



e-ISSN 2300-3065

p-ISSN 2300-1240

Baser, F., Gokten, S., Kucukkocaoglu, G. & Ture, H. (2016). Liquidity-profitability tradeoff existence in Turkey: an empirical investigation under structural equation modeling. *Copernican Journal of Finance & Accounting*, 5(2), 27–44. <http://dx.doi.org/10.12775/CJFA.2016.013>

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**LIQUIDITY-PROFITABILITY TRADEOFF EXISTENCE IN TURKEY:
AN EMPIRICAL INVESTIGATION
UNDER STRUCTURAL EQUATION MODELING**

Keywords: liquidity-profitability tradeoff, structural equation modeling, working capital management.

J E L Classification: G30, M10.

Date of submission: January 24, 2017; date of acceptance: January 30, 2017.

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Abstract: Firms in emerging markets could show a tendency to have high liquidity positions by ignoring the liquidity-profitability tradeoff in terms of working capital management due to gained experiences from stressed times. Accordingly, this study empirically examines the validity of liquidity-profitability tradeoff in Turkish market via structural equation modeling. The functions of liquidity and profitability as latent variables of the model are constituted from Piotroski's criterias of liquidity/solvency, operating efficiency and profitability. The hypothesized model for the inexistence of the validity of liquidity-profitability tradeoff was verified and there is a moderate level of positive effect between liquidity and profitability in Turkey. The findings indicate that (1) current ratio or its variants as single-handed variables are inadequate to explain liquidity-profitability relation and (2) leverage seems to be the most important indicator as taken into account on working capital management decisions. Turkish firms apply prudent working capital management to overcome possible liquidity shocks.

■■■ INTRODUCTION

Liquidity and profitability tradeoff is a crucial issue discussed in the literature under the management of current assets and current liabilities to obtain optimum profitability. Thus, efficient liquidity management involves planning and controlling current assets and current liabilities to eliminate the risk of insolvency by not meeting the short-term obligations on time. Besides, liquidity is one of the most important control variable that accounts for firm profitability as well (Iatridis & Kadorinis, 2009).

Solely, in the frame of working capital approach, cash management is a non-negligible concept which directly affects the profitability of a firm especially in short term (Schneider, 1988; Johnson & Aggarwal, 1988; Unsworth, 2000; Raspanti, 2000). In this regard, working capital management is considered as a useful tool in managing of funds to meet current operations. However, instead of using working capital as a measure of liquidity, accounting literature advocate the use of current and quick ratios to make temporal or cross sectional comparisons. Nevertheless, the ultimate measure of the efficiency of liquidity planning and control is the effect it has on profit (Eljelly, 2004).

According to Sanger (2001), working capital represents a safety cushion for providers of short-term funds of the company, and as such they view the availability of excessive levels of working capital and cash in a positive way. However, from an operating point of view, working capital has increasingly been looked at as a restraint on financial performance, as these assets do not contribute to profit. Argued vividly by Nicholas (1991), companies usually do not think about improving liquidity management before reaching to a crisis conditions or becoming on the verge of bankruptcy. Thus, any increase in cash or cash-similar

positions creates a tradeoff on profitability by lying behind passive funds to generate profit. In this sense, liquidity ratios as a measure of company's ability to pay debt obligations and its margin of safety play an important role on evaluating the financial decisions of tradeoff between liquidity and profitability (Gitman, 1974; Richard & Laughlin, 1980; Hawawini et al., 1986; Kamath, 1989; Gentry et al., 1990; Boer, 1999; Eljelly, 2004).

Liquidity ratios mostly represent the summarized indirect results of financial decisions related with the financial structure. From this point of view, as the market conditions restrict the capabilities of decision makers in terms of working capital management, they could not have the opportunity to determine the level of current assets according to liquidity-profitability tradeoff mechanism. The reality is that liquidity management focuses on profitability in good times but in troubled times systematic risk put pressure on profitability and firms need sufficient liquidity positions to survive (Summers & Wilson, 2000). In this sense, liquidity-profitability tradeoff issues may long be ignored on the formation of financial structure. That means liquidity-profitability tradeoff concept in financial management decisions could not be valid in some markets, especially for emerging ones, as prudent behaviors come from the past.

This study concentrates on testing the existence of the validity of liquidity-profitability tradeoff in Turkish market, which has many financial experiences on troubled times under liquidity shocks. To get a clear picture, we first need to go back to 1980s where Turkey has first started to adopt the rules of free market economy, free competition, and a liberalized foreign trade practices by applying neo-liberal policies to integrate into international markets. Throughout the years Turkey has faced with several financial crises because of unsteady economic and political environment forces and became dependent to IMF and its policies with standby agreements.

Structural reforms applied as part of standby agreements showed positive effects on Turkish economy especially after 2002. Inflation and interest rates have fallen significantly and the currency stabilization program has been achieved. Growth rate in 2004 was realized as 9.9 percent and interestingly, high growth rates were accompanied by a reduction in inflation rates which were reduced to single-digit figures in 2004 after almost 30 years.

In addition, a global financial shock of 2007, as an external factor, affected Turkey like all other countries. Right after the spread of US based financial crisis to all over the world, central banks started to install monetary policies to cultivate recovery and funds started to move to the emerging markets to ob-

tain satisfactory returns based on an increase in global money supply. Turkish market appeals foreign investment with nearly 70 billion USD capital inflows per year between 2002 through 2013. By paying the last loan repayment in the amount of 422.1 million \$ (the total amount of payment was 23.5 billion \$ during 2002–2013) in 2013, Turkey initialized its position against IMF. Also, in year 2013, Turkey ranked as the sixth biggest economy in Europe and the sixteenth in the world. With regards to this historical background, we expect that Turkish firms could show a tendency to have high liquidity positions by ignoring the liquidity-profitability tradeoff in terms of working capital management. As they have become more prone to financial crises and learned from the past experiences, this paper selected year 2014 to test this alleging remarks as this year represent a boom phase in the Turkish economy.

As the acceptance of general rules or conclusions are challenging in financial researches and they are based on a lot factors that are not directly observable (Titman & Wessels, 1988; Harris & Raviv, 1991), expecting the invalidity of the negative relationship between liquidity and profitability cannot come as a surprise when the conditions of emerging markets are compared with emerged ones. Financial structure decision-making is even more complicated when it is examined in developing countries where markets are characterized by controls and institutional constraints (Boateng, 2004). Therefore, most studies in the literature analyzing the financial structure topic in developed markets depict many institutional similarities and could be accepted as efficient. Accordingly, relevant studies for emerging markets depict many institutional differences as well (Schulman et al., 1996; Wiwattanakantang, 1999; Chen, 2004). Under these conditions, as an emerging market economy, it is not contrary to expect positive relation between liquidity and profitability for Turkish firms.

From this point of view, this paper tests the validity of liquidity-profitability tradeoff for firms in Turkish market by applying Structural Equation Modeling (SEM). In this sense, the functions of liquidity and profitability are constituted by using Piotroski (2000) criterions¹ and then SEM is applied.

¹ Current ratio (CR), gross margin (MARGIN), leverage (LEV) and asset turnover (TURN) which are the criterions of liquidity/solvency and operating efficiency, are used as the determinants of liquidity function. Return on assets (ROA), cash flow from operations (CFO) and accruals (AC) which are the criterions of profitability, are used as the determinants of profitability function.

The structure of the paper is as follows. In the next section, the dataset and functions are described and the methodology of SEM is given in detailed. Then, results are given and discussed respectively.

RESEARCH METHODOLOGY

Data

Sample includes 187 active firms listed and traded on National Market of Istanbul Stock Exchange (BIST-Borsa Istanbul). National Market is the largest market of BIST, where the equities of companies that satisfy the listing requirements (an average market capitalization of at least 12 million Turkish Liras of its free-float for the relevant period and, a free float rate of at least %25) of National Market are traded. Selected sample does not include financial service firms and the companies with lack of data. 2014 annual accounting numbers are used to calculate the determinants for each firm and annual financial statements of these years are obtained from Public Disclosure Platform of BIST (KAP).

Functions with Determinants

The relationship between liquidity and profitability is investigated via using latent variables. That means functions of liquidity and profitability refer latent variables of structural equation modeling respectively. Determinants of these functions are described in detail in this part of the paper.

Liquidity is defined as the function of CR^2 , $MARGIN^3$, LEV^4 and $TURN^5$ by:

$$\text{Liquidity}_i = f(CR_i, MARGIN_i, LEV_i, TURN_i). \quad (1)$$

Total amount of the current assets is the fundamental accounting measurement for liquidity position of the financial structure. In this sense, Current Ra-

² $CR = \text{Current Assets}/\text{Short Term Liabilities}$.

³ $MARGIN = (\text{Total Sales} - \text{Cost of Sales})/\text{Total Sales}$, we use '*cost of goods sold*' for manufacturing or commercial firms and '*cost of services sold*' for service firms.

⁴ $LEV = \text{Long Term Liabilities}/\text{Equities}$.

⁵ $TURN = \text{Total Sales}/\text{Total Assets}$.

tio (CR) is generally accepted as the main indicator for liquidity assessment in the frame of working capital management: As is known, increase in CR means more liquidity. On the other hand, CR is the summarized indicator of the financial decisions which derive from other indicators that affect the financial structure of firms in terms of liquidity. For this reason, CR or its variants should not be thought as single-handed determinants to evaluate the level of current assets.

MARGIN is the one of the major determinants for current assets level in the frame of accounting practices: Increase in MARGIN causes an increase in cash or receivables accounts. Which means high level of MARGIN should positively affect the liquidity of a firm.

In the literature, the relation between leverage (LEV) and size (Total Assets) is discussed frequently. International evidence suggests that leverage is positively related to size (Rajan & Zingales, 1995; Schulman et al., 1996; Wiwattanakantang, 1999; Booth et al., 2001; Boateng, 2004; Padron et al., 2005; Gaud et al., 2005; Sayilgan et.al., 2006). Several reasons are depicted on the positive relation between leverage and size, such as cheaper access to outside financing, high level of collateral and etc. (Strebulaev, 2007). In this sense, firms listed and traded on National Market of Istanbul Stock Exchange have more ability for long term debt financing due to their sizes. In general manner, long term financing especially for current assets increases liquidity in short term. Therefore, it is expected that there is a positive relation between LEV and liquidity as well.

Turnover (TURN) is the indicator of firm sales generated relative to the value of its assets in terms of cash conversion cycles. Therefore, turnover connects with the operating efficiency of a firm. Any decrease in operational efficiency make firms depend on more current assets for sustainability. In order to make a decision on adding TURN as an indicator into liquidity function, a correlation analysis was executed and the correlation coefficient between CR and TURN for the data set was found as -0.207 which is statistically significant at 1% (see Table 1). Accordingly, this study states the expectation of negative relation between the TURN and liquidity.

Table 1. Correlation matrix for CR, MARGIN, LEV, TURN

	CR		MARGIN		LEV		TURN	
	Corr. Coef. (r)	Sig. (p)	Corr. Coef. (r)	Sig. (p)	Corr. Coef. (r)	Sig. (p)	Corr. Coef. (r)	Sig. (p)
CR	1	—						
MARGIN	0.213**	0.003	1	—				
LEV	-0.080	0.278	0.187*	0.010	1	—		
TURN	-0.207**	0.005	-0.230**	0.002	-0.033	0.654	1	—

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

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

Source: developed by authors.

Profitability as the realized measurement of gained benefit from all business performance is defined as the function of ROA⁶, CFO and AC⁷ by:

$$\text{Profitability}_i = f(\text{ROA}_i, \text{CFO}_i, \text{AC}_i). \quad (2)$$

Return on equity (ROE) and return on assets (ROA) are the most usual indicators used to measure the profitability of the firm in general terms. While ROE is a measure of firm's efficiency to generate profit from the invested capital, ROA is generally used to compare companies by taking the all kinds of investments into account. In this sense, because of the availability of significant differences between the equity values of sample firms and the main concentration of this paper is on the validity of liquidity-profitability tradeoff, ROA is preferred as determinant of profitability function. Also, total investing amount of assets is the identifier of the total capacity of firm and the amount of assets represents the firm size. In the literature, there is a generalization on the existence of positive relation between size and profitability that derives from different ways; such as abilities of firms to generate discounts from suppliers, getting favorable credit terms and conditions, success in their receivables collection and etc. (Eljelly, 2004). Therefore, ROA is the summarized indicator to clarify the profitability of a firm relative to its size.

⁶ ROA = Net Income/Total Assets.

⁷ AC = [CFO/Total Assets] – ROA.

On the other side, ROA is calculated by accounting numbers based on accruals. Therefore, taking only ROA as an indicator to evaluate the profitability of a firm is inadequate. In terms of complete disclosure, cash flow from operations (CFO) should be taken into account (Baumol, 1952; Miller and Orr, 1966). Therefore, CFO is added into analysis as another determinant of profitability function and it is expected that increase in CFO means increase in profitability.

Non-debt tax shield includes methods generally derived from accounting techniques to create tax-shield advantages like debt financing. Another alternative advantage comes from the depreciation as a means of reducing corporate taxes (Rubio & Sogorb-Mira, 2012). Thus, in terms of cash generation, tax deductions under depreciation expenses are the substitutes of tax benefits from debt financing (DeAngelo & Masulis, 1980). In this case, it could be clearly expected that firms with high level of fixed assets gain more benefit from non-debt tax shield advantages derives from depreciation (Titman & Wessels, 1988; Rajan & Zingales, 1995; MacKay & Phillips, 2005; Faulkender & Petersen, 2006; Wald & Long, 2007; Kale & Shahrur, 2007) and the spread between CFO and net income should be higher for the firms that have bigger amount of tangible assets. Validity of this expectation causes smaller accounting assessment of profitability in terms of ROA due to high level of total assets for such firms (Table 2). The correlation coefficient between accruals (AC) and ROA for the Turkish firms is -0.416 and statistically significant at 1% which supports our expectation about non-debt tax shield effect on profitability measurement derives by ROA calculations. Accordingly, this study states the expectation of negative relation between the AC and profitability.

Table 2. Correlation matrix for ROA, CFO, AC

	ROA		CFO		AC	
	Corr. Coef. (r)	Sig. (p)	Corr. Coef. (r)	Sig. (p)	Corr. Coef. (r)	Sig. (p)
ROA	1	–				
CFO	0.096	0.192	1	–		
AC	-0.416^*	0.000	0.050	0.495	1	–

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

Source: developed by authors.

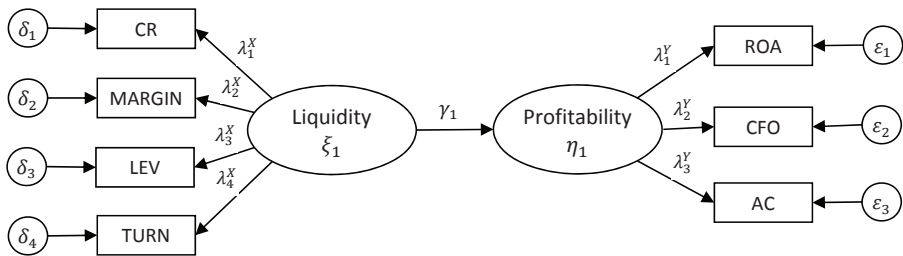
Structural Equation Modelling

Structural equation modeling (SEM) is used to model causal relationship between latent variables and to disclose linear relationships between independent and dependent variables. (MacCallum & Austin, 2000; Schumacker & Lomax, 2004; Garcia et al., 2013). SEM refers not to a single statistical technique but to a family of related procedures such as causal modeling and covariance structure analysis. (Kline, 2011). In social sciences, these causal models draw attention because of their ability to describe structural theory bearing on some phenomenon (Koç et al., 2016).

The specification of the structural model can be presented with graphical presentation, system of simultaneous equations or matrix expression. By graphical representation, causal relationship between observed variables and latent variables is introduced visually. Based on the theoretical model developed in Figure 1, we formulated the research hypothesis as follow:

H₁: The liquidity of firm has a direct positive effect on profitability (Means, invalidity of liquidity-profitability tradeoff in Turkish market).

Figure 1. Model development



Source : developed by authors.

Assessing model's fit in SEM is the most controversial subject. The overall fit of the observed data to hypothesized model must be assessed before interpreting individual parameters (Jöreskog et al., 1999). Fit indices are used to control whether the covariance matrix derived from the proposed theoretical model is different from the covariance matrix derived from the sample (Shook et al., 2004). A statistically insignificant difference reveals that the errors are insignificant.

nificant and the model is supported. Various fit indices have emerged to compare the fit of proposed model with competing or baseline models.

In this study, a model containing two latent variables which were liquidity and profitability was considered. While the profitability of firms is an endogenous variable, liquidity of firms is an exogenous variable. Generally, SEM consists of two parts wherein the first part involves the structural model testing and the second part concerns the measurement model validation. Based on the proposed model, the structural part can be written as:

$$\eta_1 = \gamma_1 \xi_1 + \zeta_1 \quad (3)$$

where η_1 is an endogenous latent variable (profitability of firm), ξ_1 is an exogenous (predictor) latent variable (liquidity of firm), γ_1 regression coefficient relating endogenous variables to exogenous variables, and ζ_1 is an error term. The critical parameter of the model in equation is γ_1 because it quantifies the hypothetical relationship between profitability and liquidity of firms.

The observed variables are linked to latent variables by way of measurement equations for the exogenous and endogenous variables. Equations of endogenous variable are defined as:

$$\text{ROA} = \lambda_1^Y \eta_1 + \varepsilon_1 \quad (4)$$

$$\text{CFO} = \lambda_2^Y \eta_1 + \varepsilon_2 \quad (5)$$

$$\text{AC} = \lambda_3^Y \eta_1 + \varepsilon_3 \quad (6)$$

and equations of exogenous variable are defined as:

$$\text{CR} = \lambda_1^X \xi_1 + \delta_1 \quad (7)$$

$$\text{MARGIN} = \lambda_2^X \xi_1 + \delta_2 \quad (8)$$

$$\text{LEV} = \lambda_3^X \xi_1 + \delta_3 \quad (9)$$

$$\text{TURN} = \lambda_4^X \xi_1 + \delta_4 \quad (10)$$

where λ_i^Y , λ_j^X are factor loadings, and ε_i , δ_j are error terms.

The data was analyzed and interpreted within the scope of the research in line with the specified purposes by utilizing descriptive statistics and several statistical analyses. SEM and other statistical analyses were performed using IBM AMOS (Analysis of Moment Structures) and IBM SPSS (The Statistical Package for Social Sciences). Statistical significance value is set as $p < 0.05$.

EMPIRICAL RESULTS

In order to test the validity of liquidity-profitability tradeoff in Turkish market, a structural equation model was employed, in which an exogenous latent factor (liquidity) and an endogenous latent factor (profitability) were considered. The scale for each factor was set by fixing the factor loading to one of its indicator variables and the maximum likelihood method was used to estimate the parameters of the model. The model that satisfies both goodness of fit measures and theoretical expectations was selected.

The key fit statistics of the structural model summarized in Table 3 shows a value of $\chi^2 / df = 3.269$, CFI of 0.760, GFI of 0.943, AGFI of 0.907, NFI of 0.705, and RMSEA of 0.079. The statistic of χ^2 / df is within the acceptable limit (Schumacker & Lomax, 2004). GFI and AGFI are all above 0.90, suggesting a good fit between the structural model and the data (Jöreskog et al., 1999; Byrne, 2010). RMSEA is below the suggested threshold value of 0.08 (Brwone & Cudeck, 1993). Therefore, the hypothesized model for the inexistence of the validity of liquidity-profitability tradeoff was verified by SEM, so consistence of the model to the data was acceptable.

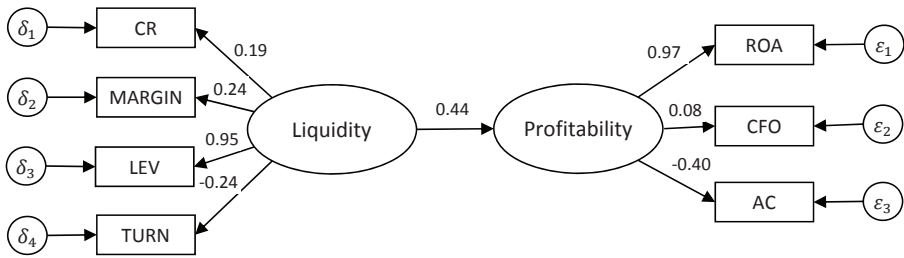
Table 3. Goodness of fit indices

Fit Indices	Model Value	Recommended Value
χ^2 / df	3.269	1 to 5
The Comparative Fit Index (CFI)	0.760	0 (no fit) – 1 (perfect fit)
Goodness of Fit Index (GFI)	0.943	0 (no fit) – 1 (perfect fit)
Adjusted Goodness of Fit Index (AGFI)	0.907	0 (no fit) – 1 (perfect fit)
The Normed Fit Index (NFI)	0.705	0 (no fit) – 1 (perfect fit)
Root Mean Sq. Error of Approx. (RMSEA)	0.073	<0.05 (very good) – 0.1 (threshold)

Source: developed by authors.

Figure 2 presents details regarding the parameter estimates for the model. Standardized coefficient estimates for the hypothesized model with corresponding t-value are presented in Table 4. According to the statistical significance of the parameter estimates from SEM, the hypothesis which expresses a positive relationship between liquidity and profitability was supported. From standardized coefficient estimate, it is concluded that liquidity-profitability tradeoff is not valid in Turkish market.

Figure 2. Structural model with standardized path coefficients



Source : developed by authors.

Table 4. Standardized coefficient estimates of SEM

Path	Standardized Coefficient Estimate	t – Value	p
Profitability ← Liquidity	0.435	2.350	0.019
TURN ← Liquidity	-0.237	-1.969	0.049
MARGIN ← Liquidity	0.235	1.963	0.050
CR ← Liquidity	0.190	-	-
LEV ← Liquidity	0.951	1.937	0.053
ROA ← Profitability	0.973	-	-
CFO ← Profitability	0.085	1.117	0.264
AC ← Profitability	-0.399	-2.555	0.011

Source : developed by authors.

DISCUSSION: A DETAILED LOOK ON DETERMINANTS

Inexistence of the validity of liquidity-profitability tradeoff in Turkish market is not surprising when the results of the determinants used in functions are analyzed. In other words, a clear understanding of this invalidity needs a detailed look on some determinants as well.

Firstly, all results are consistent with our expectation in terms of the directions of the effects under the comments that mentioned in Section 2.2. CR, MARGIN and LEV have positive effect on liquidity, while TURN is the only determinant that has negative effect. On the other side, profitability is affected positively by ROA and CFO, while AC has negative affect on profitability. However, the results create need for making a discussion to explain this invalidity of liquidity-profitability tradeoff in Turkish market. In this sense, remarkable information can be obtained when concentrated on the findings of liquidity function.

There are meaningful differences between the effect sizes of determinants. While CR, MARGIN and TURN has relatively low effect size (standardized coefficients for CR, MARGIN and TURN are 0.19, 0.24, -0.24, respectively), LEV has significantly high effect size (standardized coefficient for LEV is 0.95) on liquidity. This differentiation of LEV enables us to reveal two main inferences: (1) The inadequacy of CR or its variants to analyze the liquidity-profitability tradeoff and (2) the reality of applying prudent working capital management (P-WCM) by managers in Turkish market as an emerging one.

In the literature, generally, the researches on liquidity-profitability tradeoff are constructed on separate relationships between CR or its variants and profitability (Eljelly, 2004). In this paper, a more comprehensive analysis is applied by employing SEM to disclose the effects of all determinants on liquidity all together. As seen from our findings, CR has not much explanatory power on the liquidity in the frame of financial structure formation. The fundamental reason of that is CR or its variants are the indirect summarized results of other direct financial decisions that taken by managers strategically. The word of strategically means that the preferences of managers in financing of current assets.

High level positive effect of LEV on liquidity indicates that managers of Turkish firms prefer long term liabilities rather than current ones to finance current assets. In the other words, they apply P-WCM to overcome possible liquidity shocks (Uremandu, 2012; Modi, 2012; Akoto et al., 2013; Zakaria & Amin, 2013). This fact is coherent with our point of view, which asserts that

managers behave prudent in financial decisions in Turkey because of their bad experiences come from troubled times.

On the profitability side the result indicates a moderate level of positive effect between liquidity and profitability which is the other discussion issue that needs to be explained in addition to the invalidity of liquidity-profitability tradeoff. Firstly, the significant effect of ROA on profitability, (standardized coefficient for ROA is 0.97), verifies our choice on using it as a determinant instead of ROE. Since ROA includes the all short and long term financing alternatives especially for current assets, it completely reflects the outcome of applying P-WCM in terms of profitability. As discussed in Kling et al. (2014), cash holdings increase the ability of firms to cover possible operating losses emerged especially by liquidity shocks and to reach current liabilities in better conditions as an alternative of financing current assets, for example suppliers are more willing to provide trade credit to firms with higher liquidity positions. Also, as discussed in Jung and Kim (2008) study, stockpiling of liquid assets provides incentives for firms to increase their leverage because cash holdings decrease potential financial distress costs and increase target debt-equity ratios. In this sense, firms in Turkey decrease financial risks on cash conversion cycles by applying P-WCM and increase operating efficiency by gaining ability and flexibility on managing current liabilities.

■■■ CONCLUSION

In this paper, the existence of the validity of liquidity-profitability tradeoff is analyzed for Turkish market which has many financial experiences on troubled times that caused liquidity shocks. Our main expectation is that Turkish firms could show a tendency to have high liquidity position by ignoring the liquidity-profitability tradeoff in terms of working capital management due to gained experiences come from bad times. 2014 is the best fitted year to test this alleging remark as this year represents the best economic conditions that Turkey has faced. The data of 187 firms listed and traded on National Market of Istanbul Stock Exchange (BIST-Borsa Istanbul) are used.

Structural equation modelling is applied to provide a more comprehensive analysis and the functions of liquidity and profitability are constituted by using Piotroski's criteria of liquidity/solvency, operating efficiency and profitability to generate structural equation model of the study. The results of the hypothesized model indicate that the existence of liquidity-profitability tradeoff

is invalid in Turkey and additionally there is a moderate level of positive effect between liquidity and profitability.

High level positive effect of leverage on liquidity indicates that managers of Turkish firms apply prudent working capital management to cover possible operating losses emerged especially by liquidity shocks and this behavior makes firm more capable in terms of increasing operating efficiency and managing current liabilities in Turkey. In conclusion, leverage seems the most important indicator that taken into account on working capital management decisions in Turkey in the frame of liquidity and profitability relation.

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