

Inverted U Shaped Relation of Working Capital and Profitability Role of Cash Holdings; Whole Dilemma via Comparative Study of Pakistani Firms

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ABSTRACT— *Working capital is vital element for every business in economy for growth. This Study focuses on relationship between working capital and profitability including extractions of working capital's optimal level in both manufacturing and services sector considering 28 Pakistani Firms listing on Stock Exchange of Pakistan. In order to conduct comparative study 18 firms from sugar sector (manufacturing) and 10 from telecom sector (services) are selected. Moreover cash level is taken as moderator and study also includes comparison of firms having positive and negative cash levels for estimation of results. Panel data regressions and Driscoll & Kraay Standard Errors tests are used for evaluation of results. The results confirmed existence of inverted u shaped relation between working capital management and profitability in both sectors. Moreover the results for panel data regressions were significant for Telecom sector but insignificant for sugar sector considering moderator. Conclusively cash levels are dynamic component in working capital management.*

Keywords— Working Capital, Profitability, Cash levels, Inverted U shaped relation, Pakistan, Comparative Study

1. INTRODUCTION

The basis for growth and strong economy are set by those business concerns that aim for efficient management of both long term and short term assets. Most of the firms focus comprehensively on organization of long-term financial assets and investments which sidelines the significance of short term assets and liabilities. Nonetheless the recent situation of vague market dynamics and tumultuous financial markets has restricted external financing for working capital and highlighted the importance of short-term assets and liabilities management.

Working capital is the difference between current assets and current liabilities "Current assets include cash and those assets which can be converted into cash within a year for business operations" [1]. The obligations that become payable within accounting cycle of the business are known as current liabilities" [2].

The inefficiency of finance managers to manage current assets and liabilities in an appropriate way has resulted in closure of many businesses [3]. Working capital management (WCM) influences the profitability of the firm [4]. Working Capital Management is essential component which should be handled coherently for the endurance of the Business[5].

The introduction of China Pakistan Economic Corridor (CPEC) has given a real boost to economy of Pakistan after an epic situation in past. However persist impede in convalescence of health and education sector are apprehension and should be addressed appropriately. Working capital management is also important factor for emerging economy like Pakistan in current scenario. Although several studies have been conducted in past considering working capital and profitability relationship in different sectors of Pakistan but telecommunication and sugar sector still need exploration and for this purpose we have conducted study by selecting these two vibrant sectors from Pakistan.

Pakistan's Telecommunication sector is progressing speedily from last couple of years due to the introduction of 3G & 4G services. Although the forced bio matric system has decreased the total revenue last year but still it is the second highest contributor to Pakistan's Foreign Direct Investment (FDI) concerning services sector. The telecom industry has generated almost 333.2 Billion PKR for the period March to June 2017. Working capital Management in such fast growing sector is significant element that will elaborate how firms manage their short term assets to meet the obligation and how strong cash conversion cycle they possess that will impact on profitability. It has been observed by viewing

financials of telecommunication sector that firms have more investment in fixed assets as compared to current assets, so firms need to focus on management of working capital appropriately for growth.

Sugar industry is agro based second largest industry from manufacturing sector after textile industry in Pakistan. Sugar industry is contributing 1.9% to GDP with almost 6 million metric ton production in last year. The production of Sugar industry in Pakistan is seasonal based on availability of raw material and usually remain available for five months in a year so inventory and working capital management are significant in this regard. Moreover nearly 70 percent of total assets consist of current assets so it also highlights significance working capital management for growth of firms.

This study investigates the impact of working capital management (WCM) on profitability by taking cash levels as moderator. Moreover it includes estimation of relationship between working capital and profitability by dividing firms in two segments based on positive and negative cash levels for both sugar (manufacturing sector) and Telecom (services sector) sector. This type of study has not been conducted in Pakistan and especially working capital of telecom sector has not been investigated. It is also a comparative study comparing two different sectors considering their nature telecom sector is based on services while sugar sector is based on manufacturing. Comparative study has been conducted to know about the nature of relationship between working capital and profitability that will be beneficial for local and foreign investors and other stakeholders to understand, invest and manage their investment portfolio.

The key objectives of the study are:

To examine the impact of WCM on firms profitability as comparison of services and Manufacturing firms

To find out the optimal level of Working Capital for Telecom and Sugar sector in Pakistan

To investigate the impact of working capital on profitability by taking cash levels as moderator

To measure impact of working capital on profitability for the firms having negative cash holdings and positive cash holdings separately for both sectors individually

Inline of above cited objectives following hypothesis are established:

- H01:** Working capital and profitability of firms have no significant relation with each other.
- HA1:** Working capital and profitability of firms have significant relation with each other
- H02:** There is no inverted U shape relation between WCM and Profitability of firms
- HA2:** There is inverted U shape relation between WCM and Profitability of firms
- H03:** There is no impact of cash holdings on relationship of working capital and profitability
- HA3:** There is impact of cash holdings on relationship of working capital and profitability
- H04:** Working capital of firms has significant relation with profitability will not significantly differ based on its level of cash (positive or negative)
- HA4:** Working capital of firms has significant relation with profitability will significantly differ based on its level of cash (positive or negative)

2. LITERATURE REVIEW

Working capital management is the process of managing current assets & current liabilities of the company [6]. If firm's current assets are in excess of current liabilities then firm will reflect positive working capital and vice versa. [7]. Another study measuring impact of working capital on profitability with the help of corporate governance by taking 115 Tehrani firms registered in Stock exchange depicted that corporate governance plays indispensable role in working capital productivity [8]. Firms can ameliorate profitability by stubbing its cash conversion cycle and can enhance its value by diminishing receivables and inventory level [9]. Another study on relationship [10] of working capital and its coalition upon paper mill sale of India using Karl Pearson's model of correlation revealed direct relationship between working capital and sales. Further in another study Inverse relationship has been identified between working capital and profitability by taking listed companies of KSE for 6 years in Pakistan by using panel least square and correlation method [11]. Singhania and Mehta also conducted study measuring working capital's Impact on the profitability, In this regard sample was taken from Asian firms results were estimated by analytical modeling technique and model was presented by using generalized methods of the moments. Results indicated that each country need to adjust their working capital as per their global markets and environment in order to ascertain optimal working capital [12]. Another study conducted on estimation of relationship between working capital and profitability considering Small and Medium Enterprises from Spain considering data set ranging from 1996-2002 indicated that improved working capital management enhances profitability of firms [13]

2.1. Cash Holdings

A study conducted by Keynes revealed that retention of excess cash for short term obligation of the firm will reduce transaction cost as if the firm has no/less cash for its short term payments than firm need to borrow from other financial institutions resultantly will enhance the interest payments for firms [14]. A comparative study involving firms having different cash levels showed that operating performance of the firms are better who holds more assets in cash form as compared to high fixed asset firms [15].

Similarly Mikkleson and Partch also examined the operating performance and some other characteristics of firms that held more of their assets in cash. The results of the study showed that operating performance of the firms that hold high cash is greater and vice versa [16]. [17] The determinants of cash holding behavior were also studied by taking 164 listed firms of Turkey as sample for the period of 10 years. Results depicted that firms of the Turkey hold 7.3% cash as per total assets while larger firms tends to hold more cash compared to smaller firms.

Although many studies have been conducted on working capital management and profitability but considering Pakistan this area still needs more exploration specially comparing telecommunication Sector and sugar sector with effect of cash holdings.

3. RESEARCH METHODOLOGY

This study measures the impact of working capital on profitability of firm by taking cash holding as moderator, to examine the impact sample data is collected from the sugar companies listed in the stock exchange of Pakistan for the period of 5 years. Secondary data was collected from financial data published by State Bank of Pakistan in Financial Statement Analysis (FSA) for the period of 2011-2015. Total 34 companies were taken for review initially but 19 companies are taken for analysis while remaining firms were dropped due to incomplete and insufficient data.

For telecommunication sector all public and private companies in Pakistan are selected for the period of five years. Data is collected from the annual reports published in Security and Exchange Commission of Pakistan (SECP) for the period of 2011-2015.

3.1. Data Methodology

To examine the impact and to justify the results Panel data regression is used. Moreover Fixed and Random effect method is used to remove the impact of correlated errors further Hausman test is used to choose from two of them. Further panel data regression has been used to measure the effect of cash holding as moderator in two different sets for both sectors. Driscoll and Kraay Standard Errors has been used to remove unobserved errors that influence the errors by using statistical software STATA.

3.2. Variables

To measure the impact of working capital on profitability of firms following variables are considered.

3.3. Dependent Variable

To evaluate the performance of firms Return on Assets is (ROA) taken as dependent variable where ROA is calculated as ratio of Earning Before Interest Tax and Depreciation (EBITDA) and Total assets [18]

$$ROA = \frac{EBITDA \text{ (Earnings before Interest, taxes, Depreciation)}}{\text{Total Assets}}$$

3.4. Independent Variables

To measure the Working Capital Management (WCM) different components of WCM are taken as independent variables.

3.4.1.1. Working Capital Rate

Working Capital Rate (WCR) is taken as component of independent variable which is calculated as ratio of working capital and sales while working capital is difference between current assets and current liabilities [19].

$$\text{Working Capital Rate} = \frac{\text{Current Assets} - \text{Current Liabilities}}{\text{Total Sales}}$$

3.4.1.1.1. Accounts Receivable Rate

A suitable credit policy is very vital before offering credit [19]. Accounts receivable rate (ARR) is also taken as component of independent variable and measured as ratio of accounts receivable and sales.

$$\text{Accounts Receivable rate} = \frac{\text{Accounts Receivable}}{\text{Sales}}$$

3.4.1.1.2. Accounts Payable Rate

Account payable rate is taken as independent variable which is proxy of accounts payable, for calculation of Accounts Payable Rate (APR) we divide accounts payable by total sales [19].

$$\text{Accounts payable Rate} = \frac{\text{Accounts Payable}}{\text{Sales}}$$

3.4.1.1.3. Inventory Rate

Inventory of the firm varies as per the nature of business some firms maintain high level of inventories in order to meet the requirement and vice versa. Working capital manager should adopt specific approach in order to manage inventory properly. Moreover Just in Time (JIT) approach is the best among all, as under this approach goods are produced and delivered when required instead of producing them before demand [20]. In our study we computed inventory Rate (INVR) as a ratio of total inventory and sales

$$\text{Inventory Rate} = \frac{\text{Total Inventory}}{\text{Sales}}$$

3.4.1.2. Size

Firm size is also an important component with respect to working capital management. Working capital varies from firm to firm depending on its size. It can be determined by taking natural Log of Total Asset [21]. So in our study Firm size will follow the same pattern

$$\text{Size} = \text{Log (Total Assets)}$$

3.4.1.3. Sales Growth

Growth of the firm is dependent on sales. Sales growth of the firm is the ratio of change in sales and last year's sale [22].

$$\text{Sales Growth} = \frac{\text{Current year Sales} - \text{Previous Year Sales}}{\text{Previous Year Sales}}$$

3.4.1.4. Leverage

Leverage represents the amount of assets funded by external debts and in most of the studies it has been taken as control variable [22] [23]. Leverage is measured as a ratio of total liabilities and total Assets[22] [23].

$$\text{Leverage} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

3.4.2. Moderator (Cash Levels)

Firm's cash levels are used as moderator / interaction effect in order to see that how cash holdings can affect the working capital and profitability of the firm in financial aspect. Firm's cash level explains that how much cash firm holds and it needs to hold enough cash in order to meet short term obligations. Firm cash levels are measured as follow [21]:

$$\text{Cash Levels} = \frac{\text{Cash} + \text{Cash equivalent} - \text{Current Debts}}{\text{Total Sales}}$$

4. DATA ANALYSIS AND RESULTS

As study examine the impact of working capital on profitability it also investigates moderator's effect by taking cash holdings as moderator for services firms (telecom sector) and manufacturing firms (sugar sector) of Pakistan. Dependent variable (profitability) is calculated through Return on Asset, while accounts payable, accounts receivable and inventory rate are proxy for working capital collectively. Descriptive analysis, Correlation analysis and additional Panel data regression techniques were used to access the empirical data by using STATA.

4.1. Descriptive Analysis

Descriptive analysis is conducted to check the tendency of working capital and profitability for the sample collected. It gives basic information regarding feasible form and normality of data set which includes standard deviation, minimum value and maximum value of the variables. Descriptive analysis of 18 firms from sugar sector are depicted in Table 4.1.1 while Table 4.1.2 includes 10 firms from telecommunication sector of Pakistan for the period of 2011-2015. Both tables confirm the feasibility or normality of data set.

Table 4.1 Sugar Sector

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	90	0.0885	0.0893	-0.1525	0.4008
WCR	90	0.0147	0.2293	-1.3420	0.5121
CSL	90	0.0439	0.2995	-0.9687	0.9484
INVR	90	0.1953	0.1527	-0.0802	0.9049
ARR	90	0.0278	0.0547	0.00002	0.4110
APR	90	0.1232	0.1537	0.0029	1.0465
LEV	90	0.6094	0.1890	0.11818	1.0033
GRW	90	0.0415	0.2842	-0.7978	1.0057
SIZE	90	6.9819	1.1327	5.8863	9.6798

Table 4.2 Telecom Sector

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	50	0.0716	0.0885	-0.1525	0.3582
WCR	50	0.4947	0.8983	-2.2376	2.6515
CSL	50	0.0823	0.3054	-0.5814	0.9484
INVR	50	0.2461	0.1400	0.0013	0.6661
ARR	50	0.0428	0.0732	-0.0119	0.4110
APR	50	0.3092	0.4985	0.0086	2.2613
LEV	50	0.6640	0.1382	0.3681	1.0033
GRW	50	0.0355	0.2997	-0.7978	0.9365
SIZE	50	7.4750	1.3003	6.3899	9.6798

4.2. Correlation Matrix

Table 4.2.1 explains correlation stats of sugar sector and indicates strong positive relation between ROA and WCR while weak positive relation of ROA with CSL, INVR, ARR and GRW has been observed. There is strong negative relation between ROA and LEV while weak inverse relation of ROA with APR and SIZE is experienced. The correlation among independent variables is weak as all the variables are showing values of less than 0.5. Similarly Table 4.2.2 explains correlation stats of telecommunication sector which also confirms weak correlation among independent variables as all values are less than 0.5 but correlation is not an authentic technique to confirm the significance of the results for robust findings panel data regression will be used.

Table 4.2.1 Correlation of Sugar Industry

	1	2	3	4	5	6	7	8	9
1 ROA	1								
2 WCR	0.4647*	1							
3 CSL	0.1786*	0.0412	1						
4 INVR	0.0684	-0.0224	-0.0214	1					
5 ARR	0.2451*	0.0187	-0.0065	0.0098*	1				
6 APR	-0.1296	-0.03346*	-0.0553	0.0527	-0.0072	1			
7 LEV	-0.4130*	-0.4245*	-0.0212	0.3270*	0.0501	0.1693	1		
8 GRW	0.2059*	0.2577*	0.0644	-0.2678*	0.0085	-0.2818*	-0.0668*	1	
9 SIZE	-0.1266	-0.1063	-0.1750*	0.0716	-0.1576	0.3377*	0.2228*	0.0028*	1

**Significant at the level of 1% or 0.01

*Significant at the level of 5% or 0.05

Table 4.2.2 Correlation Matrix of Telecom Industry

	1	2	3	4	5	6	7	8	9
1 ROA	1								
2 WCR	-0.2788*	1							
3 CSL	-0.2043	-0.0059	1						
4 INVR	-0.0002	0.1291	0.2241	1					
5 ARR	0.3785*	0.0242	-0.1715	0.0885*	1				
6 APR	-0.3670*	0.1558	0.4975*	0.3832*	-0.1543	1			
7 LEV	-0.3507*	0.2192	-0.11	0.0316	0.3315*	-0.0838	1		
8 GRW	0.219	-0.0793	0.0829	-0.0674	0.1016	-0.0515	-0.1704*	1	
9 SIZE	-0.2342	0.0488	0.1828	0.2227	-0.2649	0.3759*	-0.0795	-0.015	1

**Significant at the level of 1% or 0.01

*Significant at the level of 5% or 0.05

Further in Table 4.2.3 and Table 4.2.4 variance inflation factor (VIF) of sugar sector and telecommunication sector has been gauged respectively to ensure the absences of Multicollinearity among the independent variables. In both sectors the value of VIF is less than 2 which confirms that there is no multicollinearity [24].

Table 4.2.3 VIF of Sugar Sector

Variable	VIF	1/VIF
APR	1.26	0.792301
SIZE	1.22	0.818536
INVR	1.21	0.826051
LEV	1.19	0.837271
GRW	1.19	0.839488
ARR	1.04	0.965116
Mean VIF	1.19	

Table 4.2.4 VIF of Telecom Sector

Variable	VIF	1/VIF
APR	1.33	0.7508
ARR	1.28	0.7800
SIZE	1.25	0.7972
INVR	1.23	0.8114
LEV	1.18	0.8454
GRW	1.07	0.9337
Mean VIF	1.23	

Further normal distribution of data and skewness of dependent variable has also been verified as figure 1 & 2 clearly depicts the absence of skewness in dependent variable and normal distribution of data for sugar and telecommunication sector respectively.

Figure 1 Sugar Sector

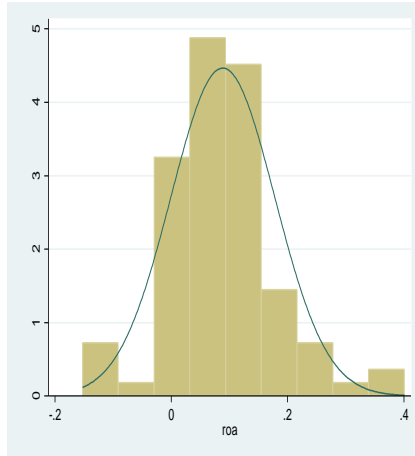
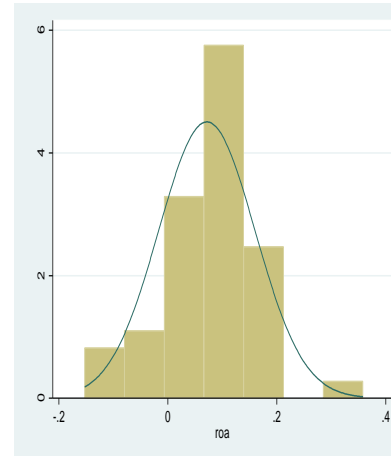


FIGURE 2 Telecom Sector



4.3. Panel Data Regression

Table 4.3.1 Panel data estimation for sugar sector indicates significant relationship between profitability as value of first coefficient is 0.2143499 with p value 0 at 1% significant level, so null hypothesis (H01) will be rejected while square of working capital rate the second coefficient is 0.14111 with p value of 0.019 at 5% level of significance confirms an inverted u shaped relationship of working capital with profitability, so null hypothesis (H02) will also be rejected. Additionally there is significant and positive relationship between profitability and growth while leverage and size are insignificant. The value of R square is .53 shows that overall model is good fit at 1% significance level.

$$ROA = \beta_0 + \beta_1 WCR + \beta_2 WCR^2 + \beta_3 LEV + \beta_4 SIZE + \beta_5 GRW$$

Table 4.3.2 panel data estimation for telecom sector indicates negative and insignificant relationship of working capital to profitability as value of coefficient is -0.0128 with p value 0.322 so alternate hypothesis (HA1) will be rejected while square of working capital the second coefficient is -0.1060 with p value of 0.03 at 5% level of significance confirms an inverted u shaped relationship of working capital with profitability, so null hypothesis (H02) will be rejected. Additionally leverage and size are negatively related to profitability while Leverage has significant but size has insignificant impact on profitability. Moreover growth has positive but insignificant impact on profitability. The value of R square is 0.32 which is not much good but under significance level indicates dependent variable can create variance in model.

Table 4.3.1 Regression Sugar Sector

ROA	Coef.	Std. Err.	T	P>t
WCR	0.2143	.0542	3.95	0
WCR2	0.1411	.0589	2.39	0.019
LEV	-0.0755	.0516	-1.46	0.147
GRW	0.0550	.0305	1.81	0.075
SIZE	-0.0046	.0072	-0.64	0.523
_cons	0.1543	.0547	2.82	0.006
R-Square	0.5298			

**Significant at the level of 1% or 0.01

*Significant at the level of 5% or 0.05

Table 4.3.2 Regression Telecom Sector

ROA	Coef.	Std. Err.	T	P>t
WCR	-0.0128	0.0127	-1	0.322
WCR2	-0.1060	0.0472	-2.25	0.03
LEV	-0.1683	0.0833	-2.02	0.049
GRW	0.0058	0.0409	0.14	0.886
SIZE	-0.0161	0.0084	-1.91	0.063
_cons	0.3202	0.0876	3.65	0.001
R-Square	0.320			

Although panel data limits the heterogeneity that minimizes the biased outcomes [25] but the chief issue in panel data is that it may contain biased cross sectional characteristics causing correlation in errors. So Fixed and Random effect models are used to check the cross sectional characteristics biasness. Fixed effect undertakes that cross-sectional characteristics are fixed whereas random effect ensures randomized impact of these characteristics on model. In the nutshell these techniques enhances estimation power of the model.

Table 4.3.3 Fixed and Random Effect Model for Sugar Sector

FIXED EFFECT					RANDOM EFFECT				
ROA	Coefficient.	Std. Err.	T	P>t	ROA	Coefficient	Std. Err.	z	P>z
WCR	.2152	.0810	2.65	0.01	WCR	0.1677	0.0595	2.82	0.005
WCR2	.1670	.0758	2.2	0.03	WCR2	0.1206	0.0609	1.98	0.048
LEV	.0057	.0787	0.07	0.94	LEV	-0.0660	0.0606	-1.09	0.276
GRW	.0507	.0261	1.94	0.06	GRW	0.0586	0.0259	2.26	0.024
SIZE	-.2423	.0976	-2.48	0.02	SIZE	-0.0082	0.0114	-0.72	0.474
_cons	1.763	.6735	2.62	0.01	_cons	0.1746	0.0827	2.11	0.035
R- Square			51.04		R- Square			49.62	
F-Statistics			0.001		F-Statistics			0.0005	

**Significant at the level of 1% or 0.01

*Significant at the level of 5% or 0.05

Table 4.3.4 Fixed and Random Effect Model for Telecom Sector

Fixed Effect Model					Random Effect Model					
ROA	Coef.	Std. Err.	t	P>t	ROA	Coef.	Std. Err.	z	P>z	
WCR	0.0018	0.0110	0.17	0.867	WCR	-0.0010	0.0108	-0.1	0.92	
WCR2	-0.0985	0.0402	-2.45	0.019	WCR2	-0.0934	0.0391	-2.39	0.017	
LEV	-0.1233	0.0911	-1.35	0.185	LEV	-0.1508	0.0839	-1.8	0.073	
GRW	0.0102	0.0388	0.27	0.792	GRW	0.0277	0.0352	0.79	0.432	
SIZE	-0.2438	0.1075	-2.27	0.03	SIZE	-0.0210	0.0165	-1.27	0.203	
_cons	1.9840	0.8063	2.46	0.019	_cons	0.3370	0.1394	2.42	0.016	
R- Square				37.04	R- Square				35.62	
F-Statistics				0.001	F-Statistics				0.0005	

**Significant at the level of 1% or 0.01

*Significant at the level of 5% or 0.05

Table 4.3.5 Hausman Test Sugar Sector

chi2(5) =	
=	11.13
Prob>chi2 =	0.0488

Table 4.3.6 Hausman Test Telecom Sector

chi2(5) =	
=	10.03
Prob>chi2 =	0.0328

Table 4.3.5 & Table 4.3.6 indicate the model assessment for which Hausman test is used to determine the appropriate model from fixed and random effect model outcomes from sugar and telecom sector respectively. Hausman test where chi-square is significant at 5% shows that Fixed effect model is better method for evaluation of results as probability value is 0.0488 for sugar sector and 0.0328 for telecom sector which is less than 0.05 so fixed effect model will be used.

The outcomes of fixed effect model for sugar sector in table 4.3.3 indicate that model is good fit at 1% of significance R-Square is 51% confirms the power of dependent variable to change the model. The probability value for WCR, WCR2 and size is less than 0.05 confirming significant while LEV and GRW are insignificant to profitability[19]. WCR's coefficient value is 0.2152 confirming positive while SIZE's coefficient value is -0.2423 indicating negative relationship with profitability. Moreover the model confirms the existence of inverted U shape relation between working capital and profitability [26].

The results of fixed effect model for telecom sector in table 4.3.4 indicate that model is good fit at 1% of significance while R-Square is 37.04% confirms the power of dependent variable to change the model. Although WCR is insignificant and positively related to profitability but WCR2 confirms the significant relation as p value is less than 0.05 it also highlights the existence of inverted u shape relationship between working capital and profitability [26]. Further LEV and GRW are insignificant to profitability while Size is significant and positively related to profitability of the firm as P value is 0.03 which is less than 0.05.

Table 4.3.7 Driscoll and Kraay Standard Errors for Sugar Sector

DRISCOLL/KRAAY				
ROA	Coef.	Std. Err.	T	P>t
WCR	0.2064441	0.0651535	3.17	0.034
WCR ²	0.1594627	0.048503	3.29	0.03
LEV	-0.0061969	0.0791571	-0.08	0.941
GRW	0.0506184	0.0084277	6.01	0.004
SIZE	-0.2295107	0.081755	-2.81	0.048
cons	1.681287	0.5610299	3	0.04

Table 4.3.8 Driscoll and Kraay Standard Errors for Telecom Sector

DRISCOLL/KRAAY				
ROA	Coef.	Std. Err.	t	P>t
WCR	-0.0128	0.00987	-1	0.282
WCR2	-0.1060	0.03278	-2.25	0.02
LEV	-0.1683	0.0755	-2.02	0.029
GRW	0.0058	0.0250	0.14	0.786
SIZE	-0.0161	0.0064	-1.91	0.043
_cons	0.3202	0.0758	3.65	0.001

In table 4.3.7 Driscoll and Kraay standard errors for sugar sector and in Table 4.3.8 for telecom sector are used to remove unobserved errors affecting the independent variable which also set basis for change in dependent variable. Driscoll and Kraay errors are extremely helpful more significant and refined results as p values indicating better results. Further it also minimizes correlation among the data Driscoll & Kraay [27].

4.4. Interaction Term (Cash Holdings)

In further analysis cash levels of the firms are taken as moderating variable to measure impact of working capital on profitability. For this process an interaction variable is created (WCR*CSL) by multiplying working capital rate (Independent Variable) with Cash Levels forming moderator and included the in regression. Impact of working capital on profitability by taking cash levels as moderator for sugar sector and telecom sector in table No.4.4.1 and 4.4.2 respectively has been gauged.

Table 4.4.1 Interaction Term Sugar Sector

ROA	Coef.	Std. Err.	T	P>t
WCR	0.1259	0.0409	3.08	0.003
WCR*CSL	0.1396	0.1819	0.77	0.445
LEV	-0.1145	0.0503	-2.30	0.026
GRW	0.0345	0.0300	1.15	0.254
SIZE	-0.0016	0.0075	-0.2	0.826
_cons	0.1662	0.0579	2.87	0.005

**Significant at the level of 1% or 0.01

*Significant at the level of 5% or 0.05

Table 4.4.2 Interaction Term Telecom Sector

ROA	Coef.	Std. Err.	T	P>t
WCR	-0.049	0.0176	-2.79	0.008
LEV	-0.181	0.0818	-2.22	0.032
SIZE	0.0478	0.0367	1.3	0.2
GRW	-0.013	0.0084	-1.63	0.111
WCR*CSL	0.0690	0.0281	2.45	0.018
_cons	0.3142	0.0869	3.61	0.001

**Significant at the level of 1% or 0.01

*Significant at the level of 5% or 0.05

The end results of sugar sector in table 4.4.1 indicates that there is no significant impact of cash levels, so null hypothesis (H03) will be accepted while measuring impact of working capital on profitability. Further WCR has significant and positive impact on profitability as P value of 0.003 which is less than 0.05 while Size and GRW are insignificant. Leverage has negative but significant impact on profitability as P value is 0.026 which is less than 0.05 and beta coefficient is -0.1145 confirming negative association between the firms LEV and ROA

Considering table 4.4.2 there is significant impact of working capital on profitability taking cash holdings as moderator, so null hypothesis (H03) will be rejected as p value 0.018 which is less than 0.05 in telecom sector of Pakistan. Further WCR and LEV has negative and significant impact on profitability while SIZE and GRW are insignificant as p value is more than 0.05.

4.5. Interaction Term Cash Level +VE / -VE

Cash holdings have been observed as positive and negative in different firms so impact of working capital on probability has been measured separately for the firms having positive cash holdings and negative cash holdings.

Table 4.5.1 Positive / Negative Cash Level in Sugar Sector

Positive Cash level					Negative Cash Level				
ROA	Coef.	Std. Err.	T	P>t	ROA	Coef.	Std. Err.	T	P>t
WCR	0.521	0.0177	3.08	0.001	WCR	-1.086	0.0558	3.08	0.187
LEV	-0.1108	0.0258	-2.3	0.124	LEV	-0.1789	0.1416	-2.27	0.707
GRW	-0.2486	0.5748	-1.36	0.254	GRW	0.5148	0.0492	1.15	0.254
SIZE	-0.1816	0.0789	-0.2	0.826	SIZE	0.4178	0.0547	-0.22	0.105
_cons	1.1370	0.0561	2.87	0.005	_cons	1.6719	0.0296	2.87	0.003

Table 4.5.1 for sugar sector indicates positive and significant relation between working capital and profitability while LEV, GRW and SIZE are negatively and insignificantly related to profitability for firm having positive cash levels. On the other hand working capital, leverage, GRW and size all are insignificant to profitability for the firms having negative cash holdings. Considering the results null hypothesis (H04) will be rejected as outcomes differ for impact of working capital on profitability in sugar sector of Pakistan for firms having positive and negative cash holding.

Table 4.5.2 Positive / Negative Cash Level in Telecom Sector

Positive Cash Level					Negative Cash Level				
ROA	Coef.	Std. Err.	T	P>t	ROA	Coef.	Std. Err.	T	P>t
WCR	-0.0074	.01538	-0.49	0.63	WCR	-0.0422	.01898	-2.22	0.048
LEV	-0.2476	.11723	-2.11	0.043	LEV	-0.1495	.09377	-1.59	0.139
GRW	0.0240	.05438	0.44	0.662	GRW	0.0734	.04084	1.80	0.1
SIZE	-0.0304	.01073	-2.83	0.008	SIZE	0.0222	.01194	1.86	0.09
_cons	0.4594	.11737	3.91	0.001	_cons	0.0555	.10839	0.51	0.618

Table 4.5.2 for telecom sector indicates that working capital and size are insignificant to profitability while leverage and size are significant to profitability as p value is less than 0.05 considering firms having positive cash levels. On the contrary working capital is significant and negatively related to profitability while LEV, GRW and size are insignificant to profitability, so here null hypothesis (H04) will also be rejected as results differ for impact of working capital on profitability in sugar sector of Pakistan for firms having positive and negative cash holding.

5. CONCLUSION

The study has formidable significance in literature as well as in business management as working capital of the firm is important aspect in a country like Pakistan. Study investigates the impact of working capital on profit of Pakistan’s Sugar sector (manufacturing sector) and Telecom sector (service sector) firms. Moreover such type of study is unique and has been conducted first time as it is a comparison between manufacturing and services sector further in past studies of Pakistan the impact of firm’s cash levels were not considered while evaluating working capital relationship to profitability of the firms. Additionally the study also identifies the optimal level of working capital where profit rate is highest.

Over all this study divulges the affirmative relationship between working capital and profitability which means the enhanced working capital management will cause an increase in profit margins. Although the result for telecom sector is insignificant [28] but for sugar sector working capital is significant to profitability [22] [29] [19]. Moreover it also confirms the existence of inverted U shape relationship between working capital and profitability for both Sugar (manufacturing sector) and Telecom sector (services sector) [30].

The impact of working capital management on profitability has also been measured by taking cash levels as moderator for both manufacturing and services sector as in many previous studies impact of cash levels has not been given importance or ignored. Although in sugar (manufacturing sector) cash levels have no significant impact on profitability while in telecom sector cash level affects profitability significantly considering cash levels as moderator. Resultantly cash holding is important element for working capital and highlights the importance of cash generating capabilities for the Telecom sector.

Lastly impact of working capital on profitability has also been gauged by splitting firms on the bases of their cash levels positive or negative as operational and functional structure of the firms are distinctive. The findings of sugar sector indicates that firms having positive cash holding has significant impact of working capital on profitability while firms having negative cash level reveal insignificant impact of working capital on profitability for sugar sector. Telecom sector indicates that firms having positive cash holding has insignificant impact of working capital on profitability while firms having negative cash level reveal significant impact of working capital on profitability. So firms with negative and positive cash levels have different relationship between working capital and profitability

Conclusively it is a detailed study on working capital and profitability relationship shows that good performance of the firms is based on their efficient working capital management and efficiency in controlling their financial and operational aspect as the cash level also plays vital role as it can change operations of a firm in manufacturing sector. Moreover firms with positive and negative cash levels have different impact while measuring relationship between working capital and profitability. Firms having negative cash level due to unmanaged current debts can be risky and have negative impact on performance of the firms. The study is vital for financial managers from manufacturing and services sector. It is also very important for Government and all stakeholders in manufacturing and services sector firms in

Pakistan. Going global this study will attract foreign investors as they will invest by viewing working capital management of firms in both sectors and comparative study will also assist them for diversified investment portfolio management.

The study should include firms from other countries in order to evaluate more generalized impact and results for diversified economies. Moreover the study should include macro-economic factors Inflation, interest rates and other factors which may affect the outcomes. Lastly various small firms and firms from other sectors holding more cash should be included in order to ascertain more clear impact on profitability.

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APPENDICES

LIST OF SUGAR INDUSTRIES	LIST OF TELECOM INDUSTRIES
Al-Abbas Sugar Mills Ltd.	Pakistan Telecommunication Co. Ltd.
Al-Noor Sugar Mills Ltd.	Telecard Ltd.
Ansari Sugar Mills Ltd.	Worldcall Telecom Ltd.
Baba Farid Sugar Mills Ltd.	Wateen Telecom Ltd.
Chashma Sugar Mills Ltd.	TRG Pakistan Ltd.
Colony Sugar Mills Ltd.	Mobilink
Dewan Sugar Mills Ltd.	Ufone
Faran Sugar Mills Ltd.	Warid
Habib - ADM Ltd.	Zong
Habib Sugar Mills Ltd.	Telenor
Haseeb Waqas Sugar Mills Ltd.	
Husein Sugar Mills Ltd.	
JDW Sugar Mills Ltd.	
Khairpur Sugar Mills Ltd.	
Kohinoor Sugar Mills Ltd.	
Mehran Sugar Mills Ltd.	
Mirpurkhas Sugar Mills Ltd.	
Sakrand Sugar Mills Ltd.	