

## **Effects of Working Capital Management on Firm Performance: An Empirical Study of Non-financial listed Firms in Pakistan**

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### **Abstract**

The purpose of this paper is to investigate whether working capital management affect the performance of non-financial listed firms in Pakistan. Panel econometric technique namely pooled ordinary least squares is used to estimate the relationship between working capital and firm performance. Data were taken from the annual reports of non-financial firms listed on the Karachi Stock Exchange Pakistan during 2007-2010. Three performance measures namely gross profit margin, return on asset, and return on equity are used to estimate the impact of working capital variables such as average age of inventory, average collection period, and average payment period. Empirical results indicate that average age of inventory is positively related to gross profit margin and return on asset, whereas it is negatively related to return on equity but the relationship is found insignificant. Although the relationship is insignificant but positive sign may be because of increasing sales which leads to higher profit and thus fewer inventories. Average collection period is significantly and positively related to gross profit margin and return on assets. This finding shows that management of receivables has a positive impact on firm performance. Moreover, it confirms the prediction that reduction in average collection period improves the accounts receivable turnover which in turn positively affects the firm's profitability. Although average collection period is positively

related to return on equity but the relationship is found insignificant. Average payment period is positively related to gross profit margin and negatively related to return on asset but the relationship is found insignificant. However, average payment period is positively and significantly related to return on equity. This finding indicates that stretching the payment period increases the firm's ability to utilize creditors' money in their operation which in turn enhances the firm value. As far as control variables are concerned, a significant positive relationship is observed between firm size and two performance measures such as gross profit margin and return on asset. Alternatively, firm size is negatively related to return on equity but the relationship is found insignificant. Leverage is negatively and significantly related to gross profit margin and return on asset. Alternatively, an insignificant and positive relationship is observed between leverage and return on equity. The negative relationship between leverage and profitability confirms the predictions of the pecking order theory which suggests that profitable firms tend to borrow less due to their ability generate funds from internal sources. Finally, firm age is negatively related to gross profit margin and return on asset whereas it is positively related to return on equity. However, the relationship is found insignificant. In sum these empirical findings indicate that management of working capital has material affects of firm performance.

**Keywords:** Working capital, gross profit margin, return on asset, return on equity, non financial firms, non-financial firms.

## 1. Introduction

Corporate finance mostly focused on the long term financial decision according to previous research. Researchers mostly emphasize on studies of analyzing capital structure, investment, company valuation or dividends, among different topics. But also focus on the investment in short term assets, and the resources employed with maturities within one year, which indicate the major share of items of firm's balance sheet. In fact, in this current study, current assets of non financial firms present 69 percent of their assets, and at the same time their current liabilities stand for more than 52 percent of their liabilities. Working capital management is very vital because of its outcome on the company performance and risk, and consequently its worth (Smith, 1980). Working capital management plays a very important job in tradeoff between firm's performance and risk. Decision that engages improving profitability also increase the risk, and alternatively, decision that engages on risk decreasing will also decrease profitability. Gitman (1974) propose that cash conversion cycle was very important constituent in working capital management. Actually, decision about how much spend in inventory and how much invest in customer, and how much accrued accept from supplier, are largely impact on the company cash conversion cycle, which point out the average number of days between the date when the company starts paying its supplier and the date when it begin to gather payment from its customer. Earlier research have focused on the cash conversion cycle to look at whether shortening this cycle has positive or negative effects on performance. Empirical proof points out that working capital management and firm's performance in general hold up the fact or not that violent working capital policies get better profitability (Jose et al., 1996; Shin and Soenen, 1998; for US; Deloof, 2003; for Belgian firms; Wang (2002) for Japanies and Taiwan firms). This demonstrates that working capital investment policies is to perk up profitability. The companies show assets in the balance sheets, and liabilities are owned by it. The difference between total assets and total liabilities of companies equals to net value. Net value is equal to shareholder equity. Assets, liabilities and net worth values are computed at historical costs. Generally Accepted Accounting

Standards (GAAP) requires this. In Pakistan, these standards are mainly stood on American and British rules, although international accounting standards (IAC) are also gaining in importance as orientation criteria. The security and Exchange Commission of Pakistan (SECP) modifies accounting process time to time.

These previous researches have support their analysis on larger firms. However, the management of current assets and current liabilities is very important in the case of non financial firms. Major companies assets are represents in the form of current assets. Also short term liabilities are one of their big resources of external finance because they face problems in achieving funding in the long term capital markets (Petersen and Rajan, 1997) and the financing problems that they encounter (Whited, 1992; Fazzari and Petersen, 1993). In this respect, Elliehausen and Wolken (19993), Petersen and Rajan (1997) and Danielson and Scott (2000) explain that non financial firms of Pakistan use vendor financing when they have run out of debt. Thus, efficient working capital management is very important for smaller firms (Peel and Wilson, 1996).

The objective of the current work is to provide empirical evidence about the effects of working capital management on profitability for a panel data of 48 non financial firms during the periods 2007-2010. This work divides the literature in two ways. First, no such evidence exists for the case of non financial firms in previous studies. We select a sample of Pakistani SME firms was studied that run within so called continental model, that is characterized by its less developed capital market (La Porta et al., 1997), and by the trend that resources are distributed through financial intermediaries (Pampilion, 2000). All this supports that Pakistani non-financial firms have low alternative sources of external finance available, which makes them dependent on short term fund in general, and on trade credit particular. As Demigurc-Kunt and Maksimovic (2002) explain that firms operate in countries with good developed banking system operate high trade credit to their customer, and at the same time they receive more finance from own supplier. The objective of working capital management is to ensure that the relationship show in the analysis carried out is due to the effects of the firm performance on working capital management. By reducing working capital investment (aggressive policies) would positively affect the profitability of the company, if we reduce the proportion of its total asses in the form of current assets. Alternatively, to earlier belief, investing highly in working capital (conservative policy) may also affect in high profitability. Most empirical evidence relating to working capital management and profitability support the aggressive working capital policies because it increases profitability of firms.

Purpose of this study is that this area is almost untouched in Pakistan or very little research has been done. This research is focusing on working capital management and its effects of profitability for a sample of Pakistani non financial firms. Afza and Nazir (2009) made an attempt in order to investigate the traditional relationship between working capital management policies and a firm's performance for a sample of 204 non financial firms listed on Karachi Stock Exchange (KSE) during the period of 1998-2005. The study investigate that there is significant different among working capital requirement and financing policies among different firms. Moreover, results show that negative relationship between the firm's performance and aggressiveness of working capital investment and financing policies. They explore that manager can improve value it they adopt conservative policy towards working capital investment and financing policies. Lack of empirical evidence on the working capital management and its impact on the firm performance in case of non financial firms of Pakistan is major motivating force to study the subject in detail. Existing literature with reference on the comparison of different working capital measures on different sector basis lacks the

empirical evidence and regression analysis is used for a relatively small sample with reference to Pakistan. Therefore, the current study is an attempt to fill this gap and estimate the relationship among working capital management and firm performance for a small sample of 48 non-financial firms listed on Karachi Stock Exchange during 2007-2010.

## 2. Literature Review

Generally the financial management decision divides into management of assets (investment) and liabilities (source of financing) in the short term and long term. Working capital management is mostly focus on the management of current assets and current liabilities of companies. As you investigate that firms performance cannot be increase in the long run unless it utilize the short run. The main reason of firm's failure is that they are unable to achieve their working capital needs. Therefore sufficient working capital management is required for firm's survival. In perfect markets, investment policy depends on the investment opportunity while investment decisions are independent of financing decision with positive net present value (NPV) because firms have large access to sources of finance without constraints and at a reasonable price (Modigliani and Miller, 1958) in that it is no effect of internal and external finance. Due to the market imperfection internal finance are more expensive than external finance. If we discuss about the investment and decision criteria it play important role in the performance of the firms.

In the recent research the major part of cash conversion cycle increase the firms sales and performance for some reason. However, the importance of inventory create good sense for the working capital management because it is the main component of cash conversion cycle. According to that the major failure of business is that the manager are not manage the working capital management in good way (Blinder and Maccini, 1991). Sales can increase by improving the trade credit of the firms (Peterson and Rajan, 1997), because it allows the customer to examine the quality and quantity of product. and to confirm that the services contracted have been carried out (Smith, 1987). This statement also suggested by Deloof and Jegers (1996), who supported that granting trade credit, improve sales because it give permission to customer to achieve goods quality before paying. It also helpful for the firm to build long term relationship with their customer (Ng et al., 1999), and it allow customer to acquire products at time of small demand (Emery, 1987). Moreover, if we discuss about account payable more firms may achieve good discount for early payment if the reduce supplier financing (Ng et al., 1999; Wilner, 2000). So that's why working capital management an opportunity cost by balancing a high investment if the firms forgoes other more profitable investment to equal that level and as Soenen (1993) showed that long cash conversion cycle might be initial reason why companies go bankrupt. If we see the earlier and above researches on working capital management we examine firms explain that cash conversion cycle and how they may affect its size. Previous studies, such as Soenen (1993), Deloof (2003), Padachi (2006) and Garcia- Teruel and Martinez-Solano (2007a), has measured the quality of working capital management that is dependent on cash conversion cycle. By taking all the component of explanatory variables used in the current analysis is calculated as  $(\text{account receivable}/\text{sales}) \times 365$ ,  $(\text{inventories}/\text{purchases}) \times 365$ ,  $(\text{account payable}/\text{purchases}) \times 365$ . The higher the cash conversion cycles the higher the invested in working capital which indicate a need for more capital.

### 2.1 Inventory

Inventory is define as the list of stock raw material, work in progress or finished good which is waiting to utilize in production or to be sold. Inventory effect the average number of days

of stock held by a company. Moreover save the value, the more firms maintain their payment commitment to their supplier. Inventory management is very important in a multinational setting is more complex than in a purely domestic setting because of the problems that are arises with handling inventory. The number of days inventory is measured as  $(\text{inventory}/\text{cost of goods sold}) \times 360$  Pedro Jaun Garcia, 1996). This variable reflects the average no of days of stock held by the companies. Longer storage times show a greater investment in inventory for an important level of operation. Large inventory and generous trade credit policy may lead to higher sales and greater inventory decrease the risk of stock out. Trade credit may increase sales because it allows customers to reach product quality before paying (Long, Mertiz and Ravid, 1993; and Deloof and Jergers, 1996), because supplier may have significant cost advantages over financial institution in achieving credit to their customers. It can also be cheaper source of credit for customers (Petersen and Rajan, 1997). The source of granting trade credit and keeping inventories is that money is saved in working capital. Reducing stock produces large financial benefits by continuously increasing cash flow, decreasing operating cost level, lowering the asset base and decreasing capital spending.

### *2.2 Account Receivable*

Account receivable is defined as the customers who are not yet payment for goods or service, with the firms has performed. The main aim of debtor management is to reduce the time laps between completion of sales and receiving of payment. If you ask some question to financial managers whether they prefer to sell their goods in the form of cash or on credit, you would expect them to response by saying something such as this if sales performance are not affected, by giving more preference to cash sales because payment is quick and certain and because of cost granting credit and balance account receivable would be finished. The ideal situation is that mostly firms would prefer to sell for cash only. Average collection period calculate of the average size of time it takes customer to pay off their credit purchases. According to Pedro Jaun Garcia (1996), no of days account receivable is measures as  $(\text{account receivable}/\text{sales}) \times 365$ . This variable shows the average no of days that the firm takes to receive payment from its customer, the larger the value, the larger its investment in account receivable. Firms would, in general, rather sell for cash than on account, but competitive pressures force most companies to offer credit. Receivable management starts with the decision of whether or not to grant credit.

### *2.3 Account Payable*

Account payable is defining as the supplier whose payment for goods or services have been processed but who have not yet been paid. The statement about the cost and riskiness of current loan versus long term liability depend, to a large extent, on the form of short term loan that originally is utilize short term credit measures as any loan for payment within one year. Credit improves generally as a firms operation extended. According to Pedro Jaun Garcia (1996), the no of days account payable reflects the average time it brings firms to pay their supplier. This was measured as  $\text{account (payable}/\text{purchase}) \times 365$ . The larger the value the higher firms take to maintain their payment commitment to their supplier. Delaying payments to suppliers allows a firm to reach the quality of the products budget and can be cheaper and flexible sources of financing for the firms. Delaying payment of invoices can be very expensive if the firm is offered a discount for early payment. In a 2001 survey by the institute for credit management of the Vlerick Leuven Ghent School for management of trade credit policies of Belgian companies, it was showed that the median Belgian companies offered a 2/10n30 discount for quickly payments. Fisman and Love (2001) demonstrate that trade creditors reduce weak creditor protection and imperfect information better than formal lenders and

find that firms in countries with low developed financial markets use informal credit provided by their supplier to finance growth. Account payable or trade credit, is the highest single type of short term debt, indicating about 40 percent of the current liabilities of the average non-financial firms. Trade credit is a spontaneous source of financing in the sense that it increases form ordinary business transaction.

#### *2.4 Return on Asset*

This is very important ratio for firms deciding whether or not open a new project. On the basis of this ratio a firm is going to open a project they expect to earn a profit on it, return on asset is the profit they would receive. In general put, if return on assets is more than the firm borrows at then the project should be accepted, if it is not more than that then it is rejected. The return on assets is very important and provide a standard for changing how efficiently financial management employs the average amount which is invested in the firms assets, whether the amount come from investor or creditors. A low level of return on assets shows that the profits are low for the amount of assets. The return on asset ratio calculates how efficiently profits are being collected from the assets employee. A low return on assets ratio is compared with industry average indicates that inefficient utilization of business assets. Chiu et al, (2006) and Wu (2001) showed that a firm's return also affects measures of working capital management. First, Wu (2001) showed that the working capital requirement and the performance of the firm have mutual effects, subsequently, Chiou et al, (2006) found that the return on assets (ROA) has a negative influence on calculate of working capital management. This can be explained in two ways. First, as companies with good performance can get outside capital more easily, they can invest in other large profitable investments (Chiou et al., 2006). According to Shin and Soenen (1998), firms with greater returns have good working capital management because of their market dominance, because they have larger bargaining power with supplier and customers. Petersen and Rajan (1997) also showed that companies with higher profitability receive significantly more credit from their suppliers. Thus, the variable return on assets, which is calculated by the ratio earning before interest and tax over total assets, was introduced into the analysis and it is expected that this factor will have a negative effect on the cash conversion cycle.

#### *2.5 Return on equity*

The amount of net income is returned as a percentage of shareholder equity. Return on equity calculate a firms profitability by investigating that how much profit a firms achieve with the money of shareholder have invested. On the basis of this the return on equity is the most important ratio. Return on equity investigate that how much gain a firms earned in comparison to the total amount of shareholder equity that show on the balance sheet. Shareholder equity is foundation of accounting that shows the assets which is produced by the retained earning of the business and the paid up capital of the owners. Every firms either it is profit oriented or not is concerned with its main objectives. One of the most usable tools of financial ratio is profitability ratio which is used to determine either the company is on bottom line. Profitability calculates the important to firms manager and owners alike. If a small business has outside the investors who have put their own money into the firm, the first owner has to indicate the profitability to those equity investors. Return on equity calculates as the ratio of net profit after taxes to stockholder equity. The expected return to the aggregate stock market is very important component in the decision of both single investor and corporate investor, as emphasized by Merton (1980). Net income is used to full fiscal year after taxes and preferred stock dividend but previous common stock dividend. Shareholder equity does not include in preferred stock because it is used as an annual. Return

on equity different across different industries. So that why it is indicate to compare that return on equity against firms previous values or return on of similar firms. Some industries have large return on equity and some have low return on equity it is depend on the nature of firms either it is large industry or small. It is indicate that the firms with a large return on equity raito are better investment that the lower ratio. In general, the firms which are less capital intensive and with a small return on equity have very low competition. But the firms which are large return on equity and having very tough comptition with each other because their return on equity very large so that why.

### *2.6 Gross profit*

The operating profit margin ration shows that how much gain earn a company after paying for variable cost of production for example wages, raw material, etc. it is show as a percentage of sales and indicate the efficiency of a firms by controlling the costs and expense which is associated with the firms operation. Moreover, it is the profit achieved form the operation and we are not include unique or one time transaction. This term is used to explain that profit margin ratios include operating profit, operating income or return on sales. Gross profit that calculate the profitability and we used this variable as dependent variable. This variable is measure as the sales minus cost of goods sold, and divided by total assets. Net profit measure that how much amount earned by the firms. A low profit margin indicate that larger risk decline in sales will reduce profit and at the end in a net loss. Net profit margin provide the information to the firms pricing policies that cost structure and production efficiency. Different product mixes strategies use because the net profit margin to different among different companies. Net profit margin is indicating that how efficient a firms is and how it well control its costs. The larger the margin is the more effective the firms are in converting income into actual earning. Net profit margin is usually used to firms compare expense over time. To compare the net profit margin between firms in the same industry might have low meaning. That not effect by the firms that it is not efficient than other company. The operating profit margin gives the opportunity that the business owner a lot of important information about the company profitability, so particularly with regard to control cost. It indicate that how much cash is thrown off after the most of the expense are achieve. A large profit margin means that the firms has good cost control and or that sales are improving faster than costs, which is the optimal situation for the firms. Operating income will be a lot of reduction than the gross profit since selling, administrative, and other expenses are included along with the cost of goods.

### *2.7 Size of the firm*

Size was calculated as the logarithm of assets. Chiou et al., (2006) demonstrate that the working capital requirement has greatly affects on size of firms. This is may be due to cost of funds which is invested in short term assets decrease with the size of firms, as low level companies have large information asymmetries (Jordan et al., 1998; Berger et al., 2001), high level information power (Berger and Udell, 1998) and that are not adopted by analysis. If we see the tradeoff theory, they have a high rate of bankruptcy, because firms tend to be more diversified and less chances of failure. Which is affect on trade credit granted, because to Petersen and Rajan (1997) and Niskanen and Niskanen (2006), companies have good capital market which improve trade credit. In real average firm size positively affected the trade credit improving. Whited (1992) and Fazzari and Petersen (1993) demonstrated that smaller firms have larger financial problems, which also can improve their trade credit received, because they use that type of credit when other forms are not available (Petersen and Rajan, 1997) or had already been exhausted (Walker, 1991; Petersen and Rajan, 1995; Cunnat,

2007). In particular the cost of funds invested in current asset is very low in lower firms so that why they have might lower account receivable and inventories. Moreover, these types of firms use higher credit from their supplier. It is estimated that, as in previous research, size will affect the firm's performance. This factor is calculated by the variable size defined as the natural logarithm of assets.

### *2.8 Leverage*

Leverage is very important variable which I used in this research for the purpose to check that how much debt use and how much firm external finance firm use. There is many way that firms achieve leverage by using borrowing fund, buying the fixed asset and the most utilization of derivatives. In any calculation of ratio that is use in the measure of financial leverage of any company have the ability to achieve the financial obligation of the firms. There are some different ratios, but the major factor sees at include debt, equity, assets and interest expenses. There is many researches have been done on this field but there is gap in Pakistan so I want to check the impact of leverage of firms profitability. a firms that are use loan very high might face large problems such as bankruptcy. But the low levered firm not faces that type of problem and maintains their existence. On the other hand the fund that are invested in working capital management with more leverage., because according to theories, they have a larger risk premium. The early researches indicate that the firms working capital management increase the leverage (Chiou et al., 2006). So that's why it is easy to check the relationship among the leverage and working capital management. Leverage was calculated using the ratio of debt to total assets.

### *2.9 Age*

This variable is very important for age of the firm which is included and link with the firm financing and credit. Age of the firms utilize the as a key when the customer are known and about the goodwill and quality of the firms (Petersen and Rajan, 1997) in that variable we also focus on the credit worthiness to supplier of debt. As well as for the size of the relationship between supplier and customer of the firms (Cunat, 2007) and their creditworthiness is very important for the debt and equity (Niskanen and Niskanen, 2006). Chiu et al, (2006) discussed about the age of the firm that indicate a positive impact on the working capital requirements, and this may showed by the fact that focus on the older firms that can focus on external financing which are in the good condition. (Berger and Udell, 1998), so that's why the funds that are invested in that part is very low in these firms.

## **3. Data and Research Methodology**

### *3.1 Data*

This study investigates the impact of working capital on firm performance using the data of non-financial firms listed on the Karachi Stock Exchange (KSE) Pakistan during 2007-2010. The data were taken from the annual reports of companies. Notably, every listed company is required to prepare its financial statements in accordance with approved accounting standards as applicable in Pakistan. Approved accounting standards comprised of such International Financial Reporting Standards (IFRS) issued by the International Accounting Standard Board (IASB) as are notified under the company ordinance 1984. The final sample, after considering any missing data, consists of a balanced panel of 48 firms over a period of four years. Firms under analysis represent the driving industrial force in Pakistan, and it is expected that the sample may do well in capturing aggregate working capital behavior in the country. The description of sample firm by industry is given below:

**Table 3.1:** Sector-wise distribution of sample firms

Sector name	No of firms	Time period	Percentage (%)
Chemical	15	2007-2010	31.25
Cement	10	2007-2010	20.83
Mineral	4	2007-2010	08.33
Motor	7	2007-2010	14.58
Electrical	4	2007-2010	08.33
Fuel & energy	4	2007-2010	08.33
Paper	4	2007-2010	08.33
Total	48		100%

### 3.2 Variables

On the basis of research objectives, variables used in this study and their measurement are largely adopted from existing literature in order to make a meaningful comparison with prior empirical studies. Three performance measures such as gross profit ratio, return on asset, and return on equity are used a dependent variable in the study. However, the explanatory variables include average age of inventory, average collection period, and average payment period. In addition, some variables such as firm's size, age, and leverage were also included in the model in order to control the firm-specific factors that may affect the performance. Variables and their definition are listed in Table 3.1.

**Table 3.2:** Definition of variables

Variables	Definition
Dependent variable	
Gross profit margin ( $GP_{it}$ )	Ratio of gross profit to net sales.
Return on asset ( $ROA_{it}$ )	Ratio of net profit after taxes to total assets.
Return on equity ( $ROE_{it}$ )	Ratio of net profit after taxes to stockholders equity.
Explanatory variable	
Average age of inventory ( $AAI_{it}$ )	Ratio of No. of working days (i.e., 360) to inventory turnover.
Average Collection Period ( $ACP_{it}$ )	Ratio of trade debt to average sales per day. Average sales per day is computed by dividing the total sales on No. of working days (i.e., 360)
Average payment period ( $APP_{it}$ )	Ratio of trade payable to average cost of goods sold per day. Average cost of goods sold per day is computed by dividing the cost of goods sold on number of working days (i.e., 360)
Control variable	
Size ( $SIZE_{it}$ )	Natural logarithm of total assets.
Leverage ( $LEV_{it}$ )	Ratio of total debt to total assets

Firm's age ( $AGE_{it}$ )

Log of age

### 3.3 Methodology

This study employed panel date procedures because sample contained data across firms and overtime. The use of panel date increases the sample size considerably and is more appropriate to study the dynamics of change. A panel econometric technique namely pooled ordinary least squares (OLS) is used to estimate the relationship between working capital and firm performance. Accordingly, the basic regression is expressed as

$$y_{it} = \alpha + X'_{it}\beta + u_{it}$$

$$i= 1, \dots, 48; t=1, \dots, 4$$

where  $i$  stands for the  $i$ th cross-sectional unit and  $t$  for the  $t$ th time period.  $y_{it}$  is performance measure for the  $i$ th firm at time  $t$ , and  $\alpha$  is the intercept.  $X'_{it}$  is a  $1 \times K$  vector of observations on  $K$  explanatory variables for the  $i$ th firm in the  $t$ th period,  $\beta$  is a  $K \times 1$  vector of parameters,  $u_{it}$  is a disturbance term and is defined as

$$u_{it} = \mu_i + v_{it}$$

where  $\mu_i$  denotes the unobservable individual effects and  $v_{it}$  denotes the remainder disturbance. The description of three estimation models (i.e., pooled OLS, fixed effects and random effects) is given below.

$$GPR_{it} = \beta_0 + \beta_1 AAI_{it} + \beta_2 ACP_{it} + \beta_3 APP_{it} + \beta_4 \sum_{j=1}^n Control_{ijt} + \varepsilon_{it} \dots \dots \dots (1)$$

$$ROA_{it} = \beta_0 + \beta_1 AAI_{it} + \beta_2 ACP_{it} + \beta_3 APP_{it} + \beta_4 \sum_{j=1}^n Control_{ijt} + \varepsilon_{it} \dots \dots \dots (2)$$

$$ROE_{it} = \beta_0 + \beta_1 AAI_{it} + \beta_2 ACP_{it} + \beta_3 APP_{it} + \beta_4 \sum_{j=1}^n Control_{ijt} + \varepsilon_{it} \dots \dots \dots (3)$$

- $GP_{it}$  =gross profit ratio  $i$ th firm at time  $t$
- $ROA_{it}$  =return on assets  $i$ th firm at time  $t$
- $ROE_{it}$  =return on equity  $i$ th firm at time  $t$
- $AAI_{it}$  =average age of inventory  $i$ th firm at time  $t$
- $ACP_{it}$  =average collection period  $i$ th firm at time  $t$
- $APP_{it}$  =average payment period  $i$ th firm at time  $t$
- $SIZE_{it}$  =size th firm at time  $t$
- $LEV_{it}$  =leverage  $i$ th firm at time  $t$
- $AGE_{it}$  =age  $i$ th firm at time  $t$

where  $GPR_{it}$  is the gross profit ratio for the  $i$ th firm at time  $t$ ,  $ROA_{it}$  is the return on asset for the  $i$ th firm at time  $t$ ,  $ROE_{it}$  is the return on equity for the  $i$ th firm at time  $t$ ,  $AAI_{it}$  is the average age of inventory for the  $i$ th firm at time  $t$ ,  $ACP_{it}$  is the average collection period  $i$ th firm at time  $t$ ,  $APP_{it}$  is the average payment period for  $i$ th firm at time  $t$ ,  $Control_{ijt}$  is the  $j$ th control variables for the  $i$ th firm at time  $t$ ,  $\beta_0$  is the intercept,  $\varepsilon_{it}$  is the random error term for the  $i$ th firm at time  $t$ ,  $\beta_1 - \beta_4$  are the coefficients of the concerned variables.

## 4. Empirical Results

### 4.1 Descriptive statistics

Table 4.1 presents the summary statistic of variable used in this study. The average of performance measures such as gross profit margin, return on asset, and return on equity is 18.96%, 4.14% and 12.43% respectively. The average of explanatory variables such as average age of inventory, average collection period, and average payment period is 66, 46, and 76 days respectively. However, the average of control variables are concerned such as size of the firm, leverage, and age is 22, 0.56, and 1.23 respectively.

**Table 4.1:** Descriptive statistics

Variable	Observations	Mean	Std. err	Mini	Maxi
$GP_{it}$	192	0.1896	0.1430	-0.320	0.7000
$ROA_{it}$	192	0.0441	0.0820	-0.220	0.3500
$ROE_{it}$	192	0.1243	0.4500	-1.290	4.4900
$AAI_{it}$	192	66.000	50.010	0.9900	209.09
$ACP_{it}$	192	46.000	53.660	0.0210	304.00
$APP_{it}$	192	77.000	47.150	14.035	283.00
$SIZE_{it}$	192	22.320	1.1500	18.680	24.000
$LEV_{it}$	192	0.5600	0.1800	0.1610	1.1700
$AGE_{it}$	192	1.2200	0.3000	0.0000	1.7900

#### 4.2 Correlation of variables

Prior to estimating the coefficients of the model, the sample data were tested for multicollinearity. Results presented in Table 4.2 indicates that most cross-correlation terms for the explanatory variables are fairly small, thus giving no cause for concern about the problem of multicollinearity among the explanatory variables.

**Table 4.2:** Correlation matrix

Variables	$GP_{it}$	$ROA_{it}$	$ROE_{it}$	$AAI_{it}$	$ACP_{it}$	$APP_{it}$	$SIZE_{it}$	$LEV_{it}$	$AGE_{it}$
$GP_{it}$	1.00								
$ROA_{it}$	0.72**	1.00							
	*								

$ROE_{it}$	0.05*	0.12*	1.00						
$AAI_{it}$	-.036*	-0.03*	-.017*	1.00					
$ACP_{it}$	0.13**	0.11*	0.12*	-0.04*	1.00				
$APP_{it}$	0.20**	0.06*	0.15*	-.08*	.410**	1.00			
	*				*				
$SIZE_{it}$	0.20**	0.03*	0.01*	-0.43***	.00*	.53***	1.00		
	*								
$LEV_{it}$	-	-0.61***	0.11*	-.07*	.17***	.12*	.19***	1.00	
	.40***								
$AGE_{it}$	-0.08*	-0.07*	0.02*	.08*	-0.0*	-	-.18*	.02*	1.00
						.06***			

\*\*\*. Correlation is significant at the 0.10 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

\*. Correlation is significant at the 0.05 level (2-tailed).

#### 4.3 Regression Results

Empirical results presented in Table 4.3 indicate that average age of inventory and average payment period are positively related to the gross profit margin but the relationship is statistically insignificant. Alternatively, average collection period is positively and significantly related to the gross profit margin. As far as control variables are concerned firm size is positively whereas leverage is negatively related to the gross profit margin. Firm age is also negatively related to gross profit margin but the relationship is found insignificant.

Empirical results presented in Table 4.4 indicate that average age of inventory and average collection period are positive while the relationship of average age of inventory found insignificant alternatively, the average collection period is related significant to the return on assets. Although the average payment period is found to negative and relationship is insignificant with return on assets. As far as control variables are concerned firm size is positively and significantly related to the return on assets whereas leverage and age of firms found negative and leverage is significant related while the age of firms insignificantly related to return on assets. Empirical results presented in Table 4.5 indicate that average age of inventory negatively and insignificant related to return on equity. Whereas, the average collection period and average payment period is positively and insignificant related to return on equity. As for as control variables are concerned the firm size is positive and significant related to return on equity. The leverage and age of firms is found negative and leverage is significant related while the age of firm is insignificant related to return on equity.

**Table 4.3:** The effect of explanatory variables on gross profit ( $GP_{it}$ )

variables	Coefficient	Std. Error	t-statistic	Prob.
$C$	-0.300	0.1773	-1.700	0.0910
$AAI_{it}$	0.0002	0.0001	1.0800	0.2800
$ACP_{it}$	0.0005	0.0001	2.8400	0.0050
$APP_{it}$	0.0001	0.0002	0.7700	0.4420
$SIZE_{it}$	0.0294	0.0076	3.8600	0.0000
$LEV_{it}$	-0.382	0.0483	-7.920	0.0000
$AGE_{it}$	-0.001	0.0296	-0.050	0.9610

$R^2$	0.3080	No. of observations	192
Adjusted $R^2$	0.2855	F-statistic (6, 185)	13.720
Std. Error of Reg	0.1213	Prob.	0.0000

**Table 4.4:** The effect of explanatory variables on return on asset ( $ROA_{it}$ )

variables	Coefficient	Std. Error	t-statistic	Prob.
$C$	-0.018	0.0906	-0.200	0.8420
$AAI_{it}$	7.2200	0.0001	0.0100	0.9940
$ACP_{it}$	0.0003	0.0000	3.9400	0.0000
$APP_{it}$	-0.000	0.0001	-0.470	0.6410
$SIZE_{it}$	0.0099	0.0038	2.5600	0.0110
$LEV_{it}$	-0.301	0.0247	-12.21	0.0000
$AGE_{it}$	-0.001	0.0151	-0.100	0.9230
$R^2$	0.4566	No of observation	192	
Adjusted $R^2$	0.4389	F statistic (6, 185)	25.90	
Std Error of Reg	0.0620	Prob.	0.000	

**Table 4.5:** The effect of explanatory variables on return on equity ( $ROE_{it}$ )

variables	Coefficient	Std. Error	t-statistic	Prob.
$C$	0.3781	0.667	0.5700	0.5720
$AAI_{it}$	-0.000	0.0007	-0.400	0.6910
$ACP_{it}$	0.0000	0.0007	0.5500	0.5800
$APP_{it}$	0.0010	0.0008	1.7100	0.0890
$SIZE_{it}$	-0.024	0.0286	-0.860	0.3890
$LEV_{it}$	0.2300	0.1818	1.2700	0.2060
$AGE_{it}$	0.3781	0.6674	0.3600	0.7180
$R^2$	0.0406	No of observation	192	
Adjusted $R^2$	0.0095	F statistic (6, 185)	1.30	
Std Error of Reg	0.4565	Prob.	0.2574	

## 5. Discussion on Empirical Findings

Empirical results indicate that average age of inventory is positively related to gross profit margin and return on assets. Although the relationship is insignificant but positive sign may be because of increasing sales which leads to higher profit and thus fewer inventories. This finding is consistent to Olufisayo (2011). Alternatively, average age of inventory is negatively related to return on equity which indicates that the longer inventory is tied in the less working capital is available, hence lowering of profit. The negative relationship between average age of inventory and performance is consistent with the findings of Falope and Ajilore (2009).

Average collection period is positively related to all performance measures used in this study. However, the relationship is found significant with gross profit margin and return on assets. The positive relationship may be because of the fact that customers do not require more time to assess quality of product they buy from firms with increasing profitability. The positive relationship between average collection period and firm performance is consistent with the findings of Olufisayo (2011)

Average payment period is positively related to gross profit margin and return on equity. Although the relationship is insignificant but positive sign indicate that the firm's profitability is increased by a day lengthening of the number of days it takes firms to settle their creditors. Moreover, the positive sign does make economic sense, the longer a firm delays its payments the higher level of working capital levels it reserves and uses in order to increase profitability. Thus, the more profitable firm waits longer time to pay their bills. This finding is consistent to the Falope and Ajilore (2009).

As far as control variables are concerned firm size is positively related with gross profit margin and return on asset. Moreover this relationship is found statistically significant. Alternatively, firm size is negatively related to return on equity however this relationship is found insignificant. The positive significant relationship is consistent with the finding of Kieschnich et al. (2006) and Chiou et al. (2006). The positive relationship may be because of the fact that the cost of the fund used to invest in current assets decrease with the size of the firm, as smaller firms have greater information asymmetries (Jordan et al., 1998; Berger et al., 2001), greater informational capacity (Berger and Udell, 1998) and are less followed by analysis. Moreover, trade-off theory suggests that larger firms tend to be more diversified and fail less often. This factor might affect the trade credit granted, because, according to Petersen and Rajan (1997) and Niskanen and Niskanen (2006), firms with better access to capital markets extend more trade credit. In sum, the cost of funds invested in current asset is higher for smaller firms, so they might have lower account receivable and inventories.

Empirical results indicate that leverage is negatively related to gross profit margin and return on asset. Moreover, this relationship is found statistically significant. On the other hand, leverage is positively associated with return on equity but the relationship is found insignificant. The negative relationship between leverage and profitability confirms the predictions of pecking order theory suggesting that profitable firms tend to borrow less due sufficiency in internally generated funds. Several previous studies reported a negative relationship between profitability and leverage include Myers, (1984), Rajan and Zingales (1995), Wald (1999), Booth et al. (2001) and Sheikh and Wang (2011).

Empirical result indicates that age is negatively related to gross profit margin and return on assets. Moreover, this relationship is found statistical insignificant. On the other hand, age is positive related to return on equity but the relationship is insignificant. The positive relationship indicate that age has positive influence on the working capital requirement, and this may be explained by the fact that older firms can get external financing more easily and under better condition Chiou et al. (2006), Berger and Udell (1998), so the cost of the funds used in this investment will be a positive relationship between age and firms performance. This variable have been used for the time the firm may have known its customers and the firms quality and reputation (Petersen and Rajan, 1997), as well as for the length of the relationship between supplier and customers (Cunat, 2007) and the firms creditworthiness to supplier of debt and equity (Niskanen and Niskanen, 2006).

## **6 Conclusions**

The purpose of this dissertation is to investigate whether working capital management affect the performance of non-financial listed firms in Pakistan. Panel econometric technique namely pooled ordinary least squares is used to estimate the relationship between working capital and firm performance. Data were taken from the annual reports of non-financial firms listed on the Karachi Stock Exchange Pakistan during 2007-2010. Three performance

measures namely gross profit margin, return on asset, and return on equity are used to estimate the impact of working capital variables such as average age of inventory, average collection period, and average payment period. Empirical results indicate that average age of inventory is positively related to gross profit margin and return on asset, whereas it is negatively related to return on equity but the relationship is found insignificant. Although the relationship is insignificant but positive sign may be because of increasing sales which leads to higher profit and thus fewer inventories. Average collection period is significantly and positively related to gross profit margin and return on assets. This finding shows that management of receivables has a positive impact on firm performance. Moreover, it confirms the prediction that reduction in average collection period improves the accounts receivable turnover which in turn positively affects the firm's profitability. Although average collection period is positively related to return on equity but the relationship is found insignificant. Average payment period is positively related to gross profit margin and negatively related to return on asset but the relationship is found insignificant. However, average payment period is positively and significantly related to return on equity. This finding indicates that stretching the payment period increases the firm's ability to utilize creditors' money in their operation which in turn enhances the firm value. As far as control variables are concerned, a significant positive relationship is observed between firm size and two performance measures such as gross profit margin and return on asset. Alternatively, firm size is negatively related to return on equity but the relationship is found insignificant. Leverage is negatively and significantly related to gross profit margin and return on asset. Alternatively, an insignificant and positive relationship is observed between leverage and return on equity. The negative relationship between leverage and profitably confirms the predictions of the pecking order theory which suggests that profitable firms tend to borrow less due to their ability generate funds from internal sources. Finally, firm age is negatively related to gross profit margin and return on asset whereas it is positively related to return on equity. However, the relationship is found insignificant. In sum these empirical findings indicate that management of working capital has material affects of firm performance.

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