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FIRM VALUE AND WORKING CAPITAL DECISIONS: FURTHER EVIDENCE FROM AN EMERGING MARKET*

ABSTRACT

This study investigates the effects of working capital management decisions on market values using a sample data set containing annual measurements for 317 Turkish publicly traded companies between 2010 and 2018. Cash ratio, Current ratio, Net Working Capital, and Cash Conversion Cycle are used as indicators of the liquidity policies of the sample firms. The specified dynamic model is estimated using the System GMM estimator. The findings show that firms can affect their market values by managing their liquid assets efficiently. However, this relationship weakens as cash holdings increase. In other words, a long cash conversion cycle and a large amount of net working capital are not considered negative signals by investors if accompanied by sufficient cash holdings. Hence, it can be said that cash management can help reduce the negative impact of working capital investments on firm value. This study found no evidence of the effects of the current ratio and net working capital on firm value.

KEYWORDS: *liquidity management, firm valuation, emerging market, working capital, cash holdings, system GMM*

1. INTRODUCTION

Corporate finance literature acknowledges that investments in short- and long-term assets can be critical since the market value of a business is the result of efficient management of its assets. Cash holdings accounts receivables, and inventories are the main short-term assets and constitute a company's working capital. A related measure of liquidity is net working capital, which is the remaining amount of current assets after deducting short-term liabilities. Liquidity increases with more cash holdings and a shorter cash conversion process and is an essential indicator of the possibility that a firm might be financially distressed. Since it proves the ability to fulfill short-term liabilities, investors tend to overvalue firms with more liquid assets.

On the other hand, too much liquidity may indicate underinvestment in long-term assets and lead to lower return rates for investors (Dittmar & Mahrt-Smith, 2007). Companies usually try to match the

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maturities of current assets with current liabilities as much as possible. Nevertheless, long-term liabilities such as debt and equity finance the surplus (Hill et al., 2010). The discounted cash flow method can be used to determine the value-generating effect of liquidity management. Like any other asset, the value of a business is estimated as the discounted sum of its future cash flows. A company's short- and long-term asset investments are subtracted from its after-tax revenues to estimate its cash flow (Ross et al., 2016). Therefore, working capital investment can be expected to put downward pressure on a firm's free cash flow. On the other hand, short-term asset investments can also have a lagged positive effect on expected cash flow (Kieschnick et al., 2013). Furthermore, the relationship between investments in current assets and the debt-equity ratio indirectly affects the company's value through the discount rate of cash flows (Damodaran, 2007).

According to García-Teruel and Martínez-Solano (2007), the optimal debt structure argument of the trade-off theory also indirectly suggests an optimal liquidity policy. When a firm's current assets are higher than its current liabilities, it can be assumed that it will be able to meet its financial obligations soon. On the other hand, overinvestment in current assets results in fewer funds for available profit-generating fixed assets and decreases the firm's value (Kieschnick et al., 2013). Therefore, managers should consider their firm's liquidity needs and long-term investment opportunities in working capital decisions. (Sharma and Kumar, 2011).

In an early attempt, Lewellen et al. (1980) theoretically proved that the working capital policies of a firm affect its value in perfect markets. Later empirical studies support their argument and show the crucial role of working capital decisions in value creation (e.g., Deloof & Jegers, 1996). Numerous studies have examined the effect of liquidity management on firm value. It has been documented that cash holdings and fixed asset investments are more valuable than the accumulation of net working capital (Kieschnick et al., 2013). In a similar study, Autukaite and Molay (2014) showed that investments in net working capital positively affect the firms' market values. Previous studies also prove that each firm has an optimal net working capital (Aktas et al., 2015; Cooper et al., 2008; Ek & Guerin, 2011).

Some studies prefer the cash conversion cycle to measure the efficiency of liquidity management and determine its value-decreasing effect (Arachchi et al., 2017; Nurein & Din, 2017; Ogundipe et al., 2012; Senan et al., 2022; Wang, 2002; Wichitsathian & Pestonji, 2019). It has been found that firm value can be increased by limiting credit terms and reducing inventory (Vijayakumaran, 2019). Also, trade receivables have a more significant relationship with value than inventory (Kieschnick et al., 2013).

Previous literature has also highlighted the indirect role of liquidity management in the relationship between financial distress and firm value. The cash conversion cycle, another measure of working capital management, negatively affects firm value (Dhole et al., 2019). The results of a multi-country analysis also support the view that efficient management of liquid assets increases value, with the effect being more substantial in developed countries (Baños-Caballero et al., 2019). Some studies examine the impact of liquidity management on corporate profitability, assuming that profitability is a direct indicator of value (Chen & Chen, 2011; Deloof, 2003; Lazaridis & Tryfonidis, 2006; Enqvist et al., 2014). Their results also show the crucial role of liquidity management as a value-generating process.

This study uses a panel data set to investigate the liquidity management of market values of publicly traded companies in Turkey. It was found that other things being equal, the longer the cash conversion cycle of a firm, the lower its market value. In particular, a long day of payable outstanding debt and a short day of outstanding receivables indicate a high market value. However, these relations are less significant for cash-hoarding firms. This suggests that although investments in working capital reduce profitability, firms with high cash holdings may not be affected as severely as other firms.

This study is divided into the following sections. The second part describes the sample dataset and research methodology. The empirical results are described in the third part. Lastly, the fourth part concludes the article.

2. METHODS

2.1. Data

The data sample includes annual measures for 317 Turkish publicly traded companies from the Compustat database. The sample period spans from 2010 to 2018. In line with previous literature, firms operating in the finance industry and those with negative equity values are excluded, and the data is winsorized at 1%.

The dependent variable is *Market Value*, the natural logarithm of the total external funds (i.e., all funds raised through debt and equity financing). The balance sheet values of long and short-term interest-bearing debt are used. Equity's value is estimated using the market price of the shares traded.

In this study, four variables of interest are used to measure sample firms' working capital manage-

ment efficiency. The first one, *Net Working Capital*, is the natural logarithm of the sum of inventories and trade receivables less accounts payable. Investing in net working capital is essential to maintain effective operations and reduce the likelihood of being unable to pay short-term debt obligations. However, excessive investment in it may cause the failure to benefit the more productive long-term assets investment projects. According to previous research, net working capital investment boosts business value (Autukaite & Molay, 2014; Baños-Caballero et al., 2019).

The *Current Ratio*, used as an alternative proxy of liquidity policies in this study, displays the firm's ability to fulfill its immediate obligations. If this ratio is less than one, the firm might be unable to pay off its immediate debt obligations in a year. On the contrary, a ratio considerably greater than one shows excess investment in short-term assets. Likewise, the *Cash Ratio* shows the debt service capacity of cash and marketable securities. It indicates the percentage of current debt the firm can pay with accumulated cash holdings. Healthy firms are expected to have cash to pay for unexpected situations such as contingent liabilities.

Cash has two significant advantages; it protects the firm against the possibility of bankruptcy and can be used to finance investment projects. Because of these two features, current and potential investors in the firm interpret cash hoarding as a sign of soundness. However, for many firms, excess cash holdings are a sign of a missed opportunity to increase profitability through additional investments in fixed assets. Firms' cash holding policies are affected by dividend policies, financing policies, and future investment prospects (D'Mello et al., 2008; Maheshwari & Rao, 2017). Interestingly, Bates et al. (2009) found that an increase in cash holdings does not correlate with the total value of short-term investments.

Based on the free cash flow approach to capital structure, cash holdings cause the likelihood of more agency conflicts from the investors' perspective (Harford, 1999). Investors, therefore, lower companies' stock prices with large cash balances by reducing the demand in the stock market. However, cash holdings reduce the likelihood of bankruptcy and allow businesses to borrow at lower loan prices, per the trade-off argument (Opler et al., 1999). It can be said that there is an ideal level of cash holdings for every firm, and managers should take action to achieve this ideal to maximize firm value (Drobetz & Grüninger, 2007; Martínez-Sola et al., 2013). Firms can influence their market value by changing their cash hoarding practices, as investors interpret these strategies as signals of a firm's business performance, while a profitable firm with more cash holdings is accepted as a positive sign

(Du et al., 2016; Luo & Hachiya, 2005). However, this relationship depends on countries' institutional characteristics, such as corporate governance and shareholder rights protection (Pinkowitz, 2006; Dittmar et al., 2003).

Lastly, the *Cash Conversion Cycle* and its three components (i.e., day's receivables outstanding, day's payable outstanding, and day's inventory outstanding, are also used to investigate the liquidity policies of firms. These ratios reflect the average credit terms in the sale and purchase transactions and the inventory management decisions of the firm. The policy for collecting accounts receivable is based on the firm's interactions with its clients. A strict credit policy might result in lower sales, while too loose a credit policy can put the firm in financing difficulties. On the other hand, accounts payable are often paid as late as permitted by suppliers. Therefore, the principal drivers of the businesses' accounts payable payment schedule are typically the credit terms of their vendors. Lastly, a shorter day's inventory outstanding is preferable because investing heavily in inventory rather than allocating cash to profit-generating projects is not desirable.

To sum up, the cash conversion cycle is accelerated by the rapid receipt of credit sales and is adversely impacted by the slow payment of debts. Therefore, businesses should minimize their waiting periods for inventory and credit collections while extending their commercial debt payment periods to speed up cash conversion. A shorter cash conversion cycle is preferable, as it is unnecessary to overinvest in inventory rather than allocate capital to profit-making fixed asset investments.

This study uses profitability, Leverage Ratio, and Firm Size as control variables. Profitability is the net income over the book value of the stockholder's equity, which is expected to affect the dependent variable positively. The *Leverage Ratio* is the ratio of long- and short-term debt divided by invested capital (i.e., the sum of long- and short-term debt and the market value of equity). It is included in the analyses to account for the firm's riskiness. The third control variable, *Firm Size*, is estimated using the natural logarithm of total assets and is considered an indicator of the firm's soundness. All other things being equal, the larger the firm size, the higher the firm's market value. The appendix provides the definitions and sources, and Tables 1 and 2 show the descriptive statistics and pairwise correlations of all variables.

TABLE 1. Descriptive Statistics

	Mean	Median	St. Dev.	C.V.	Skew.	Kurt.	N
Market Value	7.70	4.12	1.80	0.23	0.34	2.59	1872
Net Working Capital	4.15	-4.27	1.86	0.45	-0.36	3.42	1872
Cash Ratio	0.65	0.00	1.68	2.59	4.75	27.11	1872
Current Ratio	2.34	0.26	2.55	1.09	3.57	18.17	1872
Cash Conversion Cycle	207.45	-161.31	482.25	2.33	6.84	54.21	1872
Day's Inventory Outstanding	116.21	0.00	167.88	1.45	4.73	30.21	1872
Day's Sales Outstanding	210.57	3.81	669.97	3.18	7.98	68.64	1872
Day's Payables Outstanding	107.87	3.17	212.90	1.97	7.53	64.46	1872
Profitability	0.04	-1.89	0.28	7.41	-3.52	22.78	1872
Firm Size	5.85	2.27	1.78	0.30	0.23	2.60	1872
Leverage Ratio	0.04	0.00	0.07	1.75	3.67	21.07	1872

Source: Authors.

Among the set of right-hand side variables in Table 2, the highest correlation is between *Net Working Capital* and *Firm Size*. Day's *Sales Outstanding* affects Cash Conversion Cycle more than its other components. As expected, these three components are also highly correlated with each other. Even though the correlations between the other variables are significant, all correlation coefficients are in insignificant orders of magnitude.

TABLE 2. Correlation matrix

	Market Value	Net Working Capital	Cash Ratio	Current Ratio	Cash Conversion Cycle	Days Inventory Outstanding	Days Sales Outstanding	Days Payables Outstanding	Profitability	Firm Size	Leverage Ratio
Market Value	1.00										
Net Working Capital	0.75*	1.00									
Cash Ratio	0.07*	-0.18*	1.00								
Current Ratio	-0.03	-0.19*	0.82*	1.00							
Cash Conversion Cycle	-0.17*	-0.08*	-0.03	0.10*	1.00						
Day's Inventory Outstanding	-0.15*	-0.07*	-0.01	0.03	0.56*	1.00					
Day's Sales Outstanding	-0.14*	-0.09*	-0.04	0.06*	0.96*	0.41*	1.00				
Day's Payables Outstanding	-0.11*	-0.10*	-0.06*	-0.05*	0.65*	0.50*	0.74*	1.00			
Profitability	0.29*	0.21*	0.11*	0.16*	-0.07*	-0.08*	-0.07*	-0.10*	1.00		
Firm Size	0.88*	0.84*	-0.01	-0.16*	-0.11*	-0.10*	-0.07*	-0.04	0.16*	1.00	
Leverage Ratio	-0.09*	0.07*	-0.15*	-0.25*	-0.01	-0.01	0.01	0.07*	-0.33*	0.16*	1.00

Source: Authors. Note: * p < 0.05

2.2. Methodology

Since the sample is an unbalanced panel data set with missing observations and the firms' leverage ratio is expected to be correlated with their past values, Arellano and Bond (1991) and Blundell and Bond (1998)'s dynamic system-GMM estimator is preferred in this study. The Pesaran (2015) cross-sectional dependency and Maddala and Wu (1999) first-generation panel unit root tests are conducted as the initial analysis. Since the results suggest no cross-sectional dependence and non-stationarity, all variables are used at their levels without further transformation. The employed panel model of the study is given below:

$$\text{Firm Value}_{it} = \beta_0 + \delta_0 \, \text{Firm Value}_{it-1} + \sum_{k=1}^{K} \beta_k \text{Factor}_{k,it} + \sum_{m=1}^{M} \gamma_m \text{Control}_{m,it} + \sum_{t=1}^{T} Y_t + \varepsilon_{it} \quad (1)$$

Firm Value is the dependent variable. Its first lag is also used as a control variable within the dynamic specification of the model. The set of *Factor* variables are the variables of interest in this study. *Net Working Capital, Current Ratio, Cash Ratio, Day's Sales Outstanding, Day's Payables Outstanding, Day's Inventories Outstanding*, and *Cash Conversion Cycle* are examined as variables of interest in various combinations. The three variables within the control group are *Profitability*, *Firm Size,* and *Leverage Ratio*. Time dummies are also included in the analysis, but industry dummies are excluded due to the small sample size for a classification based on industries. Finally, the *i* and *t* sub-indices represent each variable's firm and year.

3. RESULTS AND DISCUSSION

The effect of focus variables on the dependent variable is investigated in two steps. First, the model given in Eq. (1) is run five times to assess the sole impacts of the focus variables. The results are presented in Table 3. In line with previous literature, *Cash Ratio* has an upward pressure on the market value of firms. In addition, a positive but insignificant relationship between *Current Ratio* and *Market Value* is detected. Although the results do not suggest that firms' market values are affected by *Net Working Capital, Cash Conversion Cycle* has a downward pressure on firms' market values. Only Day's Sales Outstanding has a significant coefficient among the latter components. These initial findings support the view that managers should increase the efficiency of the operating cycle processes to increase the value of their firms.

Firms with tighter credit policies and accumulations on cash accounts are expected to have higher market values. Also, profitability and firm size have significant positive coefficients in all models. It can also be said that high indebtedness reduces the firm's value. The models in Table 3 were also estimated after excluding firm size to check our findings' robustness. The signs and significance of the coefficients do not change in these alternative specifications.

In the second step of our analysis, focus variables are investigated within various combinations. Table 4 gives the results of this analysis. As expected, *Cash Ratio* is highly significant for different combinations of focus variables. Interestingly, it consumes *Net Working Capital*'s significance when these two variables are modeled together. Thus, it can be argued that cash holdings mitigate the impact of other current asset investments on the value of a firm. While overinvestment in trade credits and inventories reduces a firm's market value, its effect can be eliminated by holding more cash. The *Current Ratio* also reduces the significance of *Net Working Capital*. However, its effect is less pronouncedthan that of the *Cash Ratio*. The importance of *Day's Sales Outstanding* also decreases when modeled with the *Cash Ratio*. Lastly, Table 4 shows that *Day's Payables Outstanding* has a significance of 10%, which is not affected by the inclusion of other liquidity ratios.

To sum up, our findings reveal that liquidity management policies affect firms' market values. Significantly, firms should decrease their day's outstanding sales and increase their day's payables to boost their value. *Cash Holdings* should have a vital role in working capital decisions, as it is the most robust determinant of firm value among the liquidity indicators.

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TABLE 3. System GMM results for models with the single variable of interest

	Model 1	Model 2	Model 3	Model 4	Model 5
Dependent Variable			Market Value		
Lag Market Value	0.7473*** [0.0602]	0.7587*** [0.0601]	0.7378*** [0.0645]	0.7787*** [0.0603]	0.7603*** [0.0607]
Net Working Capital	0.0183** [0.0088]	-	-	-	-
Cash Ratio	-	0.0089 [0.0064]	-	-	-
Current Ratio	-	-	-0.0044 [0.0143]	-	-
Cash Conversion Cycle	-	-	-	-0.0001** [0.0000]	-
Day's Inventory Outstanding	-	-	-	-	-0.0001** [0.0000]
Day's Sales Outstanding	-	-	-	-	-0.0001 [0.0001]
Day's Payables Outstanding	-	-	-	-	0.0001 [0.0001]
Profitability	-1.6397*** [0.4192]	-1.5635*** [0.4368]	-1.6169*** [0.4619]	-1.5039*** [0.4634]	-1.6322*** [0.4525]
Firm Size	0.2496*** [0.0546]	0.2392*** [0.0551]	0.2551*** [0.0582]	0.2136*** [0.0541]	0.2316*** [0.0546]
Leverage Ratio	0.2422*** [0.0427]	0.2428*** [0.0439]	0.3028*** [0.0577]	0.2610*** [0.0427]	0.2463*** [0.0429]
Constant	0.5743*** [0.1534]	0.5360*** [0.1461]	0.5282*** [0.1862]	0.5785*** [0.1605]	0.7470*** [0.1616]
Year Effect	Yes	Yes	Yes	Yes	Yes
Probability Values for Diagnostic Test					
AR (1)	0.000	0.000	0.000	0.000	0.000
AR (2)	0.183	0.316	0.269	0.307	0.244
Hansen	0.346	0.077	0.063	0.106	0.119
Wald	0.000	0.000	0.000	0.000	0.000
# of Instruments	47	47	47	47	49
# of Groups	302	303	295	294	302
N	1783	1826	1712	1746	1801

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Source: Authors.

Notes: Standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01.

Table 4. System GMM results for models with multiple variables of interest

	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
Dependent Variable	Market Value					
Lag Market Value	0.7296*** [0.0661]	0.7743*** [0.0614]	0.7473*** [0.0632]	0.7309*** [0.0677]	0.7796*** [0.0625]	0.7666*** [0.0613]
Net Working Capital	0.0220* [0.0114]	0.0209* [0.0111]	0.0165* [0.0090]	-	-	-
Cash Ratio	-	-	-	0.0106 [0.0077]	0.0136 [0.0085]	0.0102 [0.0067]
Current Ratio	0.0133 [0.0155]	-	-	-0.0014 [0.0141]	-	-
Cash Conversion Cycle	-	-0.0001 [0.0000]	-	-	-0.0001*** [0.0000]	-
Day's Inventory Outstanding	-	-	-0.0000* [0.0000]	-	-	-0.0001*** [0.0000]
Day's Sales Outstanding	-	-	-0.0001 [0.0001]	-	-	-0.0001 [0.0001]
Day's Payables Outstanding	-	-	0.0001* [0.0001]	-	-	0.0001* [0.0001]
Profitability	-1.6229*** [0.4445]	-1.5170*** [0.4377]	-1.6726*** [0.4280]	-1.5850*** [0.4523]	-1.4255*** [0.4517]	-1.5597*** [0.4469]
Firm Size	0.2492*** [0.0579]	0.2211*** [0.0553]	0.2460*** [0.0570]	0.2616*** [0.0608]	0.2155*** [0.0570]	0.2284*** [0.0559]
Leverage Ratio	0.2788*** [0.0558]	0.2476*** [0.0418]	0.2355*** [0.0422]	0.2914*** [0.0562]	0.2467*** [0.0422]	0.2329*** [0.0428]
Constant	0.4558** [0.1885]	0.5505*** [0.1602]	0.5112*** [0.1810]	0.5094*** [0.1819]	0.5316*** [0.1533]	0.6922*** [0.1535]
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes
Probability Values for Diagnostic Test						
AR (1)	0.000	0.000	0.000	0.000	0.000	0.000
AR (2)	0.244	0.123	0.148	0.215	0.219	0.210
Hansen	0.054	0.253	0.101	0.065	0.338	0.207
Wald	0.000	0.000	0.000	0.000	0.000	0.000
# of Instruments	47	47	45	47	53	48
# of Groups	302	301	289	294	286	294
N	1801	1759	1631	1688	1607	1671

Source: Authors.

Notes: Standard errors in brackets. * p < 0.1, ** p < 0.05, *** p < 0.01.

4. CONCLUSION

This study analyzes the impact of working capital decisions of publicly traded Turkish firms on their market values. A sample of 317 firms for 2010-2018 is analyzed using the system GMM estimator. The impacts of several indicators of liquidity management policies (i.e., net working capital, current ratio, cash ratio, and cash conversion cycle) on firm value are analyzed using different model specifications. Our main finding is a positive relationship between cash holdings and firm value, which is robust to including any other liquidity measure in the models. In addition, the higher the cash conversion cycle, the lower the firm value. These results suggest that managers should consider their cash and non-cash current asset decisions together, as companies with a high level of cash holdings are seen as successful firms with lower financial distress probability, and their working capital investments are not interpreted negatively by investors.

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VRIJEDNOST PODUZEĆA I ODLUKE O OBRTNOM KAPITALU:

DODATNI DOKAZI S TRŽIŠTA U RAZVOJU

SAŽETAK

Ova studija istražuje utjecaj odluka o upravljanju obrtnim kapitalom na tržišne vrijednosti korištenjem uzorka podataka koji sadrži godišnja mjerenja za 317 turskih društava, uvrštenih u tržište kapitala, između 2010. i 2018. godine. Omjer gotovine, tekući omjer, neto obrtni kapital i ciklus konverzije gotovine koriste se kao pokazatelji politika likvidnosti. Specifični dinamički model procjenjuje se pomoću sustava GMM procjenitelja. Rezultati istraživanja pokazuju da tvrtke mogu utjecati na svoje tržišne vrijednosti učinkovitim upravljanjem svojim likvidnim sredstvima. Međutim, ova veza slabi kako se povećava zadržana gotovina. Drugim riječima, dugi ciklus konverzije gotovine i velika količina neto obrtnog kapitala ne smatraju se negativnim signalima za ulagače, ako su praćene dovoljnom količinom zadržane gotovine. Stoga se može reći da upravljanje gotovinom može pomoći u smanjenju negativnog utjecaja ulaganja u obrtni kapital na vrijednost tvrtke. Nisu pronađeni dokazi o utjecaju tekućeg omjera i neto obrtnog kapitala na vrijednost tvrtke.

KLJUČNE RIJEČI: *menadžment likvidnih sredstava; vrednovanje poduzeća; tržište u razvoju; radni kapital; zadržana gotovina; sustav GMM*

APPENDIX. Definitions and Sources of Variables

Variables	Definition	Estimation	Data Source
Dependent Variable	Market Value	Log((Number of Shares Outstanding ×Stock Price) +Short Term Debt +Long Term Debt)	
Variables of Interest	Current Ratio	(Current Assets)/ (Current Liabilities)	
	Cash Ratio	(Cash and Marketable Securities)/ (Current Liabilities)	
	Net Working Capital	Nathural Logarithm of (Accounts Receivable +Inventories -Accounts Payable)	Compustat Database
	Cash Conversion Cycle	Days Sales Outstanding +Days Inventory Outstanding -Days Payable Outstanding	
	Firm Profitability	(Net Income) ⁄ (Total Equity)	
Control Variables	Market Leverage	(Financial Debt) ⁄ (Total Capital)	
	Firm Size	Log (Total Assets)	