**The impact of working capital management on financial performance: An empirical research in UK food SMEs**

***Denghao Wei, Michael Bourlakis and Emel Aktas***

*Cranfield School of Management, Cranfield, Bedfordshire, MK43 0AL, UK*

**Introduction**

The recent economic downturn has brought considerable challenges to businesses, such as insufficient cash and increased costs of corporate borrowing (Gelsomino et al., 2016), which have raised the attention of companies to supply chain finance, especially working capital management (WCM). Compared to large companies, small and medium-sized enterprises (SMEs) are more vulnerable to financial challenges because they have fewer resources by nature and are readily exposed to harsh payment terms proposed by their powerful supply chain partners (Maglaras et al., 2015). Therefore, SMEs should pay attention to the management of their working capital.

On the other hand, WCM is important for SMEs due to their heavy dependence on owners’ finances, trade credit and short-term loans (Nobanee and Abraham, 2015). Companies with financial difficulties tend to capitalise on WCM to liberate cash through lowering the overall inventory level, extending trade credit from suppliers and shortening the debtor collection period (Coulibaly et al., 2013). Thus, WCM can be broken down into three components, namely, inventory management, accounts receivable management, and accounts payable management.

WCM can drive the financial performance of companies and achieve a balance between profitability and liquidity (Peel and Wilson, 1996; Welsh and White, 1978), but most relevant studies focus on large organisations and profitability only. Considering the resource scarcity feature of SMEs and the fact that SME owner-managers still plan, monitor, and control their working capital intuitively (Orobia et al., 2013), it is essential to understand the association between WCM and the financial performance of SMEs. Besides profitability, liquidity is also a critical financial dimension for SMEs and is commonly addressed by SME owner-managers in practice because it determines SMEs’ survival (LeCornu et al., 1996; McMahon and Stanger, 1995; Patrone and DuBois, 1981). As inventory, accounts receivable and accounts payable can all influence the efficiency of WCM, a clear impact of them on SMEs’ financial performance and the priority of them in improving SMEs’ financial performance will contribute to the decision-making on resource allocation in SMEs.

The objective of this research is to empirically examine the relationship between WCM and the financial performance of SMEs considering both profitability and liquidity and reveal the priority of three WCM components in driving SMEs’ financial performance based on the financial data of UK food SMEs. The UK food industry is adopted as the context of this study due to the significant number of SMEs in this sector. According to Food and Drink Europe (2017), 99.1 per cent of companies in the European food sector are SMEs, employing 62.1 per cent of the workforce in the food industry. In the UK, 94 per cent of businesses in this sector are SMEs (Riley et al., 2016), making it comparable to the European food industry.

The remainder of this paper is structured as follows. Section 2 provides a review of extant literature and develops hypotheses, followed by a description of the methodology adopted. Following the empirical results in Section 4, conclusions are drawn in Section 5.

**Literature review and hypotheses development**

**Working Capital Management**

According to the Chartered Institute of Management Accountants (CIMA, 2005), working capital is the fund available for conducting the day-to-day operations of an organisation, normally the excess of current assets over current liabilities. The primary objective of WCM is to ensure that firms have sufficient cash flows to run daily operations in such a way that minimises the risk of inability to pay short-term liabilities (Şamiloğlu and Akgün, 2016). The cash conversion cycle (CCC) is widely adopted to measure the WCM (Lind et al., 2012), which also indicates the efficiency of WCM as it suggests how quickly current assets are converted into cash (Yazdanfar and Öhman, 2014).

**Working Capital Management and Profitability**

Despite many studies examining the relationship between WCM and profitability, this relationship is still inconclusive in the literature. It is argued that any change in working capital is associated with both costs and benefits (Baños-Caballero et al., 2012; Tauringana and Afrifa, 2013). Specifically, companies that adopt an aggressive strategy tend to reduce the investment in working capital by reducing inventory levels, decreasing accounts receivable and delaying payment to suppliers (Afrifa, 2016). Inventory reduction leads to improved profitability due to reduced associated costs, such as storage costs and insurance costs (Johnson and Templar, 2011). A reduction in accounts payable also contributes to profitability by liberating cash tie up, which can be invested into products with higher returns (Tauringana and Afrifa, 2013). However, reducing inventory and accounts receivable is also harmful to sales, which deteriorates profitability (Afrifa, 2016; Tauringana and Afrifa, 2013). Additionally, extending trade credit from suppliers also both improves profitability by increasing cash flows and damages profitability due to the loss of discount (Afrifa, 2016; Tauringana and Afrifa, 2013).

By contrast, companies that adopt conservative strategies and increase the investment in working capital are also confronted with both benefits and costs (Afrifa, 2016; Baños-Caballero et al., 2012). On that account, many researchers advocate the concave relationship between CCC and firm profitability, and some studies have empirically verified it (e.g., Afrifa, 2016; Baños-Caballero et al., 2012). The literature also identifies a concave association between the amount of working capital invested and firms’ stock performance measured by the market-to-book ratio (e.g., Afrifa et al., 2016; Aktas et al., 2015; Baños-Caballero et al., 2014).

However, most studies support a linear relationship between WCM and profitability, especially in the context of SMEs. Through analysing the extent of the adoption of WCM practices by SMEs in Turkey, Karadağ (2018) posits that all three WCM practices are positively associated with the financial performance of SMEs, while inventory management has the weakest correlation. Based on the financial value chain analysis, Lind et al. (2012) examine the WCM along the automotive value chain and find that the amount of working capital tied up in the value chain negatively affects the profitability of automotive companies. Studies also examine the impact of WCM on SMEs’ profitability in different countries, such as Sweden (Yazdanfar and Öhman, 2014), Norway (Lyngstadaas and Berg, 2016), Portugal (Pais and Gama, 2015), and Vietnam (Tran et al., 2017), and they all identify a significantly negative association.

Due to high costs of losing sales and weak supply chain powers, SMEs tend to invest more in working capital than would be appropriate by increasing inventory and accounts receivable. The costs of increasing working capital have exceeded the benefits yielded. In addition, trade credit is one of the most critical sources of funds for SMEs (Nobanee and Abraham, 2015), so improving cash flows by extending accounts payable days contributes to the profitability of SMEs. We therefore hypothesise:

*H1. CCC is negatively associated with SMEs’ profitability.*

*H1a. The inventory holding day is negatively associated with SMEs’ profitability.*

*H1b. The accounts receivable day is negatively associated with SMEs’ profitability.*

*H1c. The accounts payable day is positively associated with SMEs’ profitability.*

**Working Capital Management and Liquidity**

Businesses usually take advantage of WCM to eliminate the risk of illiquidity, so it is reasonable to contend that WCM can influence the liquidity of companies (Afrifa, 2016; Orobia et al., 2013; Tran et al., 2017). A reduction in inventory and accounts receivable can liberate the cash tied up (Johnson and Templar, 2011; Tauringana and Afrifa, 2013), which improves firms’ liquidity. On the other hand, the longer a firm delays its payment to suppliers, the higher the cash flow it reserves (Tauringana and Afrifa, 2013). Based on the data from 5,802 listed SMEs in the US, Nobanee and Abraham (2015) identify a significantly negative relationship between CCC and the liquidity of SMEs. Because there is a simple mathematical relationship between the three components of WCM and the indicators widely adopted to evaluate liquidity (i.e., the current ratio and quick ratio), the relationship between WCM components and liquidity is not examined in this study. Therefore, we hypothesise:

*H2. CCC is negatively associated with SMEs’ liquidity.*

**Methodology**

**Data**

The data used in this study were obtained from FAME, a comprehensive and widely used financial database provided by Bureau van Dijk containing over 11 million companies in the UK and Ireland. The definition of SMEs made by the European Commission (2015) was adopted: SMEs are firms that have fewer than 250 employees and annual turnover no more than €50 million or annual balance sheet no more than €43 million.

The UK SIC code was employed to define the industry: UK companies with primary SIC code 03, 10, 11 and most sub-codes under 01 are in the UK food industry. Only food growers (companies that engage in growing crops or raising animals for food consumption) and manufacturers were included in this research, while food wholesalers and retailers were excluded as they normally engage in other industries apart from food, so their financial performance is not influenced by food products only. UK food SMEs that had all required data available in 2016 were eligible for analysis. In total, 717 SMEs in the UK food industry were included in the sample. To avoid the influence of outliers, extreme values were removed from the dataset.

**Variables**

Return on assets (ROA) is the dependent variable to measure SMEs’ profitability, which is calculated as profit or loss before tax/total assets. The liquidity of SMEs is measured by the quick ratio (QR), defined as ((current assets-inventories)/current liabilities). Independent variables include inventory holding days (IHD), calculated as (inventories/turnover×365); accounts receivable days (ARD), calculated as (accounts receivable/turnover×365); accounts payable days (APD), calculated as (accounts payable/turnover×365), and CCC, defined as IHD + ARD - APD.

The control variables considered in this research include firm size (SIZE), measured as the logarithm of total assets; growth in revenue (GRT), calculated as ((Revenue1-Revenue0)/Revenue0); firm age (AGE), which is the number of years that the firm has been operating; firm leverage (LEV), calculated as total liabilities/total assets; current asset ratio (CAR), calculated as currents assets/total assets; current liability ratio (CLR), measured as current liabilities/total liabilities, and supply chain position (SCP), a dummy variable in which food growers are denoted as 0 while manufacturers are assigned with 1.

**Estimation**

The multiple regression analysis is adopted to analyse data. We specify the following regression models to examine the relationship between WCM and the financial performance of SMEs:

|  |  |
| --- | --- |
| $$ROA\_{i}=β\_{0}+β\_{1}IHD\_{i}+β\_{2}SIZE\_{i}+β\_{3}GRT\_{i}+β\_{4}AGE\_{i}+β\_{5}LEV\_{i}+β\_{6}CAR\_{i}+β\_{7}CLR\_{i}+β\_{8}SCP\_{i}+ε\_{i}$$ | (1) |
| $$ROA\_{i}=β\_{0}+β\_{1}ARD\_{i}+β\_{2}SIZE\_{i}+β\_{3}GRT\_{i}+β\_{4}AGE\_{i}+β\_{5}LEV\_{i}+β\_{6}CAR\_{i}+β\_{7}CLR\_{i}+β\_{8}SCP\_{i}+ε\_{i}$$ | (2) |
| $$ROA\_{i}=β\_{0}+β\_{1}APD\_{i}+β\_{2}SIZE\_{i}+β\_{3}GRT\_{i}+β\_{4}AGE\_{i}+β\_{5}LEV\_{i}+β\_{6}CAR\_{i}+β\_{7}CLR\_{i}+β\_{8}SCP\_{i}+ε\_{i}$$ | (3) |
| $$ROA\_{i}=β\_{0}+β\_{1}CCC\_{i}+β\_{2}SIZE\_{i}+β\_{3}GRT\_{i}+β\_{4}AGE\_{i}+β\_{5}LEV\_{i}+β\_{6}CAR\_{i}+β\_{7}CLR\_{i}+β\_{8}SCP\_{i}+ε\_{i}$$ | (4) |
| $$QR\_{i}=β\_{0}+β\_{1}CCC\_{i}+β\_{2}SIZE\_{i}+β\_{3}GRT\_{i}+β\_{4}AGE\_{i}+β\_{5}LEV\_{i}+β\_{6}CAR\_{i}+β\_{7}CLR\_{i}+β\_{8}SCP\_{i}+ε\_{i}$$ | (5) |

where ROA is return on assets; QR, quick ratio; CCC, cash conversion cycle; IHD, inventory holding days; ARD, accounts receivable days; APR, accounts payable days; SIZE, firm size; GRT, growth in revenue; AGE, firm age; LEV firm leverage; CAR, current asset ratio; CLR, current liability ratio; SCP, supply chain position, and ε is an error term.

**Descriptive Statistics**

Table 1presents the descriptive statistics of the variables in the study sample. ROA on average is 8 per cent while the median is 7 per cent, indicating most SMEs in the UK food industry are profitable. Considering the common rule of thumb that companies with a QR greater than 1.0 are able to meet their short-term liabilities (Atrill and McLaney, 2015, p.207), the average QR of 1.53 suggests most sample firms do not have liquidity issues. It takes on average 45 days for UK food SMEs to turn over their inventory, and their ARD and APD are around 45 and 31 days respectively, resulting in an average CCC of approximately 57 days.

Firm size does not differ greatly between firms in the sample, and the average age of sample firms is around 30 years. Their average sales growth is 4 per cent and their mean leverage ratio is 0.24. Their current assets account for on average 58 per cent of their total assets, and 75 per cent of their total liabilities are current liabilities. The mean of the SCP dummy variable is 0.69, indicating that 69 per cent of sample firms are food manufacturers while the rest are food growers.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Minimum | Maximum | Mean | Median | SD |
| ROA | -0.48 | 0.49 | 0.08 | 0.07 | 0.11 |
| QR | 0.02 | 8.88 | 1.53 | 1.10 | 1.39 |
| IHD | 0.38 | 480.26 | 44.75 | 28.63 | 58.02 |
| ARD | 0.00 | 128.72 | 45.19 | 43.84 | 24.81 |
| APD | 0.48 | 92.71 | 31.12 | 28.68 | 16.52 |
| CCC | -45.92 | 384.41 | 57.41 | 46.07 | 57.55 |
| SIZE | 1.60 | 4.68 | 4.13 | 4.20 | 0.39 |
| GRT | -0.60 | 1.49 | 0.04 | 0.01 | 0.21 |
| AGE | 1.00 | 120.00 | 30.41 | 24.00 | 23.27 |
| LEV | -0.69 | 0.98 | 0.24 | 0.22 | 0.28 |
| CAR | 0.03 | 1.00 | 0.58 | 0.60 | 0.24 |
| CLR | 0.02 | 1.00 | 0.75 | 0.82 | 0.23 |
| SCP | 0 | 1 | 0.69 | 1.00 | 0.46 |

Table 1: Descriptive Results

**Results and discussion**

**Correlation Analysis**

Table 2 presents the results of Pearson correlation analysis. It is observed that CCC is significantly and negatively correlated with firm profitability, as measured by ROA. Regarding the components of WCM, both IHD and APD have significantly negative relationships with ROA, while ARD has no significant association with profitability. On the other hand, CCC has no significant correlation with SMEs’ liquidity, measured by QR. The significant relationships between IHD, ARD and APD and QR verify the mathematical relationship between them, justifying it does not make sense to examine their relationships in the regression analysis.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ROA | QR | IHD | ARD | APD | CCC | SIZE | GRT | AGE | LEV | CAR | CLR | SCP |
| ROA | 1 |  |  |  |  |  |  |  |  |  |  |  |  |
| QR | .228\*\* | 1 |  |  |  |  |  |  |  |  |  |  |  |
| IHD | -.173\*\* | -.076\* | 1 |  |  |  |  |  |  |  |  |  |  |
| ARD | -0.004 | .096\* | 0.031 | 1 |  |  |  |  |  |  |  |  |  |
| APD | -.225\*\* | -.316\*\* | .076\* | .279\*\* | 1 |  |  |  |  |  |  |  |  |
| CCC | -.117\*\* | 0.065 | .857\*\* | .361\*\* | -0.071 | 1 |  |  |  |  |  |  |  |
| SIZE | .143\*\* | -.114\*\* | -.228\*\* | .119\*\* | 0.05 | -.224\*\* | 1 |  |  |  |  |  |  |
| GRT | 0.05 | 0.031 | 0.059 | 0.068 | 0.045 | .085\* | -0.052 | 1 |  |  |  |  |  |
| AGE | -0.073 | .241\*\* | .093\* | 0.036 | -.124\*\* | .126\*\* | 0.006 | -.077\* | 1 |  |  |  |  |
| LEV | 0.002 | -.310\*\* | -.081\* | .091\* | .192\*\* | -.084\* | .261\*\* | 0.045 | -.138\*\* | 1 |  |  |  |
| CAR | .243\*\* | .262\*\* | 0.005 | .243\*\* | -0.025 | .108\*\* | .317\*\* | 0.017 | -.089\* | .470\*\* | 1 |  |  |
| CLR | 0.015 | -0.003 | -0.026 | 0.006 | 0.003 | -0.011 | .111\*\* | -0.001 | 0.011 | .107\*\* | .090\* | 1 |  |
| SCP | .154\*\* | .103\*\* | -.192\*\* | .216\*\* | -.084\* | -.097\*\* | .292\*\* | 0.064 | -.077\* | .186\*\* | .359\*\* | .082\* | 1 |
| Note: Statistically significance at: \*\*α= 0.01 and \*α= 0.05  |

Table 2: Correlation Matrix

**Regression Analysis**

The multiple regression analysis was performed via SPSS to test for significant coefficients between the dependent and independent variables (Tran et al., 2017). The results of the regression analysis are presented in Table 3.

The multiple regression results reveal that IHD is negatively associated with ROA with beta1 = -0.16 significant at p < 0.001 (model 1), which is consistent with the finding in correlation analysis, so the hypothesis H1a is supported. Although the model explains only 11.1 per cent of the variation in profitability, the relatively low adjusted R2 is common in similar previous studies (e.g., Afrifa, 2016; Tauringana and Afrifa, 2013). The results of model 2 show that ARD has a significantly negative relationship with ROA at the alpha = 5 per cent level, so H1b is supported, while H1c is not supported because APD is significantly and negatively associated with ROA (model 3). Model 4 reveals that as the proxy of WCM, CCC is negatively associated with ROA at the 0.1 level of significance, suggesting SMEs can improve their profitability through decreasing the amount of working capital tied up, so H1 is supported. The robustness of findings regarding profitability (model 1 to model 4) was examined by regressing another representative profitability indicator return on equity (ROE) on the same independent and control variables, and the same findings were obtained.

Although possessing more inventory and providing additional trade credit to customers can potentially increase sales (Pais and Gama, 2015), the costs associated exceed the benefits yielded, resulting in a low profitability. Therefore, to increase profitability, SME owner-managers are encouraged to hold fewer inventories and shorten the ARD. The significantly negative association between APD and profitability identified is consistent with the findings of Lyngstadaas and Berg (2016), Pais and Gama (2015), Tauringana and Afrifa (2013) and Tran et al. (2017). One possible explanation for the negative relationship is as follows: because of the difficulty in accessing external financing, SMEs are inclined to overly extend their payable days, which is harmful to the relationship with their suppliers and further their profitability. On the other hand, SMEs can obtain discount if they speed up the payment to suppliers (Deloof, 2003).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Dimension | Profitability | Profitability | Profitability | Profitability | Liquidity |
| Model | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
| Dependent Variable | ROA | ROA | ROA | ROA | QR |
| IHD | -.160\*\*\* |  |  |  |  |
| ARD |  | -.079\* |  |  |  |
| APD |  |  | -.213\*\*\* |  |  |
| CCC |  |  |  | -.145\*\*\* | -.128\*\*\* |
| SIZE | .043 | .102\*\* | .115\*\* | .043 | -.204\*\*\* |
| GRT | .072\* | .048 | .052 | .073\* | .062\* |
| AGE | -.052 | -.051 | -.081\* | .050 | .248\*\*\* |
| LEV | -.201\*\*\* | -.172\*\*\* | -.115\*\* | -.207\*\*\* | -.531\*\*\* |
| CAR | .300\*\*\* | .282\*\*\* | .236\*\*\* | .312\*\*\* | .603\*\*\* |
| CLR | -.012 | -.011 | -.014 | -.011 | .013 |
| SCP | .043 | .069 | .036 | .056 | .059 |
| F | 11.731 | 9.532 | 13.464 | 11.117 | 58.574 |
| R2 | .121 | .101 | .136 | .116 | .410 |
| Adjusted R2 | .111 | .090 | .126 | .106 | .403 |
| Note: Statistically significance at: \*\*\*α= 0.001, \*\*α= 0.01, and \*α= 0.05 |

Table 3: Regression Analysis Results

Among the three WCM components, APD has the strongest correlation with ROA, followed by IHD and ARD. Therefore, to improve profitability through WCM, SME owner-managers should pay the most attention to accounts payable management by shortening their APD, followed by inventory management and accounts receivable management. Regarding the liquidity performance, the results of model 5 show that CCC has a significantly negative relationship with QR at the 0.1 per cent level, so H2 is supported. This model explains 40.3 per cent of the variability in liquidity. As a result, through shortening CCC by reducing the amount of working capital tied up, SME owner-managers can improve the liquidity of their firms.

In control variables, LEV has significantly negative relationships with both profitability and liquidity, indicating that SMEs should minimise the scale of their liabilities to enhance their financial performance. By contrast, CAR is significantly and positively associated with both profitability and liquidity, which implies that SMEs can improve their financial performance by increasing the proportion of current assets in total assets. There is evidence that SIZE and GRT have a positive association with firm profitability, but it is not significant in every model. On the other hand, SIZE is significantly and negatively associated with liquidity while GRT has a significantly positive relationship with liquidity. The association between AGE and profitability is inconclusive in the results, while the relationship between AGE and liquidity is significantly positive, suggesting that the longer the company has been operating, the fewer liquidity problems it will have. However, neither CLR nor SCP has a significant relationship with profitability or liquidity.

**Conclusions**

As an important source of financing, working capital is critical for the survival and success of SMEs, which are usually financially constrained. Therefore, it is essential to understand the association between WCM and the financial performance of SMEs with considering both profitability and liquidity. Based on the multiple regression analysis of data from 717 SMEs in the UK food industry in 2016, this study reveals that CCC is negatively associated with both profitability and liquidity of SMEs, suggesting that the efficient WCM through reducing the amount of working capital tied up helps improve the financial performance of SMEs. Furthermore, all three working capital components – IHD, ARD and APD have significantly negative relationships with the profitability of SMEs, while APD has the strongest correlation. Therefore, to improve profitability through WCM, SME owner-managers should pay the most attention to accounts payable management by shortening their APD, followed by inventory management and accounts receivable management.

This study contributes to both financial management and supply chain management by revealing the criticality of WCM in driving the financial performance of SMEs. Considering the scarcity of resources in SMEs, a better understanding of the impact of WCM on firm financial performance and the importance rankings of three components of WCM assists SME owner-managers in making more informed decisions on resource allocation.

As the sample consists of SMEs in the UK food industry only, the generalisability of findings in this paper to other countries or industries may be limited. Future research is suggested to replicate this study in other countries and industries. Instead of analysing cross-sectional data, further research can focus on panel data, which allows for the control of unobservable heterogeneity and the exclusion of biases deriving from the existence of individual effects (Afrifa et al., 2016).

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