cost of capital. The question, however, still remains whether this aggressive WCM policy do contributes to profitability or not for Norwegian firms, a strategy which also has been advocated by several other studies (Jose et al. 1996; DeLoof, 2003; García-Teruel and Martínez-Salano, 2007; Pais and Gama, 2015).

The next section provides an outline of previous studies on the relationship between profitability and WCM. Thereafter, choice of variables is justified, and the research design presented. This is followed by descriptive results and analyses. The paper closes with some conclusions and suggestions for further research.

2. Previous Studies on Working Capital Management (WCM) and the Cash Conversion Cycle (CCC)

The concepts of WCM and the cash conversion cycle (CCC) have been studied from different angles. The articles written on the topic can for instance be grouped into (i) those finding a positive or negative relationship between CCC and profitability, even though the dependent variables applied vary, e.g. return on assets (ROA), return on invested capital (ROIC) and gross and net operating income. Moreover, the articles take into account methodological issues, such as (ii) controlling for endogeneity, (iii) exploring non-linear relationships, or (iv) examining the optimal level of WCM. The results from this line of research, has in general advocated an aggressive WCM policy. The ambiguity in the relationship between CCC and profitability may have arisen because studies have been conducted in different contexts, with different methodological approaches, and using different sample sizes and/or employing different firm characteristics (see Table I for a brief, non-exhaustive overview).

Author(s)	Journal	Country	Sample size	Time span	Sample	Dependent variable	Methodo-logical issues	Relationship between WCM and profitability
Jose, M.L., Lancaster, C., and Stevens, J.L. (1996)	Journal of Economics and Finance	US	2,718	1974–1993	Firms from seven different industries	ROA	Nonparametric and multiple regression	Negative. Aggressive WCM suggested.
DeLoof, M. (2003)	Journal of Business Finance and Accounting	Belgium	2,000	1991–1996	"Belgium's most important firms"	Gross operating income and net operating income		Negative. Aggressive WCM suggested.
García-Teruel, P. and Martínez-Salano, P. (2007)	International Journal of Managerial Finance	Spain	8,872	1996–2002	SMEs	ROA	Tests for endogeneity	Negative. Aggressive WCM suggested.
Gill, A., Biger, N., and Mathur, N. (2010)	Business and Economics Journal	US	88	2005–2007	Manufacturing companies	Gross operating income		Positive
Mathuva, D. (2010)	Research Journal of Business Management	Kenya	30	1993–2008	Non-financial listed firms	Net operating income		Negative
Sharma, A.K. and Kumar, S. (2011)	Global Business Review	India	263	2000–2008	Non-financial listed firms in 15 industries	ROA		Positive
Abuzayed, B. (2012)	International Journal of Managerial Finance	Jordan	93	2000–2008	Listed, non-financial firms in 11 industries	Gross operating income		Positive
Baños-Caballero, S., García-Teruel, P. and Martínez-Salano, P. (2012)	Small Business Economics	Spain	5,862	2002–2007	SMEs	Gross operating income and net operating income	Tests for endogeneity. Non-linear relations.	Concave; optimal level of CCC. CCC also influences risk
Yazdanfar, D. and Öhman, P. (2014)	International Journal of Managerial Finance	Sweden	13,797	2008–2011	SMEs in four industries	ROA	Seemingly unrelated regression	Negative
Pais, M.A. and Gama, P.M. (2015)	International Journal of Managerial Finance	Portugal	6,063	2002–2009	SMEs	ROA	Tests for endogeneity. Non-linear relations.	Negative; optimal level of CCC. Aggressive WCM suggested.

Table I: Excerpts of previous studies on WCM and profitability.

To sum up, there seems to be a tendency towards a negative relationship between profitability and CCC, and this appears to be consistent throughout the world, although different profitability measure are employed.

In the next section, the different variables in the study will be justified, starting with dependent variables, then independent variables, and at last the control variables.

2.1 Justification of variables

There are several different ways of measuring profitability. Deloof (2003) uses Gross Operating Income, since firms with mainly financial assets in their balance sheet will not receive most of their return on assets from operating activities. However in more recent studies, such as Pais and Gama (2015) and García-Teruel and Martínes-Solano (2007), uses Return On Assets (ROA) and Return On Invested Capital (ROIC) as measures for profitability. By removing industries normally associated with high levels of financial assets, such as bank and insurance industry, they argue that this will reflect the return from operating activities, and thus be a valid measure for profitability.

This study excludes industries such as bank and insurance, and uses Return On Assets as a measure for profitability. But Return On Invested Capital are also included as proxy for profitability.

The independent variables used in this study to measure working capital are Inventories, Account Receivables, Account Payables, and Cash Conversion Cycle. Higher levels of inventories is assumed to be connected to increased sales and reducing transaction costs, thereby promoting profitability (Petersen and Rajan, 1997). But having too much inventories may increase chances of goods not being sold, going out of date, and may increase as well warehouse rent, insurance security expenses (Kim and Chung, 1990), and additional interest expences on the increased financial needs in order to increase inventory level

(Kieschnick, LaPlante and Moussawi, 2011). However reducing and buying inventories only to a minimum may increase the likelihood of stockouts and thus loose customers, or not receiving volume discounts, thereby increasing the cost of goods. More recent studies do however indicates an inverse relationship between inventories and profitability (García-Teruel and Martínes-Solano, 2007; Pais and Gama, 2015).

Providing trade credit to customers may increase sales and profitability. Offering trade credit can signal trust between buyer and seller (Wilner, 2000), as it enables buyer to verify product- and services quality prior to payment (Lee and Stowe, 1993). This reduces the asymmetric information between buyer and seller. By reducing account receivables this will most likely makes customers pay earlier, and thus increasing profitability, as suggested in other studies as well (García-Teruel and Martínes-Solano, 2007; Pais and Gama, 2015).

Being granted trade credit from suppliers may be for same reasons as mentioned above, and suppliers may use trade credit to investigate credit worthiness (for instance customers inability to take advantage of early payment discounts) and price discriminate among its customers (Petersen and Rajan, 1997). The expenses of prolonged trade credit will normally be calculated in the cost of goods, so by decreasing trade credit and paying earlier, the lower the cost of goods (for instance receiving early payment discounts). That makes an inverse relationship between account payables and profitability, as found in similar studies (García-Teruel and Martínes-Solano, 2007; Pais and Gama, 2015).

Cash Conversion Cycle (CCC) is a dynamic measure of working capital (Gitman, 1974), by using both balance sheet and income statement data to calculate working capital. Cash Conversion Cycle is the time from goods being bought and receiving payment from customers. In this time the firm need to finance their own operating activities, so longer Cash Conversion Cycle will lead to higher level of working capital and vice versa. Longer CCC may reduce the risk of stockouts and motivate more sales, thereby increasing profitability. Nevertheless, there may exist an inverse relationship between CCC and profitability, as reducing CCC allows elimination of unnecessary cash and marketable securities, reducing needs of leverage to provide liquidity, and increasing the present value of firms' cash flow (Jose, Lancaster and Stevens, 1996). The question is then whether the costs of higher investments in working capital is larger than the benefits of more inventories and/or more trade credit to customers (Deloof, 2003). As mentioned earlier, there seem to be indications in research that there may exist an inverse relationship between CCC and profitability (Jose et al. 1996; DeLoof, 2003; García-Teruel and Martínez-Salano,2007; Pais and Gama, 2015; Yazdanfar and Ôhman, 2014).

The study do also take into account the control variables Firm Size, Gross Domestic Product, Sales Growth, Leverage, Current Liabilities Ratio, and Current Assets Ratio. Larger firms seem to be more profitable than smaller firms, which may be due to scale economy (Jose, Lancaster and Stevens, 1996; García-Teruel and Martínes-Solano, 2010; Lee, 2009) and better access to capital markets (Whited, 1992). On the other hand, Goddard et al. (2005) did find a negative relationship between size and profitability, which may be explained by greater diversification leading to lower profitability, and as remarked by Dyck and Zingales (2004), with managers tending to expand firms for personal benefits and achievements. Recent studies do however find a positive relationship between size and profitability (Baños-Caballero, García-Teruel and Martínez-Salano, 2012; García-Teruel and Martínez-Salano, 2007; Pais and Gama, 2015; Yazdanfar and Ôhman, 2014).

The macroeconomic cycle (development in gross domestic product) may also have an impact on the level of investment in working capital and profitability. For instance during recessions, firms may have trouble getting external financing for their operating activities, and may also increase level of inventories (Chiou, Cheng and Wu, 2006), which may be due to not being able to sell their goods. Pais and Gama (2015), and García-Teruel and Martínez-Salano (2007) do find a positive relationship between gross domestic product and profitability.

Increased sales growth is normally associated with higher profitability (Kieschnick, LaPlante, Moussawi, and Baranchuk, 2006), which may according to pecking-order logic (Donaldson, 1961) be because profits are retained within the firm to invest in opportunities which generates more profit, thus expecting a positive relationship between sales growth and profitability. This positive relationship is also found in studies (Baños-Caballero, García-Teruel and Martínez-Salano, 2012; García-Teruel and Martínez-Salano,2007; Pais and Gama, 2015).

Following the pecking-order logic (Donaldson, 1961), firms will in a defined order decide how to finance their working capital. That will most likely be using in first place internal funds (retained earnings), followed next by external funding (safe debt and then risky debt), and lastly issuing of new equity (Fama and French, 2002; Myers, 1984). Petersen and Rajan (1997) argues that higher leverage may promote higher profitability, because firms with higher profitability have easier access to external capital markets and funding. However firms with large debt ratios compared to equity may struggle with their liquidity, which necessitates the high leverage, and in next turn increase the risk of bankruptcy (Benito and Vlieghe, 2000). This negative relationship between leverage and profitability is also confirmed by other studies (García-Teruel and Martínez-Salano,2007; Pais and Gama, 2015).

The firms leverage do not say much about the composition of debt, therefore an own variable with current liabilities is included, as this is normally related to operating activities and sales (for instance accounts payable is a part of the current liabilities). Higher levels of current liabilities may be due to more goods being bought, which may be related to increased sales. On the other hand, it may also be because the firm is not paying its debt, and therefore negatively related to profitability. Pais and Gama (2015) do however find a positive relationship between current liabilities and profitability.

Current assets may be less profitable than fixed assets, due to returns generated from current assets are normally lower than for fixed assets, thus representing an opportunity cost. However holding current assets may provide a safety margin, such as sufficient inventory level, and thus contributing to future sales and profitability (Eljelly, 2004). This positive relationship between current assets and profitability is also found by Pais and Gama (2015).

3. Research Design

In what follows, the data and variables are presented with description of estimation procedures. Finally, a statistical characterization of the sample is given.

3.1 Data

This study uses panel data for non-listed, non-financial and for-profit Norwegian SMEs. The data were obtained from the Centre for Corporate Governance Research (CCGR) database developed by the BI Norwegian Business School over a four-year period (2010–2013). This database contains accounting and financial information for more than 240,000 Norwegian firms. The selection of SMEs was carried out according to the requirements established by the European Commission's recommendation 2003/361/CE, May 6, regarding the definition of SMEs. Companies that met the following requirements for all the four years were selected: fewer than 250 employees and turnover below €50 million or total annual balance sheet below €43 million. By adhering to this definition, comparisons with previous studies are possible.

Several filters were applied to eliminate firms with incomplete data or no operating activity during the relevant four-year period. Filtering out the firms with no operating activity was done in different ways. Firms with values of <0 for one or more of the following were eliminated: turnover, total assets, inventory, accounts receivable, and/or accounts payable. Sectors which are normally non-profit in Norway were not included, e.g. health and education. Finally, for the variables included in the analysis, 0.5% of the most extreme top and bottom values were removed to reduce the effect of outliers. After applying these filters, the final sample consisted of 21,075 firms with 84,300 observations.

3.2 Variables

Return on assets (ROA) is the dependent variable, with ROIC as proxy for ROA. The variable, Return On Assets (ROA), were calculated as ((gross income+interest costs)/total assets). The variable, Return On Invested Capital (ROIC), were calculated as ((operating income$_{\text{tax adj.}}$[1])/Book Value of Invested Capital[2]). The independent variables are: the number of days of inventory (INV), calculated as

[1] Average corporate tax in Norway during the period under study were assumed to be 27%.

[2] Book Value of Invested Capital is defined as Fixed Assets + Current Assets – Current Liabilities - Cash

(365x[inventories[3]/cost of sales]); the number of days of accounts receivable (ACR), calculated as (365x[accounts receivable/(sales x (1+t_{VAT}))]) where t_{VAT} is the average rate of value added tax (VAT) in Norway (25% for both sales and purchases); the number of days accounts payable (ACP), calculated as (365x[accounts payable/purchases x (1+t_{VAT})]). The cash conversion cycle is calculated as INV+ACR-ACP.

The control variables considered in this study are: the size of the firm (SIZE), measured as the logarithm of total assets; growth in sales (SGROW), calculated as ($Sales_1 - Sales_0$/ $Sales_0$); firm leverage (DEBT), calculated as total debt/total assets; the current assets ratio (CAR), measured as current assets/total assets; the current liabilities ratio (CLR), obtained by current liabilities/total liabilities. To take the economic cycle in investment in working capital into account, we use annual GDP growth (GDPGR) for the different sectors in the sample. This figure was obtained from Statistics Norway.

3.3 Estimation

We tested regression models with fixed effects, using the following formulae:

(1) $ROA_{i,t} = \beta_0 + \beta_1 INV_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SGROW_{i,t} + \beta_4 DEBT_{i,t} + \beta_7 GDPR_{i,t} + \beta_5 CAR_{i,t} + \beta_6 CLR_{i,t} + \upsilon_i + \varepsilon_{i,t}$

(2) $ROA_{i,t} = \beta_0 + \beta_1 ACR_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SGROW_{i,t} + \beta_4 DEBT_{i,t} + \beta_7 GDPR_{i,t} + \beta_5 CAR_{i,t} + \beta_6 CLR_{i,t} + \upsilon_i + \varepsilon_{i,t}$

(3) $ROA_{i,t} = \beta_0 + \beta_1 ACP_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SGROW_{i,t} + \beta_4 DEBT_{i,t} + \beta_7 GDPR_{i,t} + \beta_5 CAR_{i,t} + \beta_6 CLR_{i,t} + \upsilon_i + \varepsilon_{i,t}$

(4) $ROA_{i,t} = \beta_0 + \beta_1 CCC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SGROW_{i,t} + \beta_4 DEBT_{i,t} + \beta_7 GDPR_{i,t} + \beta_5 CAR_{i,t} + \beta_6 CLR_{i,t} + \upsilon_i + \varepsilon_{i,t}$

Notes: ROA = return on assets, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio, i = firm i, t = time; the two error components are υ = individual error component (a particular characteristic of each firm) and ε = residual error (unobservable factors that vary over time and affect $ROA_{i,t}$).

Panel data methodology was applied to analyze the data. A F-test was used to decide if fixed effect models are preferred over the Pooled OLS, with the null hypothesis that all fixed effect intercepts are zero. Then a robust Hausman test (Boris, 2014) was used to decide if the fixed effect models are preferred over random effect models. Rogers robust standard errors (heteroscedasticity and autocorrelation consistent) were calculated for the coefficients (Rogers, 1993).

3.4 Sample Description

Table II contains the descriptive statistics of the variables in the study sample. The mean ROA is 10%, with inventories being held for around 88 days, accounts receivable around 29 days and accounts payable approximately 44 days. The mean CCC is around 73 days. Firm size does not differ greatly between firms in the sample, with a mean of 15.7 (equals to approximately € 0.7 million). The sample exhibits a mean of 5% sales growth during the period studied, with about 63% of total assets being debt. Of the total assets, 84% comprises current assets and 50% current liabilities. For SMEs we see a tendency towards what they own is what they sell, and this is mainly financed by debt.

	ROA	INV	ACR	ACP	CCC	SIZE	SGROW	DEBT	CAR	CLR
Mean	0.102	88.49	28.86	44.10	73.25	15.74	0.05	0.63	0.79	0.50
Median	0.08	60.68	24.60	34.27	54.01	15.60	0.03	0.65	0.86	0.49
Standard dev.	0.15	91.01	27.49	44.29	90.53	1.38	0.19	0.20	0.21	0.21
Minimum	-0.50	0.00	0.01	0.11	-425.98	10.77	-0.80	0.00	1.00	0.00
Maximum	0.91	2787.27	1758.35	2774.00	-1901.18	22.21	1.04	1.00	0.00	1.00
1st quartile	0.004	25.07	8.23	21.24	16.55	14.81	-0.05	0.49	0.68	0.33
3rd quartile	0.189	121.44	41.41	53.04	109.46	16.51	0.13	0.79	0.95	0.66
Number of firms										21,075
Number of observations										84,300

Table II: Descriptive results.

[3] Other studies do not specify how this variable is calculated. This paper applies the average inventory for specific years. The values are calculated as the mean between beginning and year-end balance sheet value. The same estimation procedure is used for other variables using balance sheet values.

Notes: ROA = return on assets, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. INV, ACR, ACP and CCC are expressed in numbers of days; ROA, SIZE, SGROW, DEBT, CAR and CLR are dimensionless.

Table III provides information on sector characteristics. ROA is quite similar, with eight percentage points distinguishing between the lowest (Sector C-Electricity, gas, steam and air conditioning supply) and highest (Sector E - Fishing) levels of profitability. Sector K (Hotel and accommodation) show the lowest inventory levels and Sector E (Fishing) the highest. This is not surprising, given the fact that in Sector E the goods are processed and sold much later after being hatched. Sector K (Hotel and accommodation) also exhibit the lowest accounts receivable, probably because people either pay up front or immediately after staying at the hotel. This may also explain the negative CCC, as one normally pays when booking a hotel room online. Sector E (Fishing) also has a long CCC, which may be connected to the days inventory held before being sold, but it also experienced the highest sales growth during the period studied. The debt level is quite similar, around 60% for the different sectors, but Sector C (Electricity, gas, steam and air conditioning supply) have very low current assets and liabilities ratios. This may be due to the heavy investment in equipment in this sector, funded by long-term debt and equity. Not surprisingly, Sector N (Wholesale and retail trade and the repair of motor vehicles and motorcycles) exhibit the largest current assets ratio. This is due to inventory holdings being a main part of these sectors' core business.

	Sector	n obs.	n firms (% of total)	ROA	INV	ACR	ACP	CCC	SGROW	SIZE	DEBT	CAR	CLR
Mining and quarrying	A	364	91 (0.43%)	0.10	154.78	37.57	115.36	76.98	0.09	16.67	0.58	0.58	0.36
Construction	B	14,980	3,745 (17.77%)	0.11	57.70	48.01	47.09	58.62	0.07	15.57	0.62	0.79	0.51
Electricity, gas, steam and air conditioning supply	C	368	92 (0.44%)	0.03	34.97	58.03	97.34	-4.34	0.08	19.04	0.53	0.25	0.21
Professional, scientific and technical services	D	1,608	402 (1.91%)	0.11	81.47	42.25	66.70	57.03	0.07	15.48	0.60	0.79	0.51
Fishing	E	344	86 (0.41%)	0.13	233.30	29.61	61.84	201.11	0.14	18.48	0.56	0.53	0.26
Business services	F	1,112	278 (1.32%)	0.11	81.38	39.83	85.71	35.50	0.09	15.70	0.66	0.71	0.53
Manufacturing	G	14,204	3,551 (16.85%)	0.09	107.12	36.18	46.59	96.71	0.05	16.14	0.58	0.72	0.43
Information and Communication	H	1,368	342 (1.62%)	0.12	82.45	43.47	65.75	60.12	0.07	15.91	0.61	0.79	0.53
Agriculture and forestry	I	944	236 (1.12%)	0.07	91.92	31.79	64.51	59.20	0.06	15.61	0.61	0.62	0.40
Facility management in real estate	J	396	99 (0.47%)	0.06	106.67	27.29	59.35	74.59	0.07	15.73	0.64	0.52	0.33
Hotel and accommodation	K	4,316	1,079 (5.12%)	0.12	36.40	10.17	53.39	-6.81	0.04	15.29	0.69	0.61	0.52
Transport and	L	852	213 (1.00%)	0.06	49.37	36.16	95.67	-10.13	0.07	16.40	0.64	0.57	0.39

Distribution													
Water supply, sewerage, waste management and remediation services	M	100	25 (0.12%)	0.09	54.15	34.30	53.26	35.20	0.11	17.34	0.47	0.62	0.38
Wholesale and retail trade, repair of motor vehicles and motorcycles	N	43,344	10,836 (51.42%)	0.09	98.20	19.92	35.92	82.20	0.04	15.65	0.63	0.83	0.51
Total		84,300	21,075 (100%)										

Table III: Mean values, by sector.

Notes: ROA = return on assets, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, CAR = current assets ratio, CLR = current liabilities ratio. INV, ACR, ACP and CCC are expressed in numbers of days; ROA, SIZE, SGROW, DEBT, CAR and CLR are dimensionless.

Table IV presents the Pearson correlation matrix for the variables. A significant negative relationship is found between ROA and the three components of CCC, respectively INV, ACR and ACP. This is the same relationship as found in other similar studies (e.g. Deloof, 2003; García-Teruel and Martínez-Salano, 2007; Pais and Gama, 2015). Based on these results, firms that focus on decreasing inventory, accounts receivable and accounts payable will be more profitable.

	ROA	INV	ACR	ACP	CCC	SIZE	SGROW	DEBT	GDPR	CLR	CAR
ROA	1										
INV	-0.18****	1									
ACR	-0.02****	-0.04****	1								
ACP	-0.12****	0.22****	0.29****	1							
CCC	-0.12****	0.87****	0.11****	-0.16****	1						
SIZE	0.04****	-0.02****	0.18****	0.05****	0.01**	1					
SGROW	0.28****	-0.13****	-0.04****	-0.06****	-0.11****	0.09****	1				
DEBT	-0.09****	-0.08****	-0.04****	0.10****	-0.15****	0.03****	0.08****	1			
GDPR	0.06****	-0.04****	0.09****	0.02****	-0.02****	-0.01***	0.07****	0.01***	1		
CLR	0.15****	-0.18****	-0.01**	0.05****	-0.21****	-0.08****	0.08****	0.64****	0.01****	1	
CAR	0.19****	0.08****	0.04****	-0.14****	0.16****	-0.23****	0.01***	-0.05****	-0.01***	0.40****	1

Table IV: Correlation matrix.

Notes: ROA = return on assets, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. ****, ***, ** and * denote significance at 99.9%, 99%, 95% and 90% respectively.

4. Results

This section first presents the univariate and multivariate results for the basic relationship between WCM characteristics and profitability. Next, robustness and sector effects are more closely studied. Finally, a potential non-linear effect is investigated.

4.1 Working capital management (WCM) and profitability

First, we wanted to see whether there are significant differences between the most profitable firms and the less profitable ones. This was done by conducting a univariate analysis in which the quartiles of ROA were calculated annually. For each quartile, a lower limit was considered, the lowest value of all years and finally, an upper limit and the largest value of all years. This gave an overlap between ranges of ROA in quartiles. Sample firms then were grouped according to their ROA value and an analysis conducted for each quartile. Student's *t*-test was applied to determine if the mean values of the fourth quartile were

significantly different from the first quartile.

Table V reveals that as INV, ACR and ACP decrease (and thereby CCC), profitability increases, which is expected from the negative relationship in the correlation matrix. However, in the first quartile, ACR does not have the highest value. For the control variable SGROW, higher growth in sales is connected to higher profitability. For the control variables SIZE and DEBT, there seems to be no clear contrast between first and fourth quartiles. For the last control variables, CLR and CAR, the higher the current liabilities and assets ratios, the higher the profitability firms achieve. This may be because more profitable firms obtain more short-term funding in order to achieve growth and they need more current assets to facilitate sales.

Variable	**1st quartile**	**2nd quartile**	**3rd quartile**	**4th quartile**	***t-value and sig.level***
Range of ROA	-0.53-0.005	0.004-0.084	0.084-0.189	0.189-0.911	
ROA	-0.08 (-0.05)	0.04 (0.04)	0.13 (0.13)	0.31 (0.28)	-412.61 (0.000)
INV	111.36 (81.97)	97.06 (69.93)	80.44 (56.30)	65.11 (41.90)	52.52 (0.000)
ACR	28.62 (23.17)	30.98 (25.16)	29.33 (25.51)	27.35 (24.78)	5.18 (0.000)
ACP	51.93 (39.90)	47.72 (36.23)	40.39 (32.81)	36.94 (30.44)	35.39 (0.000)
CCC	88.05 (67.86)	80.05 (60.63)	69.38 (52.32)	55.52 (39.23)	37.31 (0.000)
SGROW	-0.02 (-0.02)	0.04 (0.02)	0.07 (0.05)	0.12 (0.08)	-73.43 (0.000)
SIZE	15.50 (15.36)	15.88 (15.70)	15.90 (15.75)	15.71 (15.59)	-16.60 (0.000)
DEBT	0.69 (0.74)	0.62 (0.65)	0.58 (0.60)	0.62 (0.63)	39.47 (0.000)
CLR	0.49 (0.48)	0.45 (0.44)	0.48 (0.47)	0.57 (0.57)	-36,78 (0.000)
CAR	0.73 (0.81)	0.76 (0.84)	0.81 (0.87)	0.85 (0.90)	-59.99 (0.000)
Number of firms					21,075
Number of obs.					84,300

Table V: Mean values by ROA quartile.

Notes: ROA = return on assets, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, CAR = current assets ratio, CLR = current liabilities ratio. The *t*-statistic tests the difference of means between the fourth and first quartiles, with *p*-values in parentheses. INV, ACR, ACP and CCC are expressed in numbers of days; ROA, SIZE, SGROW, DEBT, CAR and CLR are dimensionless. Comparison of mean values of variables as a function of ROA quartiles, created annually. Median values in parentheses.

As we can see from table VI, the fixed effects model were preferred for all the models tested, and that all the coefficients in the multivariate analysis were statistically significant. For all three components of CCC, INV, ACR and ACP are negative and significant related to ROA. Studies showing a positive relationship between an increasing CCC and thereby increased profitability are not verified (Abuzayed, 2012; Gill, Biger, and Mathur, 2010; Sharma and Kumar, 2011). A more aggressive working capital policy aiming to reduce CCC to the minimum seems to generate more profitability (see Baños-Caballero et al., 2012;

Deloof, 2003; Garcìa-Teruel and Martìnez-Solano, 2007; Pais and Gama, 2015). The control variables SIZE, SGROW, CAR and CLR are significant and positively related to profitability, whereas DEBT is significantly negatively connected to profitability. The results are consistent among the different regression models tested.

	MODEL 1	MODEL 2	MODEL 3	MODEL 4
INV	-0.0000687 (-4.25)****			
ACR		-0.000671 (-5.35)****		
ACP			-0.000106 (-5.65)****	
CCC				-0.0000604 (-4.36)****
SIZE	0.118 (39.76)****	0.123 (39.57)****	0.119 (39.85)****	0.118 (39.73)****
SGROW	0.178 (67.67)****	0.169 (52.72)****	0.179 (69.75)****	0.179 (69.14)****
GDPR	0.110 (13.48)****	0.114 (13.96)****	0.111 (13.63)****	0.110 (13.46)****
DEBT	-0.370 (-42.35)****	-0.369 (-42.21)****	-0.370 (-42.42)****	-0.371 (-42.38)****
CAR	0.254 (33.46)****	0.261 (33.78)****	0.251 (33.07)****	0.256 (33.47)****
CLR	0.123 (16.23)****	0.126 (16.59)****	0.127 (16.67)****	0.127 (16.00)****
C	-1.803 (-38.54)****	-1.870 (-38.74)****	-1.811 (-38.65)****	-1.802 (-38.54)****
F-test Pooled OLS	0.00	0.00	0.00	0.00
Robust Hausman test	0.00	0.00	0.00	0.00
Fixed effect preferred?	Yes	Yes	Yes	Yes
No. of obs.	84,300	84,300	84,300	84,300

Table VI: Effects of working capital on ROA (using fixed effects).

Notes: ROA = return on assets, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. Results obtained using fixed effects estimation. *t*-statistics in parentheses. F-test and robust Hausman are the *p*-values for the tests. ****, ***, ** and * denote significance at 99.9%, 99%, 95% and 90% respectively.

Using ROIC as a proxy for profitability, the results were the same, although a slightly less significant with ROIC as dependent variable compared to ROA. In table VII the models using ROA and ROIC as dependent variable are reported. To conserve space, control variable and constant coefficients for all models are not reported, but only for independent variable coefficients for each model tested, being eight in total. The control variable coefficients were thus significant at 99.9% level for all models tested.

Model tested	ROA	ROIC
INV	-0.0000687 (-4.25)****	-0.0000898 (-2.56)***
ACR	-0.000671 (-5.35)****	-0.0007584 (-3.74)****
ACP	-0.000106 (-5.65)****	-0.0000857 (-1.92)**
CCC	-0.0000604 (-4.36)****	-0.0001 (-3.15)***
Constant	Yes	Yes
Control variables	Yes	Yes
No. of obs.	84,300	84,300

Table VII: Comparing effects of working capital on ROA and ROIC (using fixed effects).

Notes: This table summarizes eight different models estimated separately. Each line refers to a different independent variable. ROA = return on assets, ROIC = return on invested capital, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. Results obtained using fixed effects estimation. *t*-statistics in parentheses. ****, ***, ** and * denote significance at 99.9%, 99%, 95% and 90% respectively.

4.2 Endogeneity

As previous research indicates, there may be an endogeneity problem (Deloof, 2003; García-Teruel and Martínez-Solano, 2007; Pais and Gama, 2015). To check for the possibility of endogeneity being present, a two-stage least squares analysis (2SLS) with robust standard errors was conducted. The first lags of the

variables INV, ACR, ACP and CCC were used as instrumental variables, and ROA as dependent variable. In table VIII the results shows similar pattern as the multivariate analysis. The Durbin–Wu–Hausman test for endogeneity does not allow us to reject the null hypothesis, the variables being exogenous. Thus, endogeneity seems to exist, but it does not alter the negative relationship of the coefficients with profitability.

	MODEL 1	**MODEL 2**	**MODEL 3**	**MODEL 4**
INV	-0.0002331 (-22.88)****			
ACR		-0.000232 (-7.68)***		
ACP			-0.0004931 (-17.19)****	
CCC				-0.0001702 (-16.18)****
SIZE	0.008 (14.51)****	0.009 (15.75)****	0.009 (15.10)****	0.009 (15.44)****
SGROW	0.198 (58.07)****	0.209 (60.69)***	0.201 (58.54)****	0.203 (59.32)****
GDPR	0.110 (6.35)****	0.109 (9.31)****	0.100 (8.47)****	0.090 (7.53)****
DEBT	-0.242 (-49.12)****	-0.267 (-54.87)****	-0.262 (-54.07)****	-0.250 (-50.98)****
CAR	0.075 (16.38)****	0.049 (11.34)****	0.027 (6.21)****	0.076 (16.01)****
CLR	0.198 (32.85)****	0.240 (41.88)****	0.252 (43.53)****	0.206 (33.32)****
C	-0.029 (-2.64)****	-0.044 (-4.09)****	-0.011 (-1.04)	-0.045 (-4.20)****
Durbin	0.00	0.00	0.00	0.00
Wu-Hausman	0.00	0.00	0.00	0.00
No. of obs.	63,225	63,225	63,225	63,225

Table VIII: Test for endogeneity.
Notes: ROA = return on assets, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. Results obtained from 2SLS, with the first lags of INV, ACR, ACP and CCC as instruments. *t*-statistics in parentheses. Durbin–Wu–Hausman is the *p*-value for the tests. ****, ***, ** and * denote significance at 99.9%, 99%, 95% and 90% respectively.

4.3 Industry effects

As can be deduced from the descriptive statistics, industries do have diverse characteristics. To control for industry effects, a centering of ROA, ROIC, and the different components of CCC were performed. This was done by subtracting the means of the components from the respective variables. Results in table IX shows equivalent to those obtained with the fixed effects approach, using centered CCC as independent variable.

	ROA	**ROIC**
CCCcentered	-0.0000604 (-4.36)****	-0.0001 (-3.15)***

SIZE	0.118 (39.73)****	0.126 (18.75)****
SGROW	0.179 (69.14)****	0.225 (34.93)****
GDPR	0.110 (13.46)****	0.089 (3.95)****
DEBT	-0.371 (-42.38)****	-0.352 (-17.67)****
CAR	0.256 (33.47)****	0.353 (19.48)****
CLR	0.123 (16.00)****	0.275 (14.50)****
C	-1.911 (-40.80)****	-2.198 (-20.57)****
F-test Pooled OLS	0.00	0.00
Robust Hausman	0.00	0.00
Fixed effects preferred?	Yes	Yes
No. of obs.	84,300	84,300

Table IX: Effects of working capital on ROA and ROIC (using centered CCC).

Notes: ROA = return on assets, ROIC = return on invested capital, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. Results obtained using fixed effects estimation. *t*-statistics in parentheses. F-test and robust Hausman are the *p*-values for the tests. ****, ***, ** and * denote significance at 99.9%, 99%, 95% and 90% respectively.

In table X the models using centered ROA and ROIC as dependent variable are reported, with all the independent variables. To conserve space, control variable and constant coefficients for all models are not reported, but only for centered independent variable coefficients for each model tested, being eight models in total. The control variable coefficients were thus significant at 99.9% level for all models tested. The tests yielded similar results, with ROIC as dependent variable being a little less significant compared to ROA.

	ROA	**ROIC**
INVcentered	-0.0000687 (-4.25)****	-0.0000898 (-2.56)***
ACRcentered	-0.000671 (-5.35)****	-0.0007584 (-3.74)****
ACPcentered	-0.0001062 (-5.65)****	-0.0000857 (-1.92)**
CCCcentered	-0.0000604 (-4.36)****	-0.0001 (-3.15)***
Constant	Yes	Yes
Control variables	Yes	Yes
F-test Pooled OLS	0.00	0.00
Robust Hausman	0.00	0.00
Fixed effects preferred?	Yes	Yes
No. of obs.	84,300	84,300

Table X: Effects of working capital on ROA and ROIC (using centered INV, ACR, ACP and CCC).

Notes: This table summarizes eight different models estimated separately. Each line refers to a different independent variable. ROA = return on assets, ROIC = return on invested capital, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. Results obtained using fixed effects estimation. *t*-statistics in parentheses. F-test and robust Hausman are the *p*-values for the tests. ****, ***, ** and * denote significance at 99.9%, 99%, 95% and 90% respectively.

To control for industry effects and the time invariant nature of the industry classification, a pooled regression were also run with robust standard errors. To do this, the data were pooled on each firm in each year and estimated by OLS:

$$DEP_{i,t} = \beta_0 + \beta_1 IND_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 SGROW_{i,t} + \beta_4 GDPR_{i,t} + \beta_5 DEBT_{i,t} + \beta_6 CAR_{i,t} + \beta_7 CLR_{i,t} + \sum_{J=B}^{S} \beta_j ID_{ij} + \varepsilon_{i,t}$$

Here DEP stands for dependent variables, ROA or ROIC, and IND are the independent variables, namely INV, ACR, ACP and CCC. The control variables are the same with same meaning. The ID variable are industry-specific dummy variables that equal 1 if a specific industry includes a given firm and

0 otherwise. The omitted variable were sector E (Fishing).

To conserve space, control variables, constant and industry-specific coefficients for all models are not reported, but only for independent variable coefficients for each model tested, using ROA or ROIC as dependent variable. The control variable coefficients were thus significant at 99.9% level for all models tested. Comparing the industry-specific coefficients for the eight models estimated, they remain significant, except for Sector A (Mining), H (Information and communication), J (Facility Management in real estate), and K (Hotel and accommodation), both in the ROA and ROIC regression. That means for those industries, they are not statistically different from the defined base industry (sector E - Fishing).

Even though ROA or ROIC are being used as dependent variable and INV, ACR, ACP and CCC as independent variables, the results remain the same, thus adding further robustness to results.

There is an inverse relationship between working capital and profitability. This may be interpreted as reducing cash conversion cycle will increase profitability, in other words promoting an aggressive working capital policy.

	ROA	ROIC
INV	-0.0002136 (-34.75)****	-0.0002722 (-20.62)***
ACR	-0.0003533 (-12.74)****	-0.0004815 (-8.34)****
ACP	-0.0003497 (-16.58)****	-0.000506 (-12.29)**
CCC	-0.0001672 (-28.26)****	-0.0001996 (-15.50)***
Constant	Yes	Yes
Control variables	Yes	Yes
Industry dummies	Yes	Yes
No. of obs.	84,300	84,300

Table XI: Effects of working capital on ROA and ROIC (using pooled regressions).

Notes: This table summarizes eight different models estimated separately using pooled data. Each line refers to a different independent variable. ROA = return on assets, ROIC = return on invested capital, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. Industry dummies refer to the set of industry specific classification dummy variables. *t*-statistics in parentheses. ****, ***, ** and * denote significance at 99.9%, 99%, 95% and 90% respectively.

4.4 Non-linear effects

Recent studies (Baños-Caballero et al., 2012; Pais and Gama, 2015) have found a non-monotonic relationship between working capital level and profitability, which indicates that there is an optimal level of working capital to maximize profitability. To check for such a relationship in our sample, we used the following additional regressions:

(1) $ROA_{i,t} = \beta_0 + \beta_1 INV_{i,t} + \beta_2 INV^2_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 SGROW_{i,t} + \beta_5 DEBT_{i,t} + \beta_6 CAR_{i,t} + \beta_7 CLR_{i,t} + \beta_8 GDPR_{i,t} + \upsilon_i + \varepsilon_{i,t}$
(2) $ROA_{i,t} = \beta_0 + \beta_1 ACR_{i,t} + \beta_2 ACR^2_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 SGROW_{i,t} + \beta_5 DEBT_{i,t} + \beta_6 CAR_{i,t} + \beta_7 CLR_{i,t} + \beta_8 GDPR_{i,t} + \upsilon_i + \varepsilon_{i,t}$
(3) $ROA_{i,t} = \beta_0 + \beta_1 ACP_{i,t} + \beta_2 ACP^2_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 SGROW_{i,t} + \beta_5 DEBT_{i,t} + \beta_6 CAR_{i,t} + \beta_7 CLR_{i,t} + \beta_8 GDPR_{i,t} + \upsilon_i + \varepsilon_{i,t}$
(4) $ROA_{i,t} = \beta_0 + \beta_1 CCC_{i,t} + \beta_2 CCC^2_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 SGROW_{i,t} + \beta_5 DEBT_{i,t} + \beta_6 CAR_{i,t} + \beta_7 CLR_{i,t} + \beta_8 GDPR_{i,t} + \upsilon_i + \varepsilon_{i,t}$

The dependent, independent and control variables have already been explained. The new addition is the inclusion of squared values for the independent variables running the regressions with fixed-effects and robust standard errors. As can be seen in Table XII, the coefficients for the squared terms of the variables ACR, ACP and CCC are significant and positive, which indicated a relevant quadratic dependence and the presence of a minimum. This minimum is found for large values of these variables, suggesting an overall decrease in ROA as these variables increase. This is in line with the findings reported by Pais and Gama (2015), although they seem not to find a significant result for the squared variable AR (ACR in this study). However in our results the squared variable INV were not significant. Other studies have suggested a negative value for the same coefficients, although reaching the same conclusion, i.e. assuming that increasing CCC will decrease ROA (Baños-Caballero et al., 2012).

	MODEL 1	MODEL 2	MODEL 3	MODEL 4
INV	-0.000107 (-3.81)****			
INV^2	0.0000000451 (1.14)			
ACR		-0.00091 (-16.17)****		

ACR^2		0.000000453 (7.63)****		
ACP			-0.000148 (-5.71)****	
ACP^2			0.0000000492 (1.72)*	
CCC				-0.00011 (-6.48)****
CCC^2				0.000000124 (4.67)****
SIZE	0.119 (25.61)****	0.125 (41.47)****	0.119 (39.92)****	0.119 (39.70)****
SGROW	0.177 (70.37)****	0.167 (62.72)****	0.178 (68.99)****	0.179 (69.20)****
GDPR	0.110 (13.48)****	0.115 (14.18)****	0.112 (13.67)****	0.110 (13.44)****
DEBT	-0.370 (-75.00)****	-0.368 (-42.15)****	-0.370 (-42.38)****	-0.371 (-42.40)****
CAR	0.255 (33.52)****	0.263 (34.47)****	0.251 (33.04)****	0.257 (33.57)****
CLR	0.123 (16.16)****	0.127 (16.62)****	0.128 (16.76)****	0.122 (15.87)****
C	-1.804 (-38.53)****	-1.891 (-40.12)****	-1.814 (-38.70)****	-1.801 (-38.47)****
F-test Pooled OLS	0.00	0.00	0.00	0.00
Robust Hausmann	0.00	0.00	0.00	0.00
No. of obs.	84,300	84,300	84,300	84,300

Table XII: Effects of working capital on ROA testing for a non-linear relationship (using fixed-effects).

Notes: ROA = return on assets, INV = number of days inventory, ACR = accounts receivable, ACP = accounts payable, SIZE = firm size, SGROW = sales growth, DEBT = debt ratio, GDPR = annual GDP growth, CAR = current assets ratio, CLR = current liabilities ratio. Results obtained using fixed effects estimation. *t*-statistics in parentheses. F-test and robust Hausman are the *p*-values for the tests. ****, ***, ** and * denote significance at 99.9%, 99%, 95% and 90% respectively.

5. Conclusions and Further Research

Working capital management (WCM) will most likely be one way of improving business for small and medium-sized enterprises (SMEs). Based on our study of Norwegian SMEs, efficient WCM will generate enhanced profitability. The sample comprised 21,075 SMEs, covering the period 2010–2013, and the SMEs were selected after employing a range of filters. Panel data treatment with fixed effect regression was considered the most appropriate approach for describing and analysing our sample.

This study finds a negative relationship between the INV, ACR, ACP and CCC variables. This is in line with previous research (Deloof, 2003; Garcìa-Teruel and Martìnez-Solano, 2007; Pais and Gama, 2015). More specific for Norwegian firms and practitioners, this support their current use of an aggressive WCM-strategy.

Regarding the control variables, SIZE, SGROW, GDPR, CLR and CAR, they were all statistically significant and positively related to profitability. The DEBT variable was also statistically significant, but negatively related to profitability. This is in line with similar studies, indicating that firm profitability decreases with increasing debt, and in general increases in periods of economic growth, probably benefiting from aggressive WCM (Baños-Caballero et al., 2012; Deloof, 2003; García-Teruel and Martínez-Solano, 2007; Pais and Gama, 2015).

The test for endogeneity did not alter the interpretation of the relationship between CCC and ROA.

The relationship of INV, ACR, ACP and CCC with ROA seems not to be linear, but has a quadratic dependence. These results indicates as well that practising more aggressive WCM policies generally increases firms' profitability. However, this must not be interpreted as being set in stone as being too aggressive may lead to decreasing profitability, this then being the opportunity cost of aggressive WCM. The reason for this may be that firms alienate potential customers due to restrictive trade credits, or they run out of supplies due to low inventory levels, while suppliers want to be paid in accordance with the trade credit terms agreed upon.

Even though the results seem to be consistent among countries, it should be noted that the underlying

accounting principles may differ in the valuation of the individual variables, having an impact on estimated results. For instance, NGAAP are based on an earnings oriented conceptual view, while IFRS are more based on a balanced sheet conceptual view. As always, this is an interesting topic in itself for further research.

This is a first step in analysing WCM and profitability in Norway. Further research may confirm and strengthen the robustness of our results, for instance by studying the relationship between WCM and profitability for specific industries, and also looking at listed companies as a sample. A qualitative study may reveal the underlying causes of the length of different components of CCC, for example if the length of trade credit results from being profitable, or if this length is due to being less solvent.

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