A PROPOSED EMPRICAL MODEL
FOR FIRM VALUATION

A THESIS SUBMITTED TO

THE GRADUATE SCHOOL OF SOCIAL SCIENCES

OF

IZMIR UNIVERSITY OF ECONOMICS

BY

İbrahim DUĞRAL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN THE GRADUATE SCHOOL OF SOCIAL SCIENCES

JULY 2013

Approval of the Graduate School of Social Sciences

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This is to certify that we have read this thesis and that in our
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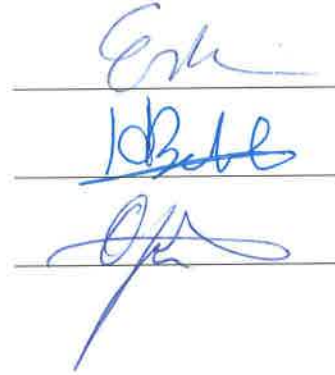the degree of Master of Science/Doctor of Philosophy.

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ABSTRACT

A PROPOSED EMPRICAL MODEL FOR FIRM VALUATION

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July 2013, 44 pages

For anyone involved in the field of corporate finance, understanding the mechanism of firm valuation, which investigated in this thesis, is an inescapable requisite. In spite of the fact that firm value is one of a complex but also a leading financial term, there are some major valuation methods that are generally accepted and being used in firm valuations. However the firm valuation is a serious requirement for firms not only for transactions but as well for measuring the performances and better management.

As each valuation methods uses different parameters, the empirical studies using these aforementioned valuation methods have different results. These studies are also criticized as the firm valuation methods have lots of assumptions and subjectivity in process of finding continuous value (forecasting period).

Currently, there is not enough information other than current financial statements. This study assumes that the financial statements which have a functional relationship to each other could be used in foreseeing companies' future outlook. This paper investigates that firm value would be explained with current financials.

The aim of the study is to build the method of valuation of public firms so that it can be employed on the valuation of private firms practically. The dataset used in the study includes both time series (years) and cross sections (companies) simultaneously; therefore, the type of dataset is defined as panel data. So panel regression is used with using financial information as independent variables for interpretation of firm value as dependent variable.

Keywords: Firm Valuation, Private Firm Valuation, Public Firm Valuation, Public Firm valuation, Firm valuation methods, Firm valuation modeling.

ÖZET

ŞİRKET DEĞERLEMESİ İÇİN AMPRİK BİR ÖNERİ MODELLEME UYGULAMASI

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Temmuz 2013, 44 sayfa

Kurumsal Finans alanında çalışananların birçoğu firma değerlemesinin nasıl bir mekanizmaya sahip olduğunu anlamaya çalışmışlardır. Modern finansın, yapısı hala tam çözilmemiş ama en önemli konularından biri olan firma değerleme konusu günümüzde genel kabul görmüş yöntemler üzerinden hesaplanmaktadır. Firma değeri sadece şirket satınalma birleşmelerinde kullanılan bir kavram olmaktan çıkmış, temel bir finansal yönetim aracı olarak literatürdeki yerini almıştır.

Her değerleme yönteminde kendine özgü farklı parametreler kullanıldığı için yapılan değerlemelerde sonuçların da farklı oluştuğu gözlenmiştir. Methotların kullanımında özellikle tahminleme içeren kısımların yoğun öznelsellik içermesi ve varsayımlara dayanıyor olması eleştiri konusu olmuştur.

Firmaların mevcut durumlarında, açıklanmış mali tablolar dışında bir bilgiye ulaşılamamaktadır. Bu çalışma ile firmanın bilanço ve gelir tablosunda bulunan geçmiş finansalları ile firmanın ileriye dönüş duruşunun belirlenebileceği ve bu finansallar kullanılarak firma değerinin belirlenebileceği araştırılmaktadır.

Zaman serisi ve farklı sektörlerden şirketler ile oluşturulan panel data üzerinden panel regresyon modeli uygulanarak, şirket değerinin bağımsız finansal değişkenler ile modellenmeye çalışılmıştır. Halka açık şirketlerin finansal verileri üzerinden kurulan model ile halka açık olmayan şirketlerin değerlerinin de tespit edileceği bir model kurmak bu tezin başlıca amacı olacaktır.

Anahtar Kelimeler: Şirket değerlemesi, halka açık olmayan şirket değerlemesi, halka açık şirketlerin değerlemesi, şirket değerleme yöntemleri, şirket değerleme modellemesi.

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1. INTRODUCTION

The firm valuation has been a major topic recently and it is expected that it will pursue its considerable place in researches have focused on different aspects of firm valuation. Publicly held companies that are registered in stock exchange market are mainly subject to these papers. Most of the studies are constructed by financial institutions like investment firms, private equity firms and banks. Earlier, lots of studies considered the point of view of selling parties. (e.g., Amir, Lev, & Sougiannis, 1999; De Bondt & Thaler, 1990; Lim, 2001; O'Brien, 1998; Orens & Lybaert, 2007). Eventually, it is realized that there could be differences in results of firm valuation depending on where the point of view is seller or buyer party.

The growing importance of merge and acquisitions, has led many researchers to valuations as a part of negotiations underlying transactions that take place outside the exchange. Key aspect of all speeches was firm valuation. Merging, acquisitions, entrance to new markets, launching new products all become meaningful with firm value. Damodoran (2001) is explaining this situation basically as "The objective of maximizing stock prices is a relevant objective only for firms which are publicly traded. For firms which are not publicly traded, the objective in decision making is the maximization of firm value." The attempts of increasing stockholders' wealth or stock prices are closely related with firm value maximization. The firm value maximization approach gained more importance in many researches that emphasize creation of firm value is strategically important in corporate governance. (e.g., Ercan et al. 2006) Admittedly, firm value maximization has become one of the real objective functions of firms. These private firm valuations were completely out of stock exchange market, but there were some issues in the process of these private firms' valuations.

In firm valuation process, one could meet with lots of valuation techniques. Owing to wide place of using firm valuation in portfolio management, financial management, merging and acquisition transactions, privatizations, initial public offerings (IPO), brand valuation and etc., there are lots of techniques that are

referred to by experts. In literature, there are three main valuation methods that contain all these techniques. Multiples valuation model or market valuation model is often seen as an easy option. This method is used to assess the company's value through the size of its earnings, sales or other indicators. The use of market multiples is based on the assumption that one can find the listed companies which are traded in exchange, similar to analyzed or valued firm. Then one can derive a multiple for the firm being valued. Earnings, book values, sales and rules of thumb multipliers are often used as a multiplier. In this model, the determination of similar firms among comparable peer groups and defining the multiple types are based on subjective assumptions. The second method of firm valuation is the cost method. It usually consists of taking the most recent balance sheet and adjusting it for direct and indirect bankruptcy costs. The cost valuation method is traditionally used to consider firms' value that lies simply in its balance sheet. This method seeks to determine the firm value by determining the value of its assets. The cost method has a weakness whether the large part of assets in the firm are intangible. The third one is the income method. The income method assumes that the firm is worth of the present value of future cash flows. The most common methods under income methods are discounted cash flow (DCF) models and economic value added (EVA) models. In DCF and other income methods, cost of capital and future cash flows have to be projected. These main valuation techniques are summarized in Table 1.

Table 1: Main Valuation Methods

Valuation Techniques	Types	Advantages	Disadvantages
Multiples Valuation	Net Sales, EBITDA	Soft computing	Determination of Similar Firms (Sub.*)
Cost Valuation	Net Asset Value, BV	Only usage balance sheet items in calculations	Intangible Asset Valuation
Income Valuation	DCF**, EVA***		Discount Rate, Future Cash Flow estimations (Sub.)
Sub.* : Subjectivity	DCF**: Discounted Cash flow	EVA***: Economic Value Added	

Due to the fact that these methods inherent lots of assumptions and subjectivity, the firm valuation methods receive much criticism in literature. Especially DCF model has lots of reviews like that. Method's sensitivity to subjectivity regarding future business plans and cost of capital is reviewed by DeAngelo in 1990. DeAngelo emphasizes that cause of subjectivity overweighs in determination of future possible profitability and cost of capital. These processes really have any inhibitor point that prevents manipulation risk of future financials. Also Elnathan, Gavious, & Hauser, (2009 p.72) is address to DeAngelo paper.

> DeAngelo argues that in order to increase the objectivity of the valuation, financial experts are supposed to base their analyses on data obtained from external sources and avoid using a single valuation method. Specifically, DeAngelo examines which valuation methods were used by four different experts who provided fairness opinions for corporate control transactions. DeAngelo finds significant discrepancies between values obtained according to different methods of valuation, and that the results of DCF are highly sensitive to the assumptions regarding the terminal value.

Elnathan has lots of criticism in his paper about the fact that expert valuations could be manipulated. Notably, in these valuations, an expert opinion is needed to provide an independent estimation for the fair value of the shares being sold or bought. Firms are not only valued by their current financials, as well outcomes are valued by their terminal value that has to be calculated based on future outlook. Two main criticisms are motivated by concerns for being impartial in these valuations. Expert valuations are higher than market values and there is a systematic upward bias in cash flow and cost of capital figures projected by experts. At this point, more importantly discrepancy between expert valuation and market value does not depend on the valuation method such as DCF, net asset value, similar firm or sector multipliers. Also discrepancy does not depend on firms' sector, expert's reputation, size of company, transaction type or market trends.   (e.g., Elnathan, Gavious, & Hauser, 2009)

Besides, these experts have been criticized for being "rubber stamps" for a price already determined by the commissioner of the valuation (e.g., DeAngelo, 1990; Elnathan, Gavious, & Hauser, 2009). In these studies, forecasting methods and building a business plan are mainly criticized by the fact that studies are based on lots of subjective assumptions. Lots of theses emphasize that private firm valuations have been

in validation process to determine which terminology has been more suitable. (e.g., Elnathan, Gavious, & Hauser, 2009)

On the other hand, there is a vitally important difference between publicly held and private companies. De Franco, Gavious, Jin, and Richardson (2008) explain that publicly held firms must fulfill regulatory and exchange requirements and issue audited financial statements, private firms do not prepare comprehensive documents for regulators such as capital markets board (CMB) in Turkey. Furthermore, in contrast to publicly held firms, private firms undergo minimal monitoring, information collection and processing by outside parties. The extant literature is insistent on private firms' earnings have lower quality than publicly held firms (e.g., Ball & Shivakumar, 2005; Burgstahler, Hail, & Leuz, 2006).

In modern finance, criticisms of firm valuation techniques and private firm valuations are tried to be redefined. Especially, practical developments in merge and acquisition activities show that data verification, validation and acceptance are getting better day by day by the due diligence studies. Also, quality of earning actually is not bad as supposed. Actually truth behind the low quality of earnings are trying to determine a price that demanded who try to determine value. With elaborated due diligence process, there is no chance for making manipulation. Especially in M&A activities, due diligence process are commonly used process before finalizing the firm valuation. With due diligence studies, firms whose value will be determined are audited fully scope. From operational procedures to accounting principles, firms are audited and data that present for valuation is verified with these audit activities. Nowadays, due diligence process have very long checklists and control points. Thus, after due diligence process probability of data manipulation diminishes considerably. Nevertheless all these studies still cannot find a solution for subjectivity of extant valuation models such as DCF, "Relative valuation method" and equity valuation.

Additional studies focus on several important aspects of valuations such as the role of accounting data (e.g., Givoly and Hayn, 2000; Barth et al., 1998; Francis and Schipper, 1999); models for equity evaluation (e.g., Ohlson, 1995; Ang and Liu, 2001); the use of multiples (Liu et al., 2002); and

governance structure premium (e.g., Smith and Amoako-Ado, 1995; Hauser and Lauterbach, 2004). Many of these issues have been addressed in DeAngelo (1990).

To prove differences in valuations, practitioners began to study about financials and valuations reliance. In the pursuit of finding the extent to which accounting information is value relevant, the value relevance theory is used many papers. The value relevance literature deals with the usefulness of financial statement information in equity valuations. A large empirical literature documents the value relevance of financial statements such as cash flow statement, income statement and balance. In literature, there have been lots of developments with these papers. The primary objective of these researches has been to assess whether financial statements provide value relevant information to investors. Dumontier and Raffournier (2010) mentioned that there are certain evidences in market reactions to financial announcements.

As from the leading papers were indicated earning relevance with firm value up to Miller and Modigliani (1966). In the finance literature, the relationship between accounting information and firm value is probably one of the most popular issues and has attracted considerable attention in many researches. In line with Miller paper, Ball and Brown (1968) showed that the earnings are related to market values of firms. Some of researchers have tried to show that financial statements are value relevant in public equity markets (Barth et al. 2001; Kothari 2001). According to studies of Nichols & Wahlen (2004) and Dechow & Dichev (2002), earnings are strongly value relevant and earnings information is considerably reliable. Both concepts are strongly correlated and the results of papers demonstrate that earnings information is value relevant. In 2005, the paper of Hand demonstrates that financial statement information is value relevant. It becomes more value relevant as the firm matures, consistent with financial statements capturing the intensity of assets-in-place relative to future investment options. Armstrong, Davila, and Foster (2006) explain change in value with relevance of financial statement. De Franco et al. (2008) documents earnings such as net income relevant with firm value. Recently, Dung (2010) investigates the value relevance of financial statement information. The paper of Dung demonstrates that the value relevance of financials is statistically meaningful. The interest for firm

valuation subject is quite a number due to desire of investors using only financial information for their investment decisions.

To explain privately held companies valuation models, this study performs the analyses on valuation of publicly held firms. In this paper, I seek to examine a market value relevance of 52 firm's financials from 2008 through 2012. The purpose of the paper is to model publicly held firms' financials to explain their market values. The value relevance of financial statements is demonstrated with the adjusted R^2 that can be uniquely ascribed to financial information in a regression of firm value.

This paper provides new insights into how financial information is related with the market value of 52 companies that listed in BIST 100 Index in Turkey.

The remainder of this paper is organized as follows. Section 2 explains how this research is connected to the existing literature. Section 3 provides a description of the data, data sources and how these data use in analyses. Section 4 outlines the research method, design and main results of analysis. Summaries of findings and conclusions are presented in Section 5.

2. LITERATURE REVIEW

Importance of valuation and valuation techniques were initially raised with study of Berle and Means in 1932. In 1976, the paper of Jensen and Meckling resumed all discussion about valuation. Day by day valuation has gained much more importance especially with developing of industries and increasing of investors that were looking for profitable firms.

While the growing body of research on equity valuation has examined a number of issues, almost all valuation models are based on Ohlson (1995) equity valuation model in particular to the paper of Barth and Clinch. These studies have tried to incorporate firm financials that related with market value of equity into Ohlson equity valuation model. The Ohlson model basically implies that there is a purely linear relationship between the value of firm and financials of same firm.

Actually, extant studies focused on equity valuation of publicly held firms. Lack of financial information and quality of earnings directed researchers to publicly held firm valuations. The papers of these researchers try to examine whether market value is relevant with publicly held firm financials. (e.g., Amir, Lev, & Sougiannis, 1999; De Bondt & Thaler, 1990; Lim, 2001; O'Brien, 1998; Orens & Lybaert, 2007).

Afterwards a few studies have dealt with firm valuations performed in the course of transactions outside the exchange. (e.g., DeAngelo, 1990; Elnathan et al., 2009; Gavious et al., 2009) Then researchers recognize that modeling of private firm valuation is in line with publicly held firms along with a number of dimensions that potentially affect firms' valuation. Prior studies have examined different aspects related to private firms for proving these resemblances. Particularly, relevance of accounting information to the pricing of private firms has been studied in extant papers. (e.g., Hand, 2005; Armstrong et al., 2006)

Especially, firm valuation has been more popular with increase of merging and acquisition activities. Cause of requirement that transaction price would be determined; some popular firm valuation methods came to the forefront. Maximizing shareholders value has become the new corporate aim. From CAPM model developed by Harry Markowitz in 1959 up to now, lots of papers have examined the firm valuation methods and tried to upgrade all these techniques. Also with these investigations, lots of criticism came to the surface. (e.g., DeAngelo, 1990; Elnathan, Gavious, & Hauser, 2009).

Following these, the papers began to investigate accounting information relevance with firm valuations. Hand (2005) finds that financial statement information is value relevant and it becomes more value relevant as the firm matures, consistent with financial statements capturing the intensity of assets-in-place relative to future investment options. Armstrong, Davila, and Foster (2006) find that determining the level of and the changes in firm value are correlated with financial statement information. De Franco et al. (2008) find that the coefficient on net income is value relevant. But also he emphasizes that earning quality of private firms are very low. The paper of Elnathan is explaining this issue as "Similar regressions, in which they decompose earnings into operating cash flows and accruals, show that private firm coefficients on both operating cash flows and accruals are significantly lower than the respective publicly held firm coefficients." And he claimed that firm valuation would not be determined truly in

private firms. According to the these studies, firm valuations performed in the course of transactions outside the exchange would not determine truly cause of private firm earning quality. (e.g., Katz, 2006; Ball et al., 2005) Earnings management is accepted more pervasive in private firms across European countries in the paper of Burgstahler et al. (2006).

Decreasing the quality of earnings in private firms is related to extenuated regulatory oversight and monitoring by external stakeholders. This issue is subjected to many researches in particular to De Franco et al. (2008). De Franco mentioned about lower earning quality could be related with firm size, firms' innate characteristics or unaudited financial history. These factors lead to less sophisticated accounting systems and weaker internal controls in private firms than in publicly held firms and to a higher opportunity for accrual manipulation. While financial statements of private firms may be of low quality, they remain as the main source of information for these firms.

Besides, practical developments in merge and acquisition activities show that quality of earning actually is not bad as supposed. Mostly, the value has been already determined by the firm itself. This causes to decrease in the quality of earnings. With elaborated due diligence process, there is no chance for making manipulation. Especially in M&A activities, due diligence process are commonly used process before finalizing the firm valuation. With due diligence studies, firms whose value will be determined are audited fully scope. From operational procedures to accounting principles, firms are audited and data that present for valuation is verified with these audit activities. Nowadays, due diligence process includes very long checklists and control points. Thus, after due diligence process probability of data manipulation diminishes considerably.

Additional studies focus on several important aspects of valuations such as the role of accounting data (e.g., Givoly and Hayn, 2000; Barth et al., 1998; Francis and Schipper, 1999); models for equity evaluation (e.g., Ohlson, 1995; Ang and Liu, 2001); the use of multiples (Liu et al., 2002); and governance structure premium (e.g., Smith and Amoako-Ado, 1995; Hauser and Lauterbach, 2004). Many of these issues have been addressed in DeAngelo (1990). All of them are aimed to demonstrate the

possibility of determining private firm value without facing any challenge. Whether define to variables correctly, studies would result with correct firm value.

Afterward researchers began to study about financials and valuations reliance. A large empirical literature documents the ability of financial variables such as cash flows, income statement and balance sheet items for modeling market value. Some of researchers tried to show that financial statements are value relevant in public equity markets (Barth et al. 2001; Kothari 2001).

Table 2 presents these researches that value relevant variables are investigated. The results shows us the most of papers try to establish a value relevance with earnings and book value.

Table 2: Value Relevance Study (Extant Studies)

Author(s)	Journal*	BV	E	CF	Di	NI	De	IA	A
Ahmed, Kilic and Lobo, 2006	AR		S			S	S		
Al Debie & Walker, 1999	BAR		S						
Ali & Pope, 1995	JBFA		S	S		S		S	
Ball and Brown, 1968	JAR		S		S	S		S	
Barth and Kallapur, 1996	AR	S	S						S
Barth et al., 1999	AR		S	S	S	S	S		
Berger et al., 1996	AR	S							
Biddle et al., 2000	JAE	S	S						S
Board & Day, 1989	ABR		S	S					S
Booth et al, 1996	AEL		S						
Brown, Lo & Lys, 1999	JAE		S		S	S			
Burgstahler and Dichev, 1997	JAE	S	S						
Charitou, 1997	EAR		S	S					
Clubb, 1995	JBFA		S	S		S			
Collins et al., 1997	JAE					S			
Cormier et al., 2000	EAR						S		
Daniel W. Collins, Morton Pincus	AR	S	S				S	S	
Dechow & Dichev, 2002	JAE		S						S
Dechow, 1994	JAE		S	S					S
Dhaliwal et al., 1999	JAE		S						S
Donders et al., 2000	EFM	S	S						
Easton and Harris, 1991	JAR	S			S				
Eccher, Ramesh and Thiagarajan, 1996	JAR	S	S						
Firth, 1981	JAR	S	S						
Francis & Schipper	JAR		S	S					
Gajewski & Quere, 2001	EFM		S						
Green, 1999	BAR		S	S					

		BV	NI	IA	CF	E	Di	De	A
Hassan et al., 2006	JAAF	S	S						
Hayn, 1995	JAE		S		S	S	S		S
Healy, 1985	JAE	S							
Hew et al. ,1996	ABR		S						
Holthausen et al, 2001	JAE		S	S	S	S			
Holthausen et al., 1995	JAE	S							
Jan and Ou, 1995	WP (NYU)	S	S			S			S
Kallunki, 1996	EAR		S						
Kanagaretnam et al, 2009	JBF							S	
Khanagha, 2011	IJEF		S	S				S	
Kothari and Zimmerman, 1995	JAE	S	S					S	
Kothari, Smith & Watts, 1982	JAAF	S				S			
Lambert, 1996	JAE	S				S			
Leftwich, 1983	JAR					S			
Lev & Thiagarajan, 1993	JAR	S	S	S		S			
Lev & Zarovin, 1999	JAR					S			
Livnat & Zarowin, 1990	JAE		S	S		S			
Martikainen, 1993	EJOR	S	S	S		S			
Marton, 1998	WP	S	S						
Nelson, 1996	AR					S			
Nichols & Wahlen, 2004	AH		S			S			
Ohlson, 1995	WP	S	S			S			
Pearson, 1994	ABR	S				S			
Peasnell et al., 1987	ABR		S			S			
Pellicer & Rees, 1999	EAR		S			S			
Pope & Inyangete, 1992	JBFA		S			S			
Ragap and Omran, 2006	RAF		S						
Runsten, 1998	WP	S	S			S			

BV: Book Value , NI : Net Income , IA: Intangible Assets , CF: Cash Flow , E: Earnings , Di: Dividend , De: Debt, A:Assets
S: Significant

Journal Abbreviations :

ABR	Accounting and Business Research	IJEF	International Journal Economics and Finance Issues
AEL	Applied Economics Letters	JAAF	Journal of Accounting, Auditing and Finance
AER	American Economic Review	JAE	Journal of Accounting and Economics
AF	Accounting and Finance	JAL	Journal of Accounting Literature
AFE	Applied Economic Review	JAR	Journal of Accounting Research
AH	Accounting Horizon	JBF	Journal of Banking and Finance
AQAFA	Advances in Quantitative Analysis of Finance and Accounting	JIFMA	Journal of International Financial Management and Accounting
AR	Accounting Review	JEB	Journal of Economics and Business
BAF	Bank Accounting and Finance	JFSA	Journal of Financial Statement Analysis
BAR	British Accounting Review	JBFA	Journal of Business Finance and Accounting

			JREP	
CAR	Contemporary Accounting Research		M	Journal of Real Estate Portfolio Management
EAR	European Accounting Review		JRI	Journal of Risk and Insurance
EFM	European Financial Management		MA	Management Accounting
EJOR	European Journal of Operational Research		RAF	Review of Accounting and Finance
FAJ	Financial Analyst Journal		RAS	Review of Accounting Studies
FASB	Financial Accounting Standards Board		RQFA	Review of Accounting Studies
IJA	International Journal Of Accounting		WP	Working Paper (included only if publication not found)

Notably investors have desired to determine whether accounting numbers that are demonstrated on financial statements are useful for valuing the firm in process of deciding investment plans. As we have seen, academic researchers have been investigating value relevance ever since this approach appeared. This issue also is echoed in paper of Barth (2000, p. 10).

> Investors represent a large class of financial statement users and thus much academic research addressing financial reporting issues relevant to practicing accountants, particularly standard setters, adopts an investor are primarily interested in information that can help them assess the value of the firm for purposes of making informed investment choices.

Value relevance is subjected to lots of researches. In the paper of Hand (2005), financial statement information found value relevant. Also results of paper demonstrated that it becomes more value relevant as the firm matures, consistent with financial statements capturing the intensity of assets in place relative to future investment options. Armstrong, Davila, and Foster (2006) explain change in value with relevance of financial statement. De Franco et al. (2008) demonstrated earnings, such as net income, are relevant with firm value. As it matures, the firm obtains financing, makes investments and undertakes operating activities, all of which convert potential investment opportunities into actual assets in place. Assuming that a maturing firm converts its existing investment options into assets in place faster than it discovers new ones, then its financial statements will reflect greater and greater fractions of its total equity value. Hence, as a firm matures its financial statements will become increasingly associated with its equity value. (e.g., Hand, 2005; Armstrong et al., 2006)

According to paper of Holthausen et al. in 2001, value relevance literature is sourced by two theories that explained this relation as below:

"In many cases the value-relevance literature's underlying theories are not specified and have to be gleaned from the papers' experimental designs. Value relevance studies appear to use two different theories of accounting and standard setting to draw inferences: "direct valuation" theory; and "inputs to equity valuation" theory. In direct valuation theory accounting earnings is intended to either measure, or be highly associated with, equity market value changes or levels (via permanent income). The book value of equity under this theory is intended to either measure, or be highly associated with, equity market values. Given direct valuation theory, standard setters would be interested in the results of a study of the relative stock price associations of alternative accounting earnings or book value of equity measures.

In inputs to equity valuation theory, accounting's role is to provide information on inputs to valuation models that investors use in valuing firms' equity. Under this theory it is not clear that standard setters would be interested in the results of the above relative association study. Under an inputs-to-equity valuation theory standard setters are more likely to be interested in a study that suggests investors could use an accounting number or a potential accounting number in their valuation models. That inference requires a valuation model (valuation theory) and an assumed link between the accounting number and a variable entering into the valuation model. Value relevance studies relying on inputs to equity valuation theory generally perform an incremental association study."

While investigation of the value relevance of financial statement information was proceeding, findings came to light one by one (e.g., Hand, 2005; see also Ye & Finn, 2000; and Beatty, Riffe, & Thompson, 2001). These papers revealed that the coefficients on earnings as well as on the market value of equity are significantly positive (e.g., DeAngelo, 1990; Elnathan et al., 2009). R&D expenditures, advertising expenditures, and capital expenditures are used for growth proxies that include future cash flow effects. These growth proxies are used for understanding whether firm and its cash flow will grow up (e.g., Core et al., 2003; De Franco et al., 2008; Demers & Lev, 2001).

Dumontier and Raffournier mentioned that there are certain evidences in market reactions to financial announcements. (2010, p. 121)

The stock price reaction to earnings announcements, which has been investigated by many European studies, confirms the seminal findings of Beaver (1968) in the US: earnings disclosures lead to significant stock price changes or trading volume increases. British financialist, Firth (1981) reported that both abnormal absolute stock returns and significant trading volume hike at the announcement dates of annual earnings under the period 1976–78, considering 120 companies. Similarly, Pope and Inyangete (1992) observed a significant rise in the volatility of security returns for a sample of 3,541 UK around the annual earnings announcements between 1985 and 1987. Applying a different method, Hew et al. (1996) confirm that indeed UK annual earnings have information content for investors, since positive (negative) unexpected earnings were found to cause major positive (negative) returns. Using the data received from the Finnish stock market, Kallunki (1996) showed that positive (negative) unexpected annual earnings announcements are associated with positive (negative) abnormal returns at the announcement dates. In the same vein, Gajewski and Que´re´ (2001) looked into the French market's response to the annual earnings announcements in order to collect the necessary data. The data elicited that positive unexpected earnings lead to positive abnormal returns, while negative unexpected ones cause the opposite. This is correlative with Gajewski' study (1999) which revealed that trades on the Paris Stock Exchange increase significantly around earnings announcements. In Spain, Pellicer and Rees (1999) examined the volatility of security returns of 223 annual earnings announcements. By figuring out the ranking order of the absolute abnormal returns across a 51-day window centered on the disclosure date, they came to a conclusion that the volatility of returns was the highest during the two day surrounding of earnings announcements. Donders et al. (2000) signified that the information content of earnings announcements should cause a reaction that would be more pronounced on option prices than on the stock prices due to the leverage effect of options. They examined the impact of earnings releases on the volatility, and the trading volume of call options on Dutch stocks at the annual earnings announcement dates. As the expected result, they found that the

volatility of option prices and trading volumes rise around the announcement days and, afterwards they fall significantly.

The key components of balance sheet and income statement are used instead of aggregate book equity and net income, in order to avoid the severe inferential errors that can be faced, when evaluating the value relevance of financial statements of fast growing, highly intangible intensive companies (Zhang 2001; Hand 2004).

Collins et al. (1994) documented that including growth proxies in a regression model of equity value reduces the loss in explanatory power that is resulted from market prices leading accounting information (i.e., lack of timeliness in accounting information). In their study, Morck et al. (1988), Demers and Lev (2001) included Sales and Marketing (S&M) expenditures and Research and Development (R&D) expenditures to conquer the expected growth in future earnings due to investments in intangible assets. Additionally, the extant papers included Capital Expenditures as well, in order to capture expected growth in earnings due to new investments in tangible assets. (e.g., Morck et al. (1988). Following Lev and Thiagarajan's (1993) study, Al-Debie and Walker selected non earnings data which signal abnormal changes in inventories of finished goods, debtors, capital expenditures, research and development expenses, gross margin, distribution and administration expenses or labor force. Total of seven non earnings data were used in Al-Debie and Walker's study. In the paper of Dumontier and Raffournier, they mentioned about this study. (2010, p. 139)

Using a sample of UK industrial companies that did not change their financial year end between 1983 and 1992, Al-Debie and Walker (1999) examined the incremental value relevance of various fundamentals beyond that of accounting earnings. Al-Debie and Walker adopted a conditional approach by using regression techniques that allow regression parameters to vary with each firm's industry and with the state of the economy. They considered fifteen industries and three states of the UK economy defined on the basis of the inflation rate, the real GNP growth and the unemployment rate. While their basic model with a constant intercept and a constant earnings variable provided an R-square of only 15%, they obtained R-squares of 36%, 40% and 43% when they allowed regression parameters to

vary with the state of the economy, the industry, or with both variables. These results show that the inclusion of non-earnings variables increases strongly the correlation between returns and accounting data.

In finance literature, extant studies demonstrate that financial statements are considered as most important source of information. Particularly, investors keep financial statements in primary position as source of information (e.g., Arnold & Moizer, 1984; Day, 1986; Vergoossen, 1993; Barker, 2000). In the valuation process of firms, this paper tries to build a model that needs just financial statements. In this study, the aim is to establish regression model for valuing firms with their financial statements.

3. DATA

Istanbul Stock Exchange, called as "BORSA ISTANBUL (BIST)" in TURKEY, was established for the purpose of ensuring that securities are traded in a secure and stable environment, and commenced to operate. As of October 15, 2012 shares of 367 companies are trading in BIST. Investment institutions are willing to issue financial products based on ISE indices and/or to calculate an index using İMKB data have to sign a license agreement with BIST.

Public Disclosure Platform (PDP / KAP in Turkish) is an electronic system through which electronically signed notifications required by the capital markets and ISE regulations are publicly disclosed. In reporting system, all corporations require to apply the International Accounting Standards / International Financial Reporting Standards as approved by the European Union. Within this framework, Turkish Accounting Standards / Turkish Financial Reporting Standards published by the Turkish Accounting Standards Board, in compliance with the adopted standards are applied in all reports in PDP. The deadlines for consolidated financial reporting are 14 weeks in PDP.

My analysis tracks a set of 54 publicly held Turkish firms which are traded in BIST 100 Index. 5 firms from trading sector, 1 from tourism, 17 firms from Holding and Investment sector, 6 firms from real estate investment sector, 13 firms from finance sector (Banks and insurance companies) and 4 firms from

sport sector are excluded from analysis (rest of BIST 100 firms) cause of their own special valuation methods and specific items that they have own valuation technics. In data origination process, IPEKE (İPEK DOĞAL ENERJİ KAYNAKLARI ARAŞTIRMA VE ÜRETİM A.Ş) and CEMAS (ÇEMAŞ DÖKÜM SANAYİ A.Ş.) are excluded from analysis due to lack of data. In addition to these, AKSEN, KOZAL and METRO do not have data for 2008 and 2009 financial data of AKSEN is absent too. Only relevant year data of these firms are excluded from analysis. As a result, the model consists of 52 firm's market valuation observation from 2008 through 2012. The reason for starting the time period from 2008 is to eliminate the effect of global financial crisis on the accuracy of the data series. The other causation would be enlarging time series of the panel data and applying some corrections on the data to remove serious shock effects, if Turkey hadn't experienced any other crisis (2000-2001 Banking Crisis: 30% of Turkey's GDP melted).

All the information is gathered from the annual financial statements published by the publicly held companies in PDP. The date has been collected and an electronic database created with excels to facilitate regression modeling. As noted above, this study is following prior literature (e.g., Brown, Lo, & Lys, 1999; Collins, Maydew, & Weiss, 1997; Core, Guay, & Van Buskirk, 2003; De Franco et al., 2008), I restrict data of firms whose book value of equity is positive. In line with prior studies (Collins et al. (1997) and Brown et al.), to mitigate the effect of extreme values in our analyses, we winsorize the top and bottom 1% of continuous variables. I winsorize outliers instead of deleting them to conserve data. The results do not change qualitatively when outliers are deleted.

Following the large literature in accounting that follows Ohlson (1995), I built a regression model for the market value of equity with using financial statement information such as earnings, book values and proxies for expected earnings (e.g., Collins et al., 1997; Dechow et al., 1999). The key components of balance sheet and income statement are used instead of aggregate book equity and net income, in order to avoid the severe inferential errors that can be faced, when evaluating the value relevance of financial statements of fast growing, highly intangible intensive companies (Zhang 2001; Hand 2004).

Additionally, I included the proxies for expected growth in earnings Collins et al. (1994) documented that including growth proxies in a regression model of equity value reduces the loss in explanatory power that

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is resulted from market prices leading accounting information (i.e., lack of timeliness in accounting information). Similar to Morck et al. (1988), Demers and Lev' study (2001), I included Sales and Marketing (S&M) expenditures and Research and Development (R&D) expenditures, withi the goal of capturing the expected growth in future earnings due to investments in intangible assets. In addition to that, I integrate Capital Expenditures, in order to capture expected growth in earnings due to new investments in tangible assets. Consistent with the prior researches, such as Morck et al. (1988), I set R&D, S&M, and Capital Expenditures equal to zero, when their values are missing. EBIT, EBITDA, Change in Working Capital, Free Cash flow to Firm and Free Cash Flow to Equity calculations are presented in Table 3. Before testing, I determined 28 critical financials to explain market value. "Net sales" that appears on income statement is expected to be in relation with market value positively. Gross profit, EBIT, EBITDA and current profits are profitability indicators and expected to be in relation with market value positively. SMDC, RDE and GME are mainly operating expenses that supposed to investment to future. Due to their financials are negative, I expect that these variables will be related with market value negatively. Change in working capital demonstrates change in requirements of operational financing. So it is expected that these variables will be related with market value in negative way. FCFF and FCFE show cash generation of firms. We expect that these variables will be related with market value positively. Capital expenditures demonstrates investment amount. Due to their financials are negative, most likely these variables will be related with market value negatively. CAE, FA, TFA, IFA, S, TR and goodwill indicates what we owned in our firm. So, one can expect that these variables will be related with market value positively. On the other hand, STFL, TP, LTTP, Equity and paid in capital indicates how we owned our assets in our firm. Besides, it is anticipated that these liabilities will be related with market value negatively. Dividend payment is one of most important indicator that investors are interested with these payments very closely. It is projected that market value will be related with positive dividend payments and increase of dividends. All these variables are shown with definitions and calculations in Table 3.

Table 3: Definitions and Calculation of Variables

Variable	Short Name	Definition	Calculation
Market Value	MV	Open market value, fair value or fair market value	Calculated with firm valuation models
Net Sales	NS	Net sales usually refer to a company's revenue net of discounts and returns.	Appears on Income Statement
Gross Profit	GP	Gross profit is a residual profit after selling a product or service and deducting the cost associated with its production and sale.	Sales - Cost of Goods Sold = Gross Profit
Sales-Marketing-Dist. Cost	SMDC	Expenses directly related to creating the goods or services being sold.	Appears on Income Statement
Research 6 Dev. Expenses	RDE	Any expenses associated with the research and development of a company's goods or services.	Appears on Income Statement
General Man. Exp.	GME	Expenditures for the overall management of the organization	Appears on Income Statement
EBIT	EBIT	A measure of a firm's profitability	EBIT = Revenue - COGS - Operating Expenses
EBITDA	EBITDA	A measure of a firm's profitability	EBITDA = EBIT + Depreciation and Amortization
Change in Working Capital	CWE	A financial metric which represents operating liquidity available to a business	Working Capital = TR + Inventories - TP (Change WC = Year 2 WC - Year 1 WC)
Capital Expenditures	CE	Money invested by a company to acquire or upgrade fixed, physical, non-consumable assets	Capital Expenditures = Investment Tutorial (CAPEX)
Taxes	T	Financial charge or other levy imposed upon a taxpayer by a state or the functional equivalent of a state	Tax = Income before taxes x Tax Rate
Free Cash Flow To Firm	FCFF	A measure of how much cash can be paid to the stockholders of the company	Free Cash Flow to Firm =(EBIT x (1-Tax Rate)) + Depreciation - CAPEX - CWC
Free Cash Flow To Equity	FCFE	It is used to calculate the equity available to shareholders	Free Cash Flow to Equity = FCFF + New Debt - Debt Repayment
Current Profit (Loss)	CP	The annual earnings most recently reported by a company	Current Profit= CP - Tax
Cash and Equivalents	CAE	Investment securities that are short term have high credit quality and are highly liquid.	Appears on Balance Sheet
Trade Receivables	TR	Amounts billed by a business to its customers when it delivers goods or services to them in the ordinary course of business.	Appears on Balance Sheet
Inventories	I	Realizable value of inventory	Appears on Balance Sheet
Fixed Assets	FA	Assets and properties that cannot be easily converted into cash.	Appears on Balance Sheet

Tangible Fixed Assets	TFA	Physical and material assets, that have a long and durable monetary life, are known as tangible fixed assets	Appears on Balance Sheet
Intangible Fixed Assets	IFA	Opposite of tangible fixed assets	Appears on Balance Sheet
Goodwill	G	An accounting concept meaning the value of an asset owned that is intangible but has a quantifiable "prudent value" in a business.	Appears on Balance Sheet
Total Assets	TA	Total amount of TFA and IFAs.	Appears on Balance Sheet
Short Term Fin. Lia.	STFL	A company's debts or obligations payable within one year.	Appears on Balance Sheet
Trade Payables	TP	Liabilities owed to suppliers for purchases or services rendered.	Appears on Balance Sheet
Long Term Financial Lia.	LTTP	A company's debts or obligations payable that aren't due within a year.	Appears on Balance Sheet
Equity	E	Same thing as inventories	Appears on Balance Sheet
Paid in Capital	PIC	Capital contributed to a corporation by investors through purchase of stock from the corporation	Appears on Balance Sheet
Dividend Payments	DP	Payments made by a corporation to its stockholder members.	Dividend Payments = (Year 1 Retained Earnings + Year 2 Net Income - Year 2 RE)/ Number of Stockholders

*MV is dependent variable, others are independent.

In our model, firstly high correlated variables became defined. Then, I chose the variables, which ones are still keeping in our model, and some of them are excluded from analysis. In the beginning there were twenty seven variables. After elimination, the independent variables are changed in line with results. The elimination conducted in order to prevent multicollinearity problem which means one variable can be linearly predicted from the others with a non-trivial degree of accuracy. In the case of multicollinearity the estimations of coefficient may change irregularly as a result of slight changes in the model or the data. The correlation matrix of problematic variables is shown at Table 4.

Table 4: Correlation Matrix of Independent Variables

	MV	NS	GP	SMDC	RDE	GME	EBIT	EBITDA	CWC	CE
GP	0.928	0.632	1.000	-0.906	-0.260	-0.916	0.959	0.975	-0.235	-0.351
EBIT	0.917	0.687	0.959	-0.768	-0.225	-0.868	1.000	0.985	-0.156	-0.278
CWC	-0.817	-0.269	-0.235	0.662	-0.068	0.798	-0.156	-0.204	1.000	0.811

CE	-0.265	-0.298	-0.351	0.429	-0.072	0.779	-0.278	-0.326	0.811	1.000
T	-0.922	-0.548	-0.933	0.780	0.155	0.852	-0.948	-0.962	0.742	0.594
FCFE	0.692	0.461	0.737	-0.627	-0.048	-0.754	0.707	0.756	-0.622	-0.540
CP	0.894	0.602	0.903	-0.741	-0.193	-0.783	0.946	0.931	-0.026	-0.256
FA	0.836	0.637	0.868	-0.773	-0.091	-0.811	0.839	0.880	-0.440	-0.580
G	0.368	0.245	0.364	-0.455	-0.010	-0.259	0.291	0.270	-0.028	-0.082
TA	0.836	0.765	0.865	-0.784	-0.195	-0.738	0.853	0.868	-0.328	-0.500
STFL	-0.709	-0.654	-0.741	0.642	0.199	0.666	-0.738	-0.725	0.150	0.256
LTFL	0.834	0.464	0.601	-0.609	-0.065	-0.534	0.539	0.591	-0.597	-0.744

	T	FCFTF	FCFE	CP	CAE	TR	I	FA	TFA	IFA
GP	-0.933	0.898	0.737	0.903	0.653	0.667	0.293	0.868	0.754	0.880
EBIT	-0.948	0.899	0.707	0.946	0.671	0.624	0.391	0.839	0.745	0.835
CWC	0.742	-0.375	-0.622	-0.026	-0.032	-0.135	-0.016	-0.440	-0.495	-0.170
CE	0.294	-0.251	-0.540	-0.256	-0.277	-0.161	-0.064	-0.580	-0.644	-0.210
T	1.000	-0.844	-0.707	-0.937	-0.662	-0.486	-0.179	-0.803	-0.690	-0.878
FCFE	-0.707	0.826	1.000	0.626	0.491	0.341	0.093	0.774	0.723	0.728
CP	-0.937	0.768	0.626	1.000	0.697	0.539	0.279	0.761	0.651	0.802
FA	-0.803	0.808	0.774	0.761	0.651	0.558	0.405	1.000	0.965	0.739
G	-0.230	0.239	0.151	0.243	0.309	0.213	0.175	0.247	0.174	0.201
TA	-0.783	0.774	0.693	0.785	0.782	0.684	0.569	0.956	0.916	0.681
STFL	0.631	-0.667	-0.555	-0.636	-0.639	-0.671	-0.626	-0.782	-0.753	-0.577
LTFL	-0.484	0.538	0.640	0.449	0.431	0.455	0.386	0.864	0.915	0.445

	G	TA	STFL	TP	LTFL	E	PC	DP
GP	0.364	0.865	-0.741	-0.489	0.601	0.825	0.865	0.877
EBIT	0.291	0.853	-0.738	-0.531	0.539	0.824	0.850	0.914
CWC	-0.028	-0.328	0.150	0.172	-0.597	-0.146	-0.204	-0.163
CE	-0.082	-0.500	0.256	0.178	-0.744	-0.376	-0.297	-0.189
T	-0.230	-0.783	0.631	0.388	-0.484	-0.798	-0.863	-0.904
FCFE	0.151	0.693	-0.555	-0.277	0.640	0.621	0.718	0.698
CP	0.243	0.785	-0.636	-0.438	0.449	0.813	0.797	0.880
FA	0.247	0.956	-0.782	-0.466	0.864	0.887	0.871	0.726
G	1.000	0.284	-0.276	-0.221	0.125	0.291	0.137	0.194
TA	-0.783	0.774	0.693	0.785	0.782	0.684	0.569	0.956
STFL	0.631	-0.667	-0.555	-0.636	-0.639	-0.671	-0.626	-0.782
LTFL	-0.484	0.538	0.640	0.449	0.431	0.455	0.386	0.864

All these results lighten our way for eliminating variables. To reach the right regression model, first of all data selection was seriously effective. After stage 3, the final model is established with using final data set. These stages and variable eliminations stage by stage are shown in Table 5. In stage 1 in order to perform variable elimination correlation matrix is created through twenty eight variables; according to the results which are presented in Table 4, 7 variables are removed from the estimation equation because of being highly correlated with the other variables. These variables are Gross Profit, Capital Expenditures, Taxes, Current Profit (Loss), Total Assets, Short Term Financial Liabilities, Long Term Financial Liabilities. The correlation matrix of problematic variables is shown at Table 4. In stage 2 the elimination is applied according to the scope of the remaining variables and 2 variables are removed from the equation, which are Fixed Assets and Goodwill. In stage 3, elimination continued with statistical significance of the remaining variables and 3 variables are removed from the equation, which are EBIT, Change in Working Capital and Free Cash Flow to Equity. During the application of this stage the main target is the improvement on the accuracy of the model, briefly because of the application of stage 3 the adjusted R

square of the model increased to .76 from 0.64. As the final result, after the application of all 3 stages, twelve variables have been eliminated.

Table 5: Stage by Stage Variable Eliminations

Variable	Short Name	Variable Type	Stage 1	Stage 2	Stage 3
Market Value	MV	Dependent	In model	In model	In model
Net Sales	NS	Independent	In model	In model	In model
Gross Profit	GP	Independent	H.C	XX	XX
Sales-Marketing-Dist. Cost	SMDC	Independent	In model	In model	In model
Research & Dev. Expenses	RDE	Independent	In model	In model	In model
General Man. Exp.	GME	Independent	In model	In model	In model
EBIT	EBIT	Independent	In model	In model	Insignificant in explaining MV. replaced with EBITDA
EBITDA	EBITDA	Independent	In model	In model	In model
Change in Working Capital	CWE	Independent	In model	In model	Insignificant in explaining MV.
Capital Expenditures	CE	Independent	In model	In model	In model
Taxes	T	Independent	H.C	XX	XX
Free Cash Flow To Firm	FCFF	Independent	In model	In model	In model
Free Cash Flow To Equity	FCFE	Independent	In model	In model	Insignificant in explaining MV. replaced with FCFTF
Current Profit (Loss)	CP	Independent	H.C	XX	XX
Cash and Equivalents	CAE	Independent	In model	In model	In model
Trade Receivables	TR	Independent	In model	In model	In model
Inventories	I	Independent	In model	In model	In model
Fixed Assets	FA	Independent	In model	Both Intangible and Tangible Fixed Assets Included	XX
Tangible Fixed Assets	TFA	Independent	In model	In model	In model
Intangible Fixed Assets	IFA	Independent	In model	In model	In model
Goodwill	G	Independent	In model	FCFE covers Goodwill as well	XX

Total Assets	TA	Independent	H.C	XX	XX
Short Term Fin. Lia.	STFL	Independent	H.C	XX	XX
Trade Payables	TP	Independent	In model	In model	In model
Long Term Fin. Lia.	LTTP	Independent	H.C	XX	XX
Equity	E	Independent	In model	In model	In model
Paid in Capital	PIC	Independent	In model	In model	In model
Dividend Payments	DP	Independent	In model	In model	In model

H.C: High correlated with other variables

All variables except market value of equity are measured at the end of the fiscal year. Market value of equity is measured 4 months after the end of the fiscal year (i.e., at April 30 for a firm with December fiscal year-end). Market value is calculated by multiplying the share quantity by the share price for each firm. The reason behind the choice of these share prices is to ensure that the financial data have become publicly available and share prices adequately have reflected the accounting information published by the selected firms.

4. RESEARCH METHOD AND RESULTS

This paper investigates the correlation between market value of publicly held firms and financial statement information. Lots of studies from previous literature demonstrate the relevance of financial statement information for firm valuations. The relation between firm valuations of private firms and financial statement information is examined by restricted amount of studies. (Armstrong et al., 2006; De Franco et al., 2008; Elnathan et al., 2010; Hand, 2005) Consistent with the literature (e.g., Collins et al., 1997; Hand, 2005), the regression model of firm values is processed with using accounting variables.

4.1 Panel Unit Root Tests

In order to define whether variables are stationary or not at their levels Levin, Lin & Chu t, Augmented Dickey Fuller, Fisher Chi-square, and Philips Perron Fisher Chi square panel unit root tests are applied. The analysis is started by carrying out the Augmented Dickey Fuller (ADF) test, which is the classical unit-root test. The ADF test is based on the null hypothesis that the time series has unit root. The unit-root

with intercept was first performed, followed by the unit-root with trend and without trend. Univariate and single equation econometric methods for testing unit-roots can give imprecise point estimates and can also provide low power test while working with small sample sizes; this situation is proposed by Hamilton (1994). Because of this advantage of the ADF, unit root test led the use of recently proposed panel unit root tests of Levin, Lin & Chu and Philips Perron panel unit root test for both trend and without trend. The results indicated that 12 variable within twenty three variables are not stationary at their levels. Therefore, their first differenced values processed by mentioned panel unit root tests and all of them resulted that the variables are stationary their 1st difference.

Table 6: Panel Unit Root Test Results

Variable	Levin, Lin & Chu t			Decision
	t_0	t_μ	t_τ	
CAE	1.83783 [2]	-16.3950* [1]	-232.167* [1]	I(0)
CE	-27.4517* [0]	-33.3982* [0]	-20.8706* [0]	I(0)
CP	0.56708 [0]	-10.4507* [0]	-161.365* [0]	I(0)
DP	3.94741 [0]	-11.1855* [0]	-16.9854** [0]	I(1)
ΔDP	-9.97184* [0]	-11.5180* [0]	-14.7589* [0]	
E	18.0773 [2]	-9.04134* [1]	-20.1105* [1]	I(1)
ΔE	-0.35977 [0]	-22.8481* [0]	-7.08527* [0]	
EBITDA	0.46721 [0]	-20.0569* [0]	-46.7901* [0]	I(0)
FCFTF	-11.0114* [0]	-19.4502* [0]	-33.6245* [1]	I(0)
GME	7.49463 [0]	4.56590 [0]	-20.6587* [0]	I(0)
IFA	-13.4550* [2]	-7.77908* [1]	-6.05116* [1]	I(0)
MV	7.10089 [0]	-6.02584* [0]	-20.8706* [0]	I(1)
ΔMV	-7.32749* [0]	-7.71232* [0]	-20.0569* [0]	
NS	7.98964 [0]	3.42624 [0]	-17.5512* [0]	I(1)
ΔNS	-9.05169* [0]	-6.22968* [0]	-15.0785* [1]	
PC	3.80736	-21.5171*	-6.07832*	I(1)

Variable	t_0	t_μ	t_τ	Decision
	[0]	[0]	[0]	
ΔPC	-10.2864*	-4.46442*	-8.7589*	
	[0]	[0]	[0]	
RDE	3.02132	-0.90279	-8.85138*	I(1)
	[2]	[1]	[1]	
ΔRDE	53.0915*	57.1412*	-9.08527*	
	[0]	[0]	[0]	
I	7.08940	-3.80696*	-23.3310*	I(0)
	[0]	[0]	[0]	
ΔI	-	-	-	
SMDC	4.81567	0.88525	-26.8802*	I(1)
	[0]	[0]	[1]	
ΔSMDC	-3.85598*	-143.481*	-40.5193*	
	[0]	[0]	[0]	
TFA	2.57557	-31.3261*	-26.4707*	I(1)
	[0]	[0]	[0]	
ΔTFA	-52.3931*	-35.3996*	-26.8802*	
	[2]	[1]	[1]	
TP	5.94953	-4.61418*	-17.7220*	I(0)
	[0]	[0]	[0]	
ΔTP	-	-	-	
TR	9.03786	2.36443	78.3773	I(1)
	[0]	[0]	[0]	
ΔTR	-3.48399*	-13.9682*	86.8802*	
	[0]	[0]	[1]	

- *, ** and *** indicate statistical significance at the 1%, 5% and 10% level respectively.
- t_0, t_μ, and t_τ are the Levin, Lin & Chu t test statistics when the auxiliary regression involves no deterministic component, a constant, and a constant and a trend respectively. The null hypothesis for the Levin, Lin & Chu test is that the series is non-stationary. Numbers in square brackets correspond to lags. Maximum lags were set at 3 and lag length is determined using the modified AIC criterion.
- Δ indicates 1st difference.

Variable	ADF - Fisher Chi-square			Decision
	t_0	t_μ	t_τ	
CAE	52.9615	95.7551**	6.46804**	I(0)
	[2]	[1]	[1]	
CE	191.927*	143.789*	1.57771	I(0)
	[0]	[0]	[0]	
CP	136.289*	104.558*	0.07351	I(0)
	[0]	[0]	[0]	
DP	34.3737	46.5211	36.3454	I(1)
	[0]	[0]	[0]	
ΔDP	94.0486*	47.7438**	56.3241*	
	[0]	[0]	[0]	
E	14.3160	79.2123	0.17716	I(1)
	[2]	[1]	[1]	
ΔE	84.6536*	93.5927*	2.3745*	
	[0]	[0]	[0]	

	t_0	t_μ	t_τ	
EBITDA	99.4555** [0]	98.4329** [0]	0.26802 [0]	I(0)
FCFTF	211.068* [0]	127.560* [0]	1.52431 [1]	I(0)
GME	29.8075 [0]	61.8210 [0]	0.00073 [0]	I(0)
IFA	89.4456*** [2]	80.8897 [1]	2.10131 [1]	I(0)
MV	21.0442 [0]	80.1896 [0]	1.54268 [0]	I(1)
ΔMV	105.981* [0]	64.0584*** [0]	2.10131* [0]	
NS	22.1472 [0]	31.4576 [0]	0.35541 [0]	I(1)
ΔNS	79.7092* [0]	48.3162 [0]	0.94695** [1]	
PC	11.3463 [0]	25.2922 [0]	-6.07832 [0]	I(1)
ΔPC	27.8945* [0]	13.6099*** [0]	7.3241* [0]	
RDE	30.0517 [2]	31.8070 [1]	9.98625 [1]	I(1)
ΔRDE	53.0915** [0]	57.1412* [0]	14.3160* [0]	
I	36.0477 [0]	47.9695 [0]	4.04479 [0]	I(1)
ΔI	128.589* [0]	83.6250* [0]	127.560* [0]	
SMDC	28.3051 [0]	49.9936 [0]	0.00442 [1]	I(1)
ΔSMDC	80.0876* [0]	72.4307** [0]	8.94676* [0]	
TFA	60.3323 [0]	75.5009 [0]	1.45469 [0]	I(1)
ΔTFA	114.645* [2]	103.957* [1]	4.04479* [1]	
TP	23.8863 [0]	52.5614 [0]	2.18279 [0]	I(1)
ΔTP	122.377* [0]	89.9176* [0]	4.04479* [0]	
TR	24.9292 [0]	45.2818 [0]	1.96189 [0]	I(1)
ΔTR	91.7840* [0]	72.3856* [0]	2.00442* [1]	

- *, ** and *** indicate statistical significance at the 1%, 5% and 10% level respectively.
- t_0, t_μ and t_τ are the Augmented Dickey-Fuller test statistics when the auxiliary regression involves no deterministic component, a constant, and a constant and a trend respectively. The null hypothesis for the ADF test is that the series is non-stationary. Numbers in square brackets correspond to lags. Maximum lags were set at 3 and lag length is determined using the modified AIC criterion.
- Δ indicates 1st difference.

Variable	PP - Fisher Chi-square			Decision
	t_0	t_μ	t_τ	
CAE	54.3091 [2]	108.754* [1]	7.23132** [1]	I(0)
CE	191.927* [0]	162.906* [0]	2.67390 [0]	I(0)
CP	134.669* [0]	126.644* [0]	0.42785 [0]	I(0)
DP	40.8059 [0]	64.8858*** [0]	54.7953 [0]	I(1)
ΔDP	98.7494* [0]	55.4767* [0]	42.8059* [0]	
E	18.0773 [2]	104.974* [1]	0.00685 [1]	I(1)
ΔE	96.8259* [0]	105.258* [0]	0.05417* [0]	
EBITDA	102.364* [0]	121.265* [0]	9.9E-05 [0]	I(0)
FCFTF	212.994* [0]	157.641* [0]	1.88277* [1]	I(0)
GME	33.9403 [0]	70.4637 [0]	0.00000 [0]	I(0)
IFA	95.8585** [2]	108.577* [1]	7.23132** [1]	I(0)
MV	18.7542 [0]	122.740* [0]	2.38605 [0]	I(1)
ΔMV	118.598* [0]	80.2983* [0]	33.9403* [0]	
NS	24.0497 [0]	40.8347 [0]	0.38807 [0]	I(1)
ΔNS	79.7092* [0]	63.9468*** [0]	0.94695** [1]	
PC	10.5498 [0]	25.5524 [0]	0.51780 [0]	I(1)
ΔPC	29.7363* [0]	17.2249* [0]	0.80597* [0]	
RDE	33.2628 [2]	42.4114 [1]	2.04575 [1]	I(1)
ΔRDE	56.5968* [0]	61.3513* [0]	8.99062* [0]	
I	35.9789 [0]	49.3693 [0]	7.80527** [0]	I(1)
ΔI	129.745* [0]	115.037* [0]	157.641* [0]	
SMDC	27.9631 [0]	61.8177 [0]	0.25499 [1]	I(1)
ΔSMDC	80.7967* [0]	88.0106* [0]	8.99062* [0]	
TFA	71.0137 [0]	88.6291*** [0]	3.02963 [0]	I(1)
ΔTFA	119.356* [2]	-35.3996* [1]	7.80527* [1]	
TP	21.6587	65.9961	3.56362	I(1)

	t_0	t_μ	t_τ	
	[0]	[0]	[0]	
ΔTP	128.021*	98.1560*	7.80527*	
	[0]	[0]	[0]	
TR	27.9066	54.1198	3.17345	I(1)
	[0]	[0]	[0]	
ΔTR	94.5808*	87.7063*	5.25499*	
	[0]	[0]	[1]	

- *, ** and *** indicate statistical significance at the 1%, 5% and 10% level respectively.
- t_0, t_μ and t_τ are the Augmented Dickey-Fuller test statistics when the auxiliary regression involves no deterministic component, a constant, and a constant and a trend respectively. The null hypothesis for the ADF test is that the series is non-stationary. Numbers in square brackets correspond to lags. Maximum lags were set at 3 and lag length is determined using the modified AIC criterion.
- Δ indicates 1st difference.

Table 7: Summary Results

SUMMARY RESULTS

Market Value	I(1)
Net Sales	I(1)
Sales-Marketing-Dist. Cost	I(1)
Research & Dev. Expenses	I(1)
General Man. Exp.	I(0)
EBITDA	I(0)
Free Cash Flow To Firm	I(0)
Cash and Equivalents	I(0)
Trade Receivables	I(1)
Inventories	I(1)
Tangible Fixed Assets	I(1)
Intangible Fixed Assets	I(0)
Trade Payables	I(1)
Equity	I(1)
Paid in Capital	I(1)
Dividend Payments	I(1)

4.2 Hausman test – Correlated random effects

The test evaluates the significance of an estimator versus an alternative estimator. It helps one evaluate if a statistical model corresponds to the data. Random effects are preferred under the null hypothesis due to higher efficiency, while under the alternative fixed effects is at least consistent and thus preferred.

$$H_0: \alpha_i \perp X_{it}, Z_i$$

$$H_\alpha: \alpha_i \not\perp X_{it}, Z_i$$

If H_0 is true, both $\widehat{\beta_{RE}}$ and $\widehat{\beta_{FE}}$ are consistent, but only $\widehat{\beta_{RE}}$ is efficient. If H_α is true, $\widehat{\beta_{FE}}$ is consistent and $\widehat{\beta_{RE}}$ is not.

Table 8: Hausmen Test Results

	Chi-Sq. Statistic	Chi-Sq. d.f.	P-Value
Random Effect Estimator	201.7955	19	0.0000
Fixed Effect Estimator	136.4576	18	0.0000

After deciding which variables and what levels will be used, before running the panel regression in order to decide which kind of regression is appropriate for the model and the data, Hausman Test was applied. According to the results of the table, as both probability values indicates (0,0000 & 0,0000) Fixed effects was chosen over Random effects.

4.3 Fixed Effect & Random Effect Panel Regressions

The term "fixed effects" gives some incorrect insight in terms of modeling, as a result of, with respect to both, the effects at the individual level are random. According to this situation, the fixed effects models have the added complication that the regressors are correlated with the effects on the individual level and, therefore, a consistent estimation of the model parameters requires the elimination or control of the

fixed effects. According to that a model, where specific effects of the individual for a dependent variable were taken into account, y_{it} specifies that:

$$y_{it} = \beta_{0i} + x'_{it}\beta_1 + \varepsilon_{it}$$

x_{it} indicates regressors, ε_{it} represents the idiosyncratic error and β_{0i} stands for the specific random effects for the individual.

With the error term being $\mu_{it} = \beta_{oi} + \varepsilon_{it}$ and x'_{it} correlated with the invariant error term in time(β_{oi}), it is supposed that x'_{it} is not correlated with the idiosyncratic errorε_{it}. The fixed effects model implies that $E(y_{it}|\beta_{0i}, x_{it})/\delta x_{j,it}$. The advantage of the fixed effects model is that a consistent estimator of the marginal effect of the jnth regressor of $E(y_{it}|\beta_{0i}, x_{it})$ can be obtained, given that $x_{j,it}$ varies in time.

On the other hand, in terms of random effects model, there is an assumption that β_{0i} is purely random, therefore, it doesn't have any correlation with the regressors. The advantage of the random effects model is estimating all coefficients, even the time-invariant regressors, and, therefore, the marginal effects. In addition to that $E(y_{it}|\beta_{0i}, x_{it})$ can also be estimated. However there is a huge disadvantage in terms of the estimators because they are inconsistent if the fixed effects model is more appropriate.

Table 9: Fixed Effect & Random Effect Panel Regression Results

	Fixed Effect Regression			*Random Effect Regression*		
	T-Stat	**P-Value**	**Coefficient**	**T-Stat**	**P-Value**	**Coefficient**
Constant	-4.079403	0.0001	-1.47E+09	2.598955	0.0100	2.26E+08
D(NS)	-0.206780	0.8364	-0.017852	-1.279778	0.2020	-0.051404
D(SMDC)	-5.524531	0.0000	-7.705448	-4.763478	0.0000	-2.481534
D(RDE)	-0.952206	0.0342	-1.269326	-3.909731	0.0001	-1.703654
GME	-1.554889	0.1218	-5.900098	-1.937380	0.0540	-1.988938
EBITDA	-0.542016	0.0488	1.358981	-1.102285	0.0271	1.588119
CE	4.985249	0.0000	1.131800	3.886763	0.0001	1.729637
CAE	2.040377	0.0428	0.813436	2.364182	0.0189	0.519094

D(TR)	-0.618412	0.5371	-0.448180	-4.632712	0.1736	-1.748842
FCFTF	-1.549826	0.1419	1.588287	-1.137678	0.2174	-0.606823
D(I)	-2.559595	0.0113	-1.906728	1.301180	0.1946	0.395421
D(TFA)	-1.474296	0.1422	-0.351399	3.504739	0.0006	0.355410
IFA	2.072606	0.0397	1.670131	6.234579	0.0000	2.245700
D(TP)	-2.758288	0.0064	-1.537972	-0.904889	0.3665	-0.241107
D(E)	4.458222	0.0000	1.682364	5.541206	0.0000	0.919067
D(PC)	-3.104111	0.0022	-1.778365	-4.366871	0.0000	-1.731347
D(DP)	4.312794	0.0000	4.840804	7.565549	0.0000	5.666779

Both random and fixed effect panel regression outputs presented within the Table 9. However, as mentioned in previous section the outputs of fixed effect panel regression are important for the study. With respect to the results 10 variables determined as statistically significant which are sales marketing and distribution costs, research and development expenditures, capital expenditures, inventories, intangible fixed assets, trade payables, equity, paid in capital, and dividend payments. Also, the model is meaningful with the R squared value 0.77553 and Adjusted R-squared 0.76226; therefore it provides an important insight for further researches. Adjusted R-squared means that the independent variables are able to explain 76% of changes in dependent variable. In addition, F statistics supports that the model is consistent as a whole. According to estimation results the most negatively effective variables on market value are sales marketing and distribution costs, change in trade payables, change in research and development expenses and change in inventories. On the other hand, in terms of being positively effective the variables are capital expenditures, EBITDA, cash and equivalents, change in dividend payments, change in equity, and intangible fixed assets.

$$D(MV) = c - 7.71D(SMDC) + 1.35EBITDA + 0.81CAE + 1.14CE - 1.91D(I) + 1.67IFA - 1.54D(TP)$$
$$+ 1.68D(E) + 4.84D(DP) - 12.69D(RDE)$$

➢ SMDC = Sales-Marketing-Dist. Cost

➢ EBITDA = Earnings Before Interest, Taxes, Depreciation and Amortization

- CAE = Cash and Equivalents

- CE = Capital Expenditures

- I = Inventories

- IFA = Intangible Fixed Assets

- TP = Trade Payables

- E = Equity

- DP = Dividend Payment

- RDE = Research and Development Expenditures

The aim of the study is to build the method of valuation of publicly held firms so that it can be employed on the valuation of private firms practically. In parallel with this aim, the panel regression results demonstrate change in market value strongly relevant with financial information. Change in market value is explained by sales, marketing and distributing cost; free cash flow to equity; EBITDA; Cash and equivalents; change in inventories; Intangible fixed assets; change in trade payable; Equity; change in dividend payments and change in Research and Development expenditures. Relevance of independent variables are measured by R^2. The test results demonstrate that our R^2 is fairly high. (R^2 = 76%)

This equation shows us, SMDC is very important operating expense. In data sheet, all expenses are defined with negative coefficient. So -7.71 should be interpreted as change in market value is relevant with increase in SMDC. This expense provides great contribution to sales power. Also this expense is a kind of investment that creates a consumer value via marketing and customer value via promotions, dealers meeting, and retailer supports etc. So this explanation verifies our result.

EBITDA is explanatory item that has strong relation with market value. EBITDA multiplier method has used in most of transactions. EBITDA is one of the most important profitability indicators. Cash and equivalents is often used added on almost every valuation models that demonstrates our model is consistent with major valuation methods. So, positive coefficient is suitable for EBITDA. Capital expenditures with positive coefficient demonstrate an importance of future value. Capital expenditures are expenses of current period, but will support future cash flows.

In our model, change in inventories has a negative coefficient as it should be. Because inventories minimization is very important due to inventories holding costs. Firms should aim to decrease their inventories. Besides, intangible fixed asset has positive coefficient. These results indicate that IA is effective on change in market value. Especially goodwill, marks, patents, brand recognition etc. are value relevant financials.

Change in trade payable with negative coefficient takes a place in our model. Trade payable is defined negative form to dataset. Due to negative definition of TP, the coefficient (-1.54) demonstrates increase in trade payables is effecting market value positive. Also, one can verify this situation from working capital management.

Equity has positive coefficient that means powerful equity position provides more valuable firm. For dividend payments, it can be observed from model that increase in market value is providing an increase in amount of dividend payments. As well as profits should increase, in the same direction dividend payments should increase.

RDE is highly correlated with change in market value. High coefficient demonstrates that RDE is very important for firms. Actually RDE is same as the investment to the future of firm. Although today it maybe persuade as an expense, it would provide cash flows with innovations and developments in the future.

5. CONCLUSION

In the process of determining fair value of firms, publicly held firms clearly have an advantage. Their shares are traded on stock exchange and market has determined this value. But private firms that are not traded on stock exchange are in different position. Finding fair value of private firms is relatively harder than publicly held firms. Generally accepted methods have been tried to find a solution to this situation. Still, lots of professionals are using these major valuation methods for determining the value of private firms. However, these major methods have lots of criticisms. Especially, finding future value has lots of

assumptions and subjectivity. Regarding to these criticisms, financial analysts, CFOs, CPAs, valuation experts and anymore who related with firm valuation tried to improve these major methods. In finance literature, there are lots of researches, that some of them are mentioned in this study, to find more value relevance. In this paper, I attempt to build a regression model to find fair value.

In particular, this paper seeks to examine which variables are value relevant and how effective they are on determining firm value. To answer this question, I build a regression model to test publicly held firms' market value change regarding to change in financial variables. These financial variables are selected from balance sheet and income statement. Data includes 54 publicly held Turkish firms which are traded in BIST 100 Index. In this paper, analysis comprehends 2008-2012 time periods. The dataset used in the study includes both time series (years) and cross sections (companies) simultaneously; therefore, the type of dataset is defined as panel data. So the panel regression is used with using financial information as independent variables for interpretation of firm value as dependent variable.

With respect to results 10 variables determined as statistically significant which are sales marketing and distribution costs, research and development expenditures, capital expenditures, inventories, intangible fixed assets, trade payables, equity, paid in capital, and dividend payments. As expected before building the model, sales marketing and distribution costs, change in trade payables, change in research and development expenses and change in inventories have negative coefficients. On the other hand, capital expenditures, EBITDA, cash and equivalents, change in dividend payments, change in equity, and intangible fixed assets have positive coefficients.

Also, the model is meaningful the R-squared value is 0,77553 and Adjusted R-squared 0,76226; therefore, provides important insight for further researches. Adjusted R-squared means that the independent variables are able to explain 76% of changes in dependent variable. In addition, F-statistics supports that the model is consistent as a whole.

Beside, this paper made a significant contribution with proving sales marketing and distribution costs, research and development expenditures, capital expenditures, EBITDA, inventories, intangible fixed

assets, trade payables, equity, paid in capital, and dividend payments are value relevant. These independent variables are explaining the 76% of firms' market values.

This paper with 76% R-squared value demonstrates that firm valuation modeling has very big opportunity to find better results with further studies. The key conclusion of this paper is that publicly held firms' market value can be modeled with regression and involved only financial information. This study clarified the major financials to determine value that can be improved with another models. The results presented in this paper should be of interest to professionals, academics, practitioners, and regulators, as there is a dearth of knowledge about private firms' valuation techniques. Beside, this study provides a study field for application of empirical models for firm valuation. The model, which is a result of this paper, is a tool for determining firm value.

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