THE EFFECTS OF FINANCIAL RISK MANAGEMENT ON FIRM'S VALUE: AN EMPIRICAL EVIDENCE FROM BORSA ISTANBUL STOCK EXCHANGE[1]

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Abstract

World trade volume shows rising trend and financial markets have been deepening. Firms that operate in the framework of economic and financial structure are affected by fluctuations in different factors such as interest rate, exchange rate and commodity prices. In this context, the use of derivatives allow companies to manage controllable risk and are preferred within the scope of financial risk management for the purpose of hedging. The prime aim of this research is to detect both the effect of derivatives in the financial risk management proves and financial risk management determinants by employing panel data analysis technique and panel logistic regression model. In order to accomplish this purpose, 248 observations of 31 companies listed in the BIST from 2008 to 2015 are analysed. The main outcome of research demonstrates that the financial risk management has no effect on the firm value. In addition, according to the research, determinants of Financial Risk Management detected are as fallows; the variables of financial leverage, exchange rate risk, firm size and geographical diversity.

Keywords: Financial Risk Management, Derivatives, Panel Data Analysis.

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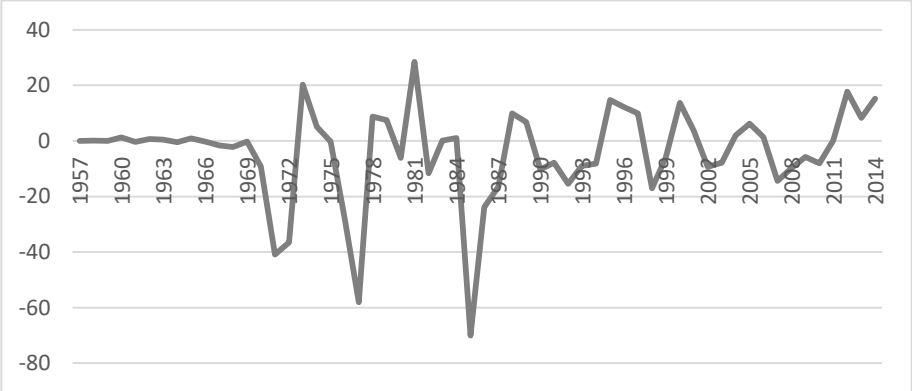
1. Introduction

Until the 1970s, operational risk management was only a moderate technical function that was concerned with hazard risks. However, along with consideration of a silo approach with the Black-Scholes option pricing model, the thought of financial risk management has begun to stand out to manage financial risk that opened the way for the use of financial derivatives (Bharathy and McShane, 2014, 38). Foreign exchange rates fluctuated at an unprecedented rate with the end of The Bretton Woods system, commonly called US dollar-denominated system, in the 1970s. This circumstance affected all economic players and exchange rate risk exposed firms, individuals and even countries.

Figure 1

Japanese Yen / USA Dollar Annual Price Change

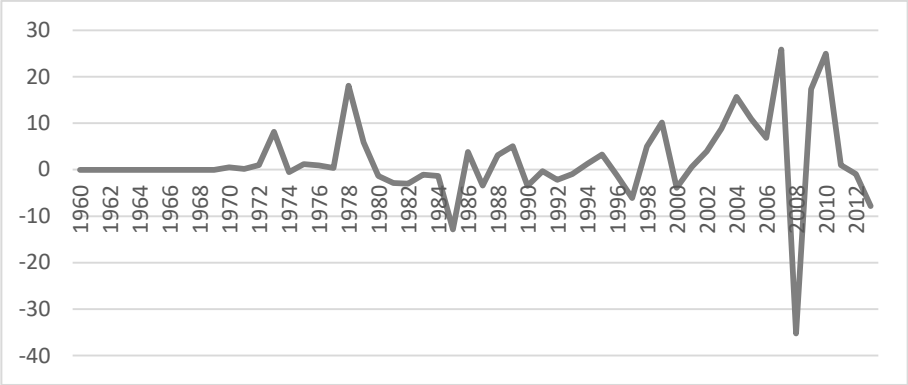


Source: World Bank, World Data Bank, 26.01.2016

Particularly, in the foreign exchange market, even short-term shocks led to years of real loss due to uncertainties in financial risk management. In this period of time, prices increased due to supply side pressures, and stock market prices fell. Verified that The Dow Jones Index could only show an increase of 1000 points from 1966 to 1983 (Yıldıran and Kısakürek, 2012: 49).

Figure 2

Annual Change in Oil Prices (1960-2013)

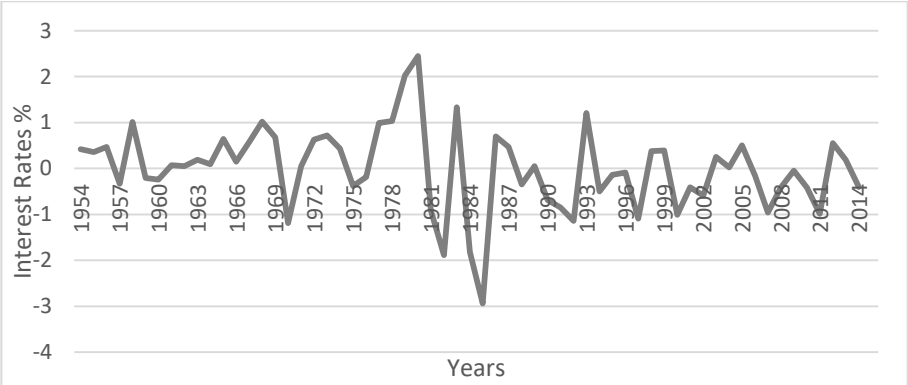


Source: World Bank, World Data Bank, 26.01.2016

Moreover, In 1973 and 1980 oil shocks were experienced due to the increase in oil prices (Uslu, 2007: 27). As known that Petroleum is a major consumption item for national economies, corporations and individuals, and is the main source of many goods and services. By abandoning Keynesian politics such as limiting the interest rates applied until the 1980s, limiting the money supply, interest rate risks started to come to the fore at financial markets (Yalçıner, 2012: 11).

Figure 3

Annual Change in US Long-Term Interest Rates



Source: World Bank, World Data Bank, 26.01.2016

Financial risk management (FRM) practice was emerged as a result of the exchange rate, interest and commodity risks that were

experienced in the 1970s, and the importance of FRM pushed companies to use financial derivatives in order to eliminate these types of risk. On the other hand, derivatives intended not only for the prevention of financial losses by the purpose of hedging, but also provide arbitrage and speculation opportunities. Besides the fact that derivatives have the possibility of speculation and arbitrage, derivatives have been started to be used taking into consideration the opportunities as well as risk dimension.

Obviously, The FRM is the process of struggling with the uncertainty arising in financial markets. The FRM includes assessing the financial risks that companies faced to and developing a management strategy consistent with priorities and policies of firms. Proactively addressing financial risks can provide competitive advantage to organizations. At the same time, the FRM enables management, operational staff, shareholders and the board of directors to act in agreement and cooperation on key risk issues (Horcher, 2005: 3).

Practically, FRM implications can be realized in two different ways. One of them is risk reduction through portfolio diversification, which is a core point of traditional portfolio management. In the modern portfolio approach, risk management is performed against portfolio risk, depending on the standard deviations of the portfolio and the variance used to measure the portfolio risk. Another method of financial risk management is the transfer of risk using financial derivatives.

2. Literature review

The researches have been carried out related to FRM can be categorised in three groups; research on FRM theory, effects of the FRM on the firm value, and FRM determinants. Empirically, use of derivative instruments represents financial risk management process. Business risk management theory has been developed as an extension of the business financing policy (Eckles et al., 2014: 248). The issue of risk management has been widely discussed since the 1950s. According to Modigliani-Miller approach, It is known that the value of the firm is independent of the risk of the company. Modigliani and Miller (1958) argued that under effective market conditions, risk management would not affect firm value. In perfect competition market and effective market conditions, it is assumed that although

additional borrowing causes increase in debt / equity ratio, the risk value of firm is not effected (Yıldıran and Tanyeri, 2006: 181). According to this approach; firms have to maximize their expected returns regardless of risk formation, and investors are able to transfer risk with an appropriate portfolio distribution (Bertinetti et al., 2013: 3, Christoffersen, 2003: 2).

Academicians argued that the effective FRM implications can increase firm's value by reducing total risk of companies. Researchers identified various value-enhancing benefits of risk management, which are reducing tax payments, financial distress, inadequate investment, asymmetric information and expected costs associated with non-diversified stakeholders. These researches allow firms to perceive in a real sense the causes of risk aversion, and provide theoretical classification for the relationship between firm value and risk management (McShane et al., 2011: 643).

Smith and Stulz (1985) developed a theory of positive risk protection to maximize firm's market values following modern finance theory. In their theory (1) they are seeking answers to the question "Why some companies do hedging while others do not?". 2) "some firms are responding to the questions of why they are protected against the exposure to accounting risks while others are receiving risk protection on economic value". Smith and Stulz (1985) have proposed three reasons for firm value seeking: (1) tax, (2) cost of financial distress, and (3) managerial risk protection. They concluded that the analyses should be empirically tested in later investigations. Therefore, in this regard, they stated that detailed information is needed to employ these tests.

Additionally, Jin and Jorion (2006) underlined to three typical lines of explanation in the risk management theory proceeds. The first one is financial stress reduction feature that decrease expected cost of risk. Secondly, the risk aversion is supported by tax incentives. Risk aversion increases the firm's debt capacity so that greater leverage provides more tax advantages. The last one, risk aversion also helps to reduce insufficient investment problems.

The researches on the effects of FRM on firm value are chronologically as follows; (2001), Carter and others (2006), Jin and Jorion (2006), Mackay and Moeller (2007), Perez-Gonzalez and Yun (2013), Panaretou (2014), Li and others (2014), Akpınar and Fettahoglu (2016) and Aytürk and others (2016). Allayannis and Weston (2001) attempted to explain the use of foreign exchange

derivatives and the potential effects of these instruments on firm value, in the case of 720 large non-financial firms in the US between 1990 and 1995. A positive relationship was found between the use of foreign exchange derivatives and firm value by selecting Tobin's Q, as a firms' value indicator. Similarly, Carter et al. (2006) investigated whether hedging for firms in the US airline industry was a value source in the 1992-2003 period or not. It was found that protecting risk related to the jet fuel is positively associated with the airline firm value.

Jin and Jorion (2006) examined the effect of hedging activities of 119 US firms engaged in oil and gas production between 1998 and 2001. According to outcomes, hedging did not affect the market value of the firm in this industry. it can, also, be noted that hedging activities decreases sensitivity of the market price of firms to oil and gas price. In addition, Mackay and Moeller (2007) observed a positive correlation between the revenue and cost of hedging and firm value by applying the model of Smith and Stulz (1985), for the 34 oil refinery firms sample.

Moreover, Bartram et al. (2011) assessed the effects of using derivative financial instruments on firm risk and value in the geographical context for non-financial firms in 47 countries. They observed that the use of financial derivative products reduces the total risk and systematic risk. It is stated that risk aversion has has an influence on the cost of capital and, thus the investment policy and economic profitability of the company are affected from risk management. Also, Perez-Gonzalez and Yun (2013) investigated the impact of effective risk management policies on firm value by employing energy companies' data. At first glance, it can be seen that the use of derivatives increased both the firm value and the leverage ratio.

Panaretou (2014) found that although the effects of the use of foreign exchange derivatives are statistically and economically significant, the interest rate derivatives had a weak effect and the commodity derivatives has no effect for non-financial firms in the UK.

Furthermore, Li et al. (2014) established the concept of risk management based on the creation of a risk management unit, the use of financial derivatives, or the utilization of services of international accounting firms as an audit firm by taking into account 189 financial firms in China during the period of 2009-2013. It is

determined that the use of financial derivative products affected the firm value.

Aytürk et al. (2016) investigated the effects of the use of financial derivatives on firm value non-financial firms in Turkey from 2007 to 2013. In panel data analysis, , it was seen that the use of derivative products, in general, has no effect on firm's value in Turkish Market by employing Fama-French three factor time series technique and sector analysis research method.

Akpınar and Fettahoğlu (2016) investigated the effects of using derivative products on firm value through tests conducted on 72 non-financial firms in 2009-2013 period. it is that there is not any positive significant effect was figured out for the companies that use derivatives to eliminate risk factors.

The last group research focuses on assessing the FRM determinants. Smith and Stulz (1985) attempted to theoretically explain the reason for firm's hedging activities. They expressed that the major determinants of FRM are the cause of tax, financial cost of difficulty, and protection from managerial risk.

The empirical studies on FRM determinants can be ordered as follows; Carter et al. (2006) found that while the use of jet fuel derivatives was positively affected by current jet fuel contracts, they are negatively affected by the ratio of executive stocks to circulating stocks. Bartram et al. (2011) figured out that the use of derivative products is related to higher interest rate risk, exchange rate risk and commodity prices. Bodnar et al. (2013) investigated the determinants of exchange rate and interest rate derivatives, and found that firm size, geographical location, credit rating, industry, access to capital markets and education level in the sample of non-financial Italian firms are possible determinants of mentioned derivatives by applying the logistic regression model.

3. Samples, Variables and Method

Derivatives in the financial sector are used for purposes such as buying-selling intermediation, arbitrage and speculation as well as being protected from risk. In that context, the main aim of this research is to reveal the possible impact of FRM applications on firms' value, and to point out FRM determinants in the non-finance sector. In order to reach that aim, the sample was selected from firms listed in Istanbul Stock Exchange (BIST), taking place in the first 200

of the list of the Top 500 Industrial Enterprises of Turkey prepared by Istanbul Chamber of Industry for 2015. The start point of research period is considered as the year 2006, when the applications of Turkish Accounting Standards (TAS) and Turkish Financial Reporting Standards (TFRS) put into practice. However, due to shortcomings in the data provided for 2006 and 2007, the working period has been set as 2008-2015. In this context, 248 observations were obtained from 31 firms. Variables and explanations that are generally used to consider financial risk management and related FRM literature are illustrated in Table 1.

Table 1

Variables Used in the Research

Variables	Explanation of Variables	Previous Researches
FRM Application (FRM1)	Derivative Instrument if used "1", if not "0"	Allayannis ve Weston (2001), Jin ve Jorion (2006), Bartram et al. (2011), Perez-Gonzalez and Yun (2013), Panaretou (2014), Abdel-Azim and Abdelmoniem (2015), Li et al. (2014), Aytürk et al. (2016) and Akpınar and Fettahoğlu (2016)
FRM Application (FRM2)	Total amount of derivatives on the balance sheet / Total Assets	Panaretou (2014), Aytürk et al. (2016)
Tobin's Q (TBNQ)	(Market Value + Short Term Liabilities + Long Term Liabilities) / Total Assets	Allayannis and Weston (2001), Carter et al. (2006), Jin ve Jorion (2006), Bartram et al. (2011), Panaretou (2014), Li et al. (2014), Aytürk et al. (2015) and Akpınar and Fettahoğlu (2016)
Market to Book Value Ratio (MVBV)	Market Value / Book Value	
Firm Size (LOGSIZE)	Natural Logarithm of Total Assets	Carter et al. (2006), Bartram et al. (2011), Bodnar et al. (2013), Panaretou (2014), Li et al. (2014), Aytürk et al. (2016) and Akpınar and Fettahoğlu (2016)
Financial Leverage (LVR)	Total Debt/Total Assets	Panaretou (2014), Li et al. (2014), Carter et al. (2006), Mackay ve Moeller (2007), Bartram et al. (2011), Aytürk et al. (2016), Akpınar and Fettahoğlu (2016)
Return on Assets (ROA)	Net Profit / Total Assets	Bartram et al. (2011), Panaretou (2014), Li et al. (2014), Aytürk et al. (2016), Akpınar and Fettahoğlu (2016)

Variables	Explanation of Variables	Previous Researches
Geographical Diversity(GD)	Foreign Sales / Total Sales	Bodnar et al. (2013), Panaretoru (2014), Aytürk et al. (2016)
Growth in Sales (GIS)	$(Sales_t - Sales_{t-1})/ Sales_{t-1}$	Bartram et al. (2011)
Price Stability (PSTB)	Standard Deviation of Daily Prices	
Exchange Rate Risk (ERT)	Net Foreign Currency Position (Absolute) / Equity	
Liquidity Risk[2] (LQD)	Short Term Liabilities / Current Assets	
Credit Riski (CRD)	Receivables/Equity	

Descriptive statistics are shown in Table 2. Accordingly, the ratio of enterprises using derivative products under the FRM in the number of observations is 31%, and the ratio of derivative instruments in the financial reports to the balance sheet is 0.2%. Tobin's Q ratio, representing the company's value, is 1.86. This ratio is greater than 1 (Tobin's Q> 1) suggests that the expectations about the firms are positive. The financial leverage ratio is seen as 49.9%, the general rate of 50% is not exceeded. The company exports 31% of the value of the observation. The ratio of short term liabilities to current assets is 68% and the exchange rate risk is 64%.

[2] *Generally, there are current assets in the share of the liquidity ratios and short-term liabilities in the denominator. In this study, the stake has been displaced by the share of the liquidity ratio used. There are two reasons for this: (1) In econometric analyses, the values of the variables are included in the regression as increasing, decreasing, or stabilizing values, and the effect of such increase, decrease or steady values is sought. However, liquidity ratios are regarded as normal between certain limits and other liquidity ratios are considered as low or excess / excessive liquidity. The existing liquidity ratios used within certain boundaries have been put into the regression equation and changed in order to eliminate the problem with investigating the effect of liquidity ratios. Thus, depending on foreign resource usage, the rate increases from zero and becomes suitable for regression. (2) Current liquidity ratios indicate liquidity. In order to be able to talk about liquidity risk, it is evaluated that "Short Term Liabilities", which is a source of risk, should be brought in proportion to leverage, credit and exchange rate risks. The displacement of the shareholder with the share also maintains the relationship in the liquidity ratios between "Short Term Foreign Resources" and "Current Assets" at the same time (Şenol ve Karaca, 2017: 11).*

Table 2

Descriptive Statistics

	Number of observations	Average	Standard Deviation	Minimum Value	Maximum Value
FRM1	248	0.3104839	0.4636274	0	1
FRM2	248	0.0019273	0.0054112	0	.0363721
TBNQ	248	1.863435	1.060412	1.038516	8.862194
MVBV	248	1.772256	1.490605	0.2032637	8.587649
LOGSIZE	248	21.03787	1.222385	16.88936	23.83085
LVR	248	0.4991119	0.1883434	0.0319347	0.9128917
ROA	248	0.0580024	0.072664	-0.1652584	0.4752167
GD	248	0.3105982	0.2447557	0	1
GIS	248	0.1269137	0.1892757	-0.4795295	0.7894037
PSTB	248	4.45	35.49419	0.0627892	539.8946
LQD	248	0.6816276	0.3022494	0.0400385	2.926808
ERT	248	0.6396442	0.6321097	0.0526262	4.99167

Panel data analysis was conducted to determine the impact of FRM on firm value. Panel data consists of N number of units and T number of observations of these units and is expressed as follows:

$$Y_{it} = \beta_{0it} + \beta_{1it} X_{1it} +,\ldots\ldots, \beta_{jit}X_{jit} + \mu_{it} \quad (1)$$

$i = 1,2,3,\ldots, N; \quad t = 1,2,3,\ldots, T$

In panel data econometrics, unit and time effects are explained by constant effect or random effect models. In the constant-effect model, constant coefficients vary within cross-sectional data, between time-series data, or both data. However, the slope coefficients in the model are fixed (Alptekin, 2012: 207). In the random effects model, it is suggested that the trend values for each section unit are the same, that these trend values remain constant over time and that there is a temporary horizontal section relation between dependent and independent variables (Kaya, 2014: 297).

Panel logistic regression was performed to identify the FRM determinants. The panel can be expressed as logistic models, binary and multiple preference models. In logistic models, the dependent

variable takes the value of "1" (Y_{it} = 1) if the event occurs for unit i at time T and "0" (Y_{it} = 0) if not. These models are probability models and the values are composed of "1" and "0" (Yerdelen Tatoğlu, 2013b: 161).

4. Analysis

Pearson correlation coefficients are shown in Table 3, in the Appendix. There is no correlation of more than 80% among variables to be modelled.

In order to determine the effect of FRM on firm value and the determinants of FRM application with the obtained observations, the following models were employed.

$$TBNQ_{it} = \beta_0 + \beta_1 FRM1_{it} + \beta_2 FRM2_{it} + \beta_3 LOGSIZE_{it} + \beta_5 ROA_{it} + \beta_6 LVR_{it} + \beta_7 PSTB_{it} + \beta_8 GIS_{it} + \mu_i$$

Previous studies to test the impact of FRM on firm value are as follows; (2001), Carter et al. (2006), Jin and Jorion (2006), Mackay and Moeller (2007), Bartram and others (2011), Perez-Gonzalez and Yun (2013), Panaretou (2014), Li and others (2014), Aytürk and others (2016) and Akpınar and Fettahoğlu (2016). Based on these studies, the above Tobin's Q (TBNQ) model was established in the academic literature, the following model of the Book to Market ratio (MVBV), which is another variable representing firm value, has been established.

$$MVBV_{it} = \beta_0 + \beta_1 FRM1_{it} + \beta_2 FRM2_{it} + \beta_3 LOGSIZE_{it} + \beta_5 ROA_{it} + \beta_6 LVR_{it} + \beta_7 PSTB_{it} + \beta_8 GIS_{it} + \mu_i$$

The following models were created to identify FRM determinants inspired by the work of Smith and Stulz (1985), Carter et al. (2006), Bartram et al. (2011) and Bodnar et al. (2013)

$$FRM2_{it} = \beta_0 + \beta_1 LVR_{it} + \beta_2 LQD_{it} + \beta_3 ERT_{it} + \beta_4 CRD_{it} + \beta_6 LOGSIZE_{it} + \beta_7 ROA_{it} + \beta_8 GD_{it} + \mu_i$$

While LVR, LQD, ERT and CRD refer financial risks in FRM2 and FRM1, LOGSIZE, ROA and GD represent company specific characteristics. Although the other models are constructed as panel data model, the FRM 1 model is organized as panel logistic regression.

$$FRM1_{it} = \beta_0 + \beta_1 LVR_{it} + \beta_2 LQD_{it} + \beta_3 ERT_{it} + \beta_4 CRD_{it} + \beta_6 LOGSIZE_{it} + \beta_7 ROA_{it} + \beta_8 GD_{it} + \mu_i$$

The classical model applies when the effects of the units and times that bring the panel data to the square are not valid. One of the methods used to test the existence of unit and time effect is the likelihood ratio (LR) test (Baltagi, 2005;63). As a result of the LR tests, the classic model was rejected (Table 4). The Hausman (1978) descriptive test is used to decide between fixed effects and random effect models (Ün, 2015: 70). Hausman test statistic refers chi-square distribution. If the Hausman statistic is high, the fixed effect model is preferred, whereas if the statistical value is low, the random effect model is selected (Karaaslan and Yıldız, 2011: 10). In the models, the Hausman test statistic (Chi Square) shows that the fixed effect estimator models are valid (Table 4).

Table 4

F, LR and Hausman Test Results

Models	**F Test**		**LR Test**		**Hausman Test**
TBNQ	**Test**	**Statistic**	**Test**	**Statistic**	**Chi-Square**
	Unit	45.079327***	Unit	269.363***	73.28 (0.0000)
	Time	11.997160***	Time	1.828*	
	Unit and Time	39.662090***	Unit and Time	324.557***	
MVBV	**Test**	**Statistic**	**Test**	**Statistic**	**Chi-Square**
	Unit	17.066025***	Unit	134.738***	38.00 (0.0000)
	Time	7.997516***	Time	5.906***	
	Unit and Time	15.898407***	Unit and Time	174.052***	
FRM2	**Test**	**Statistic**	**Test**	**Statistic**	**Chi-Square**
	Unit	4.869486***	Unit	43.582***	19.92 (0.0057)
	Time	1.711906	Time	4.305**	
	Unit and Time	4.767715***	Unit and Time	49.500***	

*Note: ***, **, and * indicate significance at the significance level of 1%, 5% and 10%, respectively, of the relevant test statistic.*

After appropriate modelling chosen processes, heteroscedasticity, autocorrelation and correlations between units are required. If there is a variable variance, estimates will not yield effective results. In the presence of autocorrelation, standard errors are affected and inefficient regression coefficients are estimated (Baltagi, 2005: 79, 84). In case of heteroscedasticity, autocorrelation and correlation between units, the validity of t and F statistics, R^2 and confidence intervals are affected. Therefore, if there is at least one of

heteroscedasticity, autocorrelation and inter-unit correlations in the model, resistant predictors should be used (Yerdelen Tatoğlu, 2013a: 242).

Table 5

Tests of Assumptions

Model	Assumptions	Test	Statistic	Eligible Estimator
TBNQ	Heteroscedasticity	Modified Wald	21872.48***	Driscoll-Kraay
	Autocorrelation	Durbin-Watson	0.91870978	
	Inter-Correlation	Pesaran's CD	11.709***	
MVBV	Heteroscedasticity	Modified Wald	14589.56***	Driscoll-Kraay
	Autocorrelation	Durbin-Watson	0.77296984	
	Inter-Correlation	Pesaran's CD	9.939***	
FRM2	Heteroscedasticity	Modified Wald	1.4e+05***	Driscoll-Kraay
	Autocorrelation	Durbin-Watson	1.254478	
	Inter-Correlation	Pesaran's CD	3.228***	

*Note: *** represents statistical significance at 1% significance level*

As it can be seen in Table 5, the Driscoll-Kraay-resistant estimator model is used due to deviations from panel data analysis assumptions. Driscoll and Kraay (1998) proposed the standard nonparametric time series covariance matrix estimator due to its durable feature to the general forms of temporal and cross-sectional dependence (Hoechle, 2007: 284).

The panel regression results related to the effects of FRM practice on firm value is shown in the Table 6. The firm size (LOGSIZE), return on asset (ROA), price stability (PSTB), growth in sales (GIS) and geographical diversity (GD) are put into the model as control variables. It can be clearly seen that the impact of FRM (FRM1 and FRM2) on firm value is not statistically significant. Therefore, it is advocated that FRM, which is applied to overcome to risk pressure, does not affect the firm value. This result reflects Modigliani and Miller (1958) approach that put forwards the functionality of risk management on firms' market values. It is also supported in previous research done by Jin and Jorion (2006), Aytürk and others (2015) and Akpınar and Fettahoğlu (2016).

Panel data analysis and panel logistic regression methods are employed in order to figure out possible factors that affect the use of FRM. According to results shown in the Table 7, financial leverage,

exchange rate risk, firm size and geographical diversity variables can be accepted as determinants of FRM under the data limit used for the research. This result is similar to Bartram et al. (2011) research on the use of derivative instruments related to interest rate risk, exchange rate risk and commodity prices that firms are greatly affected. In like manner, Bodnar et al. (2013) outlined that have the use of exchange rate and interest rate derivatives are strongly influenced by firm size, geographical location, credit rating, industry, capital market access and education level of management.

5. Conclusion

While companies carry out their activities, they are affected by changes in factors such as exchange rate, interest rate, and commodity prices. In order to eliminate or reduce these types of risk factors, companies use financial derivative instruments ın the context of financial risk management. In other words, firms use derivative products within the FRM perspective in order to ensure not-fragile financial structures to any fluctuations in the markets, and also aim to provide the continuity of the company. This research investigated the relationship between the Financial Risk Management and market values of 248 companies listed on the BIST from 2008 to 2015. In addition, the possible determinants that influence FRM are tried to be detected.

According to results, it can be claimed that using derivative instruments as financial risk management tool has no effect on firms' value. As mentioned, reached outcomes approved the prominent approach of Modigliani and Miller (1958). Additionally, as frequently encountered in the literature, financial leverage, exchange rate risk, firm size and geographical diversity are underlined as determinants of FRM.

Taking all into the consideration that although financial risk management implications do not affect firm's market value, determinants of FRM shed light on market participants who are seeking to reduce predictable market risks. However, it should also be noted that possible market, data or period change may decrease or increase the reliability of outcomes reached from the research.

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APPENDIX

Table 3

Pearson Correlation Coefficients

	FRM 1	FRM 2	TBNQ	MVBV	SIZE	LVR	ROA	GD	GIS	PSTB	LQD	ERT
FRM1	1											
FRM 2	0,507**	1										
TBNQ	-0,095	-0,025	1									
MVBV	0,111	0,024	0,509**	1								
SIZE	0,303**	0,054	-0,072	0,076	1							
LVR	0,271**	0,251**	-0,337**	0,011	0,167**	1						
ROA	-0,134*	-0,123	0,390**	0,240**	-0,047	-0,341**	1					
GD	0,138*	-0,002	0,096	0,037	0,213**	0,075	0,047	1				
GIS	0,102	0,076	-0,032	0,093	0,096	0,129*	0,038	0,014	1			
PSTB	-0,002	-0,093	0,140*	0,341**	0,054	0,009	0,154*	0,120	-0,065	1		
LQD	0,275**	0,093	-0,280**	-0,102	0,022	0,272**	-0,381**	0,007	0,065	-0,011	1	
ERT	0,133*	0,083	-0,008	0,092	-0,004	0,260**	-0,325**	-0,086	0,118	-0,075	0,415**	1

*Note: Pearson coefficients, ** and * indicate significance levels of 0.01 and 0.05 respectively.*

Table 6

Driscoll-Kraay Fixed Effects Estimator

	TBNQ				MVBV			
	Coefficients	D/K St. Error	T	P	Coefficients	D/K St. Error	T	P
FRM1	0.0483	0.033	1.43	0.162	0.1164	0.099	1.17	0.251
FRM2	3.3522	6.321	0.53	0.600	3.2603	12.125	0.27	0.790
LOGSIZE	0.2432	0.122	**1.98**	0.057	0.8170	0.248	**3.29**	0.003
ROA	1.1241	0.361	**3.11**	0.004	2.4238	0.875	**2.77**	0.010
LVR	-0.6545	0.184	-3.55	0.001	2.0788	0.677	3.07	0.005
PSTB	-0.0058	0.000	**-6.50**	0.000	-0.0071	0.001	**-6.02**	0.000
GIS	-0.0561	0.082	-0.68	0.499	-0.4086	0.164	**-2.48**	0.019
GD	-0.3372	0.124	**-2.72**	0.011	-0.3978	0.321	-1.24	0.225
Constant	-2.8752	2.569	-1.12	0.272	-16.4296	4.915	-3.34	0.002
Number of Observations : 248 Group Number : 31					*Number of Observations : 248 Group Number : 31*			
P>F = 0.0000 R^2(inside) = 0.29					*P>F = 0,0000 R^2(inside) = 0,29*			
F(8,30) =181.48					*F(8,30) = 361.88*			

Table 7

Determinants of FRM

Driscoll / Kraay Constant Impact Estimator					**Panel Logistic Regression**			
	FRM2				FRM1			
	Coefficients	D/K St. Error	T	P	Coefficients	D/K St. Error	Z	P
LVR	0.0200	0.0064	**3.10**	0.004	16.6396	6.4660	**2.57**	0.010
LQD	-0.0005	0.0020	-0.26	0.800	2.1375	2.0580	1.04	0.299
ERT	-0.0015	0.0006	**-2.46**	0.020	-0.4464	0.6223	-0.72	0.473
CRD	0.0012	0.0009	1.35	0.187	0.1263	1.2189	0.10	0.917
LOGSIZE	0.0023	0.0006	**3.75**	0.001	6.2716	1.6746	**3.75**	0.000
ROA	0.0051	0.0077	0.66	0.514	20.3396	10.421	**1.95**	0.051
GD	-0.0020	0.0003	**-5.51**	0.000	-0.6063	1.9696	-0.31	0.758
Constant					-148.27	36.980	-4.01	0.000
Number of observations : 248 Group Number: 31 P>F = 0,0000 R^2 (inside) = 0,21 F(7,30) = 36.28					Number of observations: 248 Group Number: 31 Wald x^2= 22.13 P> x^2=0.0024			