

Significance of Working Capital Management in Fuel and Energy Sector of Pakistan

Khurram Sultan¹, Ghassan Ali Asim¹, Muhammad Waseem Jalal²

¹Cihan University Erbil, Kurdistan, ²Sol-Bridge International School, South Korea

ABSTRACT

This study analysed the factors which influence the working capital management of fuel and energy sector of Pakistan. Panel data analysis has been applied to identify the significant factors that are relevant to the fuel and energy sector of Pakistan. The data has been taken from the year (2004-2014) to check the impact of operating cash flow, quick ratio, current ratio, debt ratio, company size, and sales growth on profitability of the companies in fuel and energy sector of Pakistan. E-views software used to run analysis. Findings of present study concluded that the random effect model is the most appropriate method for this study and best model among other models (i.e., pooled data model and random effect model).

Keywords: Working Capital Management, Fuel & Energy Sector, State Bank of Pakistan

1. INTRODUCTION

Capital management is very important for the success of any business. The optimal level of working capital has determined largely by the methods adopted by the financial managers of the companies. Continuous monitoring is required by the financial experts to maintain the proper level at different components of working capital such as cash receivable, inventories, and accounts payable, etc. A company may be able to reduce investment in fixed assets by the rental or leasing of plant and machinery, while the same policy cannot be followed by the components of working capital. The high level of current assets may reduce the liquidity of a company and risk associated with cost of funds. The management of working capital is divided into two groups: application of asset management and debt management. Nilsson (2010) suggested that profitability, operating cash flow, company size, sale growth and debt ratio are the factors which influence the working capital management. Many managers in Iran companies were always looking for information regarding the factors influencing the working capital management (Saghafi & Hashemi, 2005).

According to Titman, Martin, and Keown (2010) there are four types of working capital. Working capital refers the company's investment in current assets. The benefits for the company obtained with the help of the assets, which are partly fixed and partly circulating. The financial managers of company are more concerned with the total current assets. An increase in overall investment in the company has also produced an increase in working capital management.

1.1 Problem Statement

Identification of significant variables that influence the overall performance of accompany is very important for the success of any business. The researcher is concerned with the problems involved in working capital management of fuel and energy sector of Pakistan. Estimation of optimum level of working capital and provision of working capital at the appropriate time is very important for the success of any business. In the absence of proper management of working capital it is very difficult to achieve the targets properly and to sustain the organization. The importance of cash management is an indicator of financial health of a company. An asset-liability mismatch may occur, which may increase firm's profitability in the short run but on the risk of insolvency. Very few studies have been made in relation to working capital management, but no study has been done in the fuel and energy sector of the Pakistan to find out the significance of working capital management of fuel and energy sector of Pakistan.

1.2 Purpose Statement

The purpose of this quantitative study is to determine the components which effect the working capital management in fuel and energy sector of Pakistan. The results identify the significant variables and the need for working capital management in fuel

and energy sector of Pakistan. The researcher, therefore, tries to explain the reasons for the problems mentioned in the Problem Statement. The objective is, therefore, to investigate and to make a critical analysis of the fuel and energy sector of Pakistan's internal and external working capital management practices. The researcher has tried to give relevant recommendations to enhance the value of the firm. In order to realize this objective the researcher has reviewed relevant literature of the developed countries to formulate a conceptual framework. This conceptual framework has been used to determine the relevant issue of study. The researcher has collected relevant data and has analysed the findings. The purpose of the study is to determine the relationship between the company size, sales growth, debt ratio, quick ratio, current ratio, and operating cash flow and its impact on the profitability in fuel and energy sector of Pakistan.

2.3 Objectives of the Study

The objectives of the research are as follows:

1. To find out the components of working capital having significant effect on the profitability and financial position of fuel and energy sector of Pakistan.
2. To determine the optimum level of working capital in fuel and energy sector of Pakistan.

2.4 Hypotheses

The hypotheses that have been tested in this study are as follows:

- H_1 = Components of the working capital have significant effect on the profitability and financial position of fuel and energy sector of Pakistan.
- H_2 = There exists an optimum level of working capital in fuel and energy sector of Pakistan.

3. CONCEPTUAL FRAMEWORK

The figure shows that profitability is taken as the dependent variable and debt ratio, sales growth, company size, current ratio, quick ratio and operating cash flow is taken as independent variable.

The graphic above illustrates the research framework used in this research which elaborates the relationship that the researcher intends to check in this study. The dependence of the performance has been checked through the critical elements of working capital management. The figure above shows the relationship between dependent and the independent variables

4. RESEARCH METHODOLOGY

The methodology used within the framework of our empirical analysis is that of panel data analysis, which presents the advantage of treating jointly the individual effects and the temporal effects, and increasing the degree of freedom and inference exactitude.

4.1. Research Design

Research study is casual in nature and it has aimed to analyze the relationship between profitability upon the company size, sales growth, current ratio, quick ratio, debt ratio, and operating cash flow in the fuel and energy sector of Pakistan.

4.2. Variables and Their Measurement

Variable	Nature	Measurement
Profitability	Dependent	Profitability is measured as return on assets
Operating cash flow	Independent	Operating cash flow is calculated by dividing cash flow from operation with current liabilities
Company size	Independent	The company size is calculated by taken logarithm of company's total assets
Sales growth	Independent	Sales growth is calculated by (Current year sales – previous year sale)/previous year sale
Current ratio	Independent	Current Ratio=Current assets/current liabilities
quick ratio	Independent	Quick ratio= (Current assets - inventories)/current liabilities
3.1.1 Debt ratio	Independent	Debt Ratio: Total debt/total assets

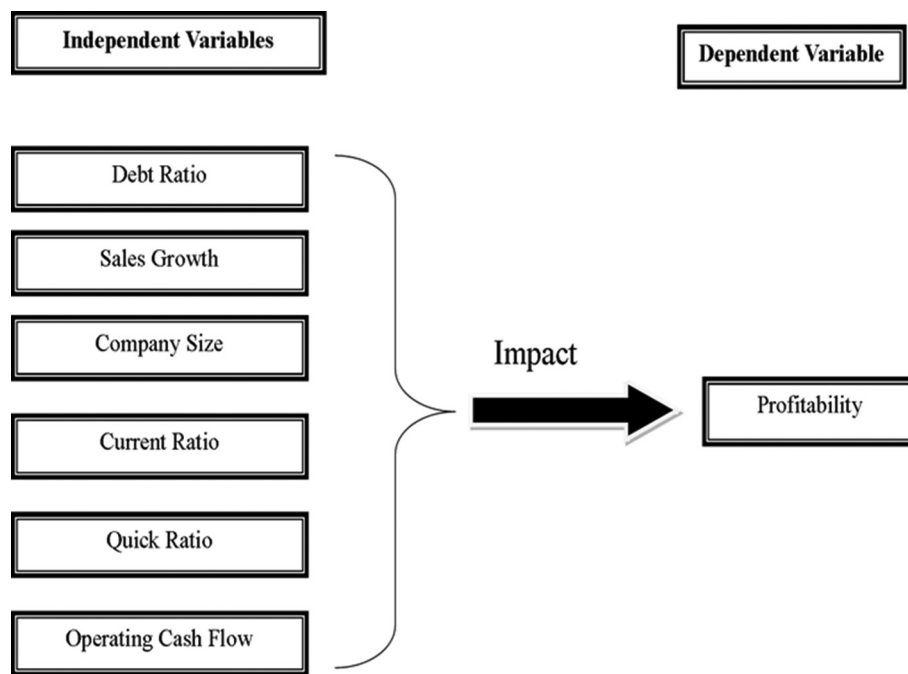


Figure 1: Conceptual Framework

4.3. Data Collection and Analysis

The Target population of the research has 411 companies, listed in Karachi Stock Exchange. Fuel and Energy Sector firms has selected as a sample. Panel data has used and regression analysis has applied to find out the significant factors that are relevant for the energy sector companies. The data has been taken from the year (2004-2014) to check the impact of operating cash flow, quick ratio, current ratio, debt ratio, company size, and sale growth on profitability in fuel and energy sector of Pakistan. Panel data analysis has been employed by taking one dependent variable as profitability, and six independent variables which are as follow:

- Quick ratio (QR)
- Debt Ratio (DR)
- Company Size (CS)
- Current Ratio (CR)
- Sales Growth (SG)
- Operating Cash Flow (OCF)

Following three econometrics panel data model which has been used in present model:

- Pooled Data Model (PDM),
- Fixed Effect Model (FEM), and
- Random Effect Model (REM)

5. RESULTS AND DISCUSSIONS

5.1. Descriptive Statistics

Basic characteristics of variables under consideration have explored through descriptive statistic over the period of 2004-2014. Mean and standard deviation of individual variables have also been explored by using descriptive statistics on average and year-wise over the period of 2004-2014. Table 1 explains the summary of descriptive statistics of Fuel and Energy Sector of Pakistan over the period of 2004-2014. Column 1 indicates the variables under consideration and remaining columns show values of mean, median, maximum value, minimum value and standard deviation.

5.2. Panel Data Regression Analysis

Panel data modelling is integration of time series data modelling and cross sectional data modelling. Panel data regression analysis has been used based on objective of present dissertation. Panel data analysis has employed by taking one dependent

variable as profitability, and six independent. Present study has applied Ordinary Least Square (OLS) technique and provided all these parameters should be linear in nature. The general form of panel model is as follow:

$$\text{Profitability}_{it} = \beta_0 + \beta_1 \text{SG}_{it} + \beta_2 \text{QR}_{it} + \beta_3 \text{OCF}_{it} + \beta_4 \text{DR}_{it} + \beta_5 \text{CS}_{it} + \beta_6 \text{CR}_{it} + u_{it}$$

5.3. Pooled Data Model (PDM)

Pooled data model is used to pool the time series data and cross sectional data, but have not considered any aspect of time series behaviour and cross sectional behaviour. Functional form of pooled data model is as follow:

$$Y_{it} = \alpha + \beta X_{it} + u_{it}$$

Table 2 shows the results of pooled regression model which indicates that performance of fuel and energy sector of Pakistan has negative relationship with current ratio and debt ratio and their relationship with profitability is also statistically significant based on p values. In case of sales growth and quick ratio their relation with profitability is positive but is significant. The value of coefficient of determinant shows 69% variation in profitability explain by the independent variable. P value shows that overall model is good fit but the value of Durbin-Watson test indicates presence of autocorrelation problem.

5.4. Fixed Effect Model (FEM)

Fixed Effect Model is also used to pool the time series data and cross sectional data but considering time effects and individual effects on the intercept. The general form of FEM is as follow:

$$Y_{it} = (\alpha + u_i) + \beta X_{it} + u_{it}$$

From Table 3 it is clear that performance of fuel and energy sector of Pakistan has a negative relationship and is significantly correlated with the debt ratio and current ratio. Company size has significant and positive correlation with performance of fuel and energy sector of Pakistan. The value of coefficient of determinant shows 82 % variation in Profitability, explained by six independent variables. P values shows that overall Fixed Effect Model is good fit. Value of Durbin-Watson test indicates absence of autocorrelation problem which is a good sign to select this model by consideration an appropriate model for prediction.

Table 1: Descriptive statistics of fuel and energy sector of pakistan over the period of 2004-2014

Variables	Mean	Median	Maximum	Minimum	Standard deviation
Profitability	5.095007	4.090000	55.95000	-35.29	14.43589
DR	0.539633	0.598350	1.334400	0.013900	0.312195
SG	0.423385	0.112400	16.37140	-1	2.029833
CS	7.007155	6.991050	8.435500	5.232100	0.949990
CR	2.908528	1.055000	27.13000	0.202500	4.421427
QR	1.802597	0.955	17.22	0.03	2.443876
OCF	6,641,457	76,9365.5	67,924,141	-4,189,460	14,918,953

Table 2: Results of pooled regression model

	Coefficient	Standard error	t-statistic	Prob
SG	0.229645	0.324873	0.676093	0.5101
QR	1.590702	1.034012	1.528708	0.1385
OCF	5.05E-07	5.66E-08	8.935818	0.0000
DR	-25.35747	3.227377	-7.860088	0.0000
CS	3.232508	1.079470	3.911648	0.0002
CR	-1.772898	0.582858	-2.870163	0.0037
C	-11.24840	7.039425	-1.738409	0.0843
R-squared	0.696434	Prob (F-statistic)		0.000000
F-statistic	57.35215	Durbin-Watson statistics		0.853589

4.5. Random Effect Model (REM)

Random effect model also pool the time series data and cross sectional data considering time effects and individual effects on error terms. The general form of Random effect model is as follow:

$$Y_{it} = \alpha + \beta X_{it} + (u_{it} + v_{it})$$

Table 4 indicates that performance of fuel and energy sector of Pakistan is positive related with company size and operating cash flow and their relationship with profitability is also statistically significant based on p values. In case of sales growth and quick ratio, their relation with profitability is positive but not significant. The value of coefficient of determinant shows 84% variation in Return on Assets explained by the independent variable. P value shows that overall random effect model is good fit, but the value of Durbin-Watson test not better as compare to than fixed effect model.

5.6. Comparison of PDM, FEM and REM

Table 5 shows the results and comparison of pooled data model, fixed effect model and random effect model to select best fit model for present study.

5.7. Selection Of Best Model Based on Hausman Test

The generally accepted way of choosing between fixed and random effects is running a Hausman test. A central assumption in random effects estimation is the assumption that the random effects are uncorrelated with the explanatory variables. One

Table 3: Results of fixed effect model

	Coefficient	Standard error	t-statistic	Prob.
SG	0.366520	0.239280	1.448180	0.1400
QR	0.487785	0.773149	0.760249	0.3485
OCF	2.39E-07	1.61E-07	1.418680	0.2584
DR	-25.67064	3.654313	-7.325767	0.0000
CS	8.444520	1.803751	5.125163	0.0000
CR	-0.702889	0.439426	-2.054701	0.0319
C	-42.35557	12.11612	-3.741757	0.0001
Effects specification				
Cross-section fixed (dummy variables)				
R-squared	0.829770	F-statistic		43.07762
Prob (F-statistic)	0.000000	Durbin-Watson statistics		1.514986

Table 4: Results of random effect model

	Coefficient	Standard error	t-statistic	Prob.
SG	0.267908	0.236797	1.258073	0.1104
QR	0.632375	0.768021	0.940567	0.2585
OCF	3.57E-07	1.02E-07	3.397083	0.0008
DR	-24.76749	3.407100	-7.915087	0.0000
CS	5.668453	1.469504	5.354496	0.0000
CR	-0.768263	0.436615	-2.217661	0.0162
C	-34.31423	9.755213	-3.731772	0.0002
Weighted statistics				
R-squared	0.832892	F-statistic		18.19277
Prob (F-statistic)	0.000000	Durbin-Watson statistics		1.564209
Unweighted statistics				
R-squared	0.806091	Mean dependent variable		5.095007
Sum squared	10057.65	Durbin-Watson statistics		1.796809

common method for testing this assumption is to employ a Hausman (1978) test to compare the fixed and random effects estimates of coefficients Wooldridge (2002).

The null hypothesis of Hausman test is that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. If they are (insignificant P-value, Prob>chi2 larger than.05) then it is safe to use random effects. If you get a significant P-value, however, you should use fixed effects.

To perform the Hausman test, this study first estimated a model with your random effects specification (see Table 6). The following table contains three parts to the output and represents the results of Hausman test.

If $p < 0.05$, reject the null. Since the p-value equals 0.4312 we fail to reject the null and there is a random effect.

H_0 : random effects would be consistent and efficient

H_1 : random effects would be inconsistent

Random effect model has been selected to be the best model. A best model has been selected based on application of Hausman test and comparison of pooled data model, fixed effect model, and random effect model.

$$\text{Profitability} = b_0 + b_1 \text{ SG} + b_2 \text{ QR} + b_3 \text{ OCF} + b_4 \text{ DR} + b_5 \text{ CS} + b_6 \text{ CR} + e$$

$$\text{Profitability} = -34.314 + 0.268 \text{ SG} + 0.632 \text{ QR} + 3.57 \text{ OCF} - 24.767 \text{ DR} + 5.668 \text{ CS} - 0.76826 \text{ CR} + e$$

Table 5: Comparison of PDM, FEM and REM

Models Variables	ROA measure as profitability (dependent variable)					
	PDM		FEM		REM	
	Coefficient	Prob.	Coefficient	Prob.	Coefficient	Prob.
ROA (Constant)	-11.247*	0.084	-42.356***	0.000	-34.314***	0.000
SG	0.220	0.510	0.367*	0.140	0.268	0.110
QR	1.591	0.139	0.488	0.349	0.632	0.259
OCF	5.05E-07***	0.000	2.39E-07*	0.258	3.57E-07***	0.008
DR	-25.357***	0.000	-25.671***	0.000	-24.767***	0.000
CS	3.223***	0.000	8.445***	0.000	5.668***	0.000
CR	-1.773***	0.062	-0.702***	0.000	-0.768***	0.016
R ²	0.696		0.820		0.843	
Adj. R ²	0.644		0.740		0.609	
SSR	9115.490		4043.765		4480.387	
F-stat.	57.352		43.078		18.193	
Prob.	0.000		0.000		0.000	
Akaike Criterion	7.038		6.412		-	
Schwarz Criterion	7.179		6.834		-	
Durbin Watson	0.854		1.515		1.797	

PDM refers to Pooled Data Model; FEM refers to Fixed Effect Mode; REM refers to Random Effect Model; Prob. refers to Probability; Adj. R2 refers to Adjusted R square; F-Stat. refers to F statistic; *, ** and *** Significant at 10%, 5% and 1% levels respectively.

Table 6: Results of Hausman test

Hausman specification test (Random vs. fixed effects)			
Equation: Untitled			
Test for correlated cross-section random effects			
Test summary	Chi-Sq. statistic	Chi-Sq. d.f.	Prob.
Cross-section random	5.928654	6	0.4312

5. CONCLUSIONS AND RECOMMENDATIONS

This study has empirically investigated the significance of Working Capital Management in Fuel and Energy Sector of Pakistan. The objective of this study was to find out the components of working capital having significant effect on the profitability and financial performance of fuel and energy sector of Pakistan. It has also aimed to focus on optimum level of working capital and to find out the relationship between profitability and independent variables.

Findings of present study concluded that the random effect model is the most appropriate method for this study and best model among other models (i.e. pooled data model and random effect model). Finding also indicates that performance of fuel and energy sector of Pakistan is positive related with company size and operating cash flow and their relationship with profitability is also statistically significant based on p values. In case of sales growth and quick ratio, their relation with profitability is positive but not significant. The value of coefficient of determinant shows 84% variation in Return on Assets explained by the independent variable. P value shows that overall random effect model is good fit, but the value of Durbin-Watson test not better as compare to than fixed effect model.

REFERENCES

- Abdual, R. (2007). Working capital management and profitability – Case of. *Int. Rev. Bus. Res. Papers*, 279-300.
- Appuhami, B. R. (2008). The impact of firms capital expenditure on working capital management: An empirical study across industries in Thailand. *International Management Review*, 8-21.
- Binti Mohamad, N. E. A., & Mohd Saad, N. B. (2010). Working capital management: The effect of market valuation and profitability in Malaysia. *International Journal of Business and Management*, 5(11), p140.
- Chatterjee, S. (2010). The impact of working capital management on the profitability of the listed companies. Available at SSRN: <http://ssrn.com/abstract=1587249>.
- Chatterjee, S. (2010). Impact of working capital management on the profitability of the listed companies in the London stock exchange. www.papers.ssrn.com/sol3/papers.cfm?abstract_id=1587249.
- Chiou, J. R., & Cheng, L. (2006). The determinants of working capital management. *Journal of American Academy of Business*, 10 (1), 149-155.
- Danuletiu, A. E. (2010). Working capital management and profitability: A case of Alba county companies. *Annales Universitatis Apulensis Series Oeconomica*, 364-374.
- Deloof, M. (2003). Does working capital management affects profitability of Belgian firms? *Journal of Business Finance and Accounting*, 30 (3), 573-587.
- Ganesan. (2007). An analysis of working capital management efficiency in telecommunication equipment industry. *Rivier Academic Journal*, 3 (2), 1-10.
- Hofman, E., & Kotzab, H. (2010). A supply chain-oriented approach of working capital management. *Journal of business Logistics*, vol 31, (2)
- Holmstrom B., & Tirole, J. (2011). Inside and outside liquidity. United State of America. Massachusetts Institute of Technology, 11-43.
- Horne, J. C., & Wachowicz, J. M. (2004). *Fundamentals of Financial Management* (12th Edition ed.). New York: Prentice Hall Publishers.
- Johnson, R., & Soenen, L. (2003). Indicators of successful companies. *European Management Journal*, 21 (3), 364-369.
- Kieschnick, R., Laplante, M., & Moussawi, R. (2006). Corporate working capital management: Determinants and consequences. Working Paper.
- Lazaridis, I., & Tryfonidis, D. (2006). Relationship between working capital management and profitability of listed companies in the Athens stock exchange. *Journal of Financial Management and Analysis*, 19 (1), 26-35.
- Long, M. S., Malitz, I. B., & Ravid, S. A. (1993). Trade credit, quality guarantees, and product marketability. *Financial Management*, 22 (4), 117-127.
- Martinez-Solano, P. J.-T. (2007). Effects of working capital management on SME profitability. *International Journal of Managerial Finance*, 3 (2), 164-177.
- Narware, P. C. (2004). Working capital and profitability - An empirical analysis. *International Journal Of Finance*, 31-78.
- Neab, M., & Noriza, B. (2010). Working capital management: The effect of market valuation and profitability in Malaysia. *International Journal of Business and Management*, 5 (11), 140-147.
- Nilsson, H. (2010). The effect of company characteristics on working capital management. Umeå School of Business.
- Nazir, T., & Afza, M. S. (2008). Working capital approaches and firm's returns in Pakistan. *Pakistan Journal of Commerce and Social Sciences*, 1, 25-36.
- Padachi, K. (2006). Trends in working capital management and its impact on firms' performance: An analysis of mauritian small manufacturing firms. *International Review of Business Research Papers*, 2 (2), 45-58.
- Pandey, I. (2005). *Financial Management* (9th ed.). New Delhi: Vikas Publishing.
- Raheman, A., & Nasr, M. (2007). Working capital management and profitability- A case of Pakistani firms. *International Review of Business Research Papers*, 3 (1), 279-300.
- Raheman, A., Afza, T., Qayyum, A., & Bodla, M. A. (2010). Working capital management and corporate performance of manufacturing

- sector in Pakistan. *International Research Journal of Finance and Economics*, 47, 151-163.
- Saghafi, & Hashemi, S. A. (2005). Analyze the relationship between operating cash flows and accruals, operating cash flow forecasting model. *Accounting and Auditing Review*, 38, 1-24.
- Samiloglu, F., & Demiraunes, K. (2008). The effect of working capital management on the firm profitability: Evidence from Turkey. *International Journal of Applied Economics and Finance*, 2 (1), 44-50.
- Sen, M., Koksal, C. D., & Oruc, E. (2008). Relationship between the efficiency of working capital management and company size. *Journal of Finance*, 522-531.
- Shah, S. M., & Sana, A. (2006). Impact of working capital management on the profitability of oil and gas sector of Pakistan. *European Journal of Scientific Research*, 15 (3), 301-307.
- Titman, S., Martin, J. D., & Keown, A. J. (2010). *Financial Management: Principles and Applications*. London: Prentice Hall.
- Wooldridge, J. M. (2002). *Econometric analysis of cross section and panel data*. Cambridge, MA: MIT Press.
- Zubairi, H. J. (2010). Impact of working capital management and capital structure on profitability of automobile firms in Pakistan. *Finance and Corporate Governance Conference*. Social Science Research Network.