Does Firm Size Affect The Firm Profitability? Evidence from Turkey

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Abstract

The aim of this study is to investigate the affect of firm size on profitability. In this study, data of 200 companies which were active in Istanbul Stock Exchange (ISE) between the years 2008-2011 has been used. "Return on Assets" (ROA) has been used as indicators of firm profitability and total assets, total sales and number of employees have been used as indicators of size. Multiple regression and correlation methods have been used in empirical analyses. The result of analysis indicates a positive relation between size indicators and profitability of firms. Control variables as the age of the firms and leverage rate have been found in a negative relation with ROA, but liquidity rate and ROA have been determined to have a positive relation.

Keywords: Firm size, Profitability, Firm Performance, Turkey

1. Introduction

Many researchers in industrial economics, strategic management, marketing and accounting and finance have attempted to identify the sources of variation of firm-level profitability. The central hypothesis in industrial economics is that any temporary divergence of a firm's profit rate from the market average is rapidly corrected through the effects of potential or actual entry and exit or other competitive forces so that no firm can earn an above-average profit for a long period of time. (Jonsson, 2007: 46)

Big firms have more competitive power when compared to small firms in fields requiring competition. Since they have a bigger market share, big firms have the opportunity to profit more. In addition to this, big firms are able to seize the opportunity to work in the fields which require high capital rates since they have larger resources, and this situation provides them the opportunity to work in more profitable fields with little competition (Bayyurt, 2007:582).

When the studies concerning the relation between firm size and profitability are reviewed, mixed results have been found present. Hall and Weiss (1967), Fiegenbaum and Karnani (1991), Majumdar (1997), Özgülbaş et al. (2006), Jonsson (2007) Serrasqueiro and Nunes (2008), Lee (2009), Stierwald (2009), Karadeniz and İskenderoğlu (2011), Saliha and Abdessatar (2011), Akbaş and Karaduman (2012), Shubita and Alsawalhah (2012) have found a positive relation between firm size and profitability. On the contrary, Shepherd (1972), Becker et al. (2010), Banchuenvijit (2012) have found a negative relation between firm size and profitability. Other than above studies, Simon (1962), Whittington (1980), Khatap et al. (2011) have found that firm size does not have an affect on profitability. These results cause a vague understanding of the affect of firm size on profitability and also an increase in the interest toward this subject.

The literature review regarding the subject showed that the studies concerning the subject have used total assets, total sales or number of employees to measure firm size except the ones belonging to Becker et al. (2010), Serrasqueiro and Nunes (2008). In this study, the aim is to review the affect of three size indicators on profitability individually and to contribute the literature in this way.

The aim of this study is to investigate the affect of firm size on profitability. In this study, data of 200 companies which were active in Istanbul Stock Exchange (ISE) between the years 2008-2011 has been used. "Return on Assets" (ROA) has been used as indicators of firm profitability and total assets, total sales and number of employees have been used as indicators of size. Additionally, age of the firms, leverage ratio and liquidity ratio have been used as control variables.

Study consists of five sections. The studies measuring the affect of firm size on profitability have been summarized in the second section following the introduction. Third section consists of introduction of dependent and independent variables and explanation of methodology and sampling of the study. Forth section contains the results of analysis. And a general assessment of the study has been put forth in the last section.

2. Literature Review

The majority of the studies measuring the affect of firm size on profitability have found results with positive direction between firm size and profitability. The majority of these studies have used total assets, total sales or number of employees as firm size indicators.

One of the first studies investigating the affect of firm size on profitability has been carried on by Simon (1962). Simon (1962) was not able to find a statistically significant relation between profitability and firm size. On the other hand, Hall and Weiss (1967) have found a positive relation between firm size and profitability in the study they carried on over Fortune 500 firms. On the contrary, Shepherd (1972) has found a negative relation between firm size and profitability. Whittington (1980) argued that firm profitability is independent from firm size.

As a result of their study which used approximately 3000 firms' data from 83 sectors between the years of 1979-1987, Fiegenbaum and Karnani (1991) have found a positive relation between firm size and profitability. In a similar way, Majumdar (1997) has used the data of 1020 firms operating in India. Results of the study have showed that big firms have a higher profitability compared to small firms. But Schneider (1991) has argued on the contrary, that the bigger the firm, the lower the profitability.

Özgülbaş et al. (2006) have studied the affect of firm size on performance over the firms operating in Istanbul Stock Exchange between the years of 2000-2005. They have found that big scale firms have a higher performance as a result of their study. In a similar fashion, Jonsson (2007) has studied the relation between profitability and size of the firms operating in Iceland. Results of the analysis have showed that big firms have a higher profitability compared to small firms.

Serrasqueiro and Nunes (2008) have studied the relation between the size and performance of big and small scale firms operating in Portugal. They found positive and statistically significant relations between the size and performance of the firms as a result of the study using the data belonging the years 1999-2003. In a similar way, Lee (2009) also has found a positive relation between the size and profitability of the firms operating in USA between the years of 1987-2006.

Stierwald (2009) has studied the factors influencing the profitability of 960 big firms operating in Australia between the years of 1995-2005. The result of the study has indicated that firm size affects firm profitability in a positive way.

Becker et al. (2010) have studied the affect of firm size on profitability in the firms operating in manufacturing sector in USA. Results of the study in which the data of the years 1987-2002 have been used showed that negative and statistically significant relations exist between the total assets, total sales and number of employees of the firms and their profitability.

Khatap et al. (2011) have studied the relation between performances and corporate governances of 20 firms which have been listed in Karachi Stock Exchange. The results of the study using the data of the period between the years 2005-2009 have showed a positive relation between total assets and ROA, but a negative and statistically not significant relation has been found between ROE and total assets. In addition, Karadeniz and İskenderoğlu (2011) have analyzed the variables affecting the return on assets of the tourism businesses listed in ISE. Results of the study showed that there are positive and statistically significant relations between total assets which has been used as a size indicator and ROA. In a similar way, Saliha and Abdessatar (2011) have studied the factors affecting profitability of 40 firms operating in Tunisia between the years of 1998-2006. As a result of their study, a positive relation has been shown between firm profitability and size.

Akbaş and Karaduman (2012) have studied the affect of firm size on profitability on the firms operating in manufacturing sector, listed in ISE between the years 2005-2011. Results of the study showed that firm size has a positive affect on profitability.

Shubita and Alsawalhah (2012) have studied the relation between capital structure and profitability of the industrial businesses listed in Amman stock exchange between the years 2004-2009. As a result of their study, a positive relation has been shown between firm profitability and return on equities.

Banchuenvijit (2012) studied factors affecting performances of the firms operating in Vietnam. A positive relation has been found between total sales and profitability of the firms but on the contrary a negative relation has been found between profitability and total assets. Additionally, the author has found statistically not significant results between number of employees and profitability.

3. Methodology

The aim of this study is to investigate the affect of firm size on profitability. In this study, data of 200 companies which were active in Istanbul Stock Exchange (ISE) between the years 2008-2011 has been used. Analysis does not include the companies operating in financial sector due to their different financial structures. All data utilized in the study have been obtained from the official web site of ISE[1] . Multiple regression and correlation methods have been used in empirical analyses. Durbin-Watson d statistic has been used to test if there is an autocorrelation of first degree between the error terms of the sample. Additionally, variance inflation factors

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[1] *http://www.imkb.gov.tr/FinancialTables/companiesfinancialstatements.aspx?sflang=tr*

(VIF) method has been used to determine multicollinearity. Dependent and independent variables used in the study are as below.

Tablo 1: Descriptions of Variables Used in Analysis

Variables	Description
Dependent Variables	
Return on Assets (ROA)	The ratio of net profit after tax to total assets
Independent Variables	
Size of firm 1 (SIZE_TA)	Natural logarithm of total assets
Size of firm 2 (SIZE_TS)	Natural logarithm of total sales
Size of firm 3 (SIZE_EMP)	Number of employees.
Control Variables	
Age (AGE)	Firm age
Leverage (LEV)	The ratio of total liabilities to total assets
Liquidity (LIQ)	The ratio of current assets to current liabilities

Main independent variables of the study are firm size indicators. Total assets, total sales and number of employees have been used as firm size indicators in this study. Writers such as Friend and Lang (1988), Gönenç and Arslan (2003), Deesomsak, (2004), Padron (2005), Khatap et al. (2011), Saliha and Abdessatar (2011) have used "Total Assets" as firm size indicator. Writers such as Rajan and Zingales (1995), Wiwattanakantang (1999), Çağlayan (2006), Huang and Song (2006), Serrasqueiro and Nunes (2008), Akbaş and Karaduman (2012), Shubita and Alsawalhah (2012) have used "Total Sales" as firm size indicator. Bilkey and Tesar (1977), Cavusgil and Naor (1992), Holzmuller and Kasper (1991), Bonaccorsi (1992), Archarungroj and Hoshino (1998), Jonsson (2007), Serrasqueiro and Nunes (2008), Becker et al. (2010), Banchuenvijit (2012) measured firm size using number of employees.

Control variables of the study are firm age, leverage ratio and liquidity ratio. These variables have been included to the study due to the assumption of their affectivity of the profitability of firms, following literature. Below regression models have been developed based on the studies concerning the relation between firm size and profitability (Majumdar, 1997; Jonsson, 2007; Serrasqueiro and Nunes, 2008; Becker et al., 2010; Banchuenvijit, 2012, and Akbaş and Karaduman 2012). Size indicators have not been assessed in a single model instead have been analyzed by developing three models in order to prevent multicollinearity and autocorrelation problems in the study.

Model I: $(ROA)_{it} = \beta_{it} + \beta2\ SIZE\_TA_{it} + \beta3\ LEV_{it} + \beta4\ LIQ_{it} + \beta5\ AGE_{it} + e_{it}$
Model II: $(ROA)_{it} = \beta_{it} + \beta2\ SIZE\_TS_{it} + \beta3\ LEV_{it} + \beta4\ LIQ_{it} + \beta5\ AGE_{it} + e_{it}$
Model III: $(ROA)_{it} = \beta_{it} + \beta2\ SIZE\_EMP_{it} + \beta3\ LEV_{it} + \beta4\ LIQ_{it} + \beta5\ AGE_{it} + e_{it}$

Tablo 2: Descriptive Statistics

Variables	Observation	Mean	Median	Std. Dv.	Minimum	Maximum
ROA	**800**	**0,030**	**0,030**	**0,096**	**-0,30**	**0,51**
LIQ	**800**	**2,547**	**1,60**	**3,160**	**0,07**	**29,95**
LEV	**800**	**0,475**	**0,480**	**0,242**	**0,02**	**1,29**
SIZE_TA	**800**	**19,57**	**19,37**	**1,516**	**15,87**	**23,37**
SIZE_TS	**800**	**19,41**	**19,31**	**1,656**	**13,66**	**23,25**
SIZE_EMP	**800**	**1789,76**	**504,50**	**4068,94**	**1**	**28562**
AGE	**800**	**37,97**	**39,00**	**12,59**	**6**	**61**

Table 2 shows the results of descriptive statistics concerning dependent and independent variables. As shown in Table 2, average asset profitability (ROA) of the firms listed in ISE and reviewed in scope of the analysis is 3%. The size indicators of total assets, total sales and number of employees are found to be 19.57; 19.41 and 1789.76 in that order.

4. Findings

Results of correlation analysis are shown in Table 3. Negative and statistically significant at 1% relations have been observed between the size indicators of the firm which are total assets (SIZE_TA) and total sales (SIZE_TS), and asset profitability of the firm (ROA). Negative and statistically significant at 5% relations have been observed between number of employees (SIZE_EMP), the other size indicator, and ROA. Relations which are positive and statistically significant at 1% have been observed between liquidity ratio (LIQ) and ROA of the firms. On the other hand, relations which are negative and statistically significant at 5% have been found between leverage ratio and ROA.

Tablo 3: Correlation Matrix

	ROA	LIQ	LEV	SIZE_TA	SIZE_TS	SIZE_EMP	AGE
ROA	1						
LIQ	0,369[**]	1					
LEV	-0,445[**]	-0,589[**]	1				
SIZE_TA	0,163[**]	-0,175[**]	0,035	1			
SIZE_TS	0,179[**]	-0,233[**]	0,093	0,908[**]	1		
SIZE_EMP	0,133[*]	-0,112[*]	0,082	0,587[**]	0,541[**]	1	
AGE	-0,065	0,080	-0,315[**]	0,167[**]	0,116[*]	0,122[*]	1

[**] Correlation is significant at the 0.01   [*] Correlation is significant at the 0.05

Table 4: Results of Regression Analysis (SIZE_TA)

MODEL 1 ROA	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Standart Error	Beta			Tolerance	VIF
Constant	-,118	,059	-	-1,992	**0,047[**]**	-	-
SIZE_TA	,012	,003	**,186**	4,140	**0,000[***]**	,936	1,068
LEV	-,147	,023	**-,370**	-6,474	**0,000[***]**	,580	1,724
LIQ	,006	,002	**,191**	3,462	**0,001[***]**	,622	1,607
AGE	-,001	,0003	**-,098**	-2,094	**0,037[**]**	,859	1,164
F-Statistic	33,201						
Adjusted R²	0,244						
DurbinWatson	1,904						

***, ** and * indicate significance at the level of 1%, 5% and 10% respectively

According to Table 4, the results of regression model may be shown mathematically as below:

Model 1: $ROA_{it} = \beta_{it} + (,186) SIZE\_TA_{it} + (-,370)LEV_{it} + (,191)LIQ_{it} + (-,098) AGE_{it} + e_{it}$

When Model 1 is analyzed, independent variables of *SIZE_TA, LEV, LIQ* and *AGE* are observed to influence firms' profitability (ROA). A positive relation has been found between total assets (SIZE_TA) and profitability (ROA) of the firms. In other words profitability increases as total assets of the firm increase.   A negative relation between leverage ratio (LEV) and firm age (AGE), and ROA but a positive relation between liquidity ratio (LIQ) and ROA have been found. In other words the increase in leverage ratio and age affect profitability of the firm in a negative way while the increase of liquidity ratio's affect on profitability is positive for the firms listed in ISE.

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Tablo: 5 Results of Regression Analysis (SIZE_TS)

MODEL II ROA	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Standart Error	Beta			Tolerance	VIF
Constant	-,200	,054	-	-3,730	**0,000*****	-	-
SIZE_TS	,016	,003	**,277**	6,302	**0,000*****	,927	1,078
LEV	-,148	,022	**-,372**	-6,692	**0,000*****	,580	1,723
LIQ	,007	,002	**,222**	4,103	**0,000*****	,614	1,629
AGE	-,001	,0003	**-,103**	-2,259	**0,024****	,869	1,151
F-Statistic	40,428						
Adjusted R²	0,283						
DurbinWatson	1,873						

***, ** and * indicate significance at the level of 1%, 5% and 10% respectively

According to Table 5, the results of regression model may be shown mathematically as below:

Model 2: $ROA_{it} = \beta_{it} + (,277) SIZE\_TS_{it} + (-,320)LEV_{it} + (,222)LIQ_{it} + (-,103) AGE_{it} + e_{it}$

When Model 2 is analyzed, independent variables of *SIZE_TS, LEV, LIQ* and *AGE* are observed to influence firms' profitability (ROA). There is a positive relation between total sales which is another size indicator and ROA. In other words profitability of the firms increases as their sales increase.

Tablo: 6 Results of Regression Analysis (SIZE_EMP)

MODEL III ROA	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Standart Error	Beta			Tolerance	VIF
Constant	,110	,023	-	4,816	**0,000*****	-	-
SIZE_EMP	,00002	,00001	**,073**	1,608	**0,099***	,966	1,036
LEV	-,152	,023	**-,382**	-6,559	**0,000*****	,578	1,731
LIQ	,005	,002	**,158**	2,841	**0,005*****	,638	1,567
AGE	-,001	,0003	**-,077**	-1,622	**0,098***	,864	1,157
F-Statistic	28,542						
Adjusted R²	0,216						
DurbinWatson	1,913						

***, ** and * indicate significance at the level of 1%, 5% and 10% respectively

According to Table 5, the results of regression model may be shown mathematically as below:

Model 3: $ROA_{it} = \beta_{it} + (,073) SIZE\_TS_{it} + (-,382)LEV_{it} + (,158)LIQ_{it} + (-,077) AGE_{it} + e_{it}$

When Model 3 is analyzed, independent variables of *SIZE_EMP, LEV, LIQ* and *AGE* are observed to influence firms' profitability (ROA). There is a positive relation between number of employees which is the last size indicator and ROA. In other words profitability of the firm increases as number of employees increase.

Durbin-Watson d statistics have been used in the model to test if there is autocorrelation of the first degree. Durbin-Watson d statistics usually show no autocorrelation around 1.5 and 2.5 (Kalaycı, 2009: 267). Variance Inflation Factor (VIF) has been used to test multicollinearity and to support regression model's results. Other method used to determine multicollinearity problem is tolerance value of the variables. In cases where VIF value is under 10 and tolerance value is not very close to 0, model is considered to be free from multicollinearity problem (Gujarati, 1995). All three models have pretty good VIF and tolerance values. There are no multicollinearity problems and autocorrelation in the model and this shows soundness and reliability of the model.

5. General Assessment

The aim of this study is to investigate the affect of firm size on profitability. In this study, data of 200 companies which were active in Istanbul Stock Exchange (ISE) between the years 2008-2011 has been used. This study

involves Return on Assets (ROA) as profitability indicator and total assets (SIZE_TA), total sales (SIZE_TS), number of employees (SIZE_EMP), liquidity ratio (LIQ), leverage ratio (LEV) and age (AGE) of the firms have been considered as independent variables. Multiple regression and correlation methods have been used in empirical analyses.

When the results of the study are analyzed, one can observe a positive relation between size indicators (total assets, total sales and number of employees) and profitability of the firms in all three models. In other words, the firms listed in ISE have higher profitability as their size expands. This may be explained by the fact that big firms are more effective than small firms since they make use of the scale economy. The study's results are in the same direction with Hall and Weiss (1967), Fiegenbaum and Karnani (1991), Majumdar (1997), Özgülbaş et al. (2006), Jonsson (2007) Serrasqueiro and Nunes (2008), Lee (2009), Stierwald (2009), Karadeniz and İskenderoğlu (2011), Saliha and Abdessatar (2011), Akbaş and Karaduman (2012), Shubita and Alsawalhah (2012) when the studies concerning the relation between firm size and profitability are analyzed. But results are different from the ones found in the studies of Simon (1962), Shepherd (1972), Whittington (1980), Becker et al. (2010), Khatap et al. (2011), and Banchuenvijit (2012).

There is a strong and positive relation between liquidity, the first one of the control variables and ROA in all three models. In other words, the increase in the short-term solvency of the firms listed in ISE goes together with an increase in their profitability. The increase in liquidity ratio of the firms cause a decrease in liquidity risk and this situation causes an increase in asset profitability. There is a negative relation between leverage ratio as well as age and ROA in all three models. In other words, the increase in leverage ratio and age of the firms cause a decrease in their profitability. The increase in leverage ratio of the firms listed in ISE creates an increase in resource cost, so firm profitability decreases.

The limitations of the study are the usage of the data belonging to the years 2008-2011 and only the firms in ISE operating in financial sector have been included. In future studies, the affect of the firm size on profitability may be analyzed by differentiating by sector.

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