

Working Capital Determinants for the UK Pharmaceutical Companies Listed on FTSE 350 Index

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Abstract *The study is conducted to investigate working capital determinants for the UK Pharmaceutical companies that are the constituents of FTSE 350 index. Secondary data is collected through annual reports and DataStream database for the UK Pharmaceutical firms since 2009 to 2014. Panel data method is used and OLS is employed as an estimation tool. Working capital is the dependent variable while firm size, profitability, leverage, operating cycle, growth and level of economic activity are independent variable. The result of multiple regression show highly significant results. Working capital is negatively linked with firm size while positively linked with growth and level of economic activity for UK Pharmaceutical firms. Furthermore, insignificant results of working capital with operating cycle, profitability and leverage are observed.*

Key words Working capital, liquidity, profitability, operating cycle and economic activity

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1. Introduction

No one can deny the significance of working capital management in the success of an organisation (Brealey and Myers, 2006). Investment in working capital components (cash, debtors and stock) has an impact on the profitability and liquidity of the company (Watson and Head, 2010). Due to this reason the management always show its concern in the management of working capital (Pike and Neale, 2010). For creating a balance between the profitability and liquidity of the company the corporate managers adopt different working capital approaches e.g. aggressive, conservative and hedging approach (Watson and Head, 2010).

For creating an optimal balance between the current assets and current liabilities (working capital is calculated as current assets minus current liabilities) the managers should effectively involve in the management of different current assets because current assets are utilized for the payment of current liabilities (Brealey and Myers, 2006). Furthermore, the efficient corporate managers are relying more on the spontaneous sources of funds (Pike and Neale, 2009) as compared to negotiable sources of funds for reducing the cost of short term investment (Watson and Head, 2010).

Based on the importance of working capital management for the success of an organisation, the current study will investigate the determinants of working capital management for the UK Pharmaceutical companies that are the constituents of FTSE 350 index.

2. Literature review

Working capital management is one of the vital areas for the success of any company because it is related with the profitability, growth, risk and return and the value of the company. The next sub-section will shed light on the working capital practices of UK companies.

2.1. Working capital practices of UK companies

Pike and Cheng (2001) have stated that the proportion of debtors is around 19 and 30 percent of the total assets for the UK large and medium companies respectively. Wilson and Summers (2002) have also stated that the debtors are more than 1.5 times of the equity and debt issue in UK. But Wilson (2008) has found out that the total debtors have reached at 45 percent of the total assets of UK companies that is considered as highly risky. The author has also stated that the level of debtors has significantly increased after 2006 due to the credit crunch. He has also stated that half of the loans that the UK businesses have taken from the UK banks are consumed to sell good on credit basis to the UK customers. Furthermore, Tauringana and Afrifa (2013) have also found the similar results and confirmed the results of Wilson (2008). Aaronson *et al.*, (2004) have found out that around 61 percent of the UK firms are heavily relying on different credit arrangements with the suppliers. £26 billion have been provided to the UK customers through different credit arrangements by the UK businesses till the end of 2008 (Manager, 2009). Paul and Boden (2008) have emphasised that the UK corporate managers should conduct credit risk management analysis for the long term survival of UK companies.

Deloof (2003) has stated that managers can maximize the shareholder's wealth by reducing the stock days. Paul and Wilson (2006) have also stated that the stock level of UK firms is reducing with the passage of time as the firms are adopting JIT stock system. Banos-Caballero *et al.* (2010) have stated that by lowering the stock level the managers can increase the profitability of the firm by earning interest on these unblocked funds in inventory. Furthermore, this study is suggesting that the UK companies should adopt efficient stock and cash management systems for the long term success of the UK companies.

2.2. Empirical evidence on working capital determinants

Different researchers have used various working capital determinants in their studies. This section will provide the details of the working capital determinants that are chosen for this study.

Empirical results have shown that different researchers have measured working capital differently in their research. Most of the researchers have measured working capital through cash conversion cycle (Soenen, 1993; Deloof, 2003; Garcia-Teruel and Martinex-Solano, 2007 and Banos-Caballero *et al.*, 2010). Cash conversion cycle is calculated by deducting creditors days from the addition of stock and debtor's days (Deloof, 2003). The study will measure working capital through a ratio which is current assets minus current liabilities divided by total assets as measured by Shulman and Cox (1985) and Nazir and Afza (2009). The main reason for utilizing the above ratio is that it compares the working capital and size of the firm.

Firm size is one of the vital working capital determinants. Gitman (2009) has stated that large firms require higher investment in working capital and vice versa. But mixed results have been found between firm size and working capital. Almeida, Campello and Weishbach (2004); Jeng-Ren *et al.* (2006) and Onaolapo and Kajola (2015) have found the positive relation while Jose *et al.* (1996) and Abbadi and Abbadi (2012) have found the negative relationship between firm size and working capital.

Normally highly leveraged companies are investing less in the current assets for reducing their financing requirements (Nakamura and Palombini, 2010). The empirical studies have shown the negative relationship between leverage and working capital because highly leveraged firms need too much financial resources for the payment of interest and principal sum (Jeng-Ren *et al.*, 2006); Abbadi and Abbadi (2012); Mohamad and Elias (2013) and Onaolapo and Kajola (2015).

The growing companies always require additional funds for meet its working capital needs (Nunn, 1981). Working capital management for rapidly growing firms should be efficient to meet the funding need. Different researchers have found the positive relationship between growth and working capital management through their research (Kim *et al.*, 1998; Jeng-Ren *et al.*, 2006; Abbadi and Abbadi (2012) and Mohamad and Elias (2013). Furthermore, different other researchers have found the insignificant results between growth and working capital (Nazir and Alfza, 2008; Chiou *et al.*, 2006 and Appuhami, 2008).

Nazir and Afza (2008) have stated that the companies that are generating high profit are relying more on the internal funds. Researchers have found mixed results regarding the relationship of profitability and working capital. Jeng-Ren *et al.* (2006); Abbadi and Abbadi (2012) and Onaolapo and Kajola (2015) have found the positive relationship between profitability and working capital while Eljelly (2004) and Lazaridis and Tryfonidis (2006) have found the negative relationship between profitability and working capital.

The operating cycle of the company is dependent on the management of working capital. If managers effectively manage the working capital than operating cycle will reduce otherwise it will be extended (Paul and Wilson, 2006). Working capital requirement is higher if the firm's operating cycle is lengthy. Different researchers have found the negative relationship between working capital and operating cycle of the firm (Deloof, 2003; Afza and Nazir, 2008; Dong and Su, 2010; Sharma and Kumar, 2011). But Onaolapo and Kajola (2015) have found the positive relationship between operating cycle and working capital.

When economic activity is at the peak the working capital requirement is highest and vice versa (Lamberson, 1995). Zariyawati *et al.* (2010) have found the positive relationship between working capital and economic activity in a country while Lamberson (1995) has found the negative relationship between the two variables. Moreover, Nazir and Afza (2008) and Al Taleb *et al.*, (2010) have found insignificant relation between economic activity and working capital.

3. Methodology of research

3.1. Data and sample

Secondary data is collected for the study. The data is collected from DataStream database and annual reports of the UK Pharmaceutical firms that are listed on the FTSE 350 index. As the data is collected from the annual reports and DataStream database so the validity and reliability of the data is not an issue. Ten UK Pharmaceutical firms are the constituents of FTSE 350 index so their data is collected from 2009 to 2014. In this way data for 60 firm years is collected for the study.

3.2. Research instrument

For the study three analytical tools will be used such as descriptive statistics, correlation and multiple regression. Following regression equation will be used

$$\text{Working capital}_{it} = \beta_0 + \beta_1 (\text{Firm size}_{it}) + \beta_2 (\text{Leverage}_{it}) + \beta_3 (\text{Growth}_{it}) + \beta_4 (\text{Profitability}_{it}) + \beta_5 (\text{Operating Cycle}_{it}) + \beta_6 (\text{Level of economic activity}_{it}) + \varepsilon \quad (1)$$

3.3. Measurement of variables and hypotheses

3.3.1. Working capital management

The study will measure working capital through a ratio which is current assets minus current liabilities divided by total assets as measured by Shulman and Cox (1985) and Nazir and Afza (2008). The main reason for utilizing the above ratio is that it compares the working capital and size of the firm.

3.3.2. Firm size

Firm size will be measured through log of sales as it was measured by Jose *et al.* (2006). This study is expecting the positive relationship between firm size and working capital because large firms require higher funding for working capital.

H1: Positive relationship exists between firm size and working capital.

3.3.3. Leverage

Leverage will be measured through total debt divided by total debt plus total equity. For this study negative relationship is expected between the leverage and working capital because the highly leverage firms are investing less in the current assets.

H2: Negative relationship exists between leverage and working capital.

3.3.4. Growth

Growth will be measured through change in the natural log of sales. Based on the positive empirical results positive relationship is expected between growth and working capital for the current study

H3: Positive relationship exists between growth and working capital.

3.3.5. Profitability

Profitability will be measured through the operating profit divided by the total assets (Asmawi and Faridah, 2012). Negative relationship is expected between profitability and working capital because higher investment in working capital reduces the earnings potential.

H4: Negative relationship exists between profitability and working capital.

3.3.6. Operating cycle

Operating cycle is measured through two different financial ratios such as debtor collection days plus inventory turnover days. Based on the empirical results positive relationship is expected between the operating cycle and working capital.

H5: Positive relationship exists between operating cycle and working capital.

3.3.7. Level of economic activity

Economic activity is measured through gross domestic product of different years in UK. Positive relationship is expected between economic activity and working capital because working capital is higher when economic activity is quite high in the country.

H6: Positive relationship exists between level of economic activity and working capital.

4. Analysis and discussion

SPSS has been used for the data analysis of ten UK Pharmaceutical companies that are the constituents of FTSE 350 index. Data is collected from 2009 to 2014 for the selected companies.

4.1. Descriptive statistics

This tool is used to generate a summary of the large data set (Weiers, 2010). Data is collected for 60 firm years (10 firms * 6 years = 60 firm years).

Table 1. Descriptive Statistics

	Working Capital	Firm size	Leverage	Growth	Profitability	Operating Cycle	Level of economic activity
Mean	.126	9.160	.463	.303	-1.728	.101	253.542
Median	.151	9.045	.508	.069	-1.699	.118	240.754
Mode	-.23	10.42	.07	-.89	-1.92	-.09	105.31
Std. Dev.	.143	1.012	.210	1.698	.135	.083	115.715
Variance	.020	1.023	.044	2.885	.018	.007	13390.039
Skewness	-.704	-.092	-.128	6.458	-.073	-.739	1.101
Range	.62	3.04	.81	12.20	.38	.33	499.24
Minimum	-.23	7.48	.07	-.89	-1.92	-.09	105.31
Maximum	.39	10.53	.88	11.31	-1.54	.24	604.56

4.2. Correlation

The main purpose to use correlation is to explore how two variables are moving together (Weiers, 2010). Pearson's co-efficient of correlation is used for the study.

Table 2. Correlation

	Working Capital	Firm size	Leverage	Growth	Profitability	Operating Cycle	Level of economic activity
Working Capital	1						
Firm size	-.164	1					
Leverage	-.012	.171	1				
Growth	.081	.122	-.032	1			
Profitability	-.024	.039	-.147	.077	1		
Operating cycle	.058	.173	.018	.125	-.027	1	
Level of economic activity	.345	-.284	.029	-.142	.011	-.212	1

After analysing the results of Table 2 it is clear that no issue of multicollinearity has been found among the variables. Due to this reason no amendments will be made in the variables for the study.

4.3. Multiple regression analysis

Table 3 is highlighting the results of multiple regression for the UK Pharmaceutical companies that are the constituents of FTSE 350 index.

Table 3. Regression for UK Pharmaceutical firms

	Coefficients	Significant level of coefficients	
Firm size	-.044	.029	
Leverage	-.142	.103	
Growth	.013	.010	
Profitability	-.067	.124	
Operating cycle	-.352	.305	
Economic activity	.000	.000	
R Square	.513	Adjusted R Square	.436
F-Statistics	6.678	Sig (F)	.000

The significant level of F statistics is .000, which means the model is highly significant. Furthermore, R square is .513 which means that the independent variables have only 51.3 percent impact on the dependent variable for the study.

4.4. Discussion on results

The hypothesis for the study regarding firm size and working capital is rejected because the significant negative relationship exists between the firm size and the working capital of the UK Pharmaceutical firms. The result of the current study is in line with the studies that are conducted by Jose *et al.* (1996) and Abbadi and Abbadi (2012) but opposite to the studies that are conducted by Almeida, Campello and Weishbach (2004); Jeng-Ren *et al.* (2006) and Onaolapo and Kajola (2015).

The hypothesis regarding leverage and working capital is rejected because insignificant result has been found for leverage and working capital for the UK Pharmaceutical firms. The results of the study are contradicting from the results of other studies that are conducted by other researchers because all the other researchers have found negative relationship between these two variables (Jeng-Ren *et al.*, 2006; Abbadi and Abbadi, 2012; Mohamad and Elias, 2013 and Onaolapo and Kajola, 2015). The hypothesis for the study regarding growth and working capital is accepted because the significant positive relationship exists between the growth and working capital for the UK Pharmaceutical firms. The result of the study is in line with the studies that are conducted by (Kim *et al.*, 1998; Jeng-Ren *et al.*, 2006; Abbadi and Abbadi (2012) and Mohamad and Elias (2013) but opposite to those who found insignificant results between growth and working capital (Nazir and Alfza, 2006; Chiou *et al.*, 2006 and Appuhami, 2008).

The hypothesis regarding profitability and working capital is rejected because insignificant result has been found for profitability and working capital for the UK Pharmaceutical firms. The results of the study are contradicting from the results of other studies that are conducting by other researchers because some researchers have found the positive relationship (Jeng-Ren *et al.*, 2006; Abbadi and Abbadi, 2012 and Onaolapo and Kajola, 2015) while others have found the negative relationship between the two variables (Hyun-Han and Soenen, 1998; Eljelly, 2004 and Lazaridis and Tryfonidis, 2006).

The hypothesis regarding operating cycle and working capital is rejected because insignificant result has been found for operating cycle and working capital for the UK Pharmaceutical firms. The results of the study are contradicting from the results of other studies that are conducting by other researchers because Onaolapo and Kajola (2015) have found the positive relation while others have found the negative relationship between the two variables (Deloof, 2003; Afza and Nazir, 2007; Dong and Su, 2010; Sharma and Kumar, 2011). The hypothesis for the study regarding level of economic activity and working capital is accepted because the significant positive relationship exists between level of economic activity and working capital for the UK Pharmaceutical firms. The result of the study is in line with Zariyawati *et al.* (2010) while the result is opposite to other studies where the researchers have found the negative relationship between working capital and economic activity (Lamberson, 1999 and Walker, 2003).

5. Conclusions

The study is conducted to analyse working capital determinants for ten UK Pharmaceutical companies that are constituents of FTSE 350 index. Secondary data is collected through DataStream database and annual reports of the selected companies from 2009 to 2014. Different analytical tools have been used for the data analysis such as descriptive statistics, correlation and multiple regressions.

The results have been presented in the analysis chapter. The results of the correlation have shown no multicollinearity issue within the variables. The result of the multiple regressions has shown that the model is highly significant and the independent variables have 51.3 percent impact on the dependent variable. The result of multiple regressions has also shown that working capital has positive relation with level of economic activity and growth while it has negative relation with firm size for the UK Pharmaceutical companies. But due to insignificant results the study is not able to explore any relation of working capital with operating cycle, profitability and leverage for the UK Pharmaceutical companies.

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