Working Capital Management, Cash Flow and SMEs' Performance

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Abstract

Purpose – The paper presents comprehensive evidence on the relationship between Working Capital Management (WCM) and SMEs' performance by taking into consideration the plausible effect of cash flow.

Design/methodology/approach – The paper adopts a panel data regression analysis on a sample of 802 British quoted small and medium enterprises listed on the Alternative Investment Market for the period from 2004 to 2013.

Findings – The results of the study demonstrate the importance of cash flow on SMEs' WCM and performance. According to our findings, WCM has a significantly negative impact on SME performance. However, with available cash flow, we find a significantly positive relationship. Additionally, our evidence revels that cash flow constrained (non-constrained) SMEs are able to enhance their performance through decreased (increased) investment in WCM.

Practical implications – Overall, the results demonstrate the importance of cash flow availability on SMEs' working capital needs. Our findings suggest that in an event of cash flow unavailability (availability) managers should strive to reduce (increase) the investment in working capital in order to improve performance.

Originality/value – This current study incorporates the relevance of cash flow in assessing the association between WCM and firm performance.

Keywords: Working Capital Management, Performance, SMEs, Cash Flow

1 Introduction

Working capital represents an essential component of firms' performance. Its relevance on performance has been revisited by recent studies (see Aktas et.al, 2015; Banos-Caballero et al., 2014; Tauringana and Afrifa, 2013). Working Capital Management (WCM) is important because of its effects on the firm's profitability and risk, and consequently its value (Smith, 1980). According to Aktas et al. (2015), efficient WCM translates into superior performance because it allows firms to redeploy underutilised corporate resources to high-value use. Firms can minimise risk and increase performance by understanding the importance of WCM (Nasr and Afza, 2008).

The issue of working capital management has been of concern to managers, investors and policy makers because of its economic magnitude and impact on firms' performance. In 2015, the leading 2,000 US and European companies had over US$1.2 trillion of cash unnecessarily tied up in working capital (Ernst & Young, 2016). Also, Aktas et al. (2015) find that, at the end of 2011, US firms' total investment in working capital (i.e., inventories plus receivables) amounted to $4.2 trillion, which is 24% of their total sales and above 18% of the book value of their assets. At the same time, almost 40% of this aggregate working capital has been financed by accounts payable (i.e., supplier credit), leading to an aggregate investment in net operating working capital (NWC) of $2.5 trillion.

According to existing literature, the nature of the relationship between WCM and performance depends on the policy that the firm decides to adopt (Garcia-Teruel and Martinez-Solano, 2007). For example, if the firm adopts an aggressive WCM policy this will result in a reduction in the investment in working capital by minimising the amount of inventory and accounts receivable. Minimising the amount invested in stock, *ceteris paribus*, means that warehouse storage costs and insurance costs will be reduced which will, in turn,

increase the firm's profitability. Keeping accounts receivable to a minimum will also increase performance because the funds not tied up in accounts receivable can be left in the bank earning interest or invested elsewhere.

On the other hand, if a firm adopts a conservative policy to WCM, which advocates an increase in investment in working capital, this will stimulate sales by increasing both inventories and receivables and therefore increase profitability. This is because an increase in inventories can prevent production disruptions (Garcia-Teruel and Martinez-Solano, 2007), reduce the risk of stock-out (Deloof, 2003), and reduce supply costs and price fluctuations (Blinder and Maccini, 1991). Also, an increase in accounts receivable can increase sales because it allows customers time to pay (Long et al., 1993; Deloof and Jegers, 1996), reduces the information asymmetry between buyer and seller, and can be an inexpensive source of credit for customers (Peterson and Rajan, 1997; Deloof, 2003).

Recent evidence has also highlighted the importance of firms' financial strength on the investment in working capital (Banos-Caballero et al., 2014; Afrifa, 2016). Previous studies based on the seminal work of Modigliani and Miller (1958) have argued that due to capital market imperfection, the ability of firms to finance their investment in working capital depends on their financial capabilities such as availability of internal finance, access to capital market and cost of financing (see Banos-Caballero et al., 2014; Hill et al., 2010). Greenwald et al. (1984), argue that the availability of cash flow is particularly relevant to SMEs due to the high cost of raising external capital to finance their investment strategy. Lack of cash flow holdings can constrain a firm's investment in working capital (Banos-Caballero et al., 2014) given that there is a limit to how much inventory it can buy on credit and also how much trade credit it can seek from suppliers. The availability of cash flow may lead to an increase in investment in inventory leading to higher performance as the firm

takes advantage of available discounts of buying in bulk (Banos-Caballero et al., 2014), which reduces the procurement cost of production and the transactional cost of paying bills (Ferris, 1981). It follows that firms with limited cash flow should strive to reduce investment in working capital so as to avoid the need for expensive external finance, while those with available internal cash flow should increase investment in working capital in order to increase performance.

Despite the importance of the interrelations between WCM and firm performance (Aktas et.al. 2015; Banos-Caballero et al., 2014; Tauringana and Afrifa, 2013), little empirical evidence exists on SMEs and, especially, the possible influence of cash flow. Also, the existing literature on the relationship between WCM and performance has largely focused on larger firms (see Banos-Caballero et al., 2014; Deloof, 2003; Hill et al., 2010) with very limited evidence on SMEs. This paper adds to the existing literature by showing evidence of the possible effect of cash flow on the relationship between WCM and SMEs performance.

However, research shows that the efficient management of working capital is critical to SMEs' performance (Peel and Wilson, 1996; Peel et al., 2000; Banos-Caballero et al., 2010; Paul and Boden, 2011). Various reasons account for this proposition. Firstly, most SMEs have a high proportion of both current assets and current liabilities in relation to total assets and total liabilities. For example, Vanhorne and Wachowicz (2001) estimate that for a typical manufacturing SME, current assets account for over half of its total assets. Further, a study by Garcia-Teruel and Martinez-Solano (2007) found that current assets of Spanish SMEs represent 69% of their total assets, while their current liabilities represent more than 52% of their total liabilities. Secondly, SMEs also rely heavily on current liabilities as an alternative source of finance due to their inability to obtain external funding from the capital market (Whited, 1992; Fazzari and Peterson, 1993; Petersen and Rajan, 1997). The

high proportion of both current assets and current liabilities in relation to total assets and total liabilities respectively, coupled with the fact that SMEs rely heavily on current liabilities as an alternative source of finance, highlights the importance of efficient management of working capital for SMEs.

In this context, the objective of the study is to provide empirical evidence on the impact of cash flow on the relationship between WCM and performance for a sample of 802 listed SMEs on the Alternative Investment Market (AIM) for the period 2004 to 2013. The market over the years has grown organically and attracted a large number of small young firms. WCM's importance to SME on the AIM can be explained by the legal and financial characteristics of these firms. SMEs listed on the AIM have less stringent joining requirements and low standard of standards of conduct compared to those listed in the main market (London Stock Exchange, 2015). As a result of this lax legal protection, WCM is seen to be relatively more prevalent and important than bank credit (see Demirguc-Kunt and Maksimovic, 2002; La Porta et al., 1998). Against this backdrop, any instabilities or dysfunction of WCM operations is likely to have significant microeconomic consequences on these firms. Also, the weak legal protection in this market represents weaker creditor protection, which could lead to a significant cash-flow risk and an adverse effect on SMEs performance through late or non-payment. These overall factors, suggests the need for an imperative study on this market.

Similar to previous studies, we use the cash conversion cycle (CCC) as a comprehensive measure of WCM (Deloof, 2003; Garcia-Teruel and Martinez-Solano, 2007; Tauringana and Afrifa, 2013). Evidence from the study indicates a negative relationship between CCC and performance in the absence of cash flow; however, the relationship becomes significant and positive after taking cash flow into consideration. The results

further show that firms with cash flow below the sample median exhibit a negative association between CCC and performance, but firms with cash flow above the sample mean display a positive relationship. Additionally, the paper broadens the scope of the literature by demonstrating that the association between CCC and firm performance persists over time.

The study contributes to WCM literature in a number of ways. Firstly, we offer new evidence of the relationship between WCM and SMEs' performance by taking into consideration the plausible effect of cash flow. This study differs from the few studies that have exclusively examined the relationship between WCM and SMEs' performance. Deloof (2003) examines the relationship between WCM and operating performance of Belgian firms. The author finds a significantly negative relationship between WCM and operating performance with firms' fixed effects. Banos-Cabellero et al. (2014), focuses on Spanish SMEs and documents a concave relationship between net working capital (NWC) and firm performance. Afrifa et al (2015) describes the relationship between working capital (CCC) and the profitability of UK SMEs. Evidence from the study reveals an inverse U-shape relationship between CCC and ROA. In another similar evidence on UK SMEs, Afrifa (2016), document an inverted U-shaped relationship between net working capital (NWC) and the profitability (QRATIO). The author argue that there is a trade-off between cost and benefit of investing in NWC. Unlike Afrifa et al (2015) and Afrifa (2016), our study adopts a linear model to investigate the relationship between CCC and SMEs performance. We argue that, there is a linear effect on the relationship between CCC and performance among listed SMEs on the AIM as evidenced by the results of the Ramsey's RESET test of linearity which failed to provide empirical support for a non-monotonic relationship in the data. This can be explained by the fact that these firms operate in a very competitive market with less

bargaining power and hence are often compeled to invest in CCC in order survive despite the associated costs (Cheng and Pike, 2003). Therefore, with the availability of cashflow, the marginal benefits of investing in CCC often tend to surpass the associated marginal costs among these SMEs.

Secondly, this paper specifically looks at SMEs that are listed on the stock exchange in the United Kingdom (UK). This is significant because being listed on the AIM helps to improve the opportunity of additional finance for a company. This can be achieved at the time of the flotation or by subsequent share issuance. By law, private companies are not permitted to solicit for finance through the public. This hinders their ability to obtain finance for the smooth running of the company. This restriction leaves an SME that is looking to expand with no choice but to list on a stock exchange in order to secure the needed finance. Pagano and Roell (1998) argue that firms that do not generate sufficient internal cash flow will have to be listed on a stock exchange to be able to raise funds to finance growth. SMEs listed on the AIM also have the advantage of obtaining funds at a low cost (Mendoza, 2011). Zara (2003) asserts that after a listing on a stock exchange, SMEs increase the average duration of loans and reduce the size of guarantees. The status as a listed company increases the credibility of a firm, which improves the number of institutions wanting to do business with it.

We study a sample of 802 non-financial small and medium enterprises listed on the Alternative Investment Market for the period from 2004 to 2013. The results indicate a negative relationship between WCM and performance in the absence of cash flow; however, the relationship becomes significant and positive after taking cash flow into consideration.

The structure of our paper is as follows: Section 2 discusses the literature review; the hypotheses are developed in Section 3; the model and data are discussed in Section 4; Section 5 discusses the empirical results; and Section 6 presents the summary and conclusion.

2 Literature Review

2.1 Working capital management and firm performance

The extant literature has demonstrated the importance of firm WCM to performance and liquidity (Shin and Soenen, 1998). However, the working capital of a firm may be managed under two different strategies: (1) aggressive strategy; and (2) conservative strategy (Garcia-Teruel and Martinez-Solano, 2007). The aggressive strategy leads to lower investment in working capital; whereas the conservative strategy is designed to increase investment in working capital (Deloof, 2003; Tauringana and Afrifa, 2013).

An aggressive strategy of WCM reduces investment in inventory and accounts receivable (Deloof, 2003). A reduction in inventory period can improve a firm's performance because of the various costs associated with the holding of inventory including warehouse storage costs, insurance, spoilage, theft etc. Also, a reduction in accounts receivable investment may increase a firm's performance because it will increase the cash flow available to the firm, which can be used to finance the day-to-day operations therefore preventing the need for expensive external finance (Autukaite and Molay, 2011). The delaying of payments to suppliers as a result of indulging in an aggressive strategy of WCM can also improve firm performance.

Alternatively, a conservative strategy can improve a firm's performance by increasing investment in working capital. The conservative strategy stimulates firms' sales

because of the increase in inventories and trade receivables (Tauringana and Afrifa, 2013). Investment in inventories can prevent production disruptions, reduce the risk of running out of inventory, and reduce supply costs and price fluctuations (Blinder and Maccini, 1991; Deloof, 2003; Garcia-Teruel and Martinez-Solano, 2007). Similarly, investment in accounts receivable can improve performance because it allows customers time to pay, reduces the information asymmetry between buyer and seller, serves as a product differentiation strategy, strengthens the supplier/customer long-term relationship, serves as an effective price cut, reduces transaction costs and entices customers to acquire merchandise at times of low demand (Nadiri, 1969; Ferris, 1981; Emery, 1987; Smith, 1987; Brennan et al., 1988; Shipley and Davis, 1991; Long et al., 1993; Deloof and Jegers, 1996; Wilner, 2000).

2.2 Cash flow, working capital management and performance

The amount of cash retained by companies shows its importance to firms' performance. According to Guney et al. (2003), 10.3% of British firms' total assets is in the form of cash. The availability of cash flow will have an influence on the relationship between WCM and the performance of companies. Previous studies have postulated that cash flow availability leads to higher investment in working capital (Hill et al., 2010). The availability of cash flow may lead to an increase in the investment of inventory, which will increase the overall CCC of a company. A company with available cash flow may take advantage and make a bulk purchase. Buying in bulk may reduce the procurement cost of production. The bulk purchase cost savings will also result in a decrease in the cost of sales of the product, which will reduce the overall price of the product leading to higher performance. These cost savings of bulk purchase may arise for many reasons. A company that buys in bulk will enjoy quantity discount from the supplier. Buying in bulk will also save companies money in terms

of transportation, because instead of undertaking two or three trips a company will make only one trip. In addition, the company will make savings on the fixed costs of ordering, including placing and processing orders or setting up costs.

An increase in inventory investment will help to avoid the prospect of a stock-out situation (Tauringana and Afrifa, 2013), as this will have a catastrophic effect on a company's performance because a company without stock may lose its goodwill (Bhattacharya, 2008). The lack of inventory will drive both current and potential customers away to competitors. This will not only affect the current performance of the company but also the future performance, as it might affect the good name of the company.

The availability of cash flow may also lead to an increase in accounts receivable investment. A company with available cash flow may be in a better position to offer generous credit to customers. An increase in the investment of accounts receivable may lead to higher performance. This is because companies offer trade credit to allow customers the necessary time to be able to verify the extent of the quality of the product (Smith, 1987; Long et al., 1993; Danielson and Scott, 2000). Buyers, especially newer ones, do not have knowledge about the product quality. Product guarantee is particularly important to sellers as it will help to facilitate future purchases (Bastos and Pindado, 2007) and to reduce the confusion over the product by allowing the customer to be satisfied with the product before payment is made, thus avoiding future contentions.

The availability of cash flow may also increase the investment in working capital by reducing the accounts payable period. A company with enough cash flow may take advantage of suppliers' cash discount by paying immediately for supplies (Banos-Caballero et al., 2010). As maintained by Ng et al. (1999) the amount of cash discount offered by suppliers can be substantial. The decision to accept or request a credit period results in an

inherent cost to a company, which diminishes performance. Research by Ng et al. (1999) indicates that the combination of the 2% discount for payment within 10 days of supplies and a net period ending after 30 defines an implicit interest rate of 43.9%. Therefore the high inherent cost involved in a credit period will cause a reduction in performance. This means that the availability of cash flow may help companies to improve their performance by paying for supplies on time.

3 Hypotheses Development

A shorter CCC may improve SMEs' performance because it will reduce or avoid the over-reliance on external finance. In this case, the company may be financing part of its current assets with suppliers' credit, thereby avoiding the need for a short-term loan, which can be expensive to SMEs in particular. Another performance enhancement benefit of a shorter CCC is the fewer financial resources of SMEs (Nobanee, 2009).

Owing to the lack of access to the capital markets, SMEs may improve performance by relying on suppliers' credit. A shorter CCC may also maximise performance because it indicates the efficiency of using working capital. An efficient use of working capital means that the company is able quickly to convert inventory into sales and at the same time is fast in collecting receivables, but slow in paying suppliers. For example, Nobanee (2009) maintains that the efficiency of WCM is based on the principle of speeding up cash collections as quickly as possible and slowing down cash disbursements as slowly as possible. Mathuva (2010) postulates a negative association between CCC and performance and therefore argues that minimising the investment in current assets can help in boosting performance. The negative association between CCC and the performance of companies is also postulated elsewhere (see, Wang, 2002; Lazaridis and Tryfonidis, 2006; Garcia-Teruel

and Martinez-Solano, 2007). Given the lack of financial resources and access to capital markets of SMEs, the reduction in working capital will enhance their performance. Therefore, we hypothesize the following:

Hypothesis 1: A negative relationship exists between CCC and performance

Cash flow is important to companies because it allows them to pay bills on time. The availability of cash flow may improve SMEs' performance by reducing the transaction costs of raising funds (All-Najjar and Belghitar, 2011). The benefits of cash flow to performance are particularly high for SMEs because their transaction costs are relatively higher as compared to those of larger firms, which benefit from economies of scale (Faulkender, 2002). Cash flow also serves as a buffer against unexpected events (Opler et al., 1999). As argued by Gill and Shah (2012), cash flow availability helps companies to pay off their obligations on time even even during the bad times. Cash flow can also help companies to avoid the likelihood of financial distress, especially for those companies with more volatile cash flows (Ferreira and Vilela, 2004). Belghitar and Khan (2013) indicate that market imperfections, such as financial distress, are more severe for SMEs. This logic leads to the following hypothesis:

Hypothesis 2: There is a positive association between cash flow and performance

Some previous studies in WCM have suggested a negative association between CCC and performance in both SMEs and larger firms, arguing that investment in CCC may require the need to seek expensive external finance (Banos-Caballero et al., 2014). However, the evidence suggests that firms with available cash flow benefit from the investment in working capital (Padachi, 2006; Hill et al., 2010; Dong and Su, 2010; Banos-Caballero et al., 2014). It can therefore be argued that a cheaper source of finance will lead to a positive

relationship between CCC and performance of SMEs (Afrifa, 2016). SMEs with available cash flow may be able to take advantage of the various benefits of longer CCCC, which can improve their performance by increasing sales (Deloof, 2003). SMEs with cash flow can entice customers to purchase to purchase a greater amount (Emery, 1987) by extending more generous trade credit terms. Cash flow availability may allow SMEs to increase inventory in stock, which will mean that customers will always have what they want (Schiff and Lieber, 1974). This may lead to higher sales, which will in turn improve performance. The availability of cash flow can also improve SMEs' performance by allowing them to make an up-front payment to suppliers (Deloof, 2003) because of the discount usually offered by suppliers for immediate payment (Ng et al., 1999; Wilner, 2000).

Hypothesis 3: cash flow availability leads to a positive association between CCC and performance

4 Model and Data

4.1 Data: sample selection, sources, and description

The sample for the study is drawn from all 1,316 firms listed on the AIM as at 27th August 2014. Financial firms such as banks and insurance were excluded because they have different accounting requirements (e.g. Deloof, 2003; Hill et al., 2010). Moreover, firm-years with anomalies in their accounts such as negative values in assets, sales, current assets and fixed assets were removed (see, Hill et al., 2010). Finally, all variables were winsorized at 1% (see, Garcia-Teruel and Martinez-Solano, 2007; Hill et al., 2010). The final sample of SMEs, which is based on the requirements established by the European Commission's recommendation 2003/361/CE of 6th May 2003 on the definition of SMEs, therefore consists of an unbalanced panel of 802 firms for which information is available. It represents 6,424

firm-year observations. Specifically, the following criteria are used for the selection of SMEs[1]:

- Fewer than 250 employees;
- Turnover less than €50 million; and
- Possession of less than €43 million of total assets.

By allowing for both entry and exit, the use of an unbalanced panel partially mitigates potential selection and survivor bias. The sample is collected from the AIM because it is one of the few stock exchanges around the world established purposely for SMEs (Mendoza, 2011) and is by far the most successful second tier market (Colombelli, 2010).

These criteria were set for many reasons. Firstly, this allows for easy comparability with similar studies. Secondly, to permit the use of unbalanced panel data, which has the advantage, as argued by Gujarati (2003), of more degrees of freedom and less multicollinearity among variables. Two separate sets of data were employed to establish the association between WCM and SMEs performance. The first set of information concerns financial data involving both accounting figures and ratios. These data were extracted from the Analyse Major Databases from European Sources (AMEDEUS). Thirdly, in order to ascertain the ages of firms, the dates of incorporation of all the sampled firms were extracted from the database of the UK Companies House.

3.2 Variable definitions

[1] The average exchange rate per each year from 2004-2013 was used to convert the total assets and turnover values from British Pounds Sterling to Euro.

The main dependent variable to be analyzed is Tobin's q ratio (QRATIO). The QRATIO has been used extensively in the literature to assess listed firm's performance (Afrifa, 2016). In this paper, we employ both the 1-year QRATIO and the 3-year QRATIO. The 3-year QRATIO horizon is employed to assess whether the performance of WCM persists through time. We adopt QRATIO as the main measure of performance for two reasons: First, it captures reputational value effect of SMEs WCM capabilities resulting from stakeholder involvement on performance. Ntim (2009) argue that market-based performance measure is best suited for listed firms due to its sensitivity to industry effects as in the case of this study. SMEs WCM is likely to influence QRATIO due to its effect on investments and financing choices of firms (Kieschnick, Laplante, and Moussawi, 2013; Ek and Guerin, 2011). Second, compared to other accounting measures QRATIO, has more desirable distributional properties and is less affected by accounting anomalies due to tax laws and accounting conventions (McGahan 1999, Wernerfelt and Montgomery 1988).

The main variable of interest is the CCC, which is a comprehensive measure of a firm's WCM efficiency and effectiveness. This definition of CCC measures the average number of days it takes a firm to recoup the amount invested in current assets, which is different from the definition adopted by studies including Hill et al. (2010) and Afrifa (2016) that measures the amount of money invested in current assets[2]. Following Afrifa and Tauringana (2013), Deloof (2003), Garcia-Teruel and Martinez-Solano (2007), it is defined as:

$$CCC = \left(\frac{\text{total inventories}}{\text{cost of sales}} * 365\right) + \left(\frac{\text{accounts receivables}}{\text{sales}} * 365\right) - \left(\frac{\text{accounts payable}}{\text{purchases}} * 365\right)$$

[2] **They measured working capital as the ratio of accounts receivables plus inventory minus account payables to sales.**

As the goal of this paper is to measure the QRATIO implications attributable to a firm's WCM, all regressions include control variables to account for other changes in financial characteristics. These control variables include: sales growth, which is defined as the annual sales growth (Sales – Salest−1)/Salest−1 (Baños-Caballero, et al., 2014); firm age, which is defined as the number of years between incorporation and the calendar year end of each firm (Afrifa et al., 2016); firm size, which is defined as the log of the total assets (Ferrando and Mulier, 2013); tangible fixed assets, which is defined as the fixed assets as a percentage of total assets (Afrifa, 2013); financial leverage, which is defined as the total debt as a percentage of total assets (Aktas et al., 2015); and finally, in order to incorporate the effect of business cycles on the relationship between WCM and SMEs' performance, the dummy variable CRISIS is used. The variable CRISIS distinguishes between boom and recession periods, which take the value one for the years 2007 to 2009, otherwise zero[3].

The firms in our sample belong to 21 different industries, according to the NACE 2 industry classification system[4]. The empirical studies suggest that WCM issues are industry-specific (Hill et al., 2010) and that WCM affects performance differently for firms in different industries (Afrifa, 2016). Therefore, we include industry in all the regressions.

4.2 Regression model specification

The choice of an the appropriate regression in working capital manangement studies is somehow ambiguous. Studies including Afrifa (2016), Banos-Cabellero et al. (2014) have used the non-linear regression, whereas studies by Afrifa et al. 2015), Garcia-Teruel et al. (2007), Tauringana and Afrifa (2013) have also used the linear regression. This therefore

[3] Similar results are quantitatively obtained when 2007-2010 is considered to be the crisis period

[4] The industrial codes are based on NACE rev. 2 which is a statistical classification system of economic activities within the European Community. The list of industries in accordance with NACE rev. 2 is provided in Appendix 1. By construction, the financial and insurance activities (K) have been omitted from this analysis.

calls for a test of the appropriate regression model to use. This paper therefore uses the Ramsey's RESET test in a bid to select the appropriate regression model. According to the results of the Ramsey's RESET test displayed in Tables 5 to 8, the null hypothesis of linear parameters cannot be rejected. Therefore, it is assumed in the paper that the data is linear in parameters. The following linear regression analysis model is therefore specified to examine the relationship between WCM and performance of AIM-listed SME firms, similar to Dezso and Rose (2012). In equations 1-3, all right-hand side variables are lagged by one period in order to alleviate the concern that CCC and firm QRATIO may be simultaneously determined in equilibrium (Renders et al., 2010).

$$QRATO_{it} = \beta_0 + \beta_1 CCC_{i,t-1} + \beta_2 GROWTH_{i,t-1} + \beta_3 AGE_{i,t-1} + \beta_4 SIZE_{i,t-1} + B_5 ATAN_{i,t-1} + \beta_6 LEV_{i,t-1} + \varepsilon_{i,t-1} \quad (1)$$

$$QRATO_{it} = \beta_0 + \beta_1 CCC_{i,t-1} + \beta_2 CFLOW_{i,t-1} + \beta_3 GROWTH_{i,t-1} + \beta_4 AGE_{i,t-1} + \beta_5 SIZE_{i,t-1} + \beta_6 ATAN_{i,t-1} + \beta_7 LEV_{i,t-1} + \varepsilon_{i,t-1} \quad (2)$$

$$QRATIO_{it} = \beta_0 + \beta_1 CCC_{i,t-1} + \beta_2 CFLOW_{i,t-1} + \beta_3 CCC*CFLOW_{i,t-1} + B_4 GROWTH_{i,t-1} + \beta_5 AGE_{i,t-1} + \beta_6 SIZE_{i,t-1} + \beta_7 ATAN_{i,t-1} + \beta_8 LEV_{i,t-1} + \varepsilon_{i,t-1} \quad (3)$$

We define all the variables in Table 1 below.

[Table 1 about here]

The dependent variable QRATIO represents two measurements, namely 1-year QRATIO and 3-year QRATIO. The subscript i denotes the n^{th} firm (i = 1,...6,424) and the subscript *t* denotes the n^{th} year (*t*=1,...10). ε_{it} is the error term.

Since panel data regression is used, the Hausman test is utilised to decide whether to employ the Fixed Effect (FE) model or Random Effect (RE) model by first determining whether there is a correlation between the unobservable heterogeneity (μ_i) of each firm and the explanatory variables of the model. The Hausman test was performed, which rejected the null hypothesis that the unobserved heterogeneity is uncorrelated with the

regressors. This finding means that the RE is significantly different from the FE, and therefore the FE is the more consistent and efficient method to use. For this reason, all the regressions are run using the FE regression.

5 Empirical Evidence

5.1 Descriptive statistics

Table 2 reports descriptive statistics of the variables included in our regression analyses. 1-year QRATIO has a mean of 1.4921 and a median of 1.2143. The mean and median 3-year QRATIO are 1.4920 and 1.3214, respectively. The CCC has a mean of 62.4109 days and a median of 44.3523 days. The mean of 62.4109 days indicates that AIM-listed SMEs are slow both in converting inventory into sales and in collecting monies owed by customers, but that they pay their suppliers faster. In order words, it takes an average of about two months' time between the outflow of cash and the inflow of cash. Mathuva (2010) reported a similar CCC duration of 69.35 days when he investigated the influence of WCM components on the corporate performance of Kenyan-listed firms. Cash flow has a mean of 10.0901% and a median of 8.8801%. The average GROWTH is 7.9066% with a median of 5.1205%. The sampled companies' average age is 19.7312 years with a median of 15.6013 years. An average age of approximately 20 years indicates that the firms in the sample are consolidated in the market. Mean and median SIZEs are approximately £10m and £11m, respectively. The average size of £10m suggests that the majority of the companies fall under the small-size category of companies (see, Garcia-Teruel and Martinez-Solano, 2010). For asset tangibility, its mean is 37.1788% with a median of 26.2038%. The average financial leverage of the sampled companies is 11.3980% and a median of 5.7109%,which explains that the majority of the companies are using equity capital to finance their business.

[Table 2 about here]

Table 3 presents firm-year observations across all 21 non-financial industries according to the European Community statistical classification system[5] (see, Tykvova and Borell 2012). The industry with the highest observations is activities of extraterritorial organisations and bodies (424), while transport and storage has the lowest firm-year observations (162). Overall, the sample is fairly representative of all 21 industries.

[Table 3 about here]

5.2 Correlation analysis

Table 4 contains the correlation matrix for the variables included to test for multicollinearity. The correlation result in Table 4 indicates a significant and negative association between 1-year and 3-year QRATIO and CCC at the 1% level. The correlations of annual sales growth with 1-year and 3-year QRATIO are positive and significantly correlated at the 1% level. The correlation between 1-year and 3-year QRATIO and cash flow are positive and significant at the 1% level. Finally, the correlations among the independent variables suggest that multicollinearity should not be a problem in the panel data regression analysis since the coefficient values are well below the 0.80 limit prescribed by Field (2005).

[Table 4 about here]

5.3 1-year QRATIO and CCC specification

Model 1 in Table 5 presents the results for hypothesis 1. The model has an R^2 of 34%. CCC is found to be negative and significantly related to 1-year QRATIO at the 1% level, which supports the hypothesis developed. The results show that minimising the investment in

[5] Note that one industry – financial – has been excluded.

working capital will result in higher performance for AIM-listed SMEs (Banos-Caballero et al., 2013). This outcome can be explained by the fact that investment in working capital requires financing, which can be extremely expensive (Autukaite and Molay, 2011). These results support the findings by Ganessan (2007), Garcia-Teruel and Martinez-Solano (2007), Wang (2002) and Autukaite and Molay (2011) that reducing the requirement in working capital leads to less need for external financing and less cost of capital, which increases performance. In the case of SMEs, this result makes sense given their severe lack of financial resources (Storey, 2004; Nobanee, 2009).

For the control variables, the association between annual sales growth and 1-year QRATIO is positive at the 1% level of significance. Company age has a direct and significant effect on performance at the 5% level. Company size is positive and significantly associated with 1-year QRATIO at the 1% level. Asset tangibility has a negative and significant relationship with 1-year QRATIO at the 1% level. Finally, financial leverage and crisis have negative coefficients with the 1-year QRATIO at the 1% apiece.

[Table 5 about here]

Model 2 presents the results for hypothesis 2 with the inclusion of the cash flow, which shows an R^2 of 41%. As we expected based on the theory, available cash flow has a strongly positive relationship with 1-year QRATIO at the 1% level. Thus, hypothesis 2 is supported. This result underscores the importance of cash flow to firm performance (Opler et al., 1999; Saddour, 2006), because of its ability to reduce the cost of raising external funds (All-Najjar and Belghitar, 2011), to buffer against unexpected events (Opler et al., 1999), to avoid the likelihood of financial distress (Ferreira and Vilela, 2004) and to undertake projects without raising outside funds (Saddour, 2006).

To test hypothesis 3, the interaction of CCC and cash flow is included in model 3, which shows an R^2 of 41%. The result indicates that the availability of cash flow turns the association between CCC and 1-year QRATIO to become positive and significant at the 1% level. Thus, hypothesis 3 is supported. The positive and significant association between the interaction of CCC and cash flow with QRATIO (0.0121) supports the empirical evidence, which suggests that firms with available cash flow can enhance performance by making a higher investment in working capital (Hill et al., 2010; Banos-Caballero et al., 2013). For example, research by Padachi (2006) and Dong and SU (2010) suggest that firms can benefit enormously from investment in working capital. This result shows that whilst a lack of cash flow will require firms to minimise investment in working capital (Autukaite and Molay, 2011), because of lack of finance in general and the expensive cost of financing in particular, the availability of cash flow should influence firms to increase investment in working capital (Fazzari and Petersen, 1993). This is because internal cash flow is cheaper than external financing (Myers and Majluf, 1984). The availability of cash flow can help firms to improve performance by extending more credit to customers (Deloof, 2003), increasing inventory in stock (Schiff and Lieber, 1974) and paying upfront to enjoy cash discount (Ng et al., 1999; Wilner, 2000). In summary, the results show that SMEs with cash availability exhibit the conservative strategy of WCM, whereas SMEs with lack of cash availability follow the aggressive strategy of WCM.

In order to determine the effectiveness of the three models, the log likelihood was calculated for each model; model 1 with CCC only; model 2 with CCC and cash flow; and model 3 with CCC, cash flow and the interaction of CCC and cash flow. The results are reported in Table 5. Comparing these models through the log likelihood ratio test it is clear

that the best model was the complete model 3. The log likelihood increases from −2788.48 in model 1 to −2662.26 in model 2 and finally to −2646.20 in model 3.

5.4 3-year QRATIO and CCC specification

To assess whether the effect of CCC on firm performance persists through time, the QRATIO over a 3-year horizon is also considered, which reduces the observation by 1,299. The results using the 3-year horizon as the dependent variable appear in models 4 to 6 of Table 5. Overall, the results are consistent with the earlier results displayed in models 1 to 3 of Table 5 in that CCC is negative. Moreover, the effect of the interaction between CCC and cash flow with 3-year QRATIO is significantly positive at the 1% level. Finally, the results of the other control variables displayed in models 4 to 6 generally echo those found in models 1 to 3.

5.5 Alternative measure of firm performance - return on assets

Here, we employ the return on assets (ROA) as a measure of SMEs performance to test the sensitivity of our main results to the alternative performance measure. ROA is defined as the profit before interest and tax divided by its total assets at the end of the financial year (Afrifa et al., 2015). The results of using ROA as the dependent variable are contained in Table 6. Once again, the same econometric approach and the same set of control variable are used as those presented in Table 5.

For both the 1-year and 3-year ROA as dependent variables in colums 1-6, the coefficient of the CCC is negative at the 1% level of significance. In terms of the interaction effect of the CCC and cash flow on the ROA, the results show in columns 3 and 6 that

regardless of whether the 1-year or the 3-year ROA is used as dependent variable, the cash flow availability leads to a higher ROA from an increase in the cash conversion cycle.

[Table 6 about here]

5.5 Robustness test

Following the work of Banos-Caballero et al. (2014) and also to check the robustness of the results, the sample is divided into two based on the median of cash flow. Firms with cash flow above the sample median are assumed to be less likely to lack cash flow, while firms with cash flow below the sample median are assumed to suffer from a lack of cash flow (Banos-Caballero et al., 2014). Therefore, it is predicted that a cash flow above the sample median will lead to a positive association between CCC and performance, whilst a cash flow below the sample median will lead to a negative relationship between CCC and performance.

Model 1 of Table 7 contains the results of firms with cash flow below the sample median with an R^2 of 31%. The results show that CCC is negative and significantly related to performance at the 1% level. This indicates the robustness of the results obtained above and confirms that firms with lower cash flow should endeavour to reduce their level of investment in working capital (Autukaite and Molay, 2011). Model 2 of Table 7 also contains the results of firms with cash flow above the sample median with an R^2 of 36%. These show a significantly positive association between CCC and performance. This finding confirms the results obtained above and indicates that firms with higher cash flow should increase investment in working capital, which will lead to higher performance (Hill et al., 2010).

As before, the results in models 3 and 4 of Table 7 echo the findings in models 1 and 2 of Table 7. Specifically, in model 3 CCC is negatively related to 3-year QRATIO at the 1%

significance level. Also, the results in model 4 indicate a significantly positive association between CCC and 3-year QRATIO at the 1% level.

[Table 7 about here]

The results presented in Table 8 by using the 1-year ROA as the dependent variable in columns 1-2 and the 3-year ROA in columns 3-4 also shows qualitatively similar results on the association between low cash flow and high cash flow with ROA. Similar to the results presented in Table 7, the relationship between both the 1-year and 3-year ROA with CCC is negative for SMEs with lower cash flow but positive and significant at the 1% level for SMEs with higher cash flow.

[Table 8 about here]

6 Conclusion

The paper presents comprehensive evidence on the relationship between WCM and SMEs' performance by taking into consideration the plausible effect of cash flow. Despite the widespread evidence on the relevance of WCM on firm performance, little empirical evidence exists on SMEs and, especially, the possible influence of cash flow. The existing literature on the relationship between WCM and performance has largely focused on larger firms with limited evidence on SMEs. We employ panel data regression analysis on a sample of 802 non-financial small and medium enterprises listed on the AIM for the period from 2004 to 2013 to estimate this relationship.

Evidence from the study reveals the importance of cash flow on SMEs' WCM and performance. The results show that CCC relationship to performance is negative; however, after taken into consideration the moderating effect of the availability of cash flow, the relationship becomes positive and significant. Also, cash flow is found to be positively

related to firms' performance. The results from separating the total sample according to the median cash flow further prove the importance of cash flow to the relationship between WCM and performance. The relationship between CCC and performance for firms with cash flow below the sample median is significant and negative. On the other hand, the association between CCC and performance for firms with cash flow above the sample median is significant and positive. Finally, the results are also robust after employing a 3-year QRATIO and employing the ROA as an alternative measure of SME performance.

Our findings suggest that managers should be concerned about the economic implications of the cash flow availability on investment in working capital. In the event of cash flow unavailability managers should strive to reduce the investment in working capital in order to improve performance. Thus, our study broadens the scope of the literature by demonstrating that the association between WCM and SMEs' performance depends on the financial strength of firms and suggests future studies to control for this in future research.

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Table 1. Summary of variables, calculations and definitions

Variable	Acronym	Description
Dependent variable		
1−year Tobin's Q Ratio	1−year QRATIO	Ratio of total assets minus book value of equity plus market value of equity to total assets.
3−year Tobin's Q Ratio	3−year QRATIO	QRATIO over a three-year period
1−year return on assets	1−year ROA	Ratio of profit before interest and tax to total assets.
3−year return on assets	3−year ROA	ROA over a three-year period
Cash Conversion Cycle	CCC	$CCC = \left(\frac{Total\ inventories}{cost\ of\ sales} * 365\right) + \left(\frac{Accounts\ receivable}{sales} * 365\right) - \left(\frac{Accounts\ payable}{purchases} * 365\right)$
Annual Sales Growth	GROWTH	Percentage change in sales revenue over the previous year.
Company Age	AGE	Number of years between incorporation and the calendar year end of each firm.
Company Size	SIZE	Value of firms' total assets in British pounds sterling.
Tangible Fixed Assets	ATAN	Fixed assets as a percentage of total assets.
Financial Leverage	LEV	Total debt as a percentage of total assets.
Crisis		Crisis is an indicator variable which identifies the financial crisis. It is equal to one for fiscal years 2007, 2008 and 2009 and zero otherwise.
Cash Flow	CFLOW	Operating income before depreciation and amortisation minus interest expense and income tax expense scaled total assets.
Cash Conversion Cycle* Cash Flow	CCC*CFLOW	Cash conversion cycle multiplied by cash flow

Table 2. Descriptive statistics

The table provides the sample characteristics of 6,424 firm−years across 802 unique UK SMEs on the AIM over the period 2004−2013. All variables are defined in Table 1.

Variables	Obs.	Mean	Std Dev	perc 10	Median	perc 90
1−year QRATIO(ratio)	6,424	1.4921	1.3089	0.9709	1.2143	2.0178
3−year QRATIO(ratio)	4,996	1.4920	1.4376	1.0023	1.3214	2.2203
1−year ROA(ratio)	6,424	5.1093	11.0232	1.0298	8.2627	16.7553
3−year ROA(ratio)	4,996	5.0935	11.1915	1.2932	8.3112	16.9123
CCC_{t-1} (days)	6,424	62.4109	53.0912	24.9143	44.3523	92.1980
$CFLOW_{t-1}$(%)	6,424	10.0901	24.0771	1.0243	8.8801	21.2143
$GROWTH_{t-1}$(%)	6,013	7.9066	6.6472	0.0000	5.1205	39.6741
AGE_{t-1}(years)	6,332	19.7312	17.1512	8.9871	15.6013	52.0187
$SIZE_{t-1}$(£M)	6,424	9.8600	13.5640	1.8400	10.8100	33.8500
$ATAN_{t-1}$(%)	6,113	37.1788	35.4094	3.0187	26.2038	69.2758
LEV_{t-1}(%)	6,008	11.3980	13.6211	0.0000	5.7109	29.6456

Table 3. Industry distribution of the sample
The table presents the industry distribution based on NACE rev. 2 which is a statistical classification system of economic activities within the European Community.

Industry Focus	NACE 2	Observations
Agriculture, forestry and fishing	A	377
Mining and quarrying	B	351
Manufacturing	C	326
Electricity, gas, steam and air conditioning supply	D	216
Water supply; sewerage, waste management and remediation activities	E	210
Construction	F	281
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	346
Transportation and storage	H	162
Accommodation and food service activities	I	275
Information and communication	J	283
Real estate activities	L	333
Professional, scientific and technical activities	M	332
Administrative and support service activities	N	282
Public administration and defence; compulsory social security	O	233
Education	P	367
Human health and social work activities	Q	331
Arts, entertainment and recreation	R	283
Other service activities	S	231
Activities of households as employers; undifferentiated goods	T	347
Activities of extraterritorial organisations and bodies	U	424
Others		

Table 4. Pearson correlation coefficients

The table provides Pearson correlation coefficients for the 6,424 firm-years across 802 unique UK SMEs on the AIM over the period 2004-2013. All variables are defined in Table 1.

Variables	1-year QRATIO	3-year QRATIO	1-year ROA	3-year ROA	CCC	CFLOW	GROWTH	AGE	SIZE	ATAN	LEV
1−year QRATIO(ratio)	1										
3−year QRATIO(ratio)	0.8703	1									
	0.0000										
1−year ROA(ratio)	0.3670	0.3189	1								
	0.0000	0.0000									
1−year ROA(ratio)	0.3413	0.3708	0.8435	1							
	0.0000	0.0000	0.0000								
CCC_{t-1} (days)	–0.1257	−0.0315	–0.1288	–0.1365	1						
	0.0000	0.0000	0.0000	0.0000							
$CFLOW_{t-1}$(%)	0.2523	0.2201	0.2550	0.2238	0.0768	1					
	0.0000	0.0000	0.0000	0.0000	0.0000						
$GROWTH_{t-1}$(%)	0.1712	0.1570	0.0242	0.0381	0.0585	0.1472	1				
	0.0000	0.0000	0.0000	0.0000	0.0401	0.0000					
AGE_{t-1}(years)	0.1483	0.1380	0.1519	0.1856	0.2064	0.2777	0.1817	1			
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000				
$SIZE_{t-1}$(£M)	0.0366	0.0583	0.1036	0.1411	–0.0663	–0.0279	–0.0708	0.1094	1		
	0.0000	0.0000	0.0000	0.0000	0.0212	0.0176	0.0000	0.0000			
$ATAN_{t-1}$(%)	–0.0085	−0.1927	-0.0006	-0.0033	0.0499	0.0645	0.0740	0.2390	0.1802	1	
	0.0000	0.0000	0.0000	0.0000	0.0165	0.0287	0.0110	0.0000	0.0000		
LEV_{t-1}(%)	–0.1467	−0.1673	-0.0966	-0.1099	0.0701	–0.1136	–0.0536	–0.2062	–0.2389	–0.2323	1
	0.2460	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

Table 5: Effect of cash flow on relationship between WCM and QRATIO

The table presents random effects regression with 1-year QRATIO and 3-year QRATIO as the dependent variables. The sample conssist of 6,424 firm-years across 802 unique UK SMEs on the AIM over the period 2004-2013. *P*-values are below coefficients. The Ramsey's RESET test is used for the test of linearity. All variables are defined in Table 1.

	(1)	(2)	(3)	(4)	(5)	(6)
DEPENDENT VARIABLE	1-year QRATIO	1-year QRATIO	1-year QRATIO	3-year QRATIO	3-year QRATIO	3-year QRATIO
WORKING CAPITAL						
CCC_{t-1}	−0.0220***	−0.0226***	−0.0888***	−0.0148***	−0.0177***	−0.0168***
	(−4.28)	(−4.33)	(−4.43)	(−3.46)	(−4.00)	(−4.72)
PRIMARY VARIABLE						
$CFLOW_{t-1}$		6.5556***	6.0201**		7.6768**	7.6301**
		(2.58)	(2.47)		(2.06)	(2.25)
INTERACTIVE EFFECT						
CCC_{t-1} * $CFLOW_{t-1}$			0.0121***			0.0767***
			(4.72)			(4.04)
CONTROL VARIABLES						
$GROWTH_{t-1}$	1.6141***	1.4414***	1.4372***	2.0565***	1.9222***	1.9235***
	(9.51)	(6.30)	(6.24)	(15.53)	(7.73)	(7.98)
AGE_{t-1}	0.1552**	0.1325**	0.1313**	0.2887***	0.2428***	0.2427***
	(2.33)	(2.08)	(2.06)	(4.27)	(4.04)	(4.04)
$SIZE_{t-1}$	1.6313***	1.5723***	1.5684***	1.4568***	1.3782***	1.3672***
	(10.82)	(10.61)	(10.56)	(9.62)	(9.98)	(9.96)
$ATAN_{t-1}$	−7.8304***	−7.9492***	−7.9535***	−7.4034***	−7.4934***	−7.4944***
	(−21.27)	(−21.65)	(−21.68)	(−20.33)	(−21.38)	(−21.48)
LEV_{t-1}	−0.0209***	−0.0213***	−0.0210***	−0.0473***	−0.0367***	−0.0437***
	(−4.55)	(−3.91)	(−3.79)	(−12.03)	(−7.23)	(−7.22)
$CRISIS_{t-1}$	−0.7035***	−0.6691***	−0.6777***	−0.4236***	−0.3885***	−0.3888***
	(−6.75)	(−6.32)	(−6.43)	(−5.96)	(−5.13)	(−5.38)
_cons	24.6267***	23.2289***	23.2309***	23.6475***	21.7465***	21.7442***
	(7.96)	(6.34)	(6.33)	(7.12)	(5.38)	(5.53)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.3379	0.4081	0.4097	0.3610	0.4897	0.4859
Log likelihood	−2788.48	−2662.26	−2646.20	−1834.70	−1784.71	−1784.43
Test of linearity	0.2121	0.2541	0.2283	0.2187	0.2209	0.2128
N	5,845	5,845	5,845	4546	4546	4546

***Significant at the 0.01 level; **Significant at the 0.05 level; *Significant at the 0.10 level.

Table 6: Effect of cash flow on relationship between WCM and profitability
The table presents random effects regression with 1-year ROA and 3-year ROA as the dependent variables. The sample conssist of 6,424 firm-years across 802 unique UK SMEs on the AIM over the period 2004-2013. *P*-values are below coefficients. The Ramsey's RESET test is used for the test of linearity. All variables are defined in Table 1.

	(1)	(2)	(3)	(4)	(5)	(6)
DEPENDENT VARIABLE	1-year ROA	1-year ROA	1-year ROA	3-year ROA	3-year ROA	3-year ROA
WORKING CAPITAL						
CCC_{t-1}	−0.0215***	−0.0219***	−0.0104***	−0.0134***	−0.0158***	−0.0154***
	(−4.75)	(−4.79)	(−4.61)	(−3.63)	(−4.18)	(−4.80)
PRIMARY VARIABLE						
$CFLOW_{t-1}$		5.301**	4.852**		6.179**	6.160**
		(2.56)	(2.43)		(2.07)	(2.26)
INTERACTIVE EFFECT						
CCC_{t-1} * $CFLOW_{t-1}$			0.0101***			0.0318***
			(6.74)			(6.02)
CONTROL VARIABLES						
$GROWTH_{t-1}$	1.216***	1.027***	1.025***	1.561***	1.441***	1.451***
	(8.34)	(5.21)	(5.17)	(14.53)	(7.15)	(7.34)
AGE_{t-1}	0.0838	0.0740	0.0731	0.182***	0.155***	0.157***
	(1.47)	(1.35)	(1.34)	(3.29)	(3.12)	(3.14)
$SIZE_{t-1}$	1.211***	1.162***	1.159***	1.069***	0.9898***	0.9896***
	(9.35)	(9.12)	(9.07)	(8.43)	(8.60)	(8.59)
$ATAN_{t-1}$	−6.185***	−6.321***	−6.324***	−5.884***	−5.9551***	−5.9559***
	(−18.93)	(−19.43)	(−19.45)	(−18.44)	(−19.64)	(−19.73)
LEV_{t-1}	−0.0127***	−0.0124***	−0.0121**	−0.0374***	−0.0338***	−0.0332***
	(−3.15)	(−2.63)	(−2.54)	(−11.39)	(−6.83)	(−6.81)
CRISIS	−0.731***	−0.713***	−0.719***	−0.388***	−0.3664***	−0.3668***
	(−8.11)	(−7.78)	(−7.89)	(−6.44)	(−5.72)	(−5.96)
_cons	18.30***	17.12***	17.13***	17.57***	15.9412***	15.9501***
	(15.61)	(14.12)	(14.12)	(15.22)	(13.57)	(13.69)
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.3314	0.3948	0.3961	0.3547	0.3762	0.3761
Log likelihood	−2651.51	−2538.54	−2523.51	−1707.56	−1666.77	−1666.60
Test of linearity	0.2312	0.2412	0.2243	0.2154	0.2212	0.2298
N	5,845	5,845	5,845	4546	4546	4546

***Significant at the 0.01 level; **Significant at the 0.05 level; *Significant at the 0.10 level.

Table 7: Firm cash flow level effect on the relationship between WCM and QRATIO
The table presents random effects regression with 1-year QRATIO and 3-year QRATIO as the dependent variables. These results are similar to Table 4, but this Table controls for the cash flow levels of firms by dividing the sample into two based on the mean of cash flow. The sample conssist of 6,424 firm-years across 802 unique UK SMEs on the AIM over the period 2004-2013. *P*-values are below coefficients. The Ramsey's RESET test is used for the test of linearity. All variables are defined in Table 1.

	(1) 1-year QRATIO Lower CFLOW	(2) 1-year QRATIO Higher CFLOW	(3) 3-year QRATIO Lower CFLOW	(4) 3-year QRATIO Higher CFLOW
WORKING CAPITAL				
CCC_{t-1}	−0.0216***	0.0165***	−0.0317***	0.0266***
	(−3.10)	(2.74)	(−3.20)	(2.84)
CONTROL VARIABLES				
$GROWTH_{t-1}$	0.1134	1.8956***	0.1234	1.8964***
	(0.46)	(7.95)	(0.56)	(7.97)
AGE_{t-1}	0.0445	0.3373***	0.0546	0.3472***
	(0.57)	(4.26)	(0.69)	(4.35)
$SIZE_{t-1}$	0.5435***	1.4204***	0.5534***	1.4289***
	(2.78)	(8.30)	(2.81)	(8.33)
$ATAN_{t-1}$	−4.2010***	−9.7657***	−4.2114***	−9.7703***
	(−9.77)	(−23.23)	(−9.86)	(−23.31)
LEV_{t-1}	−0.0908	−0.0313***	−0.0946	−0.0322***
	(−1.64)	(−5.30)	(−1.72)	(−5.35)
$CRISIS_{t-1}$	−0.8135***	−0.6764***	−0.8312***	−0.6804***
	(−5.20)	(−5.02)	(−5.37)	(−5.19)
_cons	7.9037***	26.6352***	7.9039***	26.6336***
	(4.41)	(17.24)	(4.44)	(17.23)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Adjusted R^2	0.3093	0.3565	0.3103	0.3575
Log likelihood	−1106.40	−1695.23	−1106.40	−1695.23
Test of linearity	0.2154	0.2231	0.2432	0.2643
N	2,631	3,214	2,500	2,046

***Significant at the 0.01 level; **Significant at the 0.05 level; *Significant at the 0.10 level.

Table 8: Firm cash flow level effect on the relationship between WCM and performance
The table presents random effects regression with 1-year ROA and 3-year ROA as the

dependent variables. These results are similar to Table 4, but this Table controls for the cash flow levels of firms by dividing the sample into two based on the mean of cash flow. The sample conssist of 6,424 firm-years across 802 unique UK SMEs on the AIM over the period 2004-2013. *P*-values are below coefficients. The Ramsey's RESET test is used for the test of linearity. All variables are defined in Table 1.

	(1) 1-year ROA Lower CFLOW	(2) 1-year ROA Higher CFLOW	(3) 3-year ROA Lower CFLOW	(4) 3-year ROA Higher CFLOW
WORKING CAPITAL				
CCC_{t-1}	−0.0222***	0.0157***	−0.0232***	0.0161***
	(−3.46)	(3.09)	(−3.57)	(3.10)
CONTROL VARIABLES				
$GROWTH_{t-1}$	0.0445	1.4314***	0.0454	1.4416***
	(0.00)	(7.38)	(0.08)	(7.43)
AGE_{t-1}	0.0286	0.2115***	0.0315	0.2172***
	(0.40)	(3.19)	(0.61)	(3.22)
$SIZE_{t-1}$	0.4787***	0.9725***	0.4098***	0.9734***
	(2.66)	(6.66)	(2.61)	(6.74)
$ATAN_{t-1}$	−3.2270***	−7.7581***	−3.2334***	−7.7621***
	(−8.07)	(−21.35)	(−8.17)	(−21.41)
LEV_{t-1}	−0.0980*	−0.0201***	−0.0991*	−0.0231***
	(−1.93)	(−4.03)	(−1.96)	(−4.13)
CRISIS	−0.8041***	−0.7293***	−0.8054***	−0.7376***
	(−5.55)	(−6.57)	(−5.67)	(−6.76)
_cons	6.2253***	19.3201***	6.2231***	19.3221***
	(3.80)	(14.73)	(3.82)	(14.63)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Adjusted R^2	0.3074	0.3491	0.3094	0.3501
Log likelihood	−1000.84	−1525.86	−1000.84	−1525.86
Test of linearity	0.2186	0.2253	0.2176	0.1987
N	2,631	3,214	2,500	2,046

***Significant at the 0.01 level; **Significant at the 0.05 level; *Significant at the 0.10 level.