The current issue and full text archive of this journal is available at
www.emeraldinsight.com/1743-9132.htm

Received 19 December 2013
Revised 2 April 2014
Accepted 12 July 2014

The impact of cash conversion cycle on firm profitability

An empirical study based on Swedish data

Darush Yazdanfar and Peter Öhman
Department of Business, Economics and Law, Centre for Research on Economic Relations, Mid Sweden University, Sundsvall, Sweden

Abstract

Purpose – The purpose of this paper is to seek to investigate the impact of cash conversion cycle (CCC) on performance (i.e. profitability) in Swedish small and medium-sized enterprises (SMEs) over the 2008-2011 period.

Design/methodology/approach – The study uses a seemingly unrelated regression (SUR) model to analyse cross-sectional panel data covering 13,797 SMEs operating in four industries.

Findings – The study provides empirical evidence that CCC significantly affects profitability. In addition, the firm-level control variables size, age, and industry affiliation significantly affect firm profitability. These findings imply that managers could increase firm profitability by improving their working capital management.

Research limitations/implications – The present study is limited to a sample of Swedish SMEs in four industries; further research could examine the generalizability of these findings to other countries and industries.

Practical implications – Improved working capital policy could improve firm profitability by reducing the firm's CCC, thereby creating additional firm value. In addition, the results can be used for other purposes, including monitoring of firms by auditors, debt holders, and other stakeholders.

Originality/value – The present study contributes to the literature by employing a SUR model to analyse a comprehensive cross-sectoral sample in a high-tax environment. To the authors' knowledge, this is the first empirical study to address this issue in the Swedish context based on a large data set covering SMEs in various industries.

Keywords Small and medium-sized enterprises, Cash conversion cycle, Working capital management, Firm profitability

Paper type Research paper

1. Introduction

Increased competition in recent decades has directed attention to the rationalization of short-term investments, giving working capital management a crucial role in firm profitability (Jose *et al.*, 1996; Shin and Soenen, 1998; Lazaridis and Tryfonidis, 2006; Appuhami, 2008; Ajilore and Falope, 2009; Baños-Caballero *et al.*, 2011). Furthermore, various problems related to working capital management have been regarded as significant reasons for small and medium-sized enterprise (SME) failure (Cielen *et al.*, 2004).

Working capital management, which involves managing cash, inventory, and accounts receivable, affects a firm's short-term financial performance. Several previous studies have measured the impact of working capital on firm profitability (e.g. Soenen, 1993; Deloof, 2003; Padachi, 2006; Garcia-Teruel and Martinez-Solano, 2007). According to Ebben and Johnson (2011), working capital management has increasingly been measured by cash conversion cycle (CCC). Most previous studies of CCC have investigated its impact on profitability in large countries (e.g. Jose *et al.*, 1996; Shin and Soenen, 1998). However, Sweden's business environment and economic structure differ from those of

International Journal of Managerial Finance
Vol. 10 No. 4, 2014
pp. 442-452

1743-9132
DOI 10.1108/IJMF-12-2013-0137

many other countries. Internationally, the Swedish economy can be described as a small, export-oriented open economy with universal social benefits funded by high taxes (Swedish Central Bank, 2013). The present study analyses the impact of CCC on performance in terms of profitability in Swedish SMEs.

The results confirm the inverse relationship between CCC length and profitability, even in a high-tax environment. Moreover, while firm size is significantly and positively related to profitability, firm age is significantly and negatively related to profitability. The study contributes to the financial management literature in at least two ways. First, it uses a unique method to analyse a large sample of SMEs. Second, it confirms previous findings regarding the relationship between CCC and firm profitability in a previously unstudied context.

The next section describes the conceptual framework and summarizes previous research in the area. Section 3 elaborates on the variable selection, research hypotheses, sample and data, and model specification. Section 4 reports the results of the empirical analyses, and section five presents the concluding discussion.

2. Conceptual framework and previous research

Conceptual framework

CCC management has been regarded as fundamental to working capital management (Gitman, 1974; Richards and Laughlin, 1980; Jose *et al.*, 1996; Deloof, 2003). It involves managing three components, i.e. inventory, accounts receivable, and accounts payable, with a focus on balancing them (Charitou *et al.*, 2010). Efficient CCC management gives managers better control over a firm's short-term investments, which in turn may affect risk, profitability, and thereby firm value (Peel *et al.*, 2000; Ebben and Johnson, 2011). Based on the trade-offs between expected profitability vs risk and advantages vs disadvantages, a firm's CCC can be optimized to maximize profitability and growth (Lazaridis and Tryfonidis, 2006; Baños-Caballero *et al.*, 2011). Reducing the accounts receivable period, combined with lower inventory and extended supplier credit terms, leads to a shorter CCC, and working capital policy including a shorter CCC and a lower capital level may improve profitability (Wang, 2002; Ebben and Johnson, 2011). The advantage of such a policy is that operations financed cheaply, as current liabilities, incur little or no interest. However, this policy involves risk, as low inventory levels combined with a short-term trade credit may lead to higher operation risk and decreased sales (Wang, 2002; Ebben and Johnson, 2011).

CCC expresses the net time interval between a firm's cash expenditures for purchases and its final recovery of cash receipts from product sales (Richards and Laughlin, 1980). The average CCC can be calculated by adding days sales outstanding (DSO) to days sales of inventory (DSI) and subtracting days payable outstanding (DPO). Since CCC indicates how quickly current assets are converted into cash, it measures the efficiency of working capital management. CCC provides an overview of a critical financial process in firms. If a firm invests more capital than is considered normal in any particular industry, this leads to increased costs and decreased competitiveness. The assets invested in working capital often represent a major share of total assets, and could therefore be an incentive for capital rationalization. CCC management requires planning, routing, and evaluating alternative capital structures to improve firm performance.

Previous research

Previous studies of the impact of working capital management on firm profitability have often been industry specific, focusing on the construction, service, agriculture,

mining, wholesale, oil and gas, retail, transportation, or manufacturing industries. Many of these studies have been conducted in the USA. For example, Jose *et al.* (1996) used a sample of 2,718 US manufacturing companies over the 1974-1993 period, and found that financial policy based on a shorter CCC leads to higher profitability. As a result, firms with shorter CCCs tend to be more profitable because they tend to minimize the cost of holding unproductive working capital.

Moreover, based on a sample comprising 58,985 US companies operating in seven industries over the 1975-1994 period, Shin and Soenen (1998) analysed the relationship between efficiency of working capital management and profitability, finding a strong negative relationship between CCC and profitability. The authors point out that, rather than increase liabilities, the number of days in CCC should be cut to reduce the working capital level. Ebben and Johnson (2011) found similar evidence in a study of 879 small US manufacturing firms and 833 small US retailing firms over the 2002-2003 period.

To test the relationship between liquidity management and operating performance, Wang (2002) analysed a sample of 1,555 Japanese firms and 379 Taiwanese firms in various industries over the January 1985-December 1996 period. The results indicated that the CCC-return on assets (ROA) and CCC-return on equity (ROE) relationships were generally negative, suggesting that managers could increase firm profitability by reducing CCC.

Several studies have examined the issue in small European countries. Deloof (2003) examined the relationship between working capital management and profitability in 1,009 large non-financial companies in Belgium over the 1992-1996 period. Based on a correlation analysis of the relationship between gross profit and accounts receivable, inventory, or accounts payable, respectively, the empirical results confirmed a hypothesized significant negative relationship between the dependent and independent variables. Lazaridis and Tryfonidis (2006) studied the effect of working capital management on profitability in 131 Greek firms operating in various industries listed on the Athens Stock Exchange over the 2001-2004 period. Garcia-Teruel and Martinez-Solano (2007) investigated the effects of working capital management on profitability in Spanish SMEs using a sample of 8,872 companies operating in eight industries over the 1996-2002 period. In addition, Mathuva (2010) used a sample of 30 listed Kenyan firms in several industries over the 1993-2008 period. A key finding of these three studies was a highly significant negative relationship between CCC and firm profitability. Consequently, firms could enhance their profitability by shortening their CCCs.

However, several studies have found a positive relationship between CCC and profitability. Lyroudi and Lazaridis (2000) examined the relationship between the liquidity, profitability, and leverage ratios of 82 firms in the food industry listed on the Athens Stock Exchange in 1997. They found a positive relationship between CCCs and ROA. Gill *et al.* (2010) examined a sample of 88 US manufacturing companies over the 2005-2007 period, and found a significant positive relationship between CCC and profitability. The authors argue that managers might increase profitability and thereby firm value by focusing on CCC and keeping accounts receivable at an optimal level. Similar results were found by Sharma and Kumar (2011), who analysed a sample of 263 non-financial firms in India over the 2000-2008 period. Moreover, Abuzayed (2012) argued conclusively, from a study of 93 non-financial firms in 11 industries from 2000 to 2008, that profitability and CCC were significantly and positively related. Her results indicated that more profitable firms were less motivated to manage their working capital efficiently.

As indicated by the literature review, previous empirical results are mixed and suffer from ambiguity concerning the form of the relationship between CCC and firm

profitability. The fact that these studies are based on different sample selections and contexts somewhat explains the disagreement. This, and the fact that Sweden's business environment and economic structure differ from those of other countries, leads to questions about the relationship between CCC and profitability in Swedish SMEs. To the authors' knowledge, this is the first empirical study to address this issue in the Swedish context based on a large data set covering SMEs in various industries.

3. Variable selection, research hypotheses, sample and data, and model specification

Variable selection

The main independent variable studied here, CCC, may overlap with other variables such as firm size and firm age. To measure the effect of each variable, the independent variables were classified in two groups, i.e. the main independent variable and control variables.

The dependent variable: profitability

In line with several studies (Shin and Soenen, 1998; Deloof, 2003; Filbeck and Krueger, 2005; Garcia-Teruel and Martinez-Solano, 2007; Napompech, 2012), we predict a negative relationship between CCC and profitability. In addition, as in most previous studies (e.g. Jose *et al.*, 1996; Wang, 2002), we define firm profitability as book value of net profit after tax divided by total assets, i.e. ROA.

The independent variable: CCC

In agreement with Lazaridis and Tryfonidis (2006), the independent variable, CCC, is measured as follows: number of days of accounts receivable + number of days of inventory − number of days of accounts payable. In other words, CCC is a proxy for the net time interval between a firm's cash expenditures for purchases and its final recovery of cash receipts in terms of days.

The fact that previous studies were based on different sample selections and were carried out in diverse contexts somewhat explains the disagreement between their findings. Although previous findings are not consistent, more evidence seems to support the existence of a negative relationship between CCC and profitability. We therefore formulate the following hypothesis:

H1. A longer CCC is expected to negatively influence firm profitability.

Control variables

In line with Garcia-Teruel and Martinez-Solano (2007), the present study employs the natural logarithm of net sales as a proxy for firm size. According to previous studies, firm size influences both the working capital level and profitability, and these studies have suggested a positive relationship between firm size and profitability (e.g. Garcia-Teruel and Martinez-Solano, 2007; Mathuva, 2010). We therefore hypothesize accordingly:

H2. Firm size is expected to positively influence profitability.

In this study, firm age is defined as the number of years since firm establishment, and the natural logarithm of age is used as a proxy for firm age. Firm age has been regarded as an important variable explaining change in the working capital level and in profitability (Howorth and Westhead, 2003; Mathuva, 2010). Berger and Udell (1998) argue that older

firms have better access to external financing than do younger ones, so older firms are less constrained in financing their working capital. Moreover, previous empirical studies suggest that firm age positively affects profitability (Garcia-Teruel and Martinez-Solano, 2007; Baños-Caballero *et al.*, 2010; Mathuva, 2010), so we hypothesize accordingly:

H3. Firm age is expected to positively influence profitability.

Sample and data

The panel data used here come from Affärsdata, a commercial Swedish databank, and include standardized and detailed firm-level data, including balance sheet, income statement, and qualitative variables for all Swedish limited liability firms. The initial sample consisted of approximately 23,000 SMEs, i.e. all non-financial, independent, and unlisted active SMEs in four industries: metal, restaurant, retail, and wholesale (firms were classified using a one-digit standard industrial classification code). According to Statistics Sweden (2012), the sampled SMEs were defined as firms with fewer than 200 employees. The sampling period was 2008-2011.

Panel data compiled from financial statements have certain typical problems, such as outliers and/or missing data. To overcome these problems, all firms for which there were any outliers or errors in the accounting data were deleted from the data set. Moreover, to minimize the risk of sample selection bias, firms involved in bankruptcy proceedings, with annual operating revenues under SEK 120,000, or with total assets under SEK 100,000 were removed from the data set. Firms without registered employees were also removed. As a result, a total of 13,797 SMEs were included in the final sample. The univariate descriptive analysis presented in Table I provides a summary of the descriptive statistics for the sample.

		Metal	Restaurant	Retail	Wholesale	Total
Firms	No. of observations	6,716	4,724	34,608	9,140	55,188
	Per cent of total	12	9	63	16	100
	No. of firms	1,679	1,181	8,652	2,285	13.797
	Per cent	12	9	63	17	100
Profitability (ROA)	Mean (%)	0.11	0.13	0.11	0.12	0.11
	SD	0.13	0.19	0.16	0.14	0.16
Size	Mean (SEK)	3.84	3.63	3.79	4.20	3.85
	SD	0.52	0.46	0.60	0.70	0.62
Age	Mean (years)	20.15	14.14	19.71	24.75	20.12
	SD	12.45	10.65	14.83	16.73	14.82
Employees	Mean (no.)	9.68	7.98	7.02	15.38	8.81
	SD	15.17	11.42	12.32	25.71	15.91
WCTA	Mean (%)	0.39	0.36	0.48	0.48	0.43
	SD	0.53	1.07	1.23	0.73	0.89
CCC	Mean (days)	45.49	20.30	40.58	82.81	47.30
	SD	128.64	30.09	142.44	101.95	100.78
ANOVA of CCC between different industries		Sum of squares	df	Mean square	*F*	Sig.
		34,367.43	3	11,455.81	8073.402	0.000**

Notes: Variables are defined as follows: size, the natural logarithm of sales; age, the number of years since firm establishment; employees, the average number of employees; WCTA, working capital as a percentage of total assets; CCC, cash conversion cycle in days. ANOVA (*F*), statistically significant variance of CCC across industries at 0.05 significance level

Table I.
Summary of descriptive statistics

Model specification

Seemingly unrelated regression (SUR) was the main method used to identify the combination of variables that best estimated the influence of the independent variables on the dependent variable. This model is appropriate when the sample consists of panel data, which can suffer from error terms considered to be correlated across the equations (Zellner and Theil, 1962). Moreover, despite this advantage, to our knowledge, the SUR model has not yet been used to analyse the impact of CCC on profitability.

The following model was formulated to identify and quantify the variables that explain the impact of CCC and of the control variables (i.e. size and age) on profitability in the sample of Swedish SMEs.

The equation for the complete sample is: $ROA_{i,t} = \alpha + \beta_1 CCC_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \varepsilon_{it}$

The equation for the sample for each industry is: $ROA_{i,t} = \beta_0 + \beta_1 CCC_{i,t} + \beta_2 Size_{i,t} + \beta_3 Age_{i,t} + \varepsilon_{it}$

where α is the constant; $ROA_{i,t}$ the profitability (%); $CCC_{i,t}$ the cash conversion cycle (the natural logarithm of number of days); $Size_{i,t}$ the size of firm i at time t (the natural logarithm of sales); $Age_{i,t}$ the age of firm i at time t (the natural logarithm of age); $\varepsilon_{i,t}$ the error term.

4. Results of the empirical analyses

Results of the univariate descriptive analysis

Table I presents the means and standard deviations of the dependent and independent variables. Overall, the sampled firms are approximately 20 years old and have on average around nine employees. The standard deviations of both firm age and number of employees in the present study are relatively large, indicating that the sampled firms are generally mature and have reached a significant scale of operation. In addition, comparing the means and standard deviations of profitability, number of employees, working capital to total assets (WCTA), and CCC between industries indicates low homogeneity in the sampled firms.

Table I reports the industry classification using the single-digit SIC code. As shown, the sample consists of firms in the retail (63 per cent of sample), wholesale (16 per cent), metal (12 per cent), and restaurant (9 per cent) industries. Accordingly, service firms (i.e. in the retail, wholesale, and restaurant industries) are highly represented (88 per cent). The restaurant and wholesale industries have the highest profitability ratios, with values of 13 and 12 per cent, respectively. Moreover, the results indicate that the firms in the restaurant industry have the lowest CCC (an average period of 20 days), while wholesale firms have the longest cycle (more than 80 days). An ANOVA test was performed to determine whether the CCC varies significantly across industries; the results indicate that the CCC period differs across industries, supporting the existence of an industry effect.

Results of correlation analysis

Table II presents the Pearson's correlations between all variables included in the SUR models. The coefficients are statistically significant at the 0.05 significance level. The results confirm that all the correlation coefficients of the variables are small, which implies that multi-collinearity is not a risk in the sample.

The correlations reveal several important findings. First, the significant and negative relationship between CCC and profitability indicates that the shorter the cycle, the higher the profitability. Second, the significant and positive relationship between firm size and

	Profitability (ROA)	CCC	Size	Age
Profitability (ROA)	1.0000			
CCC	−0.0924*	1.0000		
	0.0000			
Size	0.1898*	−0.1915*	1.0000	
	0.0000	0.0000		
Age	−0.0970*	0.0773*	0.1952*	1.0000
	0.0000	0.0000	0.0000	
n (observations)	55,188	55,188	55,188	55,188

Table II.
The results of correlation analysis

Note: *Coefficients are significant at the 0.05 level

profitability indicates that larger firms tend to be more profitable. Third, as the coefficient between firm age and profitability is significantly negative, it can be concluded that the younger the firm, the higher the profitability. Furthermore, larger firms and younger firms are less likely to have long cycles than are other firms.

Results of the SUR models

Table III presents the results obtained after regressing the complete SUR model and the SUR models for each industry. The complete SUR model, which includes firms in all four industries, focuses on the effects of CCC, firm size, and firm age on profitability. Consistent with *H1*, the coefficient of CCC is negative and significant ($B = -0.003$; $p = 0.000$) at the 5 per cent level, implying that the variable is inversely related to firm

	Metal	Restaurant	Retail	Wholesale	Total
Constant	−0.007	−0.118**	−0.033**	0.060**	−0.027**
Sig.	0.610	0.000	0.000	0.000	0.000
CCC	−0.006**	−0.028**	−0.004**	−0.007**	−0.003**
Sig.	0.000	0.000	0.000	0.000	0.000
Size	0.054**	0.101**	0.059**	0.044**	0.052**
Sig.	0.000	0.000	0.000	0.000	0.000
Age	−0.067**	−0.036**	−0.027**	−0.039**	−0.022**
Sig.	0.000	0.000	0.000	0.000	0.000
χ^2	437.10	397.83	2,556.57	521.20	3,189.87
Sig.	0.000	0.000	0.000	0.000	0.000
R^2	0.061	0.078	0.069	0.054	0.055
RMSE	0.127	0.185	0.155	0.137	0.153
Parms	3.000	3.000	3.000	3.000	3.000
n (observations)	6,716	4,724	34,608	9,140	55,188
D-W	1.698	1.947	1.993	1.786	2.087
ANOVA	0.000	0.000	0.000	0.000	0.000
Mean VIF	1.136	1.286	1.140	1.981	1.250
Heteroskedasticity tests					
$\chi^2(1)$	96.30	23.59	176.84	24.79	597.73
Sig.	0.000	0.000	0.000	0.000	0.000

Table III.
SUR model of the complete sample and each industry

Notes: D-W, Durbin-Watson statistics; variance inflation factor (VIF) assesses the severity of multicollinearity; Heteroskedasticity test, Breusch-Pagan/Cook-Weisberg tests. Dependent variable: ROA. **Coefficients are significant at the 0.05 level

profitability. In other words, SME profitability tends to increase with fewer days in the CCC. This implies that a firm with a shorter CCC is more likely to be profitable than is a firm with a longer cycle. In agreement with *H2*, the estimated coefficient of the control variable firm size is positive and statistically significant at the 5 per cent level, implying that firm size positively affects profitability ($B = 0.052$; $p = 0.000$). In contrast to *H3*, the results suggest that the control variable firm age significantly and negatively affects profitability, indicating that younger SMEs are more likely to be profitable than are older ones ($B = -0.022$; $p = 0.000$).

As shown in Table III, the independent variables explain approximately 5.5 per cent of the change in profitability ($R^2 = 0.055$). The diagnostics tests of the model, i.e. the *F*-statistic, Durbin-Watson (D-W), variance inflation factor (VIF), Breusch-Pagan/Cook-Weisberg, and Jarque-Bera normality tests, confirm the overall best fit and validity of the model.

Table III also summarizes the results of the SUR model of the relationships between profitability and each of CCC and the two control variables for the four industries. The sign and significance of the relationships between the independent variables and the dependent variable for each industry are found to be similar to those of the complete SUR model. In other words, the results confirm that the overall findings are valid for all industries. However, since the value of the coefficient of CCC varies slightly across industries, it can be concluded that industry affiliation has a certain impact on the relationship between CCC and firm profitability. This effect seems greatest in the restaurant industry and smallest in the retail industry.

The R^2 values of the SUR models of the industries vary between 0.054 and 0.078. Moreover, the VIF test indicates that multi-collinearity is not a problem in the models. The Breusch-Pagan/Cook-Weisberg tests examine the heteroskedasticity of the results, and confirm the appropriateness of the model specification. The D-W statistics for the four industries are greater than the upper-bound critical value of 1.6, indicating no serial correlation.

5. Discussion and conclusion

Optimizing working capital minimizes a firm's financial risks and improves its overall performance (e.g. Shin and Soenen, 1998). Consequently, working capital plays an important role in creating firm profitability and competitiveness. The present empirical findings confirm that CCC, as a proxy for working capital management, significantly influences profitability, and that firms with longer CCCs are less profitable. In other words, as the average collection period (inventory turnover and average account receivable in days) increases, this will lead to decreasing firm profitability. A possible explanation for the inverse relationship between CCC and profitability is that increased levels of inventory and accounts receivable increase working capital and thereby the costs of working capital maintenance. Maintaining working capital at a higher than optimal level will result in financial resources being detained in unprofitable cases. In particular, our results indicate that an optimal CCC can help firms improve their performance, i.e. managers can increase the value of firms by shortening this period. The control variables firm size and firm age are related to profitability as well. The effect of firm size on profitability is positive, as larger firms are more profitable and younger firms are more likely to be high-profit firms. Large, young SMEs with short CCCs are therefore more likely to be profitable. The findings of this study are consistent with those of Deloof (2003), Lazaridis and Tryfonidis (2006), Garcia-Teruel and Martinez-Solano (2007), Mathuva (2010), and Ebben and Johnson (2011).

Regardless of slight inconsistencies, further analyses of the impact of the CCC components on firm profitability for each industry confirm the conclusions drawn from the complete SUR model, demonstrating that the overall pattern can be generalized to each studied industry. However, the industry effect on the relationship between CCC and profitability recognized in the sampled SMEs implies that no single policy is necessarily optimal for firms across various industries.

The results provide useful insights into the relationship between CCC and profitability for owners, managers, debt holders, academic researchers, and policy makers. Since a firm could create additional value by optimising its CCC, improved working capital management policy could positively affect firm profitability.

A common challenge facing SMEs is financing, which makes working capital management crucial to firm profitability, survival, and growth (Appuhami, 2008). Given that most SMEs have a large amount of cash invested in working capital accounts, owners and managers should pay attention to working capital (Garcia-Teruel and Martinez-Solano, 2007). Working capital management is based on a typical example of the risk-return nature of financial decision making. A short CCC is related to high opportunity cost, while a long CCC is associated with high carrying cost. In other words, deviation from the optimal CCC level, both below and above optimal, reduces the firm's profitability. Since the CCC is the aggregate of three components, i.e. inventory holding period, accounts receivable period, and accounts payable period, attention should be paid to these components. Owners and managers can optimize the working capital investments, avoiding over- or underinvestment costs in term of inventory costs, lost returns on excess cash holdings and receivables, and debt costs. This requires the evaluation of various working capital investment alternatives and a working capital policy aiming to improve firm profitability.

Because internal and external capital sources are not perfectly interchangeable, internal financing is normally cheaper than external financing (Myers, 2001). An efficient working capital management policy can free up additional internal funds for investment, fostering independence from external financial resources. Moreover, SMEs with efficient working capital management may also face fewer difficulties raising financing from external sources (Strischek, 2001).

Since firm industry affiliation was found to affect firm profitability, owners and managers should attempt to identify challenges and opportunities associated with these industry affiliation characteristics, and implement measures to improve the profitability of their firms. However, the present study is limited to a sample of Swedish SMEs in four industries; further research could examine the generalizability of these findings to other countries and industries.

References

Abuzayed, B. (2012), "Working capital management and firms' performance in emerging markets: the case of Jordan", *International Journal of Managerial Finance*, Vol. 8 No. 2, pp. 155-179.

Ajilore, T.O. and Falope, I.O. (2009), "Working capital management and corporate profitability: evidence from panel data analysis of selected quoted companies in Nigeria", *Research Journal of Business Management*, Vol. 3 No. 3, pp. 73-84.

Appuhami, R. (2008), "The impact of firms' capital expenditure on working capital management: an empirical study across industries in Thailand", *International Management Review*, Vol. 4 No. 1, pp. 11-24.

Baños-Caballero, S., Garcia-Teruel, P. and Martinez-Solano, P. (2010), "Working capital management in SMEs", *Accounting and Finance*, Vol. 50 No. 3, pp. 511-527.

Baños-Caballero, S., Garcia-Teruel, P. and Martinez-Solano, P. (2011), "How does working capital management affect the profitability of Spanish SMEs", *Small Business Economics*, Vol. 39 No. 2, pp. 517-529.

Berger, A.N. and Udell, G.F. (1998), "The economics of small business: the roles of private equity and debt markets in the financial growth cycle", *Journal of Banking and Finance*, Vol. 22 Nos 6/8, pp. 613-673.

Cielen, A., Peeters, L. and Vanhoof, K. (2004), "Bankruptcy prediction using a data envelopment analysis", *European Journal of Operational Research*, Vol. 154 No. 2, pp. 526-532.

Charitou, M., Elfani, M. and Lois, P. (2010), "The effect of working capital management on firm profitability: empirical evidence from an emerging market", *Journal of Business & Economics Research*, Vol. 8 No. 12, pp. 63-68.

Deloof, M. (2003), "Does working capital management affect profitability of Belgian firms?", *Journal of Business Finance & Accounting*, Vol. 30 Nos 3/4, pp. 573-588.

Ebben, J. and Johnson, A. (2011), "Cash conversion cycle management in small firms: relationships with liquidity", *Journal of Small Business & Entrepreneurship*, Vol. 24 No. 3, pp. 381-396.

Filbeck, G. and Krueger, T.M. (2005), "An analysis of working capital management results across industries", *American Journal of Business*, Vol. 20 No. 2, pp. 11-20.

Garcia-Teruel, J. and Martinez-Solano, P. (2007), "Effects of working capital management on SME profitability", *International Journal of Managerial Finance*, Vol. 3 No. 2, pp. 164-177.

Gill, A., Biger, N. and Mathur, N. (2010), "The relationship between working capital management and profitability: evidence from the United States", *Business and Economics Journal*, Vol. 10 No. 1, pp. 1-9.

Gitman, L.J. (1974), "Estimating corporate liquidity requirements: a simplified approach", *The Financial Review*, Vol. 9 No. 3, pp. 79-88.

Howorth, C. and Westhead, P. (2003), "The focus of working capital management in UK small firms", *Management Accounting Research*, Vol. 4 No. 2, pp. 94-111.

Jose, M., Lancaster, C. and Stevens, J.L. (1996), "Corporate returns and cash conversion cycles", *Journal of Economics and Finance*, Vol. 20 No. 1, pp. 33-46.

Lazaridis, I. and Tryfonidis, D. (2006), "Relationship between working capital management and profitability of listed companies in the Athens stock exchange", *Journal of Financial Management and Analysis*, Vol. 19 No. 1, pp. 26-35.

Lyroudi, K. and Lazaridis, Y. (2000), "The cash conversion cycle and liquidity analysis of the food industry in Greece", paper presented at EFMA 2000, Athens, June, available at: http://ssrn.com/paper = 236175 (accessed 7 January 2012).

Mathuva, D. (2010), "The influence of working capital management components on corporate profitability: a survey on Kenyan listed firms", *Research Journal of Business Management*, Vol. 4 No. 1, pp. 1-11.

Myers, S.C. (2001), "Capital structure", *Journal of Economic Perspectives*, Vol. 15 No. 2, pp. 81-102.

Napompech, K. (2012), "Effects of working capital management on the profitability of Thai listed firms", *International Journal of Trade*, Vol. 3 No. 3, pp. 227-232.

Padachi, K. (2006), "Trends in working capital management and its impact on firms' performance: an analysis of Mauritian small manufacturing firms", *International Review of Business Research Papers*, Vol. 2 No. 2, pp. 45-58.

Peel, M.J., Howorth, C. and Wilson, N. (2000), "Late payment and credit management in the small firm sector: some empirical evidence", *International Small Business Journal*, Vol. 18 No. 2, pp. 17-37.

Richards, V.D. and Laughlin, E.J. (1980), "A cash conversion cycle approach to liquidity analysis", *Financial Management*, Vol. 9 No. 1, pp. 32-38.

Sharma, A.K. and Kumar, S. (2011), "Effect of working capital management on firm profitability: empirical evidence from India", *Global Business Review*, Vol. 12 No. 1, pp. 159-173.

Shin, H.H. and Soenen, L. (1998), "Efficiency of working capital management and corporate profitability", *Financial Practice & Education*, Vol. 8 No. 2, pp. 39-45.

Soenen, L. (1993), "Cash conversion cycle and corporate profitability", *Journal of Cash Management*, Vol. 13 No. 4, pp. 53-57.

Statistics Sweden (2012), "Swedish monetary financial institution report", available at: www.scb.se (accessed 1 October 2012).

Strischek, D. (2001), "A banker's perspective on working capital and cash flow management", *Strategic Finance*, Vol. 83 No. 4, pp. 38-44.

Swedish Central Bank (2013), "International dependence and monetary policy", available at: www.riksbank.se (accessed 1 November 2013).

Wang, Y. (2002), "Liquidity management, operating performance, and corporate value: evidence from Japan and Taiwan", *Journal of Multinational Financial Management*, Vol. 12 No. 2, pp. 159-169.

Zellner, A. and Theil, H. (1962), "Three-stage least squares: simultaneous estimation of simultaneous equations", *Econometrica: Journal of the Econometric Society*, Vol. 30 No. 1, pp. 54-78.

About the authors

Darush Yazdanfar is an Associate Professor (PhD) of Business Administration at the Mid Sweden University. His research interests are corporate finance, the stock market, risk management, and entrepreneurial finance. Associate Professor Darush Yazdanfar is the corresponding author and can be contacted at: darush.yazdanfar@miun.se

Peter Öhman is an Associate Professor (PhD) of Business Administration at the Mid Sweden University. His research interests are accounting, auditing and banking.