



## THE EFFECT OF AGE ON FIRM'S PERFORMANCE: EVIDENCE FROM FAMILY-OWNED COMPANIES

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### Abstract

*In this paper, we investigate the link between age and firm performance by analysing the family-owned companies in a developing country, Turkey. We adopt ordinary least squares estimation to the period between 2008 and 2016 using 38 listed and non-financial family-owned companies. We use profitability as a proxy for firm performance. Profitability is defined as earnings before interest and tax divided by total assets. As a result, we capture the convex relationship between age and profitability of family-owned companies which suggests that younger firms have higher profits until they reach a certain age. When they pass that threshold age older firms perform better than younger firms. This result is robust when we control for heteroscedasticity and include other control variables such as liquidity, debt ratio and asset turnover.*

**Key Words:** Family-Owned Companies; Firm age, Profitability, Emerging Market.  
**Jel Codes:** G32, L25.

## YAŞIN FIRMANIN PERFORMANSI ÜZERİNDEKİ ETKİSİ: AİLE ŞİRKETLERİNDEN İNCELEMELER

### Abstract

*Bu araştırmada, gelişmekte olan bir ülke olarak sınıflandırılan Türkiye'deki aile şirketleri analiz edilerek firmanın yaşı ve firma performansı arasındaki bağlantı araştırılmıştır. 2008 ve 2016 yılları arasında, borsada işlem gören ve finans sektöründe olmayan 38 aile şirketinin verileri en küçük kareler yöntemi uygulanarak analiz edilmiştir. Firmanın performansını ölçmek için firmanın karı kullanılmıştır. Kâr, firmanın faiz ve vergi öncesi karının toplam varlıklara bölünmesiyle hesaplanmıştır. Sonuç olarak, aile şirketlerinde firma yaşı ve kârlılığı arasındaki konveks bir ilişki bulunmuştur. Diğer bir deyişle, genç firmaların belirli bir yaşa gelene kadar daha yüksek kazançlar elde ettikleri sonucuna varılmıştır. Fakat belirli bir olgunluğa eriştikten sonra yaşlı firmalar, genç firmalardan daha iyi performans göstermektedirler. Bu sonuç değişen varyansı kontrol ettiğimiz zaman ya da farklı bağımsız değişkenler olan likidite, borç oranı veya aktif devir hızını eklediğimiz zaman da geçerli olmaktadır.*

**Anahtar Kelimeler:** Aile Şirketleri, Firma Yaşı, Karlılık, Gelişen Piyasalar.  
**Jel Sınıflandırması:** G32, L25.

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## **INTRODUCTION**

The link between age and performance of a company has been extensively examined in the finance literature as well as other disciplines such as economics and organizational studies. Theoretical and empirical papers are ambiguous regarding the relationship between age and firm performance. On the one hand, research suggests that older firm outperform younger firm since they have more experience in the industry. They call this phenomenon as “learning by doing” (Coad et al. 2013). Another strand of research suggests that older firms do not have the flexibility to adopt new changes as they get older so that they perform worse than younger firms. (Barron et al. 1994).

Latest empirical papers show the convex relationship between age and firm performance (Loderer and Waelchli, 2010; Akben-Selcuk, 2016). In other words, they show that until a certain age the younger firms earn a higher profit than older firms; however, after a firm reaches a certain age then older firms begin earning more profit than younger competitors. Even though there are numerous of research regarding the relationship between age and profitability, there is still a gap to explore in this area of finance.

Previous researches which investigate the relationship between age and performance of a firm in Turkey use different sets of companies. Gurbuz et al. (2010) look at the real sector companies, Basti et al. (2011) and Dogan (2013) examine listed firms and Akben-Selcuk (2016) examine non-financial companies in the Turkish stock market. So far, there has been no paper examine the family-owned companies. Family-owned companies are very important components of the world economy as well as the Turkish economy. Percentage of family-owned companies around the world is around 90% including listed and unlisted companies. 40% of the Fortune 500 rank companies are also family-owned companies in the U.S. Therefore, investigating only the family-owned companies will be an important contribution to the literature.

In this study, we examine the relationship between age and firm performance by looking at the family-owned companies in a developing country, Turkey by employing ordinary least squares estimation to the period of between 2008 and 2016. Our main hypothesis is to test whether the convex relationship between age and firm performance exists when we only study the family-owned companies in Turkey. We use profitability as a proxy for firm performance. Profitability is defined as earnings before interest and tax divided by total assets. As a result, we indeed capture the convex relationship between age and profitability of family-owned companies which suggests that younger firms have higher profits until they reach a certain age. When they pass that threshold age older firms perform better than younger firms. This result is robust when we control for heteroscedasticity and include other control variables such as liquidity, debt ratio and asset turnover.

There are several criteria for being a family-owned company around the world. The first criteria depend on a management of a company. If a person or a family are in the management team of a firm, this company is considered as family-owned companies. The second criteria are based on ownership structure. If a family has a certain percentage of the shareholder equity, this company is considered as a family-owned company. The last criteria are the possibility of transferring the ownership to the future generation of a family. Here, we use the second criteria to identify the family-owned companies. We impose that at least 15% of the ownership of a company should be controlled by a family.

The contribution of the paper can be summarized in two fold. The first contribution is to fulfil the gap in the literature by examining the family-owned companies. As we stated earlier, the percentage of the family-owned companies cannot be ignored in Turkey. The second contribution is to investigate the phenomenon with newest and longer data. Earlier papers (except Akben-Selcuk, 2016) use very short sample periods. Thus, using longer sample period will give us a clearer idea regarding the link between age and firm performance.

The remainder of this paper is organised as follows. Section I summarises the prior related literature. Section II describes the data. Section III reports the empirical results. The last section concludes the paper.

## **I. PRIOR RELATED LITERATURE**

Prior studies have generally focused on the relationship between size and the firm performance. They try to answer whether larger firms outperform smaller firms or vice-versa (Penrose, 1959; Majumdar, 1997). Recent papers look at from different angle and try to answer whether older firms outperform younger firms or vice-versa. As a theoretical perspective, there are two different views. One theory supports the idea of “learning by doing” phenomenon, and another theory supports “the effect of prone to inertia”. Empirical papers are also divided into two groups following theoretical views. Some papers report the positive relationship between age and firm performance (Papadogonas, 2007; Akinyomi and Olagujú, 2012), while others show the negative relationship (Majumdar, 1997; Coad, Segarra and Teruel, 2013; Dogan, 2013). There is still no agreement in the literature regarding the link between firm age and performance. Therefore, this paper will extend our understanding of this phenomenon.

Different results may come from different measures of firm performance. There are five measurements in the literature that capture the firm performance, namely return on assets (ROA), return on capital employed (ROCE), return on equity (ROE), profit margin and gross profit. Numerous research uses ROA or ROE as a proxy for firm performance (Babalola, 2003; Owolabi and Alu, 2012; Oladele and Olagunju, 2013). ROA is calculated by using two different income statement items, net income or earnings before interest and tax (EBIT). Using EBIT will eliminate the difference on capital structures so that it allows us to make an accurate comparison between companies. Hence we decided to use earnings before interest and tax as a proxy for firm performance in our paper.

There are limited papers that examine the effect of age on financial performance in developing countries. Majumdar (1997) uses Indian companies and finds that younger firms perform better than older rivals. Ghafoorifard et al. (2014) analysis 96 companies which are listed on Tehran Stock Exchange and find that when firms get older they have better performance. Kipasha (2013) and Osunsan et al. (2015) demonstrate the same positive relationship in Tanzania and Uganda using microfinance institution, respectively.

When we look at the literature, we could see that there is not much research has been done for Turkish companies. Gurbuz et al. (2010) investigate the link between age and firm performance using return on the asset as a proxy. Their initial aim is to explore the effect of corporate governance on firm performance and use age as an additional control variable. Because of this, their sample period covers only four years, from 2005 to 2008. They use 164 real sector firms and adopt panel data estimations. As a result, they do not find any significant relationship between age and firm performance. Basti et al, (2011) follow earlier paper and employ panel data methodology using 160 listed companies in Turkish stock market. They also use four years sample period from 2003 to 2006. They have found a positive and statistically significant relationship between age and firm performance. Another paper which is written by Dogan (2013) would like to analyse the effect of firm size on firm performance as well as the effect of age on firm performance. He uses age as a control variable in their regression analysis. Their sample period again covers four years with 200 listed companies between 2008 and 2011. He finds a negative and statistically significant result. The latest paper which is written by Akben-Selcuk (2016) examine the effect of age on firm performance using three different proxies for firm performance. Unlike earlier papers, she uses longer sample period. Sample period in her paper covers between 2005 and 2014. She uses 302 non-financial firms and employs panel data analysis. She captures the convex relationship between age and firm performance. Since the impact of age on financial performance is also ambiguous in the Turkish context, our paper will also contribute to the literature to explore this link by using updated sample period.

There are several studies focus on family-owned companies in different concepts. Kellermans et al. (2012) investigate the link between family-owned companies and innovativeness. Bianco et al. (2013) examine the investments of family-owned companies. Other streams of research investigate the effect of age and size on the financial decision of family-owned companies. There is two theory which explains the financial decision of companies, trade-off theory and pecking order theory.

Lopez-Gracia and Sanchez-Andujar (2007) show that there is a positive link between the family-owned firm and access to debt. On the other hand, Holderness and Sheehan (1988) and Jensen et al. (1992) finds a negative link between family-owned companies and access to debt. The last strand of research shows no relation between family-owned companies and access to debt (Holderness et al. 1999; Anderson and Reeb, 2003).

## II. DATA

Our data comprises only family-owned non-financial companies which are traded on Borsa Istanbul during the period between 2008 and 2016. We use several databases to collect the data. Public Disclosure Platform (KAP) and Isyatirim are used to obtain the financial statements information of each firm.

We impose several restrictions to eliminate the potential problems such as missing variables, mergers and acquisitions. The first restriction is to exclude the financial firms since they have different requirements to prepare their financial statements. The second restriction is that the company should stay and have a valid observation in every year during our sample period. The last requirement that we impose is that the company should be listed firm.

We define companies as a family-owned by looking at the ownership structure of the firm. If a family has at least 15% of ownership in a company, we identify this company as a family-owned company. After we impose our restrictions, we have 38 companies for 9 years between 2008 and 2016.

In this study, we use profitability as a proxy to capture the performance of the company. Profitability is calculated as the ratio of earnings before interest and tax to total assets. Using earnings before interest and tax can minimize the effect of the difference in capital structures for companies which allow efficient comparison of companies in our sample. The main interests are age and age-squared. Age is defined two different ways in the prior literature. The first calculation uses the firm existence and the second method uses the firm listing year. In this analysis, we use the natural logarithm of the years of firm existence as an age of the company. Age<sup>2</sup> is also used to show the convex relationship between age and profitability.

We follow earlier studies and include several control variables such as liquidity, debt ratio and asset turnover (Akben-Selcuk, 2016; Serrasqueiro, Nunes and Silva, 2016). Liquidity is defined as the ratio of current assets to current liabilities. The debt ratio is measured as the ratio of total liabilities to the total asset. Asset turnover is constructed as the ratio of sales to the total asset.

As a first analysis, we investigate how our interest variable profitability and other variables change over time. Table 1 reports the descriptive statistics for the whole period from 2008 to 2016. The average age of our sample is 41 and profitability are 0.051. The oldest company in our sample is 91 years old and the youngest one is 12 years old. Total asset and sales are shown in millions.

**Table 1: Descriptive Statistics**

	N	Mean	Median	Std.Deviation	Min	Max
Age	342	40.631	39	17.982	12	91
Profitability	342	0.051	0.055	0.080	-0.486	0.386
Total Asset	342	5027.11	1231.48	12695.27	9.355	109067
Sales	342	4804.02	830.84	11628.60	0.570	77535.60
Debt Ratio	342	0.563	0.587	0.241	0.002	1.625
Liquidity	342	2.236	1.364	5.399	0.001	79.25
Asset Turnover	342	1.180	0.843	3.163	0.010	57.34

To demonstrate whether young companies have higher profitability than old companies, we divide our sample into two parts. In each year, we calculate the mean of age and identify companies as young if the age of the company is less than the mean of the age in year  $t$ , and old if the age of the company is higher than the mean of the age in year  $t$ . Table 2 reports the summary statistics for two groups, young and old companies separately. Panel A shows the summary statistics for young companies and Panel B presents the summary statistics for old companies. The striking result can be seen in the mean of the profitability for young and old companies. Profitability of young companies is higher than the old companies. This result is consistent with the earlier studies. We also see that young companies have a lower total asset, sales than old companies.

**Table 2: Young and Old Firm Descriptive Statistics**

Panel A: Young Firms						
	N	Mean	Median	Std.Deviation	Min	Max
Profitability	189	0.054	0.057	0.083	-0.486	0.386
Total Asset	189	2899.46	925.658	4536.63	9.355	31218.18
Sales	189	3765.49	809.822	8247.35	0.767	47033.22
Debt Ratio	189	0.564	0.615	0.227	0.026	1.365
Liquidity	189	1.694	1.163	2.000	0.001	17.089
Asset Turnover	189	1.479	0.981	4.216	0.029	57.337
Panel B: Old Firms						
	N	Mean	Median	Std.Deviation	Min	Max
Profitability	153	0.047	0.054	0.076	-0.234	0.255
Total Asset	153	7655.38	2069.09	17987.06	32.993	109067
Sales	153	6086.91	910.554	14705.06	0.570	77535.60
Debt Ratio	153	0.561	0.566	0.257	0.001	1.625
Liquidity	153	2.905	1.500	7.721	0.307	79.250
Asset Turnover	153	0.811	0.742	0.460	0.010	1.960

After we report younger companies have higher profitability than older companies, we want to show the correlation between variables. Table 3 reports the correlation coefficients between profitability, age and other control variables. The result of correlation analysis supports the descriptive statistics. The correlation coefficient between profitability and age is negative which means profitability of the firm decreases when the firm gets older. We also see that debt ratio and asset turnover are positively correlated with profitability, and liquidity is negatively correlated with profitability.

**Table 3: Correlation Analysis**

	Profitability	Age	Liquidity	Debt Ratio	Asset Turnover
Profitability	1.000				
Age	-0.019	1.000			
Liquidity	-0.171	-0.010	1.000		
Debt Ratio	0.083	0.020	-0.412	1.000	
Asset Turnover	0.050	-0.102	-0.040	-0.021	1.000

### III. EMPIRICAL RESULTS

As an empirical analysis, we adopt ordinary least squares methodology. We have estimated two sets of the following regression:

$$\text{Profitability}_{i,t} = \beta_0 + \beta_1 * \text{Log}(\text{Age}_{i,t}) + \beta_2 * \text{Log}(\text{Age}_{i,t}^2) + \varepsilon_{i,t} \quad (1)$$

In equation (1), our dependent variable is profitability for company *i* in year *t*. Our independent variables are the natural logarithm of age and age-squared for company *i* in year *t*.<sup>3</sup> As we see in equation (1) we only use main coefficients of interest, age and age-squared. Here, we would like to see the clearer effect of age without controlling other variables that may influence profitability. If we can capture a significant result without controlling other aspects.

As a second specification, we include control variables; namely liquidity, debt ratio and asset turnover for a company *i* in year *t* in to our equation. In equation (2) our dependent variable is again profitability and our independent variables are the natural logarithm of age, age-squared, liquidity, debt ratio and asset turnover.

$$\text{Profitability}_{i,t} = \beta_0 + \beta_1 * \text{Log}(\text{Age}_{i,t}) + \beta_2 * \text{Log}(\text{Age}_{i,t}^2) + \beta_3 * \text{Liquidity}_{i,t} + \beta_4 * \text{Debt Ratio}_{i,t} + \beta_5 * \text{Asset Turnover}_{i,t} + \varepsilon_{i,t} \quad (2)$$

Table 4 reports our regression results. Column 2 and 4 show the robust t-statistics based on White (1980) correction for heteroscedasticity. T-statistics are reported in the parenthesis. The main coefficient of interest is  $\beta_1$  which show the effect of age on profitability. We see that coefficient of age is negative and statistically significant at 5 percent level in column 1. This confirms that younger firms have higher profitability than older firm. One-year increase in age will lead 3 percent decreases in profitability.

The coefficient of  $\beta_2$  gives us whether the convex relationship between age and profitability can be observed in family-owned companies. We see that the coefficient of age-squared is positive which confirms the convex relationship. The convex relationship suggests that when the firm reaches a certain age the relationship between age and profitability changes and becomes positive. The results are consistent when we correct for heteroscedasticity based on White (1980). As we know, correction for heteroscedasticity does not change the coefficient, it only changes the standard deviation. Column (2) shows that our results are stronger with robust t-statistics. The statistical significance now is at 1 percent level for age and age-squared.

Column (3) and (4) also supports our main results. The coefficient of age increases a little bit (from -0.311 to -0.267) but it is still statistically significant at 5 percent level. Liquidity is the only control variable that statistically significant. This suggests that when the liquidity of a company increases profitability is decreasing. Other two control variables are statistically insignificant.

**Table 4: Regression Results**

	Dependent Variable: Profitability			
	(1)	(2)	(3)	(4)
Log(Age)	-0.311** (-2.55)	-0.311*** (-2.79)	-0.267** (-2.19)	-0.267** (-2.49)
Log (Age Squared)	0.043** (2.48)	0.043*** (2.76)	0.037** (2.13)	0.037** (2.46)
Liquidity			-0.224** (-2.58)	-0.224*** (-2.89)
Debt Ratio			0.282 (0.14)	0.282 (0.11)

<sup>3</sup> We also use level of age and age-squared (without taking the natural logarithm) and the results are similar; therefore, we decide to not report those regression results.

Asset Turnover			0.098 (0.73)	0.098 (0.42)
Constant	0.607*** (2.85)	0.607*** (3.06)	0.531** (2.48)	0.531*** (2.81)
N	342	342	342	342
Robust Std. Errors	NO	YES	NO	YES

\*We use White (1980) robust t-statistics which are reported. \*, \*\*, \*\*\* present the statistical significance at 10, 5, and 1%, respectively.

Overall, the results of ordinary least squares estimations suggest that age and age-squared have an economically and statistically effect on firms' profitability. Until a certain age, younger firms have higher profitability than older firms but when the threshold is passed the older firms earn more profit than younger firms.

## CONCLUSION

The impact of an age of the company on its performance has been investigated by researchers for a long time around the world. One stream of researches claims that there should be an inverse relationship between age and firm performance. Another stream of studies demonstrates that age and firm performance should move in the same direction. In other words, when the firm gets older they should have higher profits. The last stream of papers shows that there should be a convex relationship between age and firm performance. Convex relationship suggests that young companies should have higher performance than old companies, but after a certain age, the direction of relationship changes and older firms outperform younger firms. This equivocal situation leads us to investigate the effect of age on firm performance in the Turkish context.

In this research, we examine the impact of age on firm performance using 38 listed and non-financial family-owned companies. Profitability is used as a proxy to capture the relationship. We focus on only family-owned companies since they are an important component of economies, especially in developing countries. We first show the summary statistics based on different age groups, young and old. We then employ an ordinary least squares methodology to identify the link between age and firm performance. As a result, we confirm the convex relationship between age and profitability for family-owned companies in Turkey. Our results are robust when we correct our standard errors based on White (1980) heteroscedasticity correction and include control variables such as liquidity, debt ratio and asset turnover.

This paper contributes to the literature in two-fold. First, best of our knowledge this is the first paper which focuses only on family-owned companies. Second, our paper uses longer horizon compare to other paper which is studied the effect of age on profitability in the Turkish context. As a further research, one can compare the family-owned companies and non-family-owned companies to detect the relationship or use other developing countries to see that the convex relationship holds for family-owned companies around the world.

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