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The Effect of Working Capital Management on Profitability in Emerging Countries: Evidence from Turkey

Samet Evci and Nazan Şak

Additional information is available at the end of the chapter

Abstract

This study aims to reveal the tradeoff between working capital components and firm's profitability by using the data of the firms listed on Borsa Istanbul Industry Index in Turkey. Annual data of 41 firms are used for the period 2005–2016 in the study. The working capital components and firm's profitability tradeoff was examined via the fixed effects panel regression model. Dependent variable is defined as return on assets; independent variables are cash conversion cycle, inventory conversion period, and payables deferral period; and control variables are sales growth, the ratio of short-term financial debts to short-term debts, and the ratio of fixed assets to total assets. Findings show the existence of tradeoff working capital management profitability. A negative relationship exists between return on assets and payables deferral period, cash conversion cycle, the ratio of short-term financial debts to short-term debts, and the ratio of fixed assets to total assets while return on assets is positively related to inventory conversion period and sales growth.

Keywords: working capital management, profitability, panel data analysis, emerging countries, Turkey

1. Introduction

Global economic integration for developing countries through economic liberalization and democratization is accepted as the best way to overcome destitution and discrimination [1]. At this point, the industry sector plays a significant role. According to the World Bank data, the share of the industry sector in the gross domestic product (GDP) of emerging countries such as China, India, and Brazil in 2016 is 40, 29, and 21%, respectively [2]. For Turkey, which is among the emerging countries, the industry sector is important for the country economy in terms of value added export and employment [3]. According to the World Bank data, the industry

sector's share in GDP is 32% [2]. The share of the industry sector in exports is around 92% [4]. In this case, the industry sector will remain important for the Turkish economy in the future.

The industry sector, which plays a key role in the Turkish economy, is faced with many problems such as lack of qualified workforce, inadequacy of infrastructure and technology, weak competition power, and difficulties in marketing and financing. The financing problem is one of the most important problems faced by these firms. These firms need to be able to use their existing resources effectively and be self-sufficient because of the scarcity of funding resources and the insufficient accumulation of capital. Working capital, which is seen as the lifeblood of a business, has an important role in the return of the owner's reckoning, and has a decisive influence on liquidity [5], is important at this point.

Firms need working capital to begin its business operations, carry on its activities efficiently, and meet its short run obligations [6]. Working capital management is concerned with the day-to-day activities rather than long-term investment decisions [7]. Working capital is a part of firm's current assets, which are converted into cash within a year or less [8]. In this sense, working capital components (WCC) are cash, cash equivalents, inventories, accounts receivables, and accounts payables.

Investment in the working capital components is important for all industrial enterprises to be powerful financially. A firm can collect its receivables in a short time and restrict credit sales to reduce account receivables and increase cash inflows. However, rigid sales policies and low credit sales would lead to loss of sales, thus causing profits to fall [6]. On the other hand, high inventory levels and flexible credit sales policy can contribute to increased sales. Because sales on credit allow the customer to examine the product before paying, it may increase sales [9]. There are some advantages to work with high inventory levels such as preventing customer losses caused by not having enough stock level and protecting against price volatilities [10]. However, the high inventory and loose trade credit policies lead to the locking of the money to the working capital [9]. In this context, firms that invest heavily in inventory and accounts receivables may be exposed to low profits [11]. Another component that has an impact on the working capital requirement is accounts payables. Deferment of payments to suppliers can enable the firm to evaluate the product bought and may be a cheap and flexible funding source. But, postponing payments can be expensive, if the firm has got a discount for early payment [9]. In this case, the level of accounts payables of the firm may affect the firm's profitability.

The style of WCM may have a considerable influence on the profitability, risk, and liquidity of the firm [12]. The firm that invests more in current assets is more liquid than a firm that does not invest. This will reduce the firm's liquidity risk, while decreasing overall rate of return, because the return of current assets is less than the return of other assets [13]. While lower investment in the working capital expressed as aggressive working capital policy is associated with higher returns and higher risk, more investment in the working capital expressed as conservative working capital policy is associated with lower return and lower risk [14]. The firm has to choose between aggressive and conservative working capital policies depending on its purpose [15].

Effective WCM is a significant factor affecting the survival of the firm, the continuity of its activities, and the maintenance of liquidity and profitability [16]. Excessive working capital

like inadequate working capital has led many businesses to fail and prevent their growth [17]. WCM is important due to the effect on profitability of firm, firm's risk, and the firm value [18]. In this context, this study aims to reveal the tradeoff between WCC and firm's profitability by using the data of the firms listed on Borsa Istanbul (BIST) Industry Index in Turkey.

This study, which investigates the impact of the WCM on the profitability of Turkish industrial firms, is considered to contribute on the determination of working capital investment levels of these firms, determination of the distribution among the working capital components, effective use of scarce resources, and resource supply and sustainability of future investments by applying a working capital that will increase the profitability. There are a number of studies covering the developed countries in the literature, while there are limited studies covering the emerging countries. It is anticipated that the study will contribute to the literature in terms of comparing the relationship between the WCM and profitability of industrial firms of emerging countries like Turkey. It is thought that the study with these aspects will be beneficial to both managers and researchers.

2. Literature review

There are studies in the literature that examine WCC-firm's profitability tradeoff in terms of different countries and different sectors. The findings obtained from these studies vary depending on the method and data set used. Some of these studies are summarized in **Table 1**.

Authors	Sampling	Variables	Method	Results
In [9]	Hindalco Industries Limited in India	Dependent variables: Profit before tax to total assets ratio Independent variables: Current ratio, liquid ratio, working capital ratio, inventory turnover ratio, receivables turnover ratio and working capital to total assets	Correlation analysis and a multivariate regression model	Findings show that the working capital components are related to profitability of Hindalco Industries Limited
In [21]	Firms in the manufacturing sector listed on BIST in Turkey	Dependent variables: Gross profit ratio Independent variables: The number of days accounts receivable, the number of days of inventory, the number of days accounts payable and net trade cycle Control variables: Financial fixed assets, sales growth, financial liabilities	Panel regression analysis	The relationship between the profitability and inventory turnover ratio, receivables turnover ratio, payable deferral period and net trade cycle is negative
In [25]	Brazilian used companies	Dependent variables: Return on assets, return on sales and return on equity Independent variables: Cash conversion efficiency, debt ratio, days of working capital, days receivable and days inventory	Multiple linear regression	The study shows a negative relationship for return on assets and return on sales with days inventory. Also return on assets has a negative relationship with debt ratio.
In [28]	Manufacturing firms listed in Centre for	Dependent variables: The profit before depreciation tax accounts return on assets	Correlation analysis, panel	The study shows a positive relationship for inventory days

Authors	Sampling	Variables	Method	Results
	Monitoring Indian Economy	Independent variables: Debtors days, inventory days, creditors days, cash velocity, working capital policy, net working capital leverage, size, current ratio	regression analysis	and debtors days with the profitability.
In [22]	Manufacturing corporations listed on Dhaka Stock Exchange in Bangladesh	Dependent variables: Return on asset and net profit margin Independent variables: Receivables Collection Period, inventory turnover period, payable deferral period, cash conversion cycle, current ratio and quick ratio	Single regression analysis	The meaningful relationship exists between the firms' profitability and the working capital components
In [20]	Production and trade firms listed on BIST in Turkey	Dependent variables: Gross profit ratio Independent variables: Inventory turnover ratio, receivables turnover ratio, payable deferral period, net trade cycle Control variables: Ratio of financial fixed assets, firm size, financial leverage ratio	Panel regression analysis	The relationship between gross profit ratio and independent variables is negative
In [27]	Firms in textile industry listed on Karachi Stock Exchange in Pakistan	Dependent variables: Profitability Independent variables: Cash management, account receivables, inventory and account payables	Regression analysis	Cash, account receivables and inventory except accounts payables have a positive relationship with profitability.
In [29]	Manufacturing firms listed on BIST in Turkey	Dependent variables: Return on assets, tobin-q Independent variables: Cash conversion cycle, inventory conversion period, account receivable period, accounts payable period and current ratio	Panel regression analysis	Return on assets has a negative relationship with account receivable period and cash conversion cycle while having a positive relationship with current ratio.
In [36]	Manufacturing firms in Egypt, Kenya, Nigeria and South Africa	Dependent variables: Net operating profit Independent variables: Number of days accounts payable, number of days inventories, the number of days accounts receivables and cash conversion cycle Control variables: firm size board size.	Panel regression analysis	Cash conversion cycles have a negative relationship with net operating profit
In [19]	Firms in the retail sector listed on BIST in Turkey	Dependent variables: Gross profit ratio Independent variables: Inventory turnover ratio, receivables turnover ratio, payable deferral period, net trade cycle	Panel regression analysis	The existence of firms' profitability- working capital components tradeoff is invalid.
In [8]	Cement companies in Kenya	Dependent variables: Firm's profitability Independent variables: Cash conversion cycle Control variables: Sales growth, depth ratio and current ratio	Multivariate regression model	Cash conversion cycle is negatively related to firm's profitability

Authors	Sampling	Variables	Method	Results
In [6]	Indian construction companies	Dependent variables: Return on assets Independent variables: Quick ratio, current ratio, debtors turnover, creditors turnover	Correlation and regression analysis	Working capital ratio is negatively related to firm's profitability
In [24]	Cement firms listed on Karachi Stock Exchange in Pakistan	Dependent variables: Return on assets Independent variables: Current Ratio, quick ratio, net current assets to total assets, working capital turnover ratio, inventory turnover ratio	Panel regression analysis	Findings show that the working capital components is related to the profitability of cement firms
In [23]	Manufacturing and conglomerates firms listed in Nigeria	Dependent variables: Return on assets and return on equity Independent variables: Average payment period, average collection period and inventory turnover period Control variables: Firms' size and leverage	Panel regression analysis	Working capital components except inventory turnover are significant determinants of firm's profitability. Also the negative relationship is observed between average collection period and profitability
In [26]	Firms in Cement Industries listed on Bombay Stock Exchange in India	Dependent variables: Return on Investment Independent variables: Working capital turnover ratio, fixed asset turnover ratio, debtors turnover ratio, inventory turnover ratio, quick ratio, current ratio, firm's size, leverage ratio	Multiple regression analysis	There is not a significant effect of working capital ratio, debtor's turnover ratio, fixed assets turnovers ratio, inventory turnover ratio except current ratio, quick ratio on return on investment
In [34]	Firms in food sector listed on BIST in Turkey	Dependent variables: Return on assets Independent variables: The number of days accounts receivables, the number of days of inventories, the number of days accounts payable, cash conversion cycle Control variables: Current ratio, firm's size, leverage ratio	Panel regression analysis	The number of days accounts receivables and current ratio have a negative and meaningful effect on firms' profitability. But the negative insignificant effect is observed between cash conversion cycle and firms' profitability

Table 1. Overview of the studies about WCC-firm's profitability tradeoff.

3. Methodology

In the study, the impact of WCM on profitability is analyzed via panel data regression model. The panel data models, which allow more consistent estimation results by including both time and cross-sectional properties, are modeled in different ways according to effect of the cross section and time properties [30]. In this context, the models in which both constant and slope parameters are constant with respect to cross section and time unit are called as pooled panel data models and are defined as follows:

$$Y_{it} = \alpha_0 + \sum_{k=1}^{K} \alpha_k X_{kit} + e_{it}; \ \ i = 1, 2, \ldots N; \ \ t = 1, 2 \ldots, T \tag{1}$$

The subscript i in the model is a cross-sectional unit such as an individual or a firm; t represents the time dimension. Y_{it} is the dependent variable, and X_{kit} denotes k independent

variables with cross sectional unit i and time t. In the model, α_k is the vector of the (kx1) size parameter that does not vary according to the i cross-section unit and time dimension, and α_0 is also the constant term. e_{it} is the error term that is independent and identically distributed with 0 mean and σ^2 variance for all i cross-section units and t time periods (IID) [31].

If both the time and the cross-section are affecting the model, the panel data model takes the name of the two-way panel data model. The model is called as a one-way panel data model if the effect is only a cross-sectional unit or a time effect.

In the case where unit and/or time effect cause changes in some or all of the parameters of the model, the panel data models are named fixed effects panel data model. If the fixed effects model is one way, model is shown as following:

$$Y_{it} = \alpha_i + \sum_{k=1}^{K} \alpha_k X_{kit} + e_{it} \tag{2}$$

Similar to previous model, Y_{it} is the dependent variable and X_{kit} denotes k independent variables with cross sectional unit i and time t. α_i is the individual specific coefficients for the cross-sectional unit, while the t time dimension is constant. Similarly, α_k is the vector of the (kx1) size parameter that does not vary according to the i cross-section unit and t time dimension. The model is also named as covariance model or dummy variables model. Unobserved individual effects are achieved by using specific dummy variables:

$$Y_{it} = \mu_i D_N + X'_{it}\beta + e_{it} \tag{3}$$

D_N is the vector of dummy variables [30]. If the model contains both cross section and time effects, the two-way fixed effect model is determined as the following model:

$$Y_{it} = \mu_i + \lambda_t + X'_{it}\beta + e_{it} \tag{4}$$

X_{it} is the vector of independent variables. In the two-way fixed effects models, μ_i is the individual specific coefficients, λ_t is the time effects, and β is also the vector of coefficients [30].

The model in which the cross section and/or time effect is included as a component of the model error term is defined as the random effects model. If the random effects model is one way, model is generally expressed as:

$$Y_{it} = \alpha_i + \beta X_{it} + e_{it} \tag{5}$$

$$\alpha_i = \alpha_0 + \mu_i \tag{6}$$

$$u_{it} = \mu_i + e_{it} \tag{7}$$

As explained in the fixed effects model, Y_{it} is dependent variable, and X_{it} is the vector of independent variables. Individual effects consist of a combination of α_0, which does not have unit and time effects, and μ_i, which contains the specific cross section effects. The cross section effects and e_{it} error term are added to the model as a component of u_{it} error term, and the

model is predicted with act of knowledge [31]. If both the specific unit effects μ_i and the specific time effects λ_t are expressed as a component of the error term e_{it}, the two-way random effects model is mentioned. The two-way random effects model is determined as,

$$Y_{it} = \alpha_0 + \beta X_{it} + e_{it} \tag{8}$$

$$e_{it} = \mu_i + \lambda_t + u_{it} \tag{9}$$

The Hausman (1978) test determines whether the fixed effects model or the random effects model is appropriate for panel data analysis [31]. Hausman suggests that the null hypothesis for the test is an appropriate model of the random effects model, which implies that there is no relationship between cross section and explanatory variables [32]. The alternative hypothesis indicates that the appropriate model is the fixed effect model. Hausman test statistic (H) is estimated by the following formula using the variance covariance matrix:

$$H = \left(\widehat{\beta}_{FE} - \widehat{\beta}_{RE} \right)' \left(V \left(\widehat{\beta}_{FE} - \widehat{\beta}_{RE} \right) \right)^{-1} \left(\widehat{\beta}_{FE} - \widehat{\beta}_{RE} \right) \tag{10}$$

Hausman test statistics fits the asymptotic χ^2 distribution with parameter k. V is the variance covariance matrix of the difference between the estimators. $\widehat{\beta}_{FE}$ and $\widehat{\beta}_{RE}$ are the fixed effects and random effects estimators, respectively. As a result of the analysis, it is determined whether the predicted model is a fixed effects model or a random effects model [30].

4. Data and variables

In this study, the tradeoff between WCC and firm's profitability is examined via the annual data for the period 2005–2016 of 41 firms listed on BIST Industrial Index in Turkey. In order to examine WCC firm's profitability tradeoff, dependent variable is defined as return on assets (ROA); independent variables are cash conversion cycle (CCC), inventory conversion period (ICP), payables deferral period (PDP), and control variables are sales growth (SG), the ratio of short-term financial debts to short-term debts (FDSD), and the ratio of fixed assets to total assets (FATA).

ROA widely used and accepted as measure of profitability [23] indicates the rate of return provided by firm's assets [13]. CCC measures the effectiveness of the working capital [9, 22]. CCC expresses the time spent between the expenses for purchasing raw materials and the collection of sales [9, 11, 12]. Longer CCC means the more investment in the working capital [9, 11], in other words, the more current asset financing needs [8]. CCC consists of three components: receivables collection period, ICP, and PDP. ICP refers to the time required for the conversion of raw materials to finished goods and then the sale of these products. PDP is the average time firm's suppliers give it to pay for its purchases [33]. The other component of CCC, receivables collection period, was not included in the study, since this variable was not statistically significant in the models formed. SG, FDSD, and FATA as control variables were also used to increase the reliability level of the models established in the study [34]. All variables and its formulations in the study are shown in **Table 2**.

	Variables	Formulas
Dependent variables	Return on assets (ROA)	Net profit/total asset
Independent variables	Cash conversion cycle (CCC)	(receivables collection period + inventory conversion period) − payables deferral period
	Inventory conversion period (ICP)	(Inventories/cost of goods sold)×365
	Payables deferral period (PDP)	Accounts payable/cost of goods sold)×365
Control variables	Sales growth (SG)	Change in sales (%)
	The ratio of short-term financial debts to short-term debts (FDSD)	Short-term financial debts/short-term debts
	The ratio of fixed assets to total assets (FATA)	Fixed assets/total assets

Table 2. Descriptions of the variables.

5. Empirical results

Panel regression analysis was used to investigate the tradeoff between WCC and the profitability of the 41 firms listed on BIST Industrial Index in Turkey. In the panel data analysis, variables include both time and cross section size. According to time and cross-section effects, it is determined that the model should be predicted to be one way or two ways. For this purpose, the LR test has performed with the maximum likelihood method, and the findings are given in **Table 3**. The calculated test statistics are interpreted according to the 1% significance level.

For the two-way effects test, the null hypothesis is formed no cross section and time effects in the model. Because the value of the test statistic for the two-way effect is 279.1188 at 1% significance level, the null hypothesis is rejected. This result shows that it is a two-way effect. Then, the presence of the cross section and time effects was tested separately with the movement from the findings that it was a two-way effect. The null hypothesis for cross section effect analysis is that the standard error of cross section is equal to zero. According to the analysis results, the null hypothesis is rejected at 1% significance level, since the value of the test statistic is 262.4951. In this case, there is a cross section effect in the panel data model. The existence of time effect was also examined, and the test statistic was calculated as 3.981432 at 5% significance level. According to this result, the null hypothesis cannot be rejected at the 1% significance level with no time effects.

Score test, Breusch-Pagan Lagrange Multiplier test, and Hausman tests were applied to identify the suitable model in the study. It was determined whether the analysis should be done

Tests	Two-way effects	Cross-section effects	Time effects
χ^2 testi	279.1188	262.4951	3.981432
Prob.	0.000	0.000	0.023

Table 3. Test results of cross section and time effects.

with the pooled model, the random effects model, or the fixed effects model. Both the score test and the Breusch-Pagan Lagrange Multiplier test analyze the pooled model against the random effects model. The null hypothesis suggests that the pooled model is appropriate, and that there is no random effect that reflects the existence of heterogeneity. Score test statistic was calculated as 8586.81 at 1% significance level, and the Breusch-Pagan Lagrange Multiplier test statistic was also estimated as 479.82 at 1% significance level. The null hypothesis is rejected relative to the 1% significance level. According to both tests, it is determined that the pooled model is not a suitable model. After it is defined that the pooled model is not suitable, it will be determined whether the model is a fixed effect model or a random effects model with the Hausman test. The test results are given in **Table 4**.

Because the Hausman test statistic was calculated as 25.46, the null hypothesis is rejected at 1% significance level. Hausman test shows that the model is a fixed effect model. The fixed effects panel data model results are given in **Table 5**.

The findings in **Table 5** show that all predicted parameters and model are significant at 1% significance level. Modified Wald test was applied to examine heteroskedasticity in the model. The null hypothesis for the modified Wald test is constructed as:

$$H_0 = \sigma_i^2 = \sigma^2 \quad \text{for all } i \tag{11}$$

$$H_1 = \sigma_i^2 \neq \sigma^2 \tag{12}$$

The null hypothesis is rejected according to the test result at 1% significance level. There is a heteroskedasticity problem in the model. Autocorrelation was investigated with modified Bhargava et al., Durbin-Watson, and Baltagi-Wu LBI tests. The test result is assessed by

	Coefficients			
	(b)	(B)	(b-B)	Sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
PDP	−0.0004057	−0.0003602	−0.0000455	0.000034
ICP	0.000696	0.0005636	0.0001324	0.0000612
CCC	−0.0004332	−0.0003739	−0.0000593	0.000036
SG	0.0847359	0.0862303	−0.0014943	
FDSD	−0.0595096	−0.0650816	0.005572	0.0042299
FATA	−0.2220324	−0.1595819	−0.0624505	0.0142161

b = consistent under Ho and Ha, B = inconsistent under Ha, efficient under Ho, Ho: difference in coefficients not systematic.
chi2(6) = (b-B)'[(V_b-V_B)^(−1)](b-B) = 25.46.
Prob > chi2 = 0.0003.

Table 4. Hausman test results.

	Coef.	Std. error	t stat.	Prob.	[95% conf. interval]
PDP	−0.0004057	0.0001086	−3.73*	0.000	(−0.0006193, −0.0001922)
ICP	0.000696	0.0002185	3.19*	0.002	(0.0002665, 0.0011255)
CCC	−0.0004332	0.0001124	−3.85*	0.000	(−0.0006542, −0.0002121)
SG	0.0847359	0.0126799	6.68*	0.000	(0.0598066, 0.1096653)
FDSD	−0.0595096	0.0168587	−3.53*	0.000	(−0.0926546, −0.0263646)
FATA	−0.2220324	0.0346947	−6.40*	0.000	(−0.2902438, −0.1538209)
Constant	0.2240622	0.0218885	10.24*	0.000	(0.1810283, 0.2670962)

F test stat. = 16.92 (prob. = 0.000).
Modified Wald test for groupwise heteroskedasticity: 918.72 (prob. = 0.000).
Modified Bhargava et al. Durbin-Watson = 1.3899562.
Baltagi-Wu LBI = 1.7238703.
Pesaran test of cross sectional independence = 6.814 (prob. = 0.000).
*indicates significance at the level 1%.

Table 5. The fixed effects panel data model results.

comparing it with two values which indicate no autocorrelation. Since test statistics are smaller than 2, it can be said that it is autocorrelation. Pesaran test was performed to examine the cross-sectional dependence in the model. The null hypothesis of no cross-sectional dependent is rejected at 1% significance level. For this reason, resistance fixed effect panel data model results were obtained by using in [37] estimator, which provided consistent estimates in the case of heteroskedasticity, autocorrelation, and cross-sectional dependent [35].

When the resistive fixed effects model presented in **Table 6** is examined, it is seen that the coefficients do not change, but t statistics and confidence intervals calculated by using Driscoll and Kraay standard errors change. These estimates give consistent results in the case of heteroskedasticity, autocorrelation, and cross-sectional dependent.

	Coef.	Driscoll and Kraay Std. Error	t stat.	Prob.	[95% conf. interval]
PDP	−0.0004057	0.0000774	−5.24*	0.000	(−0.0005761, −0.0002354)
ICP	0.000696	0.0002746	2.53**	0.028	(0.0000916, 0.0013003)
CCC	−0.0004332	0.000068	−6.37*	0.000	(−0.0005828, −0.0002835)
SG	0.0847359	0.0173669	4.88*	0.000	(0.0465118, 0.1229601)
FDSD	−0.0595096	0.0172452	−3.45*	0.005	(−0.0974661, −0.0215532)
FATA	−0.2220324	0.0302661	−7.34*	0.000	(−0.2886475, −0.155417)
Constant	0.2240622	0.0127534	17.57*	0.000	(0.1959921, 0.2521324)

F test stat. = 329.63 (prob. = 0.000).
*Significance at the level 1%.
**Significance at the level 5%.

Table 6. Resistance fixed effect panel data model.

According to the estimation results presented in **Table 6**, it was found that PDP, CCC, FDSD, and FATA have a negative effect on ROA. An increase of one-unit in PDP, CCC, FDSD, and FATA would induce a decrease of 0.0004057, 0.0004332, 0.0595096, and 0.2220324 on ROA, respectively. On the other hand, ICP and SG have a positive effect on the ROA. An increase of one-unit in ICP and SG would induce an increase of 0.000696 and 0.0847359 on ROA, respectively.

Although the studies in the literature are different in the way of both the country and the sector, similar results were obtained with other studies in the literature that a negative relationship exists between CCC which measures the efficiency of WCM, PDP, and ROA [6, 8, 22, 23, 29, 34]. Besides, the finding of this study is similar to in Ref. [27, 28] who report a positive relationship between ICP and ROA.

6. Conclusion

In emerging countries like Turkey, the development of the industrial sector plays a key role in the development of the country's economy. Firms in this sector need to solve the financing problem, which is one of the most important problems to survive in markets based on competition. Industrial firms need to become greater in their profitability by effectively managing their working capital in order to reduce the need for external financing due to scarce resources. In this context, this study aims to reveal the tradeoff between WCC and firm's profitability by using the data of the firms listed on BIST Industry Index in Turkey.

In the study, panel regression analysis was used to investigate the tradeoff between WCC and the profitability of the 41 firms listed on BIST Industrial Index. Dependent variable is defined as ROA; independent variables are CCC, ICP, and PDP; and control variables are SG, FDSD, and FATA. For the model estimation in the study, it was determined that the model had a cross section effect by performing the LR test. The Hausman test defined that the fixed effects panel data model should be applied for analysis. In the fixed effect model, the coefficients and the model were determined to be statistically significant at the 1% significance level.

The results of the study show the existence of a meaningful relationship between firms' profitability and WCC. In the industrial firms in the study, the decrease in CCC contributed to the increase of ROA. While the other variables remain constant, the increase in ICP raises the firm's profitability. This situation may be expressed as the fact that the benefit provided by meeting the customers' demands on time by keeping stocks is more than the cost of holding stocks. Another consequence of the study is that industrial firms can become greater ROA by reducing the duration of PDP. It can be said that the discounts provided by the suppliers for timely payments may contribute to the firm's profitability. According to the results of the study, a negative relationship exists between FDSD and FATA variables and ROA, while a positive relationship exists between SG and ROA. While an increase in sales volume of the firms may positively affect ROA, the increase in short-term financial liabilities may raise the financial risk of the firms and decrease the firm's profitability.

Both the findings obtained in the study and the studies in the literature reveal that there is an impact of WCM on the industrial firm's profitability in emerging countries such as Turkey. In this context, decreasing the cash return period of the firms will reduce the funds used for the financing of the current assets and contribute to increase their asset profitability. In addition to this, the firms should benefit from discounting by reducing the payables deferral period, which will help increase the firm's profitability. Besides, industrial firms can contribute to raise the firm's profitability by increasing Inventory conversion period and sales.

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References

[1] Raynard P, Forstater M. Implications for Small and Medium Enterprises in Developing Countries. United Nations Industrial Development Organization; 2002. p. 1-90

[2] The World Bank. World Development Indicators: Structure of Output [Internet]. Available from: http://wdi.worldbank.org/table/4.2# [Accessed: 2017–07-01]

[3] Türkiye sanayisine sektörel bakış. Tusiad Basın Bülteni. 2008;**08**(47):1-8

[4] Sanayi Üretim Endeksi ve İmalat Sanayi Değerlendirme Raporu. Bilim, Sanayi ve Teknoloji Bakanlığı. 2017:1-4

[5] Pandey S, Jaiswal VK. Effectiveness on profitability: Working capital management. SCMS Journal of Indian Management. 2011;January–March:73-80

[6] Kandpal V. An analysis of working capital management in select construction companies. Journal of Commerce & Management Thought. 2015;**6**(1):7-31. DOI: 10.5958/0976-478x. 2015.00001.4

[7] Masocha R, Dzomonda O.The mediating role of effective working capital management on the growth prospects of small and medium enterprises in Polokwane municipality. In: SAAPAM Limpopo Chapter 5th Annual Conference; 2016. p. 157-165

[8] Afande FO. Relationship between working capital management and profitability of cement companies in Kenya. Research Journal of Finance and Accounting. 2015;**6**(7):154-182

[9] Deloof M. Does working capital management affect profitability of Belgian firms. Journal of Business Finance and Accounting. 2003;**30**(3):573-587

[10] Blinder AS, Mancini LJ. The resurgence of inventory research: What have we. The Journal of Economic Survey. 1991;**5**:291-328

[11] Singh JP, Pandey S. Impact of working capital management in the profitability of Hindalco Industries Limited. The Icfai University. Journal of Financial Economics. 2008;**6**(4): 62-73

[12] Shin H, Soenen L. Efficiency of working captial management and corporate profitability. Financial Practice and Education. 1998;Fall/Winter:37-45

[13] Keown AJ, Martin JD, Petty JW. Foundations of Finance: The Logic and Practice of Financial Management. 9th ed. Pearson Education Limited: England; 2017

[14] Banos-Caballero S, Garcia-Teruel PJ. How does working capital management affect the profitability of Spanish SMEs. Small Business Economics. 2012;**39**:17-529. DOI: 10.1007/ s11187-011-9317-8

[15] Nazir MS, Afza T. A panel data analysis of working capital management policies. IBA Business Review. 2009;**4**(1):143-157

[16] Thapa PDP. How does profitability get affected by working capital management in food and beverages industry. Journal of Advanced Research in Management. 2013;**2**(8):2-4. DOI: http://dx.doi.org/10.14505/jarm.v4.2(8).01

[17] Grass M. Control of Working Capital. Essex: Grower Press Limited; 1972

[18] Smith K. Profitability versus liquidity trade off in working capital management. In: Smith KK, Paul S, editors. Reading on the Management of Working Capital. West Publishing Company; 1980. p. 549-562

[19] Toroman C, Sönmez AR. Çalışma sermayesi ve karlılık arasındaki ilişki: Perakende ticaret sektörü üzerine bir uygulama. Erzincan Üniversitesi Sosyal Bilimler Enstitüsü Dergisi. 2015;**8**(1):15-24

[20] Dursun A, Ayrıçay Y. Çalışma sermayesi-karlılık ilişkisinin IMKB örneğinde 1996-2005 dönemi analizi. Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi. 2012;**26**(3):199-214

[21] Öz Y, Güngör B. Çalışma sermayesi yönetiminin firma kârlılığı üzerine etkisi: Imalat sektörüne yönelik panel veri analizi. Sosyal Bilimler Enstitüsü Dergisi. 2007;**10**(2)

[22] Quayyum ST. Relationship between working capital management and profitability. International Journal of Business and Management. 2012;**7**(1):58-69. DOI: 10.5539/ijbm. v7n1p58

[23] Azeez OT, Abubakar MA, Olamide FT. Analysis of the effects of working capital management on profitability of listed Nigerian conglomerate companies. FWU Journal of School Sciences. 2016;**10**(1)

[24] Shahzad F, Fareed Z, Zulfiqar B. Impact of working capital management on firm's profitability:A case study of cement industry of Pakistan. European Researcher. 2015;**91**(2): 86-93. DOI: 10.13187/er.2015.91.86

[25] Ching HY, Novazzi A, Gerab F. Relationship between working capital management and profitability in Brazilian listed companies. Journal of Global Business and Economics. 2011;**3**(1):1-14

[26] Pandey NS, Sabamaithily S. Working capital management on profitability: Cement industry in India. SCMS Journal of Indian Management. 2016;April–June:81-95

[27] Muhammad M, Jan WU, Ullah K. Working capital management and profitability: An analysis of firms of textile industry of Pakistan. Journal of Managerial Sciences. 2012;**6**(2):155-165

[28] Arunkumar ON, Radharamanan T. Analysis of effects of working capital management on corporate profitability of Indian manufacturing firms. International Journal of Business Insights & Transformation. 2011;**5**(1):71-77

[29] Aksoy EE. İşletme sermayesi yönetimi ile firma performansı ilişkisi: 2008 krizi örneği. Finans Politik & Ekonomik Yorumlar. 2013;**50**(586):9-21

[30] Greene WH. Econometrics Analysis. 5th ed. New Jersey: Prentice Hall International; 2002

[31] Baltagi B. Econometric Analysis of Panel Data. 3rd ed. USA: John Wiley & Sons Ltd; 2005

[32] Hausman JA. Specification tests in econometrics. Econometrica. 1978;**46**:1251-1271

[33] Brigham EF, Ehrhardt MC. Financial Management: Theory and Practice. 14th ed. USA: South-Western; 2014

[34] Keskin R, Gökalp F. Çalışma sermaye yönetiminin firma karlılığı üzerine etkisi: panel veri analizi. Doğuş Üniversitesi Dergisi. 2016;**17**(1):5-25

[35] Tatoğlu FY. Panel Veri Ekonometrisi. 2nd ed. İstanbul: Beta Yayınları; 2013

[36] Ukaegbu B. The significance of working capital management in determining firm profitability: Evidence from developing economies in Africa. Research in International Business and Finance. 2014;**31**:1-16

[37] Driscoll JC, Kraay AC. Consistent covariance matrix estimation with spatially dependent panel. Review of Economics and Statistics. 1998;**80**:549-560