DO FIRMS APPROACH THE TARGET WORKING CAPITAL REQUIREMENT? A CASE OF PAKISTAN
As empresas abordam o capital de giro alvo? Um caso do Paquistão

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ABSTRACT: The study investigates the dynamism of working capital requirement (WCR) in non-financial firms listed on Pakistan Stock Exchange from the period of 2007 to 2013. The purpose of this research is to analyze whether firms follow the target WCR, to estimate the speed with which firms adjust towards its target WCR and to investigate the firm specific and macroeconomic determinants of WCR. Difference GMM technique is used to analyze the speed and determinants of WCR to avoid the problems of endogeniety and unobservable heterogeneity. The study gives evidence that there is an existence of target WCR in firms of Pakistan and firm require 1.6 years to completely adjust back to target WCR. The factors which are statistically significant in determination of WCR are: the level of economic activity in the country, operating cash flow, profitability, leverage, financial distress, and financing cost. The WCR is measured by net trade cycle of a firm.

KEY WORDS: Working capital requirement; Speed of adjustment; Net trade cycle; Endogeniety; GMM

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RESUMO: O estudo investiga o dinamismo da necessidade de capital de giro (WCR) em empresas não financeiras listadas na Bolsa do Paquistão do período de 2007 a 2013. O objetivo desta pesquisa é analisar se as empresas seguem a meta de WCR, estimar a velocidade com quais empresas se ajustam ao seu objetivo de WCR e investigar os determinantes específicos e macroeconômicos da WCR. Diferença a técnica GMM é usada para analisar a velocidade e os determinantes da WCR para evitar os problemas de endogeneidade e heterogeneidade não observáveis. O estudo dá evidências de que existe uma existência de WCR alvo nas empresas do Paquistão e a empresa exige 1,6 anos para se ajustar completamente ao alvo da WCR. Os fatores que são estatisticamente significativos na determinação de WCR são: o nível de atividade econômica no país, fluxo de caixa operacional, lucratividade, alavancagem, dificuldades financeiras e custo de financiamento. O WCR é medido pelo ciclo de comércio líquido de uma empresa.

KEY WORDS: exigência de capital de giro; Velocidade de ajuste; Ciclo comercial líquido; Endogeniedade; GMM

INTRODUCTION

The field of corporate finance has conventionally focused on the financial decisions in long term, investment decisions, capital structure, dividend payment decisions, and analysis of company's valuation. Since short term assets and liabilities (working capital) are important part of their financial statements, they should be analyzed carefully. The management of these short term assets and liabilities warrants a vigilant investigation, since Smith (1980) described the importance of working capital management and its effects on profitability, value and risk of a company. The main objective of working capital management is to maintain an optimal balance between each of the working capital components. An optimal level of working capital is the level where risk and efficiency of firms are balanced. There has been a paradigm shift in the management of working capital as many executives now regard working capital management as a source of competitive advantage, part of corporate strategy and the overall liquidity and risk management framework of the company (Yucel & Kurt, 2002). Therefore, firms try to keep an optimal level of working capital that maximizes their value (Deloof, 2003).

Previous research has focused on determining factors of components of working capital requirement separately. However, Hill, Kelly, and Highfield (2010) described that the components of working capital should ultimately be managed jointly rather than individually. So, this study aims to offer an empirical evidence on the firm specific and macroeconomic determinants of working capital requirement in Pakistan. There is no harmony in findings of previous research on determining factors of WCR. Moreover, it is essential to study that whether the determining factors (cash flow of firm, financing cost, size, tangibility, leverage, profitability, GDP, and financial distress) in developed countries also affect the WCR in developing country like Pakistan. We use net trade cycle as a measure of working capital requirement because this measure is widely used in previous studies (Baños-Caballero et al. (2010, 2013, 2016), Deloof (2003), Juan García-Teruel & Martinez-Solano (2007), Shin & Soenen (1998), Tauringana & Adjapong Afrifa (2013). The net trade cycle is interpreted as the number of days a firm takes to finance its working capital requirement (Shin & Soenen, 1998).

Previous research evidenced the existence of target WCR in firms of developed countries. Peles and Schneller (1989) described that firms follow the partial adjustment model in which the financial ratios of current balance sheet items are adequately essential to make markets involved in a continuous adjustment. Baños-Caballero et al. (2013) indicated that firms in Spain follow the dynamic behavior of WCR and have target WCR, they adjust from their current level to optimal level of working capital requirement gradually with time following some speed. Cuong, N. T., & Nhung, N. T. H. (2017) have studied the determining factors of working capital management and its speed of adjustment on firms listed on Vietnam stock exchange. They have concluded that WCR increase with the increase of profitability of firms and decrease with the size, and fixed investment (FAR) of the firms.

Following Baños- Caballero et al. (2013), this research is going to use partial adjustment model to examine the speed of adjustment firms follow to reach at the target level of WCR in developing country like Pakistan. It is essential to investigate whether the firms in developing countries follow the speed of adjustment toward target WCR as in developed countries. The captivating point is that there is lack of empirical research on dynamic structure of Working capital requirement in Pakistan. So far, Nazir & Afza (2009) have investigated the issue in Pakistan, that is determinants of Working capital requirement using simple regression model. Monica Singhania, Piyush Mehta, (2017) have studied the impact of WCR of firms' profitability in South East Asian countries and used GMM as econometrics technique. They concluded that frims; profitability and WCR have nonlinear relationship in Asian Pacific region. Azeem, M. M., & Marsap, A. (2015) have investigated the determinants of working capital management in Pakistan using ANOVA and regression analysis.

This research study contributes to literature of corporate finance on numerous grounds. First, this study aims to offer an empirical evidence on the speed of adjustment of firms toward optimal WCR in Pakistan, which has not been studied previously. Second, the proposed model of this study is a dynamic model which does not assume firms to be at equilibrium level unlike the static model. The dynamic model relies on more realistic assumption that is partial or incomplete adjustment. This dynamic nature of model enables us to study the working capital dynamism which comprises of the presence of target WCR, speed of adjustment toward target WCR and determining factors of target WCR. Unlike previous studies, the use of this model will also enable us to treat the unobservable heterogeneity and endogeneity problems. Third, this study will help managers to manage the working capital of firm effectively and efficiently, which help them to fight against bankruptcy or breakdown. This study

will also help managers to keep an eye on the speed of adjustment, a firm follows to reach at target WCR, which help them to anticipate and cope up with the aberration of working capital.

The rest of the paper is designed as follows: the second section describe the literature of working capital requirement, its adjustment speed and determining factors of WCR. The third section explain the research model, methodology, sample and data of the study. The fourth section enlightens the empirical results and finally fifth section describes the conclusion of this study.

LITERATURE REVIEW

Previous studies on dynamics of working capital requirement have focused on the areas of importance of WCR in firms, existence of target WCR, and determinants of WCR. The dynamic structure of WCR is ignored in previous literature which tells us the speed of firms to reach at target WCR and the determinants of that speed. This study is designed to analyze the speed with which firms adjust back to target WCR and firms specific and macroeconomic determinants of WCR.

The success of business is profoundly depending on the effectiveness and efficiency of managers to manage the accounts receivables, inventory, and payables (Filbeck & Krueger, 2005). Firms can increase their funds for growing projects by reducing the idle investment kept in current assets. Most of the time, financial managers' time is consumed in finding the optimal level of working capital components (Lamberson, 1995). Some research studies have found that either the firms have existence of optimal WCR and following the dynamic behavior of WCR. Baños-Caballero et al. (2013) studied the dynamic behavior of working capital in Spain and indicated that firms do follow the dynamic behavior of WCR and they have target WCR. Firms adjust from their current level to optimal level of WCR gradually with some speed and that speed depends upon the adjustment cost. They further indicated that firms which manipulate their current balance sheet items quickly can adjust relatively quickly toward target WCR.

Peles and Schneller (1989) studied the adjustment of financial ratios towards its target value and indicated that there are some factors like changes in cost of production, temporary economic shocks, and any improvement in technology which make the firms to deviate from the optimal value. The firms then analyze and revert back to their optimal value with some speed which incur the adjustment cost. They indicated that this adjustment cost is hurdle for firms to come back to their optimal level. Firms get back to their target value when the benefit of being at optimal level is more than the cost of adjustment. Nadiri and Rosen (1969) have described the reasons of not forecasting actual sales and purchases of firms--- the monetary policy shocks and uncertain level of bad debts in receivables. Actual cash collected is only known with the time and it involves cost which become he hurdle in adjustment toward target level of WCR. Maintenance of the optimum level of working capital components such as cash, inventory, payables, and receivables require continuous monitoring. The efficient management of working capital is a fundamental part of the overall corporate strategy to create shareholders' value (Afza & Nazir, 2008). Therefore, firms try to maximize their shareholders' value (Deloof, 2003).

Previously, number of studies have focused on the determining factors of WCR either its firm specific or macroeconomic variables. Akinlo (2008) studied the determinants of WCR using 66 Nigerian firms for the period of 1997 to 2007, they found sales growth, economic activity, size, firms' operating cycle and leverage as significant determinants of WCR. Kwenda & Holden (2014) have conducted study in Johannesburg on determinants of WCR and they have used the short-term financing, business activity, growth of sales, leverage, operating cash flow, firm size, and market power as determinants of working capital requirement. Baños- Caballero et al. (2010) have studied the determinants of WCR in Spain and used capacity to generate internal sources, leverage, growth opportunities, tangible fixed assets, size, age, and return on assets as determinants of working capital requirement. Cuong, N. T., & Nhung, N. T. H. (2017) have studied the determining factors of working capital management and its speed of adjustment on firms listed on Vietnam stock exchange. Azeem, M. M., & Marsap, A. (2015) have investigated the determinants of working capital management in Pakistan using ANOVA and regression analysis. Singh & Kumar (2017) have studied the determinants of working capital requirement in India and have used profitability, growth, leverage, size, tangibility, operating cash flow and firm age as determinants of WCR in India.

This study includes the following macroeconomic and firm specific variables as determinants of working capital requirement:

GDP: Gross Domestic Product (GDP) used in this study is measured as annual growth of GDP. GDP affects the accounts receivable (J. K. Smith, 1987; Walker, 1991), inventory level (Blinder & Maccini, 1991; Carpenter, 1994; Kashyap & Stein, 1994) and accounts payable (Nelson & Nelson, 2002). Hence it is considered as a determinant of working capital requirement. We expect a relationship between WCR and GDP.

OCF: Operating cash flow (OCF) is measured as ratio of earnings before interest and taxes plus depreciation over sales. OCF shows the capacity of a firm to generate internal resources (Baños-Caballero et al. (2010, 2013); García-Teruel & Martínez-Solano, 2010). Working capital is majorly financed through operating cash flow as Deloof (2003) claimed that availability of cash enables firm to afford lengthy net trade cycle which is representative of WCR, which increases the sales of a company (Deloof, 2003), extends credit to customers (Emery, 1987) and increases profitability (Paul & Boden, 2008). Following Chiou et al. (2006) and Baños-Caballero et al. (2010, 2013) and Azeem, M. M., & Marsap, A. (2015), OCF is used as a determinant of WCR and we expect a relationship between operating cash flow and working capital requirement of firm.

SIZE: Company size (SIZE) is an important variable which affects the WCR. According to Yang and Chen (2009), larger firms have preferential treatment over smaller firms in terms of cost of credit from financial institutions, a pool of qualified human capital, and are able to achieve greater strategic diversification over their smaller counterparts. Shepherd (1989) suggested that company size determines its bargaining power. The companies with superior bargaining power, tend to me more profitable as such companies are able to influence their trading relationship in terms of the amount of credit granted, terms of payment, quality of the products, and even the means of delivery. While, smaller firms bear higher cost of funds to finance their current assets, so they have lower level of inventories and accounts receivable. Smaller firms tend to face more constraints to finance their operation (Fazzari & Petersen, 1993); Whited, 1992) which will lead to higher usage of trade credit when other financing sources are unavailable (Petersen & Rajan, 1997) or the other financing sources are already being used or exhausted. Azeem, M. M., & Marsap, A. (2015) have used size as determinant of WCR in Pakistan. Size proxy is natural logarithm of assets and we expect that size has an impact on WCR.

FAR: The fixed asset ratio (Tangibility) or FAR is measured as ratio of fixed asset over total assets. The investment in fixed assets enable firms to raise funds at low cost to finance WCR (Bhagat, Dong, Hirshleifer, & Noah, 2005), because investment in fixed assets offer credibility to investors' threat to take them to bankruptcy or to dismiss its management team (Campello, 2006). Braun (2005) suggested that tangible assets are those that would more easily shift to the investor's control when the relationship breaks down. In imperfect capital markets, higher investment in tangible assets compete with the investment in working capital requirement. So Fazzari and Petersen (1993) have reported negative relationship of investment in tangible asset with working capital requirement. Hence, any side of relationship is expected between these variables.

PROF: Profitability (PROF) is measured by the ratio of earning before interest and taxes to total assets. Profitability of a firm is positively affected by the investment in WCR (Juan García- Teruel & Martinez-Solano, 2007; Jose, Lancaster, & Stevens, 1996; J. Gill & Johnson, 2010; Raheman & Nasr, 2007 and Sharma & Kumar, 2011). In contrast, (Baños- Caballero et al, 2012; Baños-Caballero et al, 2013 and Deloof, 2003) gave opposite findings that shorter trade cycle stimulates the profitability because firms will be able to generate funds internally and rely less on external sources to finance (Autukaite & Molay, 2011). We expect any side of relationship between the two variables.

LEV: The leverage (LEV) of a firm has significant effect on the working capital investment. Several empirical studies have found it as a statistically significant determinant of working capital requirement (Chiou et al, 2006 and Palombini & Nakamura, 2012). The firms having larger leverage have high cost of funds invested in working capital because these firms have to pay an additional premium for using higher ratio of leverage. Chiou et al. (2006) described that increase in leverage of a firm faces reduction in the measure of working capital management. Following (Azeem, M. M., & Marsap, A., 2015; Cho et al, 2014; Delcoure, 2007; Jõeveer, 2013; Nazir & Afza, 2009a), we measure leverage as ratio of total liabilities to total assets. We expect that leverage has an impact on WCR and we expect negative impact of leverage on WCR.

ZSCORE: Financial distress (ZSCORE) is a situation faced by firms who have difficulty in paying their promised payments to creditors. The financial distress theory states that companies have weakening bargaining position when they have financial distress because they have to effectively follow their credit policies. Companies with higher probability of financial distress face more difficulties in accessing the external capital and anticipated to have lower working capital requirement. ZSCORE is measured by Altman (1968) model as it is used by Begley, Ming, and Watts (1996) in their research study and described that higher ZSCORE means firms are having less probability of insolvency. We expect that Financial distress have an impact on WCR.

FCOST: Following Baños-Caballero et al. (2010), financing cost (FCOST) is measure by the ratio of interest expenses to total debts. Baños-Caballero et al. (2013) described that when external finance is expensive, firms need to pay more to borrow funds; therefore, investment in working capital requirement becomes higher. We expect a relationship between FCOST and WCR.

METHODOLOGY

The sample of this study is extracted from the listed companies of Pakistan Stock Exchange for the period of 2007 to 2013. Following Baños-Caballero et al. (2010), Deloof (2003), Falope & Ajilore (2009), Kwenda & Holden (2014), Lazaridis & Tryfonidis (2006) and Nazir & Afza (2009a), only non-financial companies are considered for analysis in this study because financial firms are regulated differently (Deloof, 2003) and have different investment behavior and different financial characteristics (Falope & Ajilore, 2009). The data is extracted from Balance Sheet analysis of State Bank of Pakistan. The financial data of non-financial firms available for analysis is of 383 firms. The inclusion of firms in final data requires to have the financial statements of those firms for whole sample period from 1st January 2007 to 31st of December 2013. Firms having negative assets, negative sales, and missing required year values will be excluded from the sample. Finally, selected sample will be of 350 firms with 2450 firm year observation. These two standards are essential for making the comparison and to permit the use of balanced panel data because panel data is advantageous in handling the multicollinearity problem and more degrees of freedom (Gujarati, 2003).

Model Specification

This empirical study uses the partial adjustment model to determine the presence of target WCR and to examine the speed of adjustment with which firms adjust toward their target working capital requirement. This model accounts for the endogeniety problem caused by unobservable heterogeneity, the presence of endogeniety in model is important to handle because it biases the estimation results (Hsiao, 1985). This model also allows

empirical estimation of firm and time varying adjustment process (Ramakrishnan, 2012). The partial adjustment model can be represented as follows:

$$NTC_{it} - NTC_{i,t-1} = \gamma (NTC_{it}^* - NTC_{i,t-1}) \qquad 0 < \gamma < 1 \qquad (1)$$

Where NTC_{it}^* is target net trade cycle of firm and NTC_{it} is net trade cycle of firm i at time t. Essentially, when firms deviate from their target WCR (NTC_{it}^*), they usually do not adjust back to target completely due to some market imperfections and adjustment cost. When there is no adjustment cost and other market imperfections firms remain at their target WCR most of the times. So firms' current working capital requirement (NTC_{it}) and target working capital requirement (NTC_{it}^*) must be equal. It depicts that the change in current working capital requirement (NTC_{it}) from previous working capital requirement ($NTC_{i,t-1}$) should exactly being equal to the change expected for firms to be at target at time t. It can be expressed as:

$$NTC_{it}^* = (1 - \gamma_{it})NTC_{i,t-1} + \gamma_{it} \left(\sum_{i=1}^{n} \beta_k V_{kit} + \mu_{it} \right) \qquad (2)$$

The coefficient γ_{it} in equation (2) depicts the coefficient of adjustment or the speed of adjustment. It is described as the percentage of adjustment from current WCR (NTC_{it}) to its target WCR (NTC_{it}^*). The adjustment impact is limited to the condition that $|\gamma_{it}| < 1$ which express that $NTC_{it} \rightarrow NTC_{it}^*$ as $t\rightarrow\infty$. If the value of γ_{it} is 1, it can be interpreted that either firm is at target WCR (NTC_{it}^*) in current period or have completely adjusted in one time period. The firm whose ($\gamma_{it} < 1$), meaning that firms have not completely adjusted to the target WCR (NTC_{it}^*). If ($\gamma_{it} > 1$), meaning that firms are overly adjusted to the target WCR (NTC_{it}^*). Hence the value of coefficient of adjustment depicts the degree of adjustment, higher the value of coefficient, higher will be the speed of adjustment toward target WCR (NTC_{it}^*).

As target working capital requirement (NTC_{it}^*) is dependent variable of the study, depending upon Gross domestic product (GDP), operating cash flow (OCF), Size (SIZE), Fixed asset Ratio (FAR), Profitability (PROF), Leverage (LEV), Financial distress (ZSCORE) and Financing cost (FCOST). So the equation (2) can be described as:

$$NTC_{it}^* = (1 - \gamma_{it})NTC_{i,t-1} + \gamma_{it}\beta_1 GDP_{it} + \gamma_{it}\beta_2 OCF_{it} + \gamma_{it}\beta_3 SIZE_{it} + \gamma_{it}\beta_4 FAR_{it} + \gamma_{it}\beta_5 PROF_{it} + \gamma_{it}\beta_6 LEV_{it} + \gamma_{it}\beta_7 ZSCORE_{it} + \gamma_{it}\beta_8 FCOST_{it} + \mu_{it} \qquad (3)$$

Replacing $(1 - \gamma_{it})$ with λ_o and $\gamma_{it}\beta_k$ with λ_k , equation (3) can be rewritten as:

$$NTC_{it}^* = \lambda_o NTC_{i,t-1} + \lambda_1 GDP_{it} + \lambda_2 OCF_{it} + \lambda_3 SIZE_{it} + \lambda_4 FAR_{it} + \lambda_5 PROF_{it} + \lambda_6 LEV_{it} + \lambda_7 ZSCORE_{it} + \lambda_8 FCOST_{it} + \mu_{it} \qquad (4)$$

Many empirical studies have used GMM as an econometric technique in different research areas as capital structure (Haron, Nor & Ibrahim, 2013; Drobetz & Wanzenried (2006) and working capital management (Baños-Caballero et al., 2012, 2013, 2016). Flannery & Hankins (2013) have explained that generalized method of moments is likely to perform better than the other estimation techniques. We use Arellano & Bond (1991) approach of generalized method of moments which is designed for small T and large N samples, as it fits our sample perfectly. Difference GMM takes the instruments obtained from orthogonality condition that exist between variables' lagged values and disturbances. We do not use system GMM suggested by Blundell & Bond (1998) because it increases the number of instruments in the analysis and it became much higher than the number of cross sections (250 firms) in our data. Roodman (2009) states the rule of thumb regarding the number of instruments used in GMM, that the number of instruments should be less than the number of cross sections (firms). Increased number of instruments weakens the instruments' validity test (Mileva, 2007). Therefore, we opt difference GMM for our analysis. This study also used some statistical test to prove the validity of instruments used in GMM. Hansen test is used to prove

the validity of instruments (Haron et al. 2013; Baños-Caballero et al., 2013). AR (1) and AR (2) test are used to test the presence of serial autocorrelation in the data and F test is used to test the fitness of the model.

RESULTS AND DISCUSSIONS

The empirical results are discussed in two parts; first part describes the speed of adjustment of WCR towards its target WCR and second part describes the determinants of target WCR. The Table 1 shows the descriptive statistics of variables used in the empirical analysis. The average NTC of Pakistani firms is 4.63 days meaning that firms' cash is tied up in the cycle and it needs to finance these days through net income or line of credit. The average GDP growth rate of Pakistan is 3.3% for the period of 2007 to 2013. The average operating cash flow of firm is 31.9%. 55.2% of assets are firm's tangible assets averagely. Average profitability of firms is 23.08%. Leverage Pakistani firms is 67% on average. Averagely the firms are paying 4.27% of financing cost against their leverage. Table 2 shows the correlation coefficients between the variables used in the study. Asteriou and Hall (2007) state that many researchers appear to consider that correlation coefficient of more than 0.8 may cause the problems in estimation. Considering this as the benchmark, Table 2 shows that correlation among the independent variables, as the coefficients are comparatively small except the correlation between FAR and OCF (0.7759). To check the multicollinearity in the data we run VIF (Variance Inflation Factor) test. The VIF results are reported in Table 3. The higher the value of VIF, the higher the collinearity. If there is no collinearity, the VIF is 1. If VIF is more than 10, then the variables are highly collinear (Gujarati, 2003). Hence, correlation and VIF confirm the nonexistence of multicollinearity in our model.

TABLE 1: Descriptive Statistics

	Mean	Median	SD	Minimum	Maximum
NTC	4.6365	22.6814	113.6234	-392.4639	202.3698
GDP	3.3186	3.7000	1.3775	0.3600	4.9900
OCF	0.3190	0.1227	1.5122	0.0052	40.3491
SIZE	14.7936	14.6648	1.5409	10.6350	19.6661
FAR	0.5521	0.5632	0.2005	0.0000	0.9993
PROF	0.2308	0.0915	1.0457	0.0001	26.1016
LEV	0.6738	0.6513	0.4264	0.0152	9.8067
ZSCORE	0.4882	0.3788	0.5025	0.0111	10.4611
FCOST	0.0427	0.0318	0.0456	0.0000	0.3689

Note: This table presents the descriptive statistics of the dependent variable and independent variables used in this study. NTC is net trade cycle which is dependent variable of this study, is a measure of working capital requirement of a firm, and is calculated as sum of number of days' sales outstanding and number of days' inventory outstanding subtracting the number of days payable outstanding. GDP is gross domestic product of a firm measured as annual growth of nominal GDP. OCF is the ratio of earnings before interest and taxes plus depreciation to sales as a measure of cash flow of firm. SIZE is the natural log of total assets as a measure of size of firm. FAR is the ratio of tangible fixed assets over total assets as a measure of tangibility of firm. PROF is the ratio of earnings before interest and taxes over sales used as a measure of profitability of firm. LEV is the ratio of debt to total assets, used as a measure of leverage of firm. ZSCORE is the measure of financial distress and calculated as summation of five factors: X1 (ratio of working capital to total assets), X2 (ratio of retained earnings to total assets), X3 (ratio of net operating profit to total asset), X4 (ratio of market value of capital to book value of debt), and X5 (ratio of sales to total assets). FCOST is the ratio of interest expenses to total debt as a measure of financing cost of firm.

Table III reports the empirical results of equation (4) using difference GMM given by Arellano and Bond (1991) for target WCR. The equation is estimated by using second lag of all independent variables as instruments. The longer lag values are not considered because of its impact on sample size (Baum, Caglayan, & Rashid, 2013). Hansen J Statistic is used to analyze the validity of instruments used in the study because the validity of instruments proves the consistency of difference GMM (Roodman, 2009).

TABLE 2: Correlation Matrix

	NTC	GDP	OCF	SIZE	FAR	PROF	LEV	ZSCORE	FCOST
NTC	1.0000								
GDP	-0.0066	1.0000							
OCF	0.2872***	0.0341	1.0000						
SIZE	-0.0565***	0.0231	-0.1223***	1.0000					
FAR	-0.4195***	0.0370	0.7759***	-0.0456***	1.0000				
PROF	-0.2715***	0.0315	0.4748***	0.1074***	0.0799***	1.0000			
LEV	-0.3453***	0.1241**	0.5188***	-0.1935***	-0.0634***	0.2475**	1.0000		
ZSCORE	0.1893***	0.0216*	-0.2158***	0.1558**	0.0554***		0.5235***	1.0000	
FCOST	0.2137***	0.1390**	0.0206**	0.0878***	0.0673***	0.0066**	-0.0936***	0.0678**	1.0000

Note: This table shows the Pearson correlation coefficients between the variables and its significance level. ***, **, * means it is significant at 1%, 5% and 10% respectively.

Table III reports the result of difference GMM estimation. The lagged dependent variable of WCR (NTC$,%)*) shows the speed of adjustment of WCR. The lower the coefficient, higher the speed of adjustment $(1 - \gamma\$ \% = \lambda Q)$. The value of coefficient (λQ) is 0.3584 and the coefficient value is statistically significant at 1%. The significance of the value depicts that there is an existence of target working capital requirement in Pakistani firms and they make partial adjustment toward target WCR in one period. Hence the speed of adjustment of firms toward its target WCR is 0.6416 (64.16%), meaning that firms are adjusting towards target WCR. This implies that a firm takes 1.6 years to reach at target working capital requirement.

The adjustment is partial because of market imperfections and adjustment cost (Baños-Caballero et al., 2012, 2013). As Lee & Wu (1988) and Peles & Schneller (1989) have explained that current items of balance sheet have lower adjustment cost because firms have control over their current balance sheet items and they can easily manipulate them in short run. So the firms having lower adjustment cost can rapidly adjust toward target WCR but firm with higher adjustment cost can partially adjust toward target WCR.

In case of Pakistan, firms take 1.6 years to completely adjust towards target WCR because firms heavily rely on bank financing. The capital market of Pakistan is not well developed (Saleem, 2003), so banks plays an important role as a source of external finance to corporate sector. When NTC is positive, firms seek banks for funds to finance it. It requires less documentation and less transaction cost to acquire and retire debt with the banks than with the bond markets. So the speed of adjustment depends upon the transaction cost faced by firms. When there is less transaction cost, firms adjust quickly towards target WCR.

TABLE 3: GMM Estimation

Variable	Coefficient	t Statistics	P-Value	VIF

	0.3584	5.1600	0.000	1.60
NTC$_{\$,\%)*}$	-13.6786	-2.5400	0.012	1.45
OCF	1.8195	0.0800	0.939	1.12
GDP	-11.0806	-1.9900	0.048	4.61
SIZE	-43.3399	-0.5500	0.581	1.33
FAR	14.2125	2.0200	0.044	3.37
PROF	-40.4455	-1.1400	0.255	2.04
LEV	61.4265	2.0700	0.039	2.17
ZSCORE	472.4914	3.3300	0.001	1.30
AR(1)FCOST		-5.0200	0.000	
AR(2)		-0.8700	0.386	
Hansen test		61.27	0.010	
F Statistic		11.72	0.000	
Observations		1342		

Note: NTC is net trade cycle which is dependent variable of this study, is a measure of working capital requirement of a firm, and is calculated as sum of number of days sales outstanding and number of days inventory outstanding subtracting the number of days payable outstanding. NTC$_{\$,\%)*}$ is the lagged independent variable representing the speed of adjustment toward target WCR. GMM is used to predict the speed of adjustment of WCR towards target WCR. GDP is gross domestic product of a firm measured as annual growth of nominal GDP. OCF is the ratio of earnings before interest and taxes plus depreciation to sales as a measure of cash flow of firm. SIZE is the natural log of total assets as a measure of size of firm. FAR is the ratio of tangible fixed assets over total assets as a measure of tangibility of firm. PROF is the ratio of earnings before interest and taxes over sales used as a measure of profitability of firm. LEV is the ratio of debt to total assets, used as a measure of leverage of firm. ZSCORE is the measure of financial distress and calculated as summation of five factors: X1 (ratio of working capital to total assets), X2 (ratio of retained earnings to total assets), X3 (ratio of net operating profit to total asset), X4 (ratio of market value of capital to book value of debt), and X5 (ratio of sales to total assets). FCOST is the ratio of interest expenses to total debt as a measure of financing cost of firm.

The second section of empirical results discuss the determinants of working capital requirement. The results are consistent with our hypothesis. The economic growth (gross domestic product) is statistically significant at 1% in determining WCR as supported by Azeem, M. M., & Marsap, A. (2015), Baños-Caballero et al., (2013) and P Teruel (2007). Operating cash flow is negatively and significantly related to WCR as supported by Azeem, M. M., & Marsap, A. (2015), Mansoori & Muhammad (2012) and Valipour, Morad, & Farsi (2012). We do not find size of firm and investment in fixed asset as significant in determining WCR, which is in line with Baños-Caballero et al., (2013), Fazzari and Petersen (1993) and Mansoori & Muhammad (2012) and Cuong, N. T., & Nhung, N. T. H. (2017) . We find profitability, leverage, probability of financial distress, and financing cost of firm as statistically significant determinants of WCR. These findings are supported by Afeef, M. (2011), Baños-Caballero et al., (2010, 2013); Chiou et al. (2006); Cuong, N. T., & Nhung, N. T. H. (2017); Nazir & Afza (2009a); Gill & Johnson (2010) ; Raheman & Nasr (2007) respectively.

The Hansen test coefficient (61.27) is significant at 1% significance level, meaning that the instruments used in the study are valid. The AR (1) result shows that the error terms of differenced equations are serially correlated with its first lag and AR (2) results shows that the error terms of equations are not serially correlated at second order. The model equation is estimated at the two lags of independent variables, so it is important to have no serial autocorrelation on the second lag of variables. The result of F statistics (11.72) is significant at 1% significance level, meaning that it rejects the null hypothesis that all the coefficients of the determinants of target WCR are jointly equal to zero. Hence it proves the fitness of the model.

CONCLUSION

Under the dynamic modelling, this study confirms the existence of optimal WCR among firms listed on Pakistan Stock Exchange. The study examined the factors affecting WCR and its speed of adjustment toward target WCR, using Difference Generalized Method of Moments technique. This study contributes to empirical knowledge on WCR in several ways, including the treatment of endogenity and unobservable heterogeneity problems. The sample of this study includes the non -financial Pakistani firms over the period of 2007 to 2013, which enables us to add value to the literature of WCR and its speed of adjustment.

The empirical analysis show that the speed of firms towards its target WCR is quick (1.6 years), because its easier for firms to manipulate components of WCR as its part of current balance sheet items. Our results show that the level of economic activity, operating cash flow, profitability, leverage, financial distress, and financing cost significantly affects WCR of the firm.

The empirical findings of this study have implications on different stakeholders, like corporate managers to keep an eye on speed of adjustment a firm follow to reach at target WCR which help them to anticipate and cope up with aberration of working capital). This study helps policy makers as SECP (Securities and Exchange commission of Pakistan) and regulatory authority as SBP (State Bank of Pakistan) to develop early warning system for firms to avoid bankruptcies. They can bring the reforms in capital market of Pakistan to facilitate firms to have external finance. This study helps financial investors to make them understand about the firm's ability to reach at target WCR. Shareholders and creditors may avoid investing in the firm that are not capable to manage WCR and are prone to bankruptcy. Shareholders can participate in annual meetings of firms and influence managers' decisions. This research is also helpful for researchers and academicians because the dynamic behavior of WCR and its versatile dimensions are still open to research. They can also extend this study to find the determinants of speed of adjustment affecting WCR and their impact on macroeconomic factors.
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