

# **An Analysis of the Factors Determining the Working Capital Requirement for Non-Financial Companies**

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*The main purpose of this study is to investigate the factors determining the working capital requirement of firms. Companies require working capital to improve the capacity, expand the business volume, reduce the risk of failing to meet their financial obligations, and become profitable and efficient. An inadequacy of the working capital causes interruptions in the business operations. This study investigates the determining factors of the working capital requirements of non-financial companies. The research analysis was done on publicly traded firms, and the data was collected from BIST-100 in Turkey for the years between 2011 and 2016. In this study, working capital requirement was used as the dependent variable. Factors such as profitability, leverage, growth, firm size, age and industry were tested as determining factors. PLS-SEM technique is employed in the research. Results reveal that two explanatory variables- company's leverage, and profitability- are significant factors that determine the companies' working capital requirements for the period under study.*

**Key words:** *Working Capital Requirement, Profitability, Leverage, Growth, Size, Age, Industry*

## **Introduction**

Managing the financial needs and operations of any business is very important to the management of the company, as it has an effect on both the company's profits and liquid assets. The literature on business finance focuses on three key areas. These are capital budgeting, capital structure, and working capital management. Capital budgeting and capital structure concerns long-term investment and financing decisions. Working capital management can be expressed as the short-term investments of firms and the selection and management of financial strategies in these investment decisions.

If there is not enough working capital to fulfill the obligations of a company, it may cause financial insolvency, legal problems, and liquidation of assets (Hawley, 2015). For this reason, it is very important for all enterprises to have sufficient management of their working capital.

The amount of financing an entity needs to carry out its day-to-day business activities is a working capital requirement, and it is the minimum amount of resources that a company needs to effectually meet the usual costs of business operations. There are several factors in determining working capital requirement and some studies such as Nazir and Afza (2009), Gill (2011), and Saarani and Shahadan (2012) have examined these factors. The purpose of these studies was to designate the determinants of the working capital requirement. On the other hand, many studies that have been conducted in the area of working capital (Deloof, 2003; Raheman & Nasr, 2007; Perkovic, 2012) have examined the relationship between firm profitability and working capital. Nazir and Afza (2009) and Gill (2011) have focused on determining the factors of working capital requirements.

Since the identification of working capital requirements is of great importance in businesses, the purpose of this study is to investigate the working capital requirements and determining factors in non-financial companies in BIST 100 by using the Partial Least Squares – Structural Equation Model (PLS-SEM) technique.

## **Literature Review**

The working capital management as the management of current assets such as cash, marketable securities, trade receivables and inventories that a firm has and the financing (specially, current liabilities) necessity to support current assets (Van Horne and Wachowicz, 2005).

According to Palombini and Nakamura (2012), any researcher who conducts an overview of the corporate finance literature will find no robust, widely accepted theory about working capital management. Saarani and Shahadan (2012) put forward that for working capital management, the closest relevant theory is the Pecking Order Theory, popularized by Myers and Majluf (1984). According to the theory, companies should first use the funds necessary for financing their investments from internal sources. If internal resources are inadequate, firms tend to use debt to meet their funding needs. If the companies cannot meet their funding requirements with the use of debt, the issue of shares should cover the fund requirement in the company. In theory, internal resources are prioritized over external resources. So, this theory explains why the most profitable firms use less debt because these companies are highly profitable and do not need external sources. Enterprises with lower profitability rates export debt (Yakar, 2011).

Several aspects of such working capital practices around the world been discussed in the literature. Some of these studies attempted to determine the effect of the working capital on the factors, while some others examined many factors that determined the working capital and its requirements.

Nazir and Afza (2009) used panel data to study 132 firms from 2004 to 2007 in Pakistan, and used the OLS (ordinary least squares) regression model to find the determinants of working capital. Authors designated working capital as a dependent variable, operating cycle, level of economic activity, operating cash flow, sales growth, return on assets, Tobin's q, leverage, size and industry as a determinants of working capital. According to the results, operating cycle, leverage, ROA, and Tobin's q are internal factors that significantly affect working capital requirements.

BintiMohamad and MohdSaad (2010) investigated the impact of market valuation and profitability on working capital management during the period 2003–2007 with a sample of 172 firms in Malaysia. The authors applied the Tobin Q, return on asset, and return on invested capital as dependent variables, and used cash conversion cycle, current asset to current liability ratio, current asset to total asset ratio, current liability to total asset ratio, and total debt to total asset ratio as independent values. Correlation and multiple regression analysis results proved that working capital variables and the firm's performance have a negative relationship.

Another study that is effective in this regard was performed by Saarani and Sahadan (2012). The authors used a sample of 285 firms for the period 2006–2008 in Malaysia. To determine the factors of working capital requirements, the authors used working capital for a dependent value, assets tangibility, profitability, debt, growth, non-debt tax shield, size, industry type, and age as independent values. According to the results of the analysis of the structural equation model, working capital requirement factors were found to be debt, profitability, non-debt tax shield, and tangibility of assets.

Perković (2012) investigated the 131 manufacturing companies listed in Bosnia and Herzegovina in 2005–2009 by using Pearson's correlation test and regression analysis. According to his findings, while the cash conversion cycle and financial leverage have a significant negative impact on the profitability of the company, the impact of the size of the firm (sales) is significant and positive.

Since the implementation of this thesis will be on the publicly traded non-financial companies in Turkey, studies about working capital management conducted in Turkey were reviewed in detail. The studies conducted in Turkey are summarized below.

Uyar (2009) obtained data from the Istanbul Stock Exchange for the year 2007. The cash conversion cycle is employed as a measure of the working capital. Return on assets and return on equity are used for profitability. The results showed that the cash conversion cycle has a significant negative relation with the firm size and the profitability.

Akbulut (2011) explored the profitability relation between the working capital management from 2000 to 2008, in the ISE manufacturing sector. In the study, working capital management is measured by cash conversion cycle and profitability is measured by the return on assets. Regression analysis has shown that there is a negative relationship between working capital management and profitability.

The other study done in Turkey was done by Khajeh (2014), who examined the effect of 18 firms belonging to the textile and leather sector from 2007 to 2012, regarding firm profitability of working capital management, using panel data analysis. According to the results of the study, there is a significant relationship between stock turnover, debt turnover, and gross profit.

## **Methodology**

### ***Data source***

Data for this study were sourced from the annual financial reports of the companies, BIST 100. In all, this study utilizes data from 70 non-financial firms for the 6- year period 2011-2016. So, the total of 426 observations are included in the analysis.

### ***Variable description and expectations***

Dependent Variable: The working capital requirement is the minimum amount of resources that a company needs to effectively cover the costs and expenses essential to operate the business (Gill, 2011). As seen in some of the studies examined earlier, CCC was used to gauge the efficiency of working capital, such as Sharma and Kumar (2011), Saarani and Shahadan (2012), Palombini and Nakamura (2012), and Goel and Sharma (2015). The working capital to total assets ratio gauge the ability of a company to cover its short-term financial obligations by comparing its total current assets to its total assets. Qurashi and Zahoor (2017) and Abbadi and Abbadi (2013) used this formula to try to find the determinants of working capital requirements. Other measures used to measure working capital requirement are working capital to expenses and working capital to revenue Saarani & Shahadan, 2012).

Independent variables: Profitability, leverage, growth, firm size, age and industry are employed as independent variables.

Wang, Feng, and Lawton (2015) indicated that a multi-dimensional perspective reflects firm performance more comprehensively than a single measure of profitability. There are many different ways and indicators to analyze profitability such as; return on equity, return on asset and gross operating profit. Nazir and Afza (2009), Sharma (2011), Gill (2011), Saarani and Shahadan (2012), Abbadi and Abbadi (2013), Agha (2014), Keskin and Gökalp (2016) used

ROA to measure profitability. The return on equity ratio is a profitability ratio that measures how much profit each equity shareholder's capital generates. To gauge the profitability Saarani and Shahadan (2012), Naser, Neseibeh and Al-Hedayya (2013) used return on equity. Lazaridis and Tryfonidis (2006), Perković (2012), Dong and Su (2010) employed gross operating profit to measure profitability.

Leverage is the financial debt ratio, which is used in order to bring into connection with the external financing of the company and total assets (Abbadi & Abbadi, 2013). Deloof (2003), Raheman and Nasr (2007), Nazir and Afza (2009), Gill (2011), Sharma and Kumar (2011) used the total debt divided by total assets to calculate the leverage.

Studies show that more growth opportunities will increase the cash hold and short-term investment of a firm (Abuzayed, 2012). Two different indicators (sales growth and growth rate of GDP) were used to measure growth in this study. Deloof (2003), Appuhami (2008), Nazir and Afza (2009), Sharma and Kumar (2010), Palombini and Nakamura (2011), Gill (2011), Naser, Nuseibeh and Al-Hadeyya (2013), Goel and Sharma (2015) used sales growth to measure growth. Nazir and Afza (2009), Abbadi and Abbadi (2013) used growth rate of GDP to measure growth. Uyar (2009), Nazir and Afza (2009), Gill (2011), Sharma and Kumar (2011), Abbadi and Abbadi (2013), used natural log of total assets to measure of firm size.

Abor and Biekpe (2009) and to Goel and Sharma (2015) used firm age in their researches as an independent variable.

Firms in diversified sectors have different capital structures, different transactions, different products, different credit policies, different customers and different markets. The elements as a whole, affect working capital management. For this reason, it can be said that the type of industry influences the working capital management (Naser, Nuseibeh, & Al-Hadeyya, 2013). Gill (2011) and Naser, Nuseibeh and Al-Hadeyya (2013) used industry as an independent variable. The means by which the various variables adopted in this study are computed are as shown in Table 1.

**Table 1: Measurement of the Variables**

Variables	Abbreviation	Formulas
Working capital requirement	CCC	Number of days of accounts receivable + Number of days of inventory – Number of days of accounts payable
	WCR_T.A	(Current Asset- Current Liability) / Total Assets
	WCR_Exp	(Current Asset- Current Liability) / Expenses
	WCR_Rev	(Current Asset- Current Liability) / Revenue
Profitability	ROA	Net income of the firm / total assets
	ROE	Net income of the firm / shareholder's equity
	GrsOpPr	(Sales - COGS) / (Total Assets - Financial Assets)
Leverage	LEV	Total Debt / Total Assets
Growth	S.GR	(This year's sales – previous year's sales)/previous year's sales
	GDP	(This year's GDP - previous year's GDP)/ previous year's GDP sales
Firm Size	SIZE	The natural log of total assets of firm
Age	AGE	Year under study - Year of incorporation
Industry	INDS	manufacturing firms=1; non- manufacturing=0

### *Hypothesis*

There are six hypotheses developed based on previous studies. The following hypotheses and supported studies are detailed.

Hypothesis	Reference Literature
H <sub>1</sub> : There is a relationship between Profitability and Working Capital Requirement. (+/-)	Nazir and Afza (2009), Abbadi and Abbadi (2013), Palombini and Nakamura (2012)
H <sub>2</sub> : There is a relationship between Growth and Working Capital Requirement. (+/-)	Gill (2011), Naser, Nuseibeh and Al-Hadeya (2013), Appuhami (2008), Nazir and Afza (2009), Saarani and Shahadan (2012)

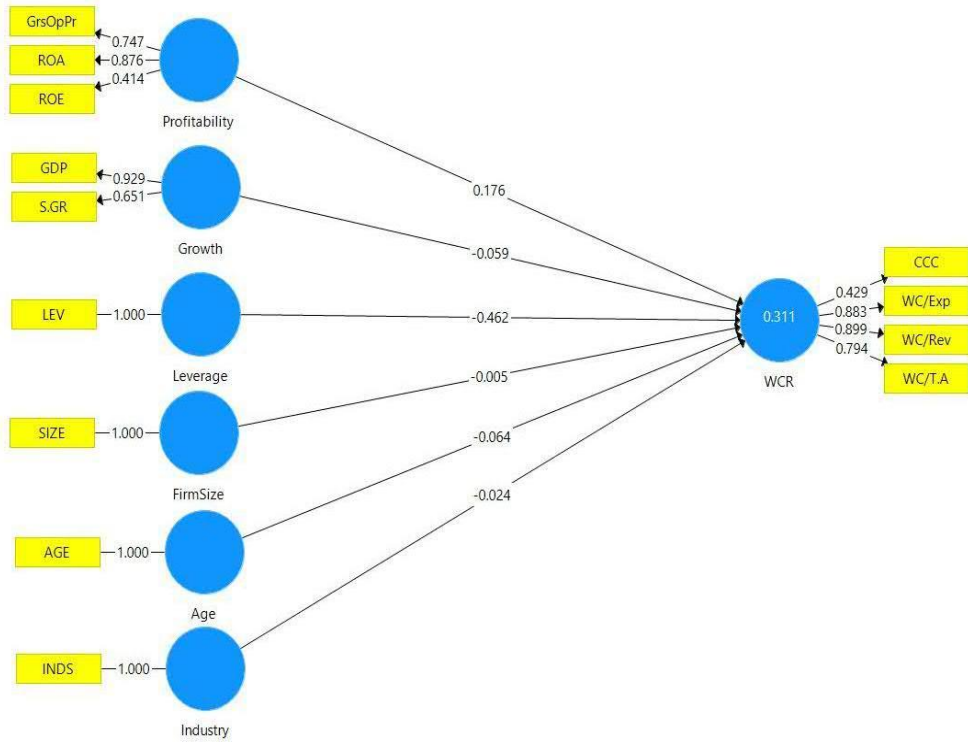
H <sub>3</sub> : There is a relationship between Leverage and Working Capital Requirement. (+/-)	Nazir and Afza (2009), Abbadi and Abbadi (2013), Palombini and Nakamura (2012)
H <sub>4</sub> : There is a relationship between Size and Working Capital Requirement. (+/-)	Uyar (2009), Gill (2011), Abbadi and Abbadi (2013)
H <sub>5</sub> : There is a relationship between Age and Working Capital Requirement. (+/-)	Goel and Sharma (2015)
H <sub>6</sub> : There is a relationship between INDS and Working Capital Requirement. (+/-)	Naser, Nuseibeh and Al-Hadeya (2013)

### ***Model***

GrOpPr, ROA, and ROE are the indicators used in the measurement model of profitability. GDP and S.GR are the indicators used in the outer model of Growth. CCC, WCR\_T.A, WCR\_Rev, and WCR\_Exp are the indicators used in the measurement model of working capital requirement. Leverage, firm size, age, and industry have only one indicator in the measurement model.

To test the hypothesis we implemented the partial least squares-structural equation modeling technique (PLS-SEM). The data analyzed using SmartPLS® software version 3.2.6. Structural Equation Model is used to test the causal relationships between latent variables and observed variables through models. The aim of the SEM is to determine whether the theoretical model is supported by the data or whether the model conforms to the data. SEM studies are generally based on theory (Doğan, 2015). Because of the frequent use of SEM analysis, measurement errors must be taken into account, unlike regression analysis; it is thought to give more accurate results than the regression analysis (Alkış, 2016). Titman and Wessels (1988), Maddala and Nimalendran (1995) and Saarani and Shahadan (2012) were applied SEM in corporate finance.

**Figure 1: PLS algorithm results (factors and items)**



## Result and Discussion

### *Analysis of measurement model reliability and validity*

In order for a measurement model to have satisfactory internal consistency reliability, each construct must exceed the composite reliability (CR) threshold of 0.7. Outer loadings looked to check indicator reliability and 0.70 or higher is preferred if it is an exploratory research, 0.4 or higher is acceptable (Hulland, 1999). The convergent validity of measurement model is evaluated by investigate its average variance extracted (AVE) value. Convergent validity is sufficient when there are at least 0.5 or more average variance (AVE) values in the constructs.



**Table 2: Results of Measurement Model- Convergent Validity**

Constructs	Outer Loadings	Average Extracted Variance (AVE)	Composite reliability (CR)
WCR	0.429 (CCC)	0.61	0.79
	0.883 (WCR/EXP)		
	0.794 (WCR/T.A)		
	0.899 (WCR/REV)		
Profitability	0.876 (ROA)	0.50	0.73
	0.414 (ROE)		
	0.747 (GOP)		
Growth	0.651 (S.GR)	0.65	0.85
	0.929 (GDP)		
Leverage	1.00	1.00	1.00
Age	1.00	1.00	1.00
FirmSize	1.00	1.00	1.00
Industry	1.00	1.00	1.00

***Analysis of the Structural Model***

The coefficient of determination, R<sup>2</sup>, is 0.431 for the WCR endogenous latent variable. R<sup>2</sup> means the amount of described endogenous latent variables variance in the structural model. The R<sup>2</sup> value is normed between 0 and +1 and reflects the amount of described variance in the construct (Hair, Hult, Ringle, & Sarstedt, 2017). The value 0.431 in the Profitability, Leverage, Growth, Firm Size, Age, Industry rows and the WCR column is the standardized path coefficient of the relationship from those six variables to WCR. This means that the six latent variables (Profitability, Leverage, Growth, Firm Size, Age and Industry) moderately (Kwong & Wong, 2013) explain 43.1% of the variance in WCR.

According to previous studies, the path coefficient must be at least 0.1 a certain effect accounts within the model (Hashim, 2012) (Hair, Hult, Ringle, & Sarstedt, 2017). In this case, by interpreting the graph, we can say that the leverage has a negative impact on WCR. Profitability also affects the WCR positively.

**Table 3: Results of Hypothesis Testing**

Hypotheses	Path Relationship	B- Coefficient	T-statistic	Supported
H <sub>1</sub>	Profitability and WCR	0.176	3.785	Yes
H <sub>2</sub>	Growth and WCR	-0.059	0.909	No
H <sub>3</sub>	Leverage and WCR	-0.426	10.324	Yes
H <sub>4</sub>	Firm size and WCR	-0.005	0.125	No
H <sub>5</sub>	Age and WCR	-0.0064	1.992	No
H <sub>6</sub>	Industry and WCR	-0.426	0.521	No

Based on the research findings, WCR identified as being influenced by profitability ( $\beta = 0.176$ ,  $t = 3.785$ ,  $p < 0.05$ ). This finding is in line with previous studies (Nazir & Afza, 2009; Saarani & Shahadan, 2012; Abbadi & Abbadi, 2013). These results means that the more profitable companies are able to manage their working capital better. Besides, the better the company manages its working capital, the more profitable is the company.

From the analysis, Working Capital Requirement is not influenced directly by Growth ( $\beta = -0.059$ ,  $t = 0.909$ , not significant). These results are consistent with previous studies results (Nazir & Afza, 2009) (Saarani & Shahadan , 2012).

Based on the research findings, WCR was identified as being influenced by Leverage ( $\beta = -0.462$ ,  $t = 10.324$ ,  $p < 0.05$ ). This result is supported in other studies (Nazir & Afza, 2009; Onalapo & Kajola, 2015; Saarani & Shahadan,2012). These results mean that by increasing the ratio of debt to total assets, companies should pay more attention to effective management of working capital in order to prevent excess capital in accounts receivable and inventories. This means that the financial manager can manage the working capital management by reducing the company's debt level to prevent unnecessary tying up of capital in accounts receivable and stocks. As comprehensively discussed in the literature, this outcome is in accordance with the pecking order theory.

From the analysis, working capital requirement is not influenced directly by Firm Size ( $\beta = -0.005$ ,  $t = 0.125$ , not significant). This finding is in line with previous studies (Nazir & Afza, 2009; Saarani & Shahadan, 2012).

Working capital requirement is influenced directly by Age ( $\beta = -0.064$ ,  $t = 1.992$ ,  $p < 0.05$ ). These results are consistent with previous study results (Nazir and Afza, 2009; and Goel and Sharma, 2015)

Working capital requirement is not influenced directly by Industry ( $\beta = -0.462$ ,  $t = 0.521$ , not significant). These results are consistent with previous study results (Saarani & Shahadan, 2012).

## Conclusion

The study finds that profitability, age and leverage factors, which are influencing the working capital requirements significantly. So, it can be concluded that the listed companies in BIST their working capital requirements based on the profitability, age and leverage. For age, results are in accordance with the earlier studies of Nazir and Afza (2009) and Goel and Sharma (2015). For profitability, results are in accordance with the earlier studies of Nazir and Afza (2009), Saarani and Shahadan (2012) and Abbadi and Abbadi (2013). For leverage, results are in accordance with the earlier studies of Nazir and Afza (2009), Saarani and Shahadan (2012), Onaolapo and Kajola (2015). In addition, if they manage these factors in a more efficient way, it may be the result that companies can improve their profitability.

On the other hand, contrary to expectations, this study could not confirm statistically the importance of four factors- growth (Nazir and Afza, 2009; Saarani and Shahadan, 2012), age (Saarani and Shahadan, 2012), firm size (Nazir and Afza, 2009; Saarani and Shahadan, 2012) and industry (Saarani and Shahadan, 2012) as determinant factors of working capital requirements. These results are in accordance with the earlier studies.

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