T.C. DOĞUŞ UNIVERSITY

INSTITUTE OF SOCIAL SCIENCES

FINANCIAL ECONOMICS

A PANEL COINTEGRATION APPROACH ON MODELING SHARE PRICES OF FOOTBALL CLUBS

PhD DISSERTATION

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2009186007

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İstanbul, February 2018

DOĞUŞ ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ

Tarih : 05/03/2018

Doktora Tez Savunma Sınav Tutanağı

Anabilim Dalı	: Finansal İktisat
Öğrencinin Adı Soyadı	:Engin Dumanlı
Öğrenci No	:2009186007
Tez Danışmanının Adı Soyadı	:Doç. Dr. Deniz Parlak
Tezin Başlığı	: A Panel Cointegration Approach on Modelling Share Prices of Football Clubs

Doğuş Üniversitesi Lisansüstü Eğitim-Öğretim ve Sınav Yönetmeliği'nin 44.Maddesi uyarınca yapılan değerlendirmeler sonunda;

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ACKNOWLEDGEMENTS

I could not imagine that it would be so difficult to write this section since there are many people that I owe.

First of all, I would like to express my deepest thanks and gratitude in valuable memory of Prof. Dr. Cudi Tuncer Gursoy, the founding Rector of Doğuş University and our finance lecturer who passed away in 2011. He taught us not only finance, but also how to be a life-long student. It was a great honour to study under his supervision.

Secondly, this work could not be done without the guidance of my supervisor Assoc. Prof. Dr. Deniz Parlak, I am grateful for her motivation and extensive advice. I also would like to thank Assoc. Prof. Dr. Barış Aşıkgil for his guidance, suggestions and endless support during the study. Many thanks to all other people who have supported me in completing this work and I ask their forgiveness for I could not count all their name here.

This time consuming and exhausting work kept me away from my family long times. I am grateful to all of them for their utmost understanding and patience throughout my study. I will spend more time with all of you from now on.

Thanks God, for surrounding me with people encouraging, assisting and supporting me all the time, and for offering me health, strength, ambition and every possibility that made this work completed.

ABSTRACT

Share valuation is one of the most studied topics in finance, whereas the studies on valuation of football club companies are limited. In fact, football companies show significant differences from other companies due to their non-profit nature and require different approaches for valuation. In literature review, there are some different approaches suggested for the valuation of football companies while there are also some authors favouring use of the known valuation methods.

In this study, a model for football clubs in a certain league has been proposed based on net asset value by bringing the assets and liabilities to market value. In addition to net asset value, the proposed model takes into account the brand value and econ-wise management factors which are not seen in the balance sheet of the company. Moreover, a share price index, as a proxy of the investment sentiment in the market has also been included in the model. The model also includes a factor that represents the value derived from the league in which the club participates. The proposed model has been tested with the data for each quarter between the 2011/12 and 2016/17 seasons of the four publicly traded football club companies competing in Turkish Super League, assuming the market is fully efficient. Applying panel cointegration regression tests, all the factors included in the model were found to be statistically significant. According to the test results, the sales figure, used as a proxy for brand value, was the factor with the highest statistical significance in determining club value. The second most important factor influencing the company's value in the same direction is the Team Value, which has usually the biggest share among the assets of most clubs. As a proxy for the contribution of econ-wise management to the company's value, Free Cash Flow item, which takes into account the cash flows from operations and investment activities both in working and fixed capital assets, is used. This factor, found statistically significant, is interpreted as the fact that the cash surplus resulted by club management is positively reflected to the share prices by investors. While the Total Debt factor has a negative impact on company value as expected, an interesting finding of the study is that investing in non-team assets has a negative impact on company value.

Tests made with the data of the four clubs revealed that the R-squared value of the model was 76%. The model predictions are also presented in comparison to the observations of the Borsa Istanbul at the end of the study.

The limitation of the data used in the model testing has been one of the most important constraints of the study. It was not possible to incorporate more factors into the model due to data limitations.

Key Words: Equity Valuation, Share Value, Football Clubs, Sports Finance, Valuation Factors

ÖZET

Hisse değerlemesi finansın en çok çalışılan konularından biri olmakla beraber futbol kulübü şirketlerinin değerlemesi konusundaki çalışmalar kısıtlıdır. Esasen futbol şirketleri, kar maksatlı olmamaları nedeniyle diğer şirketlerden önemli farklılıklar göstermekte ve değerleme konusunda farklı yaklaşımları gerekli kılmaktadır. Yapılan literatür taramasında futbol şirketlerinin değerlemesine yönelik farklı bazı farklı yaklaşımlar önerildiği görülmekle beraber, bilinen değerleme yöntemlerinin kullanılmasını önerenler olduğu da görülmüştür.

Bu çalışmada belli bir ligde yer alan futbol kulüp şirketlerinin hisse değerlemesi için varlık ve yükümlülüklerin piyasa değerine getirilerek net varlık değerini esas alan bir model önerilmiştir. Önerilen model bunlara ek olarak bilançoda görünmeyen marka değeri ile akil-ekonomik yönetimin katkısını da şirket değerini etkileyen faktörler arasında dikkate almaktadır. Ayrıca, piyasadaki yatırım eğiliminin bir göstergesi olarak Borsada işlem gören hisselerin fiyat endeksi de modele dâhil edilmiştir. Model aynı zamanda, futbol takımının içinde yer aldığı ligden kaynaklanan bir değer olduğu faktörünü de içermektedir. Önerilen model, piyasanın tam olarak etkin çalıştığı kabul edilerek Türkiye Süper Liginde yarışan, dört halka açık futbol kulübü şirketinin 2011/12 ve 2016/17 sezonları arasındaki her bir çeyrek döneme ilişkin verileri ile test edilmiştir. Yapılan panel eşbütünleşme regresyon testlerinde modele dâhil edilen tüm faktörlerin istatistiksel olarak anlamlı oldukları görülmüştür. Test sonuçlarına göre, marka değeri için vekil olarak kullanılan Satışlar rakamı, kulüp değerini belirlemede istatistiksel olarak anlamlılığı en yüksek faktör olarak çıkmıştır. Şirket değerine aynı yönde etki eden ikinci en önemli faktör, çoğu kulübün varlıkları arasında en büyük payı olan Takım Değeri olmuştur. Akil-ekonomik yönetimin şirket değerine katkısı için vekil olarak faaliyetlerden kaynaklanan nakit ile işletme ve sabit sermaye yatırımlarından kaynaklanan nakit akımlarını dikkate alan Serbest Nakit Akım kalemi kullanılmıştır. İstatistiksel olarak anlamlı çıkan bu faktör, Kulüp yönetiminin nakit fazlası yaratmasının yatırımcılar tarafından fiyatlara olumlu yansıtıldığı şeklinde yorumlanmaktadır. Toplam Borçlar faktörü şirket değerine negatif yönde etki ederken, takım dışındaki varlıklara yapılan yatırımın şirket değerine olumsuz yönde etki etmesi araştırmanın ilgi çekici bir bulgusu olmuştur.

Dört kulübün verileri ile yapılan testler sonucu kurulan modelin R-squared değeri % 76 bulunmuştur. Ayrıca çalışmanın sonunda modelin tahminleri ile Borsa İstanbul'daki gözlem değerleri karşılaştırılarak, model sınanmıştır.

Model test etmekte kullanılan verilerin sınırlı olması çalışmanın önemli kısıtlarından biri olmuştur. Veri sınırlılığı nedeni ile modele daha fazla faktör dâhil etmek mümkün olmamıştır.

Anahtar Kelimeler: Özkaynak Değerleme, Hisse Değerlemesi, Futbol Kulüpleri, Spor Finansmanı, Değerleme Faktörleri

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LIST OF ABBREVIATIONS

APT	Arbitrage Pricing Model
BV	Book Value
BYPRP	Bond Yield plus Risk Premium Method
CAPM	Capital Asset Pricing Model
DDM	Dividend Discount Model
EBO	Edwards-Bell-Ohlson Model
EPL	English Premier League
EPS	Earnings per Share
FCFE	Free Cash Flow to Equity
FCFF	Free Cash Flow to Firm
FMOLS	Fully Modified Least Squares
IFRS	International Financial Reporting Standards
IPO	Initial Public Offering
MLB	Major League Baseball
MPT	Modern Portfolio Theory
MV	Market Value
NBA	National Basketball Association
NFL	National Football League
NHL	National Hockey League
RIM	Residual Income Model
ROE	Return on Equity
WACC	Weighted Average Cost of Capital
YTM	Yield to Maturity

1. INTRODUCTION

Share price valuation and movements of share prices are probably one of the most studied subjects in finance. Yet, despite to the fact that football news captures a considerable share in written and visual media, studies on football club shares in academic literature are relatively limited.

In fact, football club shares specifically deserve to be studied with their unique features. First of all, these companies are not generating cash to equity holders in general and therefore it is difficult (if possible) to justify the share prices with the cash flows to the investors. Secondly, the holders of club shares are acting considerably with emotional motivations rather than assumed rational decisions. Therefore, behavioural aspects of club shares definitely differ from other shares, again necessitating specific further studies on club share prices. Considering the differing aspects of club shares and the limited studies for valuing them, the purpose of this study is to determine the factors affecting the share prices of clubs and suggest a model to estimate.

Here in this study, a model based on the idea that club equity should be valued with an asset based approach is propounded, including intangibles that are not seen in clubs' balance sheet. The intangibles that usually have the most weight among the clubs' assets are transfer value of players. Another intangible asset which is not seen on balance sheet even in nominal terms is brand value. It is also suggested that the contribution of economic-wise quality of management has to be taken account. These factors are proxied in this model and including other factors which are "Other Assets excluding Fixed Intangibles" and "Total Debt", the model is tested with the data derived for club shares traded at Borsa Istanbul.

The data includes observations from four clubs publicly traded at Borsa Istanbul. Therefore, for each time t, there are four sets of observations. This enables us to carry on panel data analysis which allows the researcher to work with a wider data set and reduces the trend effect, compared with time series and horizontal section analysis. Additionally, better parameter estimates and consequently more effective econometric forecasts are predicted. The study employs cointegration regression approach in testing the proposed model. This approach is known as superior to linear regression which may be misleading with results indicating spurious correlations.

Thus, the scope of the study is to overview the equity valuation techniques, to underline the difficulties in applying these methods to club shares, to suggest affecting factors and a model to estimate share prices, based on the previous observations in Borsa Istanbul, assuming the market is efficient, that is the share prices observed at time t, instantly and fully reflect all the information whether disseminated or not.

This study has several important contributions to existing literature. First, the difficulties in valuation of club companies are widely recognised and this work is intended to contribute to existing literature by suggesting a new model to estimate the equity value of the clubs, and factors affecting the club values. While the study uses some independent variables that used before, some new variables which increases the prediction power of the equity value were introduced.

Second, the model is tested by employing a cointegrating regression using fully modified least squares method on the panel data which is a relatively new technique, to our best knowledge, not used before in modelling valuation of football club shares. The technique's major strength is to avoid spurious regression.

Finally, although there are some studies for clubs in different leagues, there is no previous model study based on the data from Turkish Super League clubs.

The rest of the study is organised as follows: Part two summarizes the literature about valuation in general, specific difficulties and previous studied on club valuation. Part three explains the founding idea behind the model, factors assumed to be affecting the club values and then sets out the model. Part four starts with explaining the data and proceeds with the statistical tests to examine the validity of the model. Part five, summarizes the results and contribution of the study, along with suggestions for further study and final notes.

2. LITERATURE REVIEW

2.1 History of Valuation

A well-documented article on the history of UK and US equity valuation is written by Rutterford (Rutterford, 2007). In this section, the mentioned article is benefited from. The article states that the earliest studies to value shares dates back to the development of capital markets in the 19th century. The key measures to value shares were dividend yield and book value in that era. Shares were thought to be a bond-like security, differing in the uncertainty of their maturity and of their dividend payments: "A common stock is a bond which provides future payments indefinite in number and amount" (Preinreich, 1932). Accordingly, shares were valued like bonds using the dividend yield metric. The investors used dividend yield as a tool to compare shares with alternative investments such as treasury bonds and corporate debt issues. The uncertainty of dividends is considered the risk of shares and therefore on average, they were expected to yield more than debt issues.

For valuation purposes, Capital Gain was not considered as a part of return for shares. It was the goal for speculators and naive investors who bought shares in the hope of getting rich in short time. Whereas Book Value was considered as an important indicator for the safety of capital invested. Graham and Dodd, mentioned that 'the typical investor was concerned primarily with the safety of principal and secondly in the continuance of income' (Dodd, 1934). It was considered of vital importance to investors in ordinary shares that the book value of their shares should be above par.

At the end of the 19th and early 20th centuries, a number of benchmarks were used to analyse the quality of dividend yields. An implication of this was the Dividend Cover Ratio that measures times dividends earned. Investors also thought in which sector they are investing while assessing dividend yield. Dividend yields, used to compare with bonds or similar shares individually until then, began to be used for comparisons between markets and sectors as well.

Influential critics to dividend yield criterion came from Smith and Fisher (Fisher, 1930; Smith, 1925). They showed that dividends were not stable over time and reverting to a long run average as formerly assumed. In fact, with the compound effect of retained

earnings, it was understood that dividends could grow. Thus, making decision with dividend yield which does not take into account the growth aspect was clearly inadequate. Then, Wall Street turned to Earnings as a key factor in valuing stocks.

George H. Troughton summarized the development of the valuation methods in the foreword of "Analysis of Equity Investments: Valuation", and put forward that "Rigorous thinking with respect to the valuation of securities appears to be a by-product of severe market declines" (Stowe et al., 2002). Accordingly, things started to change following the first major market decline of 90% in value in the US between 1929 and 1933. Investors then sought new approaches to value shares and at the beginning of the 20th century, earnings began to gain importance instead of dividends. One of the earliest studies on share valuation commonly referred in literature is Graham and Dodd's Security Analysis (Dodd, 1934). The study emphasized the importance of income statement and balance sheet analysis in order to foresee future earnings as well as dividends. Consequently earnings multiples were began to be used to value equities. At the same time other investors giving priority to dividend yield, also started to take into account Dividends Coverage Ratio which shows the times dividend earned.

Another study contributing to the valuation literature was from John Burr Williams' The Theory of Investment Value (Williams, 1938). The study was exploring the discounting practices in valuation, the then-new financial technique. These studies were the basis for calculating how valuable a stock is for a rational investor.

In the 1930's, investors have come faced to two new perspectives on stock valuation; growth stocks and value stocks. While both parties use the same tool, that is the P / E ratio, proponents of growth stocks argued that high P / E was a sign of future growth and encouraged investors to buy high P / E stocks in the expectation of profiting from that future growth advantage. On the other hand, proponents of value stocks, such as Graham and Dodd, argued that low P / E stocks are undervalued stocks compared to their earnings and thus good value to invest (Dodd, 1934). Warren Buffet, one the most successful investors in the 20th century, is also known as a value investor. The debate continued following the economic boom years of 1950's and 1960's where companies with high growth prospects traded with high P / E ratios.

The proponents of value stocks reintroduced the concept of “intrinsic value” first discussed during the South Sea Bubble of the early 18th century and favoured to invest into those shares whose market value was below the intrinsic value. Graham and Dodd defined the intrinsic value as "the value justified by the facts", unlike the market quotations established by artificial manipulation or distorted by psychological effects (Dodd, 1934). They acknowledged that market values could deviate from intrinsic values, but believed that these two values would converge for shares in which the popular interest is keen enough. While Graham and Dodd preferred to look at earnings rather than dividends to estimate intrinsic value, Williams (1938) argued that the intrinsic value could be estimated by calculating the present value of all future dividends per share.

In the beginning of 1970’s, the main wisdom was to invest in a number (approximately 50) of large cap growth stocks. Portfolio management was a simple proposition: Buy and Hold the Nifty Fifty. Assuming that the growth would continue, these shares could be bought at any price. It was thought that these stocks could never become overvalued, thus they were one-decision stocks (Stowe et al., 2002). However, Graham and Dodd had already studied on how much to pay for growth in their 1962 edition. They argued that it was impossible to have confidence that high growth would continue and there was a limit on how much to pay for growth.

The second major market decline occurred in the mid 1970’s following the Nifty Fifty trend that peaked in popularity in 1973. The popular idea then was to invest in the top 50 stocks with largest market capitalisation, proven earnings and growth record. After the decline, a new generation of academics provided a framework based on evaluating risk and return. These new theories, which have become familiar as “Modern Portfolio Theory” (MPT), were based on Harry Markowitz’s “Portfolio Selection-Efficient Diversification of Investments” (1959) and William Sharpe’s “Portfolio Theory and Capital Markets” (1970). MPT recognised that investors must consider the risk of security as well as its growth prospects. Furthermore, not all risk was equal, some of it could be diversified away by holding assets that had weak correlation with other assets. MPT was quickly adopted as a way to estimate the required rate of return in dividend discount and other equity valuation models (Troughton, 2002).

Discounted cash flow technique was first developed to value shares by discounting dividends in 1930's. However, the methodology has been very slow to become accepted, both in the UK and the US until the end of 20th century, although it is a suitable and powerful tool to handle shares with growth and stable cash flow characteristics. The method became popular by the arrival of powerful computers and developed software at the end of 1990's. At the same time, the Capital Asset Pricing Model gained wide acceptance among investment practitioners (Rutterford, 2004).

One difficulty in using discounted cash flow method was obtaining tables of dividends showing different growth rates for different periods. To overcome this, Clendenin and Van Greave (1954) produced a set of discount tables. Later studies by Durand (1957) and Gordon (1962) made the infinite growth at a constant rate formula popular among the investment community, commonly known as 'Gordon's Growth Model'. Nevertheless, the discounted cash flow model failed to really take off in the US until the 1980s.

During the technology bubble of the late 1990's, new valuation approaches emerged such as Price to Subscriber, Enterprise Value to EBITDA, and Price to Cash Flow. While the valuation methods were new, the industries in which the company being valued is operating was new as well. Analysts in this period developed more sophisticated variants of Discount Cash Flow model such as Free Cash Flow to Firm, Free Cash Flow to Equity, etc.

The availability of information was an important factor in the development of valuation techniques that has to be underlined. Having limited information disseminated, investors initially had almost no other chance to use dividend yield for valuation purposes. For example, in Britain, the profit and loss account gave only limited financial information, being required to disclose only dividend payments to investors and transfers to reserves until after the Second World War. The profit figure was typically stated after (undisclosed) tax, depreciation, and other expenses and a sales figure was not provided (Rutterford, 2007). Turnover figures did not have to be disclosed until as late as 1976 in the UK (Wilson, 2003). However, as the markets emerged, providing consolidated, detailed and audited financial statements in a timely manner became necessary, enabling investors to develop and employ more sophisticated methods.

While the Discounted Cash Flow model is the most favoured valuation technique in the early years of 21st century, it appears that the P / E ratio, and dividend yield seem to regain their publicity again. Rutterford (Rutterford, 2007) argues that "once accounting and taxation difficulties have been dealt with, it is market levels which are a primary influence on the popularity of particular valuation techniques."

2.2 Use of Valuation

Equity valuation concepts and models are used to address a range of problems by investors and analysts in practice. Selecting shares, inferring (extracting) market expectations, evaluating corporate events, rendering fairness opinions, evaluating business strategies and models, communicating with analysts and shareholders, and appraising private businesses are examples of the subjects which involves application of valuation concepts (Stowe et al., 2002, s. 3-4).

Needless to say that stock selection is the primary use of the valuation methods. Investors continuously try to value the shares traded in the market, and aim to reach a conclusion about their market price. If the perceived value is above the prevailing market price, the share said to be undervalued or otherwise, if the market price is above the perceived fair value, the share said to be overvalued. In case the perceived value and market price are fairly close to one another, the share said to be fairly priced in the market. As it is clear from the definitions, undervalued shares are advised to buy, while overvalued shares are advised to sell. Making comparisons through valuation multiples among peer shares can also be a basis for an investment advice. A share traded with a low P / E, Market to Book ratio or Price to Sales multiple is thought to be cheap compared to the others operating in the same industry and with similar characteristics. Nevertheless, to come a conclusion is not as simple as said. Having a high P / E may be a result of a high growth prospect which may make the share a good buy. Similarly, investing in a share with a low P / E does not guarantee you that it will perform above its peers. Trading at a low P / E may be a sign of deteriorating profitability, declining financial sustainability and decreasing cash flows. Therefore, investors and analysts must carry on a detailed and comprehensive valuation analysis before selecting a share to invest or issuing an advice on.

Valuation concepts can also be used in inferring market expectations. Assuming that the markets operate efficiently and in consequence all the information including future expectations are fully reflected into the prices, the share prices on the market embodies the investors' future expectations about those firms. Analysts then may want to figure out what are the expectations behind that market prices, in order to check or compare them with their own. After reconsidering the expectations and assumptions made for valuation of a share under the light of market prices, analysts may realise that some of their expectations may not be reasonable. This way of thinking may result either strengthen the analysts own view and issue an investment advice in the way buy or sell, or realise the unreasonable assumptions made in previous valuation efforts. Once the market expectations inherent in the prices are come to light, these fundamentals can also be used for valuation studies for other shares with similar characteristics (Stowe et al, 2002).

Valuation concepts are a useful tool for evaluating corporate events as well. For example, when a company is subject to a merger or acquisition, valuation techniques are used to predict the impact of this transaction on the market value of the parent company. To estimate the value of the shares following a merger or acquisition is important in the sense that since these shares are sometimes used as a means of exchange to the shareholders of the target company.

Valuation methods can also be used to make a choice between alternative investment projects. In most cases, comparing alternative investment projects may not be easy due to differences in investment amounts, cash flow timings and synergies to be created with other activities of the firm. To evaluate these projects most accurately with their entire aspects and effect to the firm value is possible with valuation methods. For the finance manager whose target is maximizing the value of the company, valuation methods would be right tool to reach a conclusion.

On the other hand, the communication between the company and investors, regarding how the value of the company would be affected by the decisions of the management and the changes in macroeconomic as well as industrial specific environment, takes place within valuation concepts.

For privately held companies, valuation studies are of particular importance when the IPO of its shares is planned or a possible takeover is being discussed. Since there is no price previously generated in the stock market, the transaction price of the stock is determined by applying valuation methods. When this price is being determined, it is obvious that the analyst needs to know the industry and the firm in detail, as well as how and where to use the valuation models.

2.3 Valuation Methods

Valuation is the estimation of an asset's value based either on variables perceived to be related to future investment returns or on comparisons with similar assets. In this study, Equity Valuation is referred by the term "valuation". In other words, the main interest is the value of shareholders' stake in a company.

Generally a firm has one value if it continues operations and another value if it does not continue operations and liquidated. While starting a valuation study, assuming that the firm will continue its operations into the foreseeable future, it is called "Going Concern Assumption" and the value derived under this assumption is named "Going Concern Value". In this section, the main interest is the models of going-concern value. Although Contingent Claim Valuation is based on the assumption that the option will be exercised, resulting the liquidation of the firm, a brief note is also given for this method. Accordingly, valuation methods under going concern assumption are generally classified into two broad groups (Stowe et al., 2002).

- Absolute Valuation Models
- Relative Valuation Models

Absolute valuation models cover variants of cash flow discounting methods including DDM, discounting FCFF and FCFE. Residual Income method, based on earnings in excess of the opportunity cost of capital, is also classified in this group. These methods are regarded as fundamental approaches in finance theory. The main idea behind these methods is that the value of the asset should be related with the returns expected to be received by the holder, including the timing and certainty characteristics of the returns.

Another valuation approach, counted as Absolute Valuation is "Asset Based Valuation". Sometimes a firm may be subject to a takeover only because of its valuable assets. If the company is not operating a business and the only source of value is the assets; the best thing to value the equity of this firm is valuing each asset separately and deducting the total debt from the total assets value. If the same approach is applied under a short time period constraint and the liquidation is forced by the creditors, it is called "Liquidation Value". In this case, some discounts should be applied for forced liquidation of assets and cost of legal procedures should be taken into account. In both cases the going concern assumption is not regarded.

Relative Valuation Models are based on comparisons with peer firms traded in markets. The most common examples of relative valuation models are P / E, P / BV, and P / S ratios. The going concern assumption is valid for these models as well.

Not every model is suitable for every firm for valuation. Therefore, selection of an appropriate valuation model is an important issue. Following criteria provide a general guidance in selection of an appropriate model (Stowe et al., 2002):

- Consistency with the characteristics of the firm
- Appropriateness given the availability and quality of data
- Consistency with the purpose of valuation, including the analyst's ownership perspective.

Understanding the nature of assets and the way the firm creates value is the first step in valuation. The availability and quality of data also play role in the selection of a valuation model. The purpose or the perspective of the analyst, for example whether the valuation is carried on for a silent investor in a stock market or for an investor aiming to take control of the firm also affect the selection of valuation model.

2.4 Determining the Required Rate of Return

The discount rate reflecting both the time value of the money and the riskiness of the shares is called Required Rate of Return (also known as Cost of Equity) that is the minimum rate of return required by an investor to invest in that particular equity. There are two major approaches to determine the Required Rate of Return (Stowe et al., 2002):

- An equilibrium model method, employing either Capital Asset Pricing Model (CAPM) or Arbitrage Pricing Model (APT)
- The bond yield plus risk premium method.

The CAPM, developed for pricing an individual security or portfolio, states that the expected return on an asset is Risk Free Rate plus a Risk Premium related to its risk measured by beta. The model was first put forward by Jack Treynor (1961; 1962), William Sharpe (1964), John Lintner (1965) and Jan Mossin (1966) studying on earlier works of Harry Markowitz.

$$E(R_i)=R_F+\beta_i[E(R_M)-R_F]$$

Where

$E(R_i)$ = the expected return on asset *i* given its beta

R_F = the risk-free rate of return

$E(R_M)$ = the expected return on the market portfolio

β_i = the asset's sensitivity to returns on the market portfolio, equal to

$$\text{Cov}(R_i, R_M)/\text{Var}(R_M)$$

The Expected Rate of Return ($E(R_i)$) calculated with the above formula can be used as the Required Rate of Return in Discounted Dividend and Free Cash Flow to Equity calculations.

Estimating the Required Rate of Return with CAPM is a fairly established method. Its strengths are simplicity to calculate and familiarity to many. Nevertheless, studies suggest that returns are driven by multiple factors. Therefore, another way to estimate Required Rate of Return is to employ a model based on multiple factors. Such models are called as Arbitrage Pricing Models (APT) created by Stephen Ross in 1976. APT Models are formulated as follows (Ross, 1976);

$$E(R_i) = R_F + (\text{Risk premium})_1 + (\text{Risk premium})_2$$

$$+ \cdots + (\text{Risk premium})_K$$

An example of APT model, including company specific factors, is the Fama-French three factor model. The factors in the model are; the return on a value-weighted equity index in excess of the one month T-bill rate (RMRF), a size factor (SMB, that is the average return on three small-cap portfolios minus the average return on three large-cap portfolios.), and thirdly, the average return on two high book-to-market portfolios minus the average return on two low book-to-market portfolios (HML).

There are also APT models incorporating macroeconomic factors to returns on shares. For example, Burmeister, Roll, and Ross studied a model, known as BIRR model, based on five macroeconomic factors. These factors are confidence risk, time horizon risk, inflation risk, business cycle risk, and market timing risk.

An alternative to CAPM and APT models to estimate the Required Rate of Return is Bond Yield plus Risk Premium Method (BYPRP) which can be applied much easily.

BYPRP cost of equity = YTM on the company's long-term debt

+ Risk premium

Note that this method is available for firms with publicly traded long term debt. The Yield to Maturity (YTM) on the long term debt of the firm represents the time value of money and default risk. The risk premium is the additional compensation for investing to the equity of the firm rather than its debt.

If the firm does not have a publicly traded long term debt, a discount rate for valuation may be determined by a built-up method. The required rate of return derived from built-up method is the sum of risk premiums, in which one or more is typically subjective rather than based on a formal model such as CAPM or APT. For example, the required rate of return may be determined as the sum of risk free rate and an equity market risk premium, plus or minus a subjective company specific risk adjustment.

2.5 Determining the Growth Rate

In the following sections about discounted cash flow valuation, growth rates will be required for calculations. Therefore, a brief about the determinants of growth rates is presented here. This section is going to be particularly about the stable growth rate to be

used in Gordon growth model or the mature growth rate in multistage dividend discount model in which Gordon model is applied for the terminal value of the stock. The stable or mature growth rate is defined as the growth rate that can be sustained for a given level of equity, keeping the capital structure constant over time and without issuing additional common stock (Stowe et al., 2002, s. 83).

The fundamental equation for growth rate is;

$$g = b \times ROE$$

where

g = dividend growth rate,

b = earnings retention rate (1 – Dividend payout ratio)

ROE = return on equity

In the definition it is emphasized that the capital structure stays constant. However, in practice the capital structure fluctuates even from day to day and this results changes in ROE as well. Moreover, retention ratio is not fixed for most of the companies. It varies depending on the working capital needs in accordance to the market trends and investment programme in following year. Because of these, it is difficult to determine a long run stable retention rate. However, the formula is useful in understanding the logic behind and approximating an average rate to be used in the long run.

The above given formula can be detailed further for analysis which will help the analyst to better understand the firm in question.

PRAT Model

$$g=\frac{\text{Net income -Dividends}}{\text{Net income}}\times\frac{\text{Net income}}{\text{Sales}}\times\frac{\text{Sales}}{\text{Assets}}\times\frac{\text{Assets}}{\text{Shareholders' equity}}$$

The model is useful in analysing the factors affecting growth rate of the firm. The model, explained by Higgins, is called as PRAT model, where P stands for profit margin, R for retention rate, A for assets turnover and T for financial leverage (Higgins, 2001).

2.6 Discounted Cash Flow Valuation

Discounted cash flow calculations have been used in some form since money was first lent at interest in ancient times Historical studies of ancient Egyptian and Babylonian mathematics reveal that similar techniques were used to discount future cash flows. This asset valuation method differs from the accounting book value that is based on the amount paid for the asset (Neugebaner, 1951, s. 33). After the collapse of the stock market in 1929, new quests began for a better valuation method for stocks and discounted cash flow analysis gained popularity. The model was first formalised in the book of Irving Fisher, "The Theory of Interest" in 1930 and in the text of John Burr Williams, "The Theory of Investment Value" in 1938 (Fisher, 1930; Williams, 1938).

This model lies on the fundamental idea in finance that the value of an asset is the sum of expected cash flows to its holder, discounted with a rate corresponding to the riskiness of the cash flows. In the simplest form, a shareholder may expect two kind of cash flows by holding a share: Dividends and the proceeds arising from the sale of the share. However, there are other cash flow measures used by the model, to calculate the value of the equity. Thus, Discounted Cash Flow Valuations may be based on 3 different cash flows (Stowe et al., 2002):

- Dividends
- Free Cash Flow to Equity
- Free Cash Flow to Firm

2.6.1 Dividend discount models

This model assumes that the only cash flow received by the shareholders is dividends. Dividends are the returns that a shareholder receive from the issuing company in return for his investment in its equity. Assuming that the investor will hold the security infinitely, the only thing that will determine the value of the share would be sum of the present value of all expected dividends in the future. Nevertheless, expected time span is limited, and investors usually consider an expected future sale price of their investment, along with the income stream they will receive until that time. This expected future sale price of the share is also a function of the value of dividends expected to be received further that sale time as well as the required rate of return to be used to discount these

cash streams. Thus, the fundamental model for Dividend Discount Model is written as follows:

$$\text{Value per share of stock} = \sum_{t=1}^{t=x} \frac{DPS_t}{(1+r)^t}$$

Where

DPS_t = Expected Dividends Per Share (DPS)

r = Required rate of Return on Stock

The discount rate r in the model represents both the time value of money and the riskiness of the shares. Time value of money is taken into account with risk free rate while the risk premium is incorporated with a risk premium relative to the risk free rate. Determining the required rate of return is summarised in section 2.4 above.

Intuitively, the Dividend Discount Model is the most straightforward and easy model to understand. For this reason, the model should be preferred if the dividends are forecast with reasonable certainty. If there is an established and ongoing dividend policy and the policy is in line with the profitability and cash generation of the company then the dividend discount model can be applied. However, if the dividend is distributed from retained earnings account and financed by increased debt, the dividend projections to be used in the model should be evaluated very cautiously.

While it is easy and clear to understand the model, the high sensitivity of the results to the discount rate is the criticized aspect of the model. Because a small difference in discount rate may result sizable differences in value. Estimating the discount rate is also not an easy task and subjective to a certain degree. For this reason, two different analysts using the same method (dividend discounting) can reach varying results. Therefore, using the model is much more difficult than thought since the projections and discount rate choice involve subjective evaluations and sensitivity of the results to discount rates.

Dividend Discount Models are most suitable for firms paying dividends, have an established dividend policy that bears a sustainable relationship to the firm's earnings, and if the valuation study takes a non-control perspective.

The different variations of the Dividend Discount Model are explained below.

2.6.1.1 Gordon's growth model

The general formula above necessitated to estimate each future dividend in the future. In practice, it is neither possible nor practical to estimate dividends for each year in long term as market conditions, investment needs and capital requirements may cause the profitability and the pay-out ratio of the firm fluctuate year on year. Therefore, an alternative way to estimate future dividends is to estimate the dividends in year t+1 and an average long run growth rate. This assumption can be made for the firms with stable growth. In that case, the value of the share of a steady growing company is found with the following formula, called Gordon's Growth Model. The Model is developed by Gordon and Shapiro (Gordon & Shapiro, 1956).

$$\text{Value of stock} = \frac{DPS_1}{r - g}$$

Where

DPS_1 = Expected dividends during next year

r = Required rate of return for equity investors

g = Growth rate in dividends forever

In fact, the model is no different than the mathematical abbreviation of the general formula with steady growing dividends and its simplicity attracts many analysts. Analysts often attempt to apply this method by trying to approximate a long run, stable growing growth rate and a rate of required return to value a share. Although the model is a powerful tool to value shares, it's suitable only for mature companies with stable earnings and well-established dividend policies.

Beside the simplicity of the model, there are some important points to be noted. To maintain a steady growth in dividends, note that other financial performance measures, such as sales, gross and net profits should also be growing with the same

steady growth rate so that the steady growing dividends necessitates the same pay-out ratio in the long run. Otherwise, if the performance of the company does not grow as much as the dividends, the assumed stable dividend growth rate will not be sustainable only by changing the pay-out ratio.

Secondly, analysts must be careful in determining a reasonable stable growth rate in the long run comparable with the expected growth rate of the overall economy. A firm can grow with a rate significantly higher than the economy in which it operates, particularly in the early years of operations but this higher growth rate cannot last for long. Therefore, looking to the current financial figures, one should not be too optimistic in determining the long run stable growth rate. In fact, a firm cannot grow consistently with a rate higher than the economy in the long run. Otherwise, it would ultimately cover the entire economy. Thus, the long run growth rate should not to be higher than the growth rate of the economy. On the other hand, as the fashion of some sectors diminish over time, the stable growth rate might well be below the overall economic growth.

In addition, the required rate of return must be higher than the firm's stable growth rate. This is not contrary to logic. Because, if dividends grow with a rate higher than the rate of return (the discount rate) the value of the share goes infinity. Looking other way, as the future dividends are less certain than cash today, the discounting rate must be higher than the long run stable growth rate.

The Gordon Model is useful for valuing stable growth, dividend paying companies, as well as broad based equity indexes. It is simple, clear and useful for understanding how the value is affected with growth, required rate of return, and pay-out ratio. On the other hand, the main criticism of the model arises from the high sensitivity of model results to the inputs, both the required rate of return r, and the expected dividend growth rate g. Moreover, the model is inapplicable to non-dividend-paying or dividend paying but unstable growth shares.

2.6.1.2 Two stage dividend-discount model

This model assumes that the company will grow with a higher rate for a certain period, followed by a sustainable and lower long run growth rate thereafter. Accordingly, there are two parts in the model, the value that comes from the period when the growth is extraordinary and the value after the company settles to a stable growth. While the

estimated dividends are discounted with the rate of required return in the first part, the second part is a discounted value derived from Gordon Model.

Value of the stock = PV of dividends during extraordinary phase

+ PV of terminal price

$$P_o = \sum_{t=1}^{t=n} \frac{DPS_t}{(1+r)^t} + \frac{P_n}{(1+r)^n} \qquad \text{Where} \quad P_n = \frac{DPS_{n+1}}{(r - g_n)}$$

Where

P_o = Value of the stock now

DPS_t = Expected dividends per share in year t

r = Required rate of return

P_n = Price at the end of year n

gg_n = Growth rate forever after year n

Like other models, the success of the two stage model depends on the consistency of the assumptions compared to the characteristics of the firm. Therefore, estimating the growth rate in the initial phase and defining the length of the period is important. Since the growth rate will decline in the second phase, defining the first period longer than should be, will result over valuation. In addition, as the second part of the formula is usually bigger part of the value and is an application of Gordon's Model, the high sensitivity to inputs is a concern in this model too.

The model is suitable best for firms that expect high growth rate for a reasonably certain period and then expect to continue with a stable growth rate. The disadvantage of the model is, it assumes that the growth rate will decline to stable growth rate at the end of the first phase suddenly which is usually unrealistic.

2.6.1.3 The H model

Presented by Fuller and Hsia The H Model is another two-stage growth model in which the growth rate in the first period declines gradually to the stable growth rate by the end of the period (Hsia, 1984).

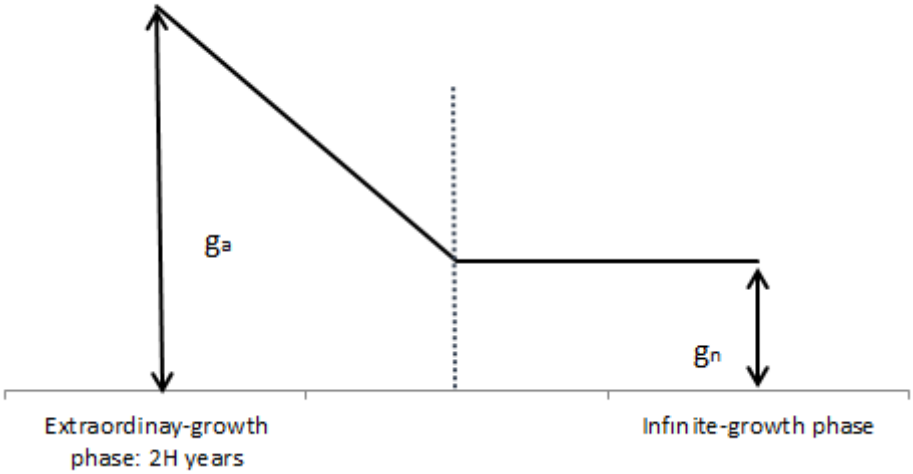


Figure 2.1 Growth Rates over Time

While the model obviates the critics for the Two-stage Model which assumes a sudden drop in growth rates, it has its own limitation as the growth rate in the first period is assumed to decline in linear increments. Nevertheless, small deviations do not affect the result considerably while large deviations can result problems. Consequently, the model is useful to value firms with high growth rates currently but expected to decline over a certain time gradually and then stay stable thereafter.

$$P_o = \frac{DPS_0 \times (1 + g_n)}{(r - g_n)} + \frac{DPS_0 \times H \times (g_a - g_n)}{(r - g_n)}$$

Stable growth Extraordinary growth

Where

P_o = Present per share value of the firm

DPS_t = DPS in year t

r = Required return to equity investor

g_a = Growth rate initially

g_n = Growth rate at end of 2H years, applies forever after that

Note that the H-Model is an approximation model which estimates the value of the share that results from discounting all future dividends. Although the result is very

close to the value that is calculated by discounting all future dividends, for a long high growth period or for a large difference in growth rates, H model should be avoided and a more exact model should be used.

2.6.1.4 Three Stage Dividend Discount Model

This model combines an initial phase with stable high growth rate to the H model. Therefore, the formula takes into account a stable high growth phase, following a gradually declining growth period and then continue with a stable long run growth rate to infinity.

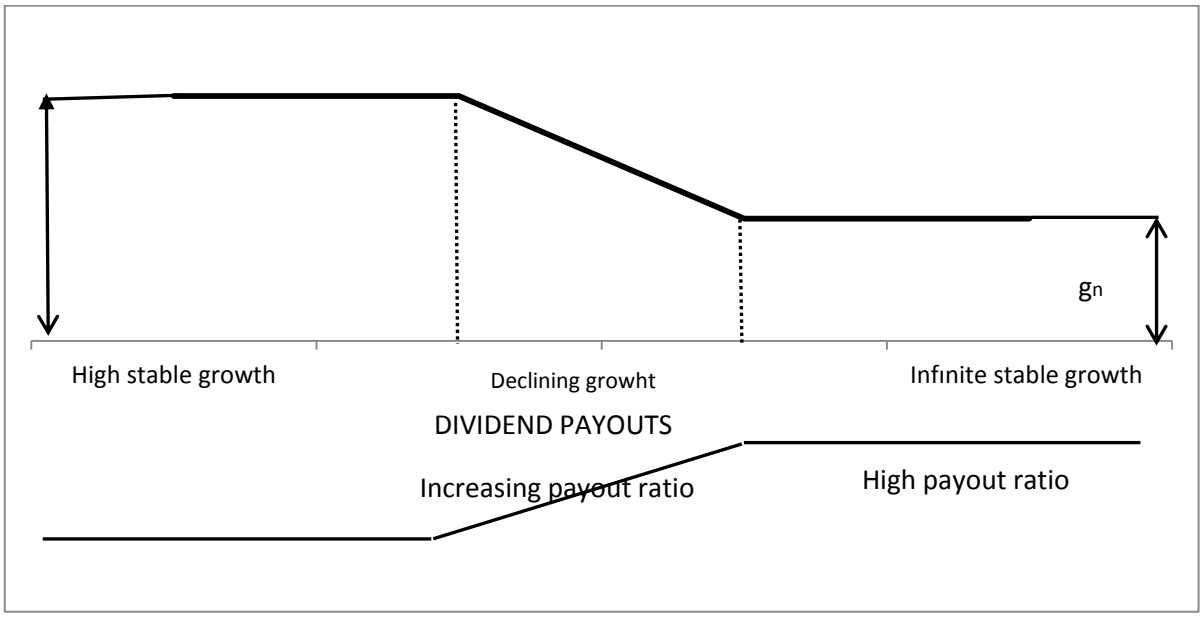


Figure 2.2 Earnings Growth Rates

$$P_o = \sum_{t=1}^{t=n1} \frac{EPS_0 \times (1+g_a)^t \times \prod_a}{(1+r)^t} + \sum_{t=n1+1}^{t=n} \frac{DPS_t}{(1+r)^t} + \frac{EPS_n \times (1+g_n) \times \prod_n}{(r-g_n)(1+r)^n}$$

High-growth phase Transition Stable-growth phase

Where

EPS_t = Earnings per share in year t

DPS_t = Dividends per share in year t

g_a = Growth rate in high growth phase (lasts n1 periods)

g_n = Growth rate in stable phase

$\prod_a$ = Payout ratio in high growth phase

$\prod_n$ = Payout ratio in stable growth phase

r = Required rate of return on equity

The model has the least constraints compared to previously discussed dividend discount models, thus it is called as the most general one. On the other side, the model requires the most number of inputs. If these estimations are not foreseen accurately, the resulting error in valuation may outweigh the positive effects from the flexibility of the model. Finally, the model is suitable for companies with high stable growth in the initial period, then following a declining growth phase and an ever-lasting stable growth period thereafter.

2.6.1.5 Discussion of dividend discount model

The attraction of the dividend discount model is the intuitive logic behind it and its simplicity. However, there are many analysts arguing that the model is useful only for firms with high and stable dividends. In fact, the multistage DDM's can accommodate a variety of patterns of future streams of expected dividends. A firm may not distribute dividends during a growth phase where the pay-out ratio is "0" or minimum. In such case, the high growth rate and investment need does not go together for ever and eventually the firm will come to a phase that the growth rate reverts to a long run sustainable rate, and the pay-out ratio improves as the investment need declines. Therefore, if the company does not pay dividends for now, does not mean that it will not for ever. The fundamental formula and Gordon Model may well be applied for these firms using "0" or limited dividends for the early years and then improving the pay-out ratio and dividends until to reach a stable growth rate.

Another critique of the model is that it does not take into account the unutilised assets which are not used in operations. To overcome this problem, analysts can simply add the value of the unutilised assets to the value calculated by the model. For example, a company may have some real estate on its balance sheet which is not used in operations, and in the projections, the sale of these real assets or contribution to the operations in the

future may not be foreseen. In this case, the value of the real estate should be added to the value calculated by dividend discount model.

2.6.2 Free Cash flow to equity models

The Free Cash Flow to Equity ("FCFE") is the residual cash flow to the firm's equity after all operating expenses, debt holders' payments which is interest and principal repayments, and capital expenditures both to maintain the existing assets and new investments have been paid. It is calculated as follows:

FCFE = Net income + Depreciation – Capital spending

- Δ Working capital - Principal repayments + New debt issues

The model does not take into account whether the FCFE is distributed to shareholders as dividends or not. Because, when dividends are paid, the share price decreases by an amount equal to the dividends per share. If the dividends are not paid, then the price includes these retained funds. Therefore, this approach considers the funds described as FCFE above for valuing the company.

If the company has a target debt ratio then the FCFE is calculated as follows:

$$\text{FCFE} = \text{Net income} + (1 - \delta)\,(\text{Capital expenditures} - \text{Depreciation}) + (1 - \delta)\,\Delta\,\text{Working capital}$$

From accounting point of view, to distribute dividends, the limit is the total of the current year's distributable earnings and the retained earnings from previous years, briefly, distributable earnings. However, the company should also be able to pay dividends and FCFE does represent the amount that the company can afford to distribute. In other words, FCFE is the residual cash flow left to the board's discretion to distribute or not, subject to the limit of distributable earnings.

Several factors may play role to decide on how much to pay dividends and how much to retain in the company. Damadoran mentions four issues that affects this decision (Damadoran, 1994).

- Desire for stability
- Future investment needs

- Tax factors
- Signaling Prerogatives

2.6.2.1 The Constant Growth FCFE Model

This model values the firm as Gordon growth model, with one significant difference that FCFE replaces dividends. The model is suitable for firms that are expected to show stable growth to infinity.

Constant Growth FCFE formula:

$$P_0 = \frac{FCFE_1}{r - g_n}$$

Where P_0 = Value of stock today

$FCFE_1$ = Expected FCFE over the next year

r = Cost of equity of the firm

g_n = Growth rate in FCFE for the firm forever

Where the expected growth rate in FCFE is calculated as follows;

$$g_{EPS} = b\{ROA + D/E(ROA - i(1 - t))\}$$

Where g_{EPS} = Growth rate in EPS

b = Retention ratio = 1 – Payout ratio

ROA = Return on Assets = (Net income

+ Interest expense(1- t)/(BV of debt+BV of equity)

D/E = BV of debt / BV of equity

i = Interest expense / BV of debt

The simplicity of the formula is its advantage but it is also highly sensitive to the growth rate and rate of return estimations. As the growth rate is estimated to be valid for infinity, the maximum value it can take is the long run growth rate of the economy in

which operates. In addition, the discount rate in the model is the Required Rate of Return on the equity and should commensurate with the average risk of firms in the economy.

A distinct feature of stable firms is their capital expenditure is equal to depreciation. Since these companies do not need high capital expenditures, the likely policy for such a firm would be to distribute funds exceeding to maintain existing capital. In this case, the FCFE and Dividend figures would be same and thus, both models result exactly the same values.

2.6.2.2 The Two Stage FCFE Model

If a firm is expected to grow with a rate, higher than a stable firm would in an initial period and then continue with a stable growth rate thereafter, then a two-stage FCFE model may be used. The model in this case is as follows:

$$\text{Value} = \text{PV of FCFE} + \text{PV of terminal price}$$

$$= \sum_{t=1}^{n} FCFE_t /(1 + r)^t + P_n /(1 + r)^n$$

Where

$FCFE_t$ = Free cash flow to equity in year t

P_n = Price at the end of the extraordinary-growth period

r = Required rate of return to equity investors in the firm

The terminal price is calculated by applying Gordon's growth model with a rate estimated to be valid forever. The assumptions of the model are same as the two stage dividend discount model. Since the model based on FCFE rather than dividends, it is particularly useful in cases where the firm distributes dividends more than sustainable or less then it can afford.

2.6.2.3 The E Model – A Three Stage FCFE Model

If a firm is expected to experience three stages of growth, such as high growth, declining growth and steady growth periods, then the conceived model is the E model. The model calculates partial values that come from each part of the growing paths.

$$P_o = \sum_{t=1}^{t=n1} \frac{FCFE_t}{(1+r)^t} + \sum_{t=n1+1}^{t=n2} \frac{FCFE_t}{(1+r)^t} + \frac{P_{n2}}{(1+r)^n}$$

High Growth Transition Stable Growth

Where

P_0 = Value of the stock today

$FCFE_t$ = FCFE in year t

r = Cost of equity

P_{n2} = Terminal price at the end of transitional period

$= FCFE_{n2+1} / (r - g_n)$

n1 = End of initial-high-growth period

n2 = End of transition period

The model is suitable for firms with high growth rates currently and that will turn to a long run stable growth rate after a transition period, regardless of dividends paid.

2.6.2.4 FCFE Valuation versus dividend discount valuation

The primary difference between the two approaches to valuation is definition of cash flow taken into consideration. While the DDM takes dividends as cash flow, FCFE is the cash flow considered in latter. Since the dividends are paid out by the management's decision, dividend discount model is more suitable for passive investors with no power on dividend distribution decision. The FCFE model however considers the funds that falls to discretion of management. Thus, this method is more useful for investors with control power or valuing the company to acquire.

Note that if the firm pays higher dividends than the firm can afford without debt financing, it is not sustainable and should revert to FCFE soon or later. In the other case, if the firm pays dividends less than the firm can afford, that means the firm is retaining the previous years' earnings. In such case, the firm is expected to invest in projects with returns equal or higher than the investors required rate of return on equity. If the retained equity invested in projects with the same required return, the Net Present Value of the

project will be “0”, reflecting no change in the value of firm. Otherwise, if the retained earnings invested in projects with lower rates than the investors required rate of return, there would be a deterioration in the value of the firm or vice versa. As a result, as long as the retained earnings invested in projects with rates of return equal to the investors required rate, both DDM and FCFE discount models will produce exactly the same result.

2.6.3 Free Cash Flow to Firm (FCFF) Approach

For firms with high leverage or in the process of changing leverage, estimating FCFE or Dividends is difficult. Because FCFE figure is sensitive to the assumptions about payments to the debtors and if the leverage is high, a small difference in payments to debtors would cause high deviations in FCFE and so the dividends. In this case, another approach is used which value the entire firm, by discounting the cash flows to all capital providers, including debtors to the firm, that is Free Cash Flow to Firm (FCFF). FCFF is calculated as follows:

FCFF = FCFE + Int. Expense (1 – Tax rate)

+ Principal repayments – New Debt Issues

+ Preferred Dividends

There are two important points to mention with this method compared to previously discussed DDM and FCFE discount methods. First, the discount rate used in this method is not the required rate of equity holders. Instead, Weighted Average Cost of Capital (WACC) is used as the discount rate, since FCFF represents the cash flow that corresponds to all capital providers.

$$\text{WACC}=\frac{\text{MV (Debt)}}{\text{MV (Debt)} + \text{MV (Equity)}}\ r_d(1 - \text{Tax rate}) + \frac{\text{MV (Equity)}}{\text{MV (Debt)} + \text{MV (Equity)}}\ r$$

Secondly, the growth rate is different than the rate used in Dividend Discount and FCFE models. The growth rate in FCFF is calculated simply by multiplying retention ratio by Return on Assets.

Expected growth rate in FCFF = b(ROA)

Note that this model discounts cash flows to all capital providers. Therefore, to reach the equity value of the firm, current value of debt capital must be subtracted from the firm value found with FCFF approach.

FCFF model has variants depending on the future growth expectations of the firm, as previously discussed discounted cash flow models.

2.6.3.1 The general version of the FCFF model

If sufficient information is available to forecast FCFF, following general version of the model can be used to value a firm:

$$\text{Value of firm} = \sum_{t=\infty}^{t=\chi} \frac{FCFF_t}{(1+WACC)^t}$$

Where $FCFF_t$ = Free cash flow to firm in year t

If the FCFF of the firm is forecast to reach a steady state after a while and continue to grow with stable growth rate thereafter, the FCFF formula for value of the firm can be written as:

$$\text{Value of firm} = \sum_{t=1}^{t=n} \frac{FCFF_t}{(1+WACC)^t} + \frac{(FCFF_{n+1}/(WACC - g_n))}{(1+WACC)^n}$$

To reach equity value of the firm, current value of outstanding debt capital should be subtracted from the value derived from FCFF approach.

FCFF and FCFE approaches are expected to reach same results as long as consistent assumptions are made in the two approaches and market value of the debt capital is correctly priced.

The model is suitable for firms where FCFE calculation is difficult due to high and / or changing leverage. Where FCFE figures take negative value in forecast studies,

using FCFF will be more suitable again since FCFF is a pre-debt service figure and thus rarely takes negative values.

2.6.3.2 The Model for stable growth firm

If a firm has FCFF growing at a stable growth rate, it can be valued using a variant of the infinite growth model as follows:

$$\text{Value of firm} = FCFF_1/(WACC - g_n)$$

Where $FCFF_1$ = Expected FCFF over the next year

WACC = Weighted average cost of capital

g_n = Growth rate in the FCFF (forever)

There are two conditions for this model to be applied: First, the growth rate used in the model must be reasonable compared to the nominal growth rate of the economy. Secondly, the capital expenditures and depreciation must be in line with a stable growth firm. In other words, capital expenditures should not be significantly higher than depreciation since the firm is expected to invest just to maintain a stable growth. As with other Gordon Model applications, this model is highly sensitive to growth rate and discount rate assumptions.

2.7 Relative Valuation

The method of using valuation multiples is a popular valuation technique among analysts. It is a conceptual shortcut, and simpler than DCF models, that enables analysts to estimate equity value by comparison to other businesses with similar characteristics. The method consists of selecting a peer group of firms trading at an exchange, and obtaining an average market value multiple regarding some relevant parameters such as revenues, earnings, book value, capacity, etc. Then the multiple is applied to the same parameter of the firm being valued.

The method is criticised by many academics as being imprecise due to its simplicity. However, the method is not less reliable than a poorly handled DCF analysis. Nevertheless, reliable relative valuation requires the strict application of a comprehensive and detailed analysis.

2.7.1 Price / Earnings (P / E) ratio

Price/earnings ratio is a commonly used multiple to value shares if a suitable firm for comparison exist in the market. It shows, how many times of the EPS the market prices the share. Thus, a share may be valued by applying the relevant P / E multiple to the firm's EPS.

Price/earnings ratio relates the price to current earnings. Therefore, the logic behind is easy to understand as well as to compute. Thus, it is widely available on media and internet sources. Price/earnings ratio is also viewed as a proxy of some other characteristics of the firm, such as risk and growth. Unlike the case in DCF models, analysts do not need to make assumptions about growth, required rate of return and pay-out ratio when using Price/earnings multiple to value a firm. Nevertheless, the ratio itself is determined by following formula including fundamental parameters; Payout Ratio, Growth Rate and Cost of Equity.

For a stable firm, Price/earnings ratio related to fundamentals is formulated as;

$$P_0/EPS_0 = \text{Payout ratio } x(1+g_n)/(r-g_n)$$

If the P / E ratio is calculated on the basis of expected earnings for next year,

$$P_0/EPS_1 = P/E_1 = \text{Payout ratio}/(r - g_n)$$

Analysts should have a well understanding of how these parameters affect the ratio. The Price/earnings ratio increases as the pay-out ratio and / or growth rate increases and decreases as the riskiness of the firm increases.Note that since the numerator in the ratio is market price, the ratio inherently carries the current market sentiment. Consequently, if there is an overvaluation in the market or for the share compared, it affects the valuation in the same way. This aspect of the valuation with P / E multiple is considered as its weakness.

Comparisons of Price/earnings ratios are made across countries, time and firms. In each case, one must be careful in assessing the fundamental parameters such as growth, required rate of return and pay-out ratio, affecting the Price/earnings ratios. Making decisions simply by comparison and without evaluating these factors will lead to invalid valuation conclusions.

A weakness of the Price/earnings method is, it takes into account only one period (past or forecast) earnings. In consequence, a problem arises when earnings are negative as the P / E ratio becomes meaningless. Similarly, there are peak and low earnings levels for cyclical firms in which the cycle takes several years. In such cases, using normalised or average earnings is a common practice to overcome the problem.

A variant of the Price/earnings ratio is the Price / FCFE. Some analysts prefer this multiple if the earnings have a negative or unusually low / high figures. Earnings is a result of accounting entries and subject to assumptions. However, cash flow is real and does not change with accounting practices. The determinants of the Price / FCFE ratio is the same with Price / Earnings which include expected growth rate and the relationship between capital spending and depreciation.

If the firm is highly leveraged, it is difficult to estimate FCFE because of sizeable payments and new debt issues since FCFE measures cash flows after payments to debtors. In this case, Value of Firm / FCFF ratio is a suitable option to use. Note that as the denominator in the ratio is before debt payments figure, the nominator of the ratio values the entire firm that is the value for all capital providers. Therefore to reach equity value of the firm, market value of total debt capital is subtracted from the Value of Firm.

Another variant of Price/earnings ratio is Price / Dividend ratio or its inverse Dividend Yield. Such a ratio may only be applicable to companies with stable earnings and growth, as well as established and sustainable dividend policy. Therefore its use for share valuation purposes is fairly limited. Nevertheless, Dividend Yield is used by some investors as a rule of thumb to decide on whether the market or traded shares in the market are overvalued or undervalued. Namely, Graham Dodd school followers and Dow theorists consider a high dividend yield as a significant indication of undervaluation.

2.7.2 Price/Book value (P/BV) ratio

The Price / Book Value ratio has a long history of use in valuation studies. While it is used to estimate the share price in offerings, a high / low Price to Book Value ratio is considered to be a good indicator for a share to be overvalued / undervalued. Its simplicity and availability of the data to compute make it popular.

Book value of a firm is the difference between the book value of assets and the book value of the total debt both from financiers and other sources. Book value of assets

reflects their acquisition costs minus depreciation. Thus, the book value of an asset decreases by the time passes. An important assumption here is the economic value of assets decline in tandem with depreciation. On the other hand, debt figures are current market values as of financial reporting date, in accordance to International Financial Reporting Standards. Thus, the price is expressed as a multiple of equity value, provided that assets and liabilities represent fair values. If that is not the case, it will harm the usefulness of the ratio for valuation and the significance of the comparison will suffer.

Price / Book Value ratio is popular tool for valuation because, book value is a relatively stable and easily understandable figure to compare the market price. Moreover, it is much simpler than any DCF model calculation. The use of same accounting standards across companies for Book Value makes Price / Book Value ratios well comparable provided that other characteristics of the firms are similar, such as financial and operational leverage, riskiness, human capital, etc. The ratio is also suitable for firms with negative earnings where using Price/Earnings ratio is not possible. On the other hand, though rare, the ratio is not applicable for firms with negative book value. Finally, Price / Book Value ratio should be used cautiously for service firms where book value of assets may not have significant information.

Price / Book Value is related to the same fundamentals that determine value in DCF models. For a stable firm growing at a rate comparable to or lower than the growth rate in the economy, Price / Book Value is determined as;

$$\frac{P_0}{BV_0} = P/BV = \frac{ROE \times \text{Payout ratio} \times (1 + g_n)}{r - g_n}$$

If the ratio is calculated by using expected earnings for the next year;

$$\frac{P_0}{BV_0} = P/BV = \frac{ROE \times \text{Payout ratio}}{r - g_n}$$

As can be derived from the formula, P / Book Value ratio increases when ROE, payout ratio and the growth rate increases and riskiness of the firm decreases. The formula above can be further abbreviated by relating growth to ROE:

$$g = (1 - \text{Payout ratio}) \times ROE$$

and plugging into the P / BV formula;

$$\frac{P_0}{BV_0} = P/BV = \frac{ROE - g_n}{r - g_n}$$

The final formula shows that the P / Book Value ratio of a stable firm is determined by the differential between the ROE and the required rate of return of the investors to the firm. In addition, this form of formulation is convenient to estimate a fundamental P / Book Value for firms that do not pay dividends.

Since the firms have different fundamentals affecting the P / BV ratio such as expected growth, pay-out ratio, different risk levels and ROE's, their P / Book Values vary even among those firms in the same sector. Therefore comparisons between companies without taking into account the differences in fundamentals are inadequate.

A variant of the P / BV ratio is Tobin's Q which relates Market Value of Firm to Replacement Cost.

Tobin's Q = Market Value of Assets / Replacement Value of Assets in Place

The rationale behind this ratio is replacement cost is a better indication for value of assets compared to book value. This is particularly the case when the assets replacement value have increased due to inflation or decreased due to technological or fashion change. Since the ratio uses replacement cost which is a better measure for current value of assets, instead of book value, it may be viewed as a better comparison tool. Nevertheless, estimating the replacement cost of assets in practice is much more difficult than said. In addition, while trying to value a firm with Tobin's Q measure, assets of the firms should have the same characteristics (technology, fashion, etc.). Note that applying the Tobin's Q ratio to the replacement cost of assets of the firm in question, the entire value of the firm is estimated, not the value of equity. Therefore, to reach the value of equity, market value of debt should be subtracted.

2.7.3 Price/Sales (P/S) ratio

Another widely used ratio in relative valuation and to compare values among traded firms is Price / Sales (P/S) ratio. Applicability of the ratio even to the most troubled firms with negative earnings make it attractive for analysts. It is also less volatile

compared to P / E and P / BV ratios, thus viewed as more reliable. However, this stability may turn to a disadvantage of the ratio if the firm has a failure in cost control.

The P / S is formulated as follows for a stable firm:

$$\frac{P_0}{Sales_0} = P/E = \frac{\text{Profit margin} \times \text{Payout ratio}}{r - g_n}$$

Same ratio can be defined with expected earnings as follows:

$$Po/Sales_0 = \frac{\text{Profit margin} \times \text{Payout ratio} \times (1 + g_n)}{r - g_n}$$

The ratio is determined by earnings growth rate, pay-out ratio and risk. The ratio increases when profit margin, pay-out ratio and growth rate increases, and riskiness of the firm decreases. Among these fundamentals Profit Margin has the highest importance in determining the P / S ratio. Therefore, one must take into account differences in profit margins when comparing the P / S ratios of two different firms.

2.7.4 Price/Cash flow (P/CF) ratio

Using this ratio is difficult than said. The difficulty arises from how the cash flow is defined. Analysts often use approximations for cash flow by adding major non-cash charges (depreciation, amortisation and depletion) to net earnings. However, from the accounting point of view, this is not the accurate definition for cash flow. Instead, analysts can use cash flow from operations figure which can be found in the cash flow statement. Nevertheless, FCFE concept has the strongest link with the valuation theory (Stowe et al., 2002, s. 224). P/EBITDA is another ratio sometimes used for valuation purposes. When using this ratio, analysts should remember that EBITDA is a pre-tax and pre-interest number. Therefore it represents a flow to government, financiers and equity holders. As a result, a cash flow definition to all financiers in the denominator, and using Enterprise Value (Equity + Debt) instead of P in the meaning of equity value would be more appropriate than using P/EBITDA for equity valuation purposes.

2.8 Residual Income Valuation

Residual Income, sometimes has been called Economic Profit, is the net income after deducting the cost of all capital, debt and equity of the firm. Assuming that the company is expected to earn its cost of capital, earnings in excess of the cost of capital are named abnormal earnings. Therefore, the model has also been called the Discounted Abnormal Earnings Model. Another name for the model is Edwards-Bell-Ohlson model (EBO). The idea behind the Residual Income Model (RIM) is; companies that earn more than the cost of capital should sell for more than the book value or vice versa. The RIM analyses the value of equity into two components: The current book value of equity and the present value of expected future residual income.

According to the RIM, the value of equity can be expressed as follows:

$$V_0 = B_0 + \sum_{t=1}^{\infty} \frac{RI_t}{(1+r)^t} = B_0 + \sum_{t=1}^{\infty} \frac{E_t - rB_{t-1}}{(1+r)^t}$$

Where

V_0 = Value of share of stock today ($t = 0$)

B_0 = current per-share book value of equity

B_1 = expected per-share book value of equity at any time t

r = required rate of return on equity (cost of equity)

E_t = expected EPS for period t

RI_t = expected per-share residual income, equal to $E_t - rB_{t-1}$

In practice, either with DDM or FCFE models, a large fraction of the equity value consists of the present value of the expected terminal value estimates. However, there is a significant uncertainty in the estimated terminal value. In contrast, RIM valuations are less sensitive to terminal value estimates. The strengths of the RIM model are;

- Terminal values do not make up a significant part of the total value.
- The RIM uses readily available accounting data
- The model can be easily applied to firms that do not pay dividends or to firms that do not have positive expected near term cash flow.
- The RIM can be used when cash flows are unpredictable
- and the model have an appealing focus on economic profitability.

When fully consistent assumptions are used to forecast earnings, cash flow, dividends, book value, residual income and the same required rate of return is used, the same estimate of value should result from residual income, dividends and other cash flow discount models. The difference of the RIM is; it starts with a value based on the book value of equity, then adjusts this value by adding the present values of expected future residual income. Whereas DDM and FCFE models calculate the value of the share by forecasting future cash flows and discounting them to the present value using the required rate of return (Stowe et al., 2002).

2.9 Applications of Option Pricing Theory to Valuation

Though practically not applied due to its restrictions, Option Pricing Theory provides another perspective to valuation of troubled firms. For a troubled firm, equity holders' claim is the residual that remains after the debt holders' claim is met. If the assets of the firm are not sufficient to meet the debt holders' claim, limited liability principle protects the equity holders. Thus, the maximum amount they can lose is the value of the shares. Therefore, if the firm is liquidated, the amount left to shareholders is V-D, where V is value of total assets and D is face value of the debt. If D > or = V, then there is nothing left over to shareholders. This situation can be examined like a call option, where exercising the option means that the firm is liquidated and the face value of the debt is paid off. The figure below represents the payoff on equity as a call option on the firm.

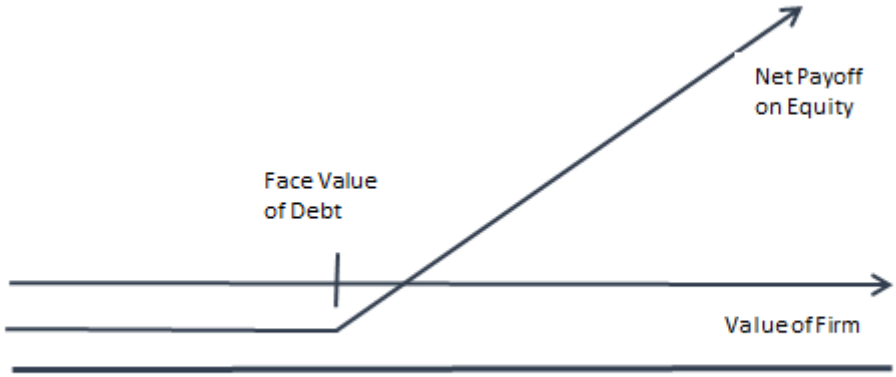


Figure 2.3 Payoff on Equity as a Call Option

The option pricing theory to value equity makes some overly simplifying assumptions to practice.

1) There are only two claimholders in the firm; debt and equity.

2) There is only one issue of debt outstanding, and it can be retired at face value.

3) The debt has a zero coupon and no special features. (convertibility, put clauses, etc.)

4) The value of the firm and the variance in that value can be estimated.

Most firms do not fall into this overly restricting framework outlined above. In addition, the model is for firms in trouble where the total value of debt is mostly above the total value of assets. Therefore the applicability of the model is limited or some compromises have to be made to use the model in valuation (Damadoran, 1994).

2.10 Selecting the Appropriate Model

It is also important to select the appropriate model for the subject company in order for the valuation study to be successful. As a general criterion in this regard; the model should be (Stowe et al., 2002, s.21);

1) Consistent with the characteristics of the company,

2) Appropriate given the availability and quality of data, and

3) Consistent with the purpose of valuation.

2.10.1 Where to use discounted cash flow models

Given the importance of dividends to share value, this section starts with a company paying dividends. If the company pays dividends and has an established dividend policy, the DDM is the best choice to select. A utilities company or a mature company operating in another sector with no major investment plan for above normal growth may be a good example to be valued with DDM as well. Even if there is a future plan for growth, dividends should be predictable with an acceptable accuracy. It is also presumable here that the investor takes a non-control perspective. In other words, the investor is assumed to be standing outside of the business and invests solely for the purpose of receiving a return from these shares.

Conversely, there may be companies not paying dividends due to their capital need and retain earnings. Even if a company pays dividends, the sustainability of the dividend policy may be questionable, in case dividends significantly exceed or fall short of free cash flow to equity. In either case, dividends cannot be forecast with a reasonable accuracy. An example for this may be a manufacturing company with investment plans in near future. In such case, analysts must consider the likely effect of the project to the value of the business when it is completed. The applicable approach in this case should be FCFF and FCFE models. When these methods are used, it is also important to remember that the analyst takes the control perspective. In other words, if the analyst is trying to value the company with an intention to acquire, FCFF or FCE discount models are the right approach for valuation.

When the company being valued is not a dividend-paying one, RIM can be an alternative to free cash flow discount models. Particularly, RIM is more appropriate when a company is in its initial stage, the investments are ongoing, operations are expected to start a couple of years later, and the firm is not expected to produce positive cash flows in the comfortable forecast horizon.

2.10.2 Where to use relative valuation models

The P / E ratio, being a relative valuation technique, is a popular valuation method applicable almost every sector provided that a close peer is available. Earning power is seen as the main value driver by many analysts and differences in P / E's are related to differences in long run average returns. However, it is not always possible to find a peer firm with similar features to reach a conclusion about the value of the firm by relative valuation techniques. The disadvantage of the P / E model is that it is not applicable for companies with negative earnings, as the P / E ratio becomes meaningless. Another drawback of this approach is, earnings can be distorted by the accounting practices within allowable principles. Therefore, analysts must ensure that earnings are comparable in terms of accounting principles applied before comparing the P / E ratios.

Another most commonly used relative valuation ratio, P / BV is generally positive even when earnings is negative. Therefore it is one of the alternatives applicable to firms currently making losses. Also, if the earnings figure is volatile, using P / BV should be preferred since BV is more stable. Remembering that BV is a measure of net asset value, it is viewed that BV is a good proxy for valuation of companies with liquid assets, such

as banks, insurance and finance institutions (Subramanyam & Wield, 2001). BV has also been used in valuation of companies that are not expected to continue as a going concern (Martin, 1998, s. 22). On the other hand, the assets not included on the balance sheet are highly important in some cases. Service firms may be a good example of such situation. For companies where human capital plays an important role, making comparison based on BV would not be an appropriate choice. Analysts should also be aware of the inflationary effects on the book values of assets. Assets bought in different times and subject to different financial reporting practices makes impossible the comparison of BV's.

Sales are generally less subject to manipulation and more stable than other fundamentals, although revenue recognition practices provide some room for distortion. Also, sales figure is positive even when earnings are negative. Therefore, if a publicly traded peer is found with similar capital structure and return ratios, using P / S ratio would be the favourable choice. P / S has been viewed as appropriate for valuing the share of mature, cyclical, and zero-income companies (Martin, 1998). However, analysts should ensure that the company ultimately generates earnings and cash inflow if the valuation is based entirely on P / S ratio.

CF is another criteria that is less subject to manipulation than earnings. Since, CF does not change by differences in accounting practices, it addresses the difficulties in comparing earnings between companies applying different accounting principles. Moreover, it is more stable compared to earnings and consequently P / CF is more stable compared to P / E. The empirical research reveals that differences in P / CF may be related to differences in long-run average returns (Hackel et al., 1994; O'Shaughnessy, 1997). The matter here is which CF definition will be used. If the approach, earnings plus non-cash charges is assumed, items affecting actual CF from operations are ignored. On the other hand, considering that theory views FCFE as the appropriate variable for equity valuation, P / FCFE ratio can be used. However, FCFE has the possible drawback of being more volatile and more frequently negative compared to CF.

P / EBITDA multiple is also mentioned in section 2.6.4. Since the numerator should be Enterprise value (the market value of debt and equity) instead of equity only, EV / EBITDA is a valuation indicator for overall company. Applying this ratio is appropriate when comparing companies with different financial leverage. In addition,

since the denominator includes amortization and depreciation, the EV / EBITDA ratio allows capital-intensive firms as well to be compared for valuation purposes (For example, cable companies and steel companies. Such companies typically have substantial depreciation and amortisation expenses) (Stowe et al., 2002, s. 230). On the other hand, it should be noted that FCFF has a stronger link to valuation theory than does EBITDA. Therefore EV / FCFF is a better measure than the one with EBITDA in denominator.

2.10.3 Where to use residual income model

The RIM is most suitable when (Stowe et al., 2002, s. 271);

- A firm does not pay dividends or dividends are unpredictable.
- Expected free cash flows are negative in the comfortable forecast time horizon
- A great uncertainty exists is forecasting terminal values.

This method has been used to value small businesses in tax cases since 1920's in the US. In tax valuation, the method is known as the excess earnings method (Hawkins & Paschall, 2000). The model can also be used together with other models to assess the consistency of results.

2.11 Specific Characteristics of Football Clubs

Section 2.10 discusses which models can be used for companies with different characteristics. Analysts have several alternative models to apply, if one is not appropriate or impossible to use. However, for football companies only some relative valuation models can be applied if a peer club exists in the Exchange. In this section specific features of football clubs will be touched upon which makes the valuation of football clubs with any discounted cash flow model impossible.

Starting with dividends, all the four clubs examined in this study does not pay dividends. This is not surprising as all the four clubs in general are making losses for the six years examined with a few exceptions (Besiktas May.2017 and Fenerbahce May.2012, May.2013 financials disclosed insignificant amounts profits.). Even if they had profits, they are most likely to retain these earnings to close the Previous Years' Losses account to strengthen the Equity and finance new transfers in the hope that to increase the chances for the next year's championship.

The fact that football clubs do not make profits and pay dividends is so common that they are often known as lost making entities. In fact, this is not surprising if remembered that football clubs are managed not for profit oriented, but for sporting success. The studies regarding these features of clubs are mentioned in Section 2.12.

The management of the clubs for the purpose of sporting success, rather than for profit making, is especially valid for clubs structured as associations. All the clubs covered in the study are actually formed as associations. The club associations are managed by boards elected in congress of the associations for three years in accordance to the associations' statute. While all other sportive activities are run under the association structure, football branches are organised as a separate entity in the form of limited liability corporation, whose majority shares are owned by the associations. The associations have both majority of the shares in the equity and moreover some of these shares are privileged, providing some super-powers to holding associations in selecting the board members and voting casts in the company general meetings. In consequence of these arrangements, the president and the board selected in the congress of the associations takes control of the football companies as well. Since the associations are non-profit organisations, the only focus of the management is sportive success within the period they stay in office. The football companies are also managed with the same objective, despite the form of entity is like a profit seeking one. Therefore, it is not surprising to see association owned football companies making losses while overly spending on transfers and heavily increasing the financial indebtedness with a short-sighted view.

In case of clubs in Europe, sporting success is again the primary objective and high indebtedness is a problem too but there are also clubs which preserves the balance between sporting expenditures and financial sustainability. The Financial Fair Play measures taken by UEFA since 2010 have played a significant role in this. According to the Club Licencing Benchmarking Report of UEFA for 2016, combined bottom line losses have decreased by 84% since the introduction of financial fair play in 2011 and there are many clubs announcing profits (UEFA, 2016).

Table 2.1 Top 20 European Clubs by Net Profit FY2016

Rank	Club	Country	FY16 Net Profit
1	FC Zenit St. Petersburg	RUS	€77m
2	Tottenham Hotspur FC	ENG	€44m
3	Manchester United FC	ENG	€34m
4	FC Bayern München	GER	€33m
5	Real Madrid CF	ESP	€30m
6	Borussia Dortmund	GER	€29m
7	FC Schalke 04	GER	€29m
8	Leicester City FC	ENG	€29m
9	FC Barcelona	ESP	€29m
10	B. Mönchengladbach	GER	€27m
11	FC Dynamo Kyiv	UKR	€23m
12	KAA Gent	BEL	€21m
13	SL Benfica	POR	€20m
14	Málaga CF	ESP	€20m
15	Athletic Club	ESP	€19m
16	FC Augsburg	GER	€18m
17	PFC CSKA Moskva	RUS	€17m
18	Sevilla FC	ESP	€16m
19	VfB Stuttgart	GER	€15m
20	Villarreal CF	ESP	€14 m

Source: UEFA Club Benchmarking Report FY2016

However, the amounts and consistency of profits are far from justifying the equity values of publicly traded clubs. The reason is clear: even if these clubs do not provide any financial return to equity holders, there would be a significant interest for the ownership of these clubs especially for those with a strong brand, wide supporters base and a history with achievements.

As a result; using P / E and Dividend yield ratios for club shares is not possible. Due to the lack of financial returns compared to their economic size and market values, other cash flow discount techniques such as discounted FCFE or FCFF and relative valuation techniques such as P / CF are also inadequate for club shares. Even P / BV ratio is not suitable as many clubs have negative book values on their balance sheet. Among the clubs examined, all of them have negative book values due to high previous years losses figure accumulated in years. Only P / S ratio may be used as a relative valuation method if there is a peer club in the market with similar characteristics. Revenues are also

considered as the most important factor in determining value of clubs by many academicians. Revenue figure is an important factor in the proposed model too.

One of the most controversial accounts in club balance sheets is Fixed Intangible Assets. This item is often thought as the value of the rights the club owns over the players. In fact, it is the remaining balance from amortisation of historic transfer cost of the players and does not give any indication about possible transfer revenue potential to the club. Therefore, when considering the assets that a club has and their fair values, the transfer revenue potential as in the meaning of, cost of rebuilding the team, has to be taken into account. These values can be obtained from some special websites[1] providing likely transfer values of players. The model that proposed in the next section includes this parameter as a factor affecting the equity value of a club.

Another feature of club balance sheets is it omits brand value like other companies unless it is purchased from a third party. However, the brand value is particularly important for clubs since all their activities are based on their brand. As a sports club, aiming sportive success before everything else, in fact they try to enhance the value of their brand. And the more valued brand a club has, the higher revenues it can generate. Club brand loyalty is also much different than for any other brands. People may change their preferences if a branded product or service does not meet customer needs well. But when it comes clubs, brand loyalty dictates to stick with the club in bad times as well as good times. Therefore, a fan is not a customer, much more valuable than that. These features of sports make club brand value a very important element among their assets. Therefore brand value, which is not seen on balance sheet, cannot be neglected in a club valuation study.

2.12 Football Clubs in Capital Markets

In the US, there are very few team clubs from NBA, MLB, NFL and NHL that are available for public consumption (investment) and those few sport team companies belong to the parent companies which normally carry out a number of other activities. When examined according to the league in which they compete; there are no team from

[1] A good example for such a website is www.transfermarkt.com

NFL[2], three teams from NHL, and two teams from NBA and MLB (Sports Teams Stocks, 2018). However, Manchester United is a club from the UK publicly traded at the New York Stock Exchange as of February 2018 (Manchester United (MANU), 2018).

Looking to Europe, there are 22 football clubs publicly traded. The STOXX Europe Football Index covers all football clubs that are listed on a stock exchange in Europe. The Index accurately represents the breadth and depth of the European Football Industry. The table below lists all the clubs and their countries as of February 2018 (STOXX Europe Football, 2018).

Table 2.2 STOXX Europe Football Index Components & Countries of Clubs

Club Name	Country
AALBORG BOLDSPILKLUB	DK (FIVE CLUBS)
AGF	
BRONDBY IF B	
PARKEN SPORT	
SILKEBORG	
BEŞİKTAŞ	TR (FOUR CLUBS)
FENERBAHÇE	
GALATASARAY	
TRABZONSPOR	
AS ROMA	IT (THREE CLUBS)
JUVENTUS	
LAZIO	
FUTEBOL CKUBE DO PORTO	PT (THREE CLUBS)
SPORT LISBOA E BENFICA	
SPORTING	
BORUSSIA DORTMUND	DE
OLYMPIQUE LYONNAIS	FR
CELTIC	GB
TETEKS AD TETEVO	MK
AFC AJAX	NL
RUCH CHORZOW	PL
AIK FOOTBALL	SE

Source: STOXX Europe Football, 2018.

[2] Per league rules, each club needs to be owned by a single person or a small group. (Why aren't more professional sports teams publicly traded in the US?, 2018)

It appears that the existence of the clubs in capital markets does not coincide with the UEFA country ranking which is based on the results of each association's clubs in the five previous UEFA Champions League and UEFA Europa League seasons. For example, while Spain, England and Italy are ranked as the top three in UEFA country rankings as of February 2018, there are no clubs from Spain and England[3] whereas three clubs from Italy in capital markets with shares offered to public. In contrast, Denmark and Turkey, ranking 17th and 10th in UEFA list has five and four clubs respectively in capital markets. In summary, there appears no relation with the competitiveness of football and existence of clubs in capital markets. Then the focus will be one of the exchanges with the most number of club shares, the Turkish Stock Exchange, Borsa Istanbul in this case.

Table 2.3 UEFA Rankings for Club Competitions

UEFA Rankings for Club Competitions

Top 20 Associations as of 28 February 2018

Country	13 / 14	14 / 15	15 / 16	16 / 17	17 /18	Points
1. Spain	23.000	20.214	23.928	20.142	14.714	101.998
2. England	16.785	13.571	14.250	14.928	17.071	76.605
3. Italy	14.166	19.000	11.500	14.250	14.166	73.082
4. Germany	14.714	15.857	16.428	14.571	7.714	69.284
5. France	8.500	10.916	11.083	14.416	9.333	54.248
6. Russia	10.416	9.666	11.500	9.200	11.600	52.382
7. Portugal	9.916	9.083	10.500	8.083	8.666	46.248
8. Ukraine	7.833	10.000	9.800	5.500	7.800	40.933
9. Belgium	6.400	9.600	7.400	12.500	2.600	38.500
10. Turkey	6.700	6.000	6.600	9.700	6.800	35.800
11. Austria	7.800	4.125	3.800	7.375	7.500	30.600
12. Switzerland	7.200	6.900	5.300	4.300	6.100	29.800
13. Czech Republic	8.000	3.875	7.300	5.500	5.100	29.775
14. Netherlands	5.916	6.083	5.750	9.100	2.900	29.749
15. Greece	6.100	6.200	5.400	5.800	5.100	28.600
16. Croatia	4.375	6.875	4.500	5.125	5.125	26.000
17. Denmark	3.800	2.900	5.500	8.500	5.250	25.950
18. Israel	5.750	1.375	2.250	6.750	5.625	21.750
19. Cyprus	2.750	3.300	3.000	5.500	7.000	21.550
20. Romania	6.875	5.125	2.250	3.300	2.900	20.450

Source: UEFA Rankings for Club Competitions, 2018

[3] Manchester United (MANU) shares are not included in the STOXX Football Index since these shares are traded at New York Stock Exchange.

2.13 Previous Studies on Football Club Valuation

In the literature, there are some studies on the valuation of club shares and some others on performances of club share prices. But before going any forward, studies on the objective of clubs need to be mentioned. Club objective is important because, while club shares are being valued with commonly used financial technics, it is inherently assumed that the issuer is a profit maximising entity. In other words, clubs, taken as an economic entity, are assumed to aim to generate cash flows to their equity holders. However, there are studies arguing that profit maximizing is not a suitable objective for clubs.

Sloane argues in his seminal paper that clubs are firms endeavouring to maximise utility rather than profit and they are operating in a cartelized market (Sloane, 1971). This is a convincing argument when European clubs viewed since there are many loss making entities, despite to the fact that most of the owners are commercially successful businessman beside football.

Robert McMaster also noted that directors invest in clubs not primarily for commercial gain, but for a less tangible utility return. Although there are some high profile investments in large clubs primarily for commercial gain, they remain isolated incidents and for the main part commercial criteria are secondary (McMaster, 1997).

Madden (2012), introduced the club objective of fan welfare maximization, and investigated its consequences for club and league performance, comparing with the more commonly studied profit and win maximization objectives. The study concludes that the optimal pricing behaviour of only the fan welfare maximizer is consistent with the empirically observed ticket black markets and inelastic pricing, suggesting that the current reality may involve some element of fan welfare maximisation.

In summary, the consensus in previous studies shows that profit maximization is not the true objective for football clubs. Instead, utility maximization, win maximization, and fan welfare maximization are considered as more accurate objectives for the clubs.

When considering the literature on valuation of football companies; Grant Thornton, one of those internationally well-known auditing and consultancy firms, states in a document with heading “Valuing Sports Teams” that some adjustments should be made to reflect specific features of the clubs being valued. However, they argue that

fundamentally, the techniques for valuing a football club are the same as those used for other firms (Thornton & Matyszczyk, 2010).

Solntsev (2014) treated the practical problems related to the valuation of football clubs. After examining the revenues and expenses of football clubs, the author mentions the difficulty in forecasting cash flows for applying income approach. Nevertheless, it is argued that this difficulty should not be a cause for denial of the application of the income approach. The article counts some principles for forecasting then moves to calculate free cash flow to firm (FCFF). Calculating the discount rate is another important issue when applying income approach. The author gives examples by using CAPM and a questionnaire for determination of specific risk premium for a football club. Although the article favours the income approach for football club valuation, in conclusion, it is accepted that the income approach is not always applicable. The reasons are given as follows: First, most football clubs have historically been unprofitable and were financed by private investors or municipal authorities. Knowing that DCF requires sustained and predictable profitability, it could be very hard to use DCF method for evaluation of a football club. Another limitation in the application of the income approach is attributed to the heavy dependence of any football club on sports results, which makes its finance performance highly volatile and seriously difficult to predict, even in the medium term. When using DCF it is assumed that after the end of the projection period revenues will stabilize and grow with a stable rate to perpetuity. Soltnsev acknowledges that this assumption is hardly applicable for any business and absolutely unreal for football. The article ends by emphasizing the importance of reviewing all of the assets and liabilities of an organisation subject to valuation and states that a club's net assets figure could be considered as value of the club.

Musa Kızıltepe (2012) examined the valuation of four publicly traded Turkish football clubs. In the study, the income and cost structures of clubs overviewed. Also, suitability of valuation methods discussed. In conclusion, the author suggests using Discounted Cash Flow, an Income based approach, for valuation of four Turkish clubs publicly traded at that time.

If one can understand the motivation behind buying a football club, it may facilitate to understand where the value of the club comes from. Linda Yueh, Chief Business Correspondent of BBC, touches upon to the subject in her article, "Why on

Earth Buy a Football Club" (Yueh, 2014). Yueh writes; despite the significant TV and other commercial revenues, football clubs in England's top flight still struggle to break-even. According to Deloitte's Annual Review of Football Finance for the season 2012-13, only half of the clubs in the premier league made an operating profit and when the net costs of player trading are added, there are large overall net losses. Yueh also notes that these figures belie the fact that most of England's largest football clubs are run by successful businessman who make plenty of money in other walks of life. Yueh then asks; given the appalling financial returns, why do people buy football clubs? One given explanation is that it has nothing to do with money. Many owners are simply fans of the clubs and after all they are supporters. Therefore they do not act like a rational investor would do, rather their actions follow their heart. Another suggested explanation is that football is simply being used as a geopolitical tool, with many of these investments ultimately backed by governments. In this way, governments aim to make their country name known better in international arena. A similar argument may also explain the motives for individuals. One can buy a football club that costs a lot of money but it may make the owner a highly recognisable figure around the world. In other words, buying a football club can give the owner celebrity, notoriety and access to important people.

Yueh also stresses that dividends are not the only way to make money from football clubs. If the value of the club could be raised, there can be a good opportunity to make capital gains. The author also admits the importance of revenues, rather than profits or cash flow to equity, for club valuation.

An interview with Frederic Longuepee, Deputy Managing Director of Paris Saint German also sheds light on and reveals another motivation to own a club. He argues that Qatar has chosen sports as a vehicle to promote the country and since football is probably the most watched sport in the world, Qatar decided to invest into promoting the country through football. They have invested in Paris Saint German and organized sporting events. After winning the bid for the World Cup 2022 and investing PSG as well as the Barcelona jersey sponsorship, people became much more aware about Qatar (Desbordes & Chanavat, 2014). In another part of the interview, Longuepee sees to increase the revenue of the club from €160 million to almost €400 million is a success itself indicating the importance he has given to revenues. However in the long run, he admits the need to demonstrate a return on investment.

Forbes magazine considers revenues as the main value driver too, by reasoning higher values of soccer teams to escalating revenues rather than higher profit or cash flow to equity (Ozanian, 2016).

Fan base is probably the most important factor to revenue generation. Ram Tamara, Director at Nathan Economic Consulting India, states that in the long run the value of a team or franchise is determined by how strong and durable its fan base is (Tamara, 2011).

In 2016, KPMG, an internationally well-known auditing and consultancy firm, issued a report; "Football Clubs' Valuation: The European Elite 2016" (KPMG, 2016). The report touches upon the peculiarities of football clubs that makes valuation difficult. First, the report mentions the fact that clubs pursue utility maximization rather than profitability maximization. Although UEFA Financial Fair Play Regulations limit the losses they can report, clubs' main aim is to gain success and prestige rather than make profits. Another peculiarity of football clubs is lower correlation between direct investments and sportive success. Because of these peculiarities, KPMG uses Enterprise Value for the clubs ranking. Enterprise Value is a capital structure neutral metric that allows to compare companies with different capital structures. It can be defined as sum of equity value and total debt of a company, minus cash and cash equivalents. The report also briefly explains the methodology of KPMG to determine the EV of a club. In their formula, they take into account five parameters, each have different weights so that the applied revenue multiplier is modified depending to the case. The five metrics are Profitability, Popularity, Sporting Potential, Broadcasting Rights, Stadium Ownership.

Tom Markham developed a multivariate model to value English Premier League clubs (Markham, 2013). Markham initially examined the techniques traditionally used to value a business, namely; Market Capitalisation, Discounted Cash Flow Models, and Bankruptcy Valuation. While DCF Models represent the fundamental technique to ascertain a value to a business, Markham admits that it is not applicable for clubs since most clubs in the UK are perpetually loss making entities and therefore do not have any positive cash flow to equity to discount. The author also critics the special approaches widely used within the football sector. These are revenue multiples approach, Forbes valuation, and Broker valuation. After examining these methodologies, Markham notes none of the aforementioned valuation methods were universally applicable and capable of

providing a reliable value for every EPL club. The author then determines components of the suggested alternative model. These are; Revenue, Net Profit, Net Assets, % Stadium Attendance, and Wages / Turnover ratio. These components are brought together in the manner below:

$$\text{Club Valuation} = (\text{Revenue} + \text{Net Assets}) \times \frac{\text{Net Profit} + \text{Revenue}}{\text{Revenue}} \times (\text{Stadium Capacity \%}) \div (\text{Wage Ratio \%})$$

The paper compares the model's EPL club valuations to those found by applying other methods evaluated in the study. All figures than compared to actual transaction values of clubs that changed hands between 2003/04 and 2011/12. In conclusion, the paper suggests that the suggested multivariate model is the most reliable one among the methods discussed in the paper, as well as being universally applicable to all EPL clubs.

Examining price performance of club shares would also give idea about the valuation of football clubs. Zuber et al. examined the game related performance of 10 publicly traded English Premier League teams (Zuber et al., 2005). In offering circulars and annual reports of many football clubs, it is said that the future financial condition of clubs highly depend on sportive success. Therefore, one might expect that the game results may be affecting the share prices as these produce kind of info giving hints about future financial condition of the firm. However, the study shows that the market is insensitive to game results in terms of both price movements and trading volume. Zuber et al. identifies the market for football club shares as very different compared to traditional market. Because, in their study, they see that neither positive nor negative information is associated with an observable market reaction. They also note that the sample of club shares demonstrate flat trending while traditional market goes upward in the long run. Additionally, in the football club shares market, the well-known Monday Effect is not evident. The study concludes that the club share investors are as a new type of investor. They do not trade on information expected to affect cash flow, instead appear to derive value from merely holding the shares.

Brown & Hartzell studied the data for the Boston Celtics, the first publicly traded American sports team and found that game results have significant impact on returns, trading volume and volatility (Brown, 2001). To control for the expected value of game results, betting market point spreads were used. Authors evidenced different market

responses to unexpected game results. It appears that losses have a significant negative impact on returns while there is a positive and significant reaction to wins in playoffs.

Nicolas Scelles et al. studied to estimate the determinants of firm values in European Soccer over the period 2005-2013 incorporating player valuations, clubs' operating income, and new ownership (Scelles et al., 2014). The results of the study demonstrate that these variables are significant factors in club valuations. Other factors appear to have significant impact are clubs assets including stadium age, club ownership type, supporter numbers and income, and past sport performances. The authors also view revenues as a better basis upon which to calculate value than profit since revenues are a good indication of a clubs' cash generation capacity whereas profit depends on preferences and decisions of financial management to a certain extend.

Vine D. (2004) also studied to develop a model for valuation of equity of clubs competing in football, basketball, baseball and hockey. The study used multivariate regression in modelling and independent variables such as Debt / Revenue, TRPS (Total Relative Productivity Score), income, expenses, payroll, gate receipts, and other revenues. In conclusion, Vine finds that revenue is the key driver behind the valuation of sports franchises.

As a result, it has been observed that there is no club valuation model which the academicians agree on and the debate on the subject continues. However, it is seen that there is a consensus on that revenues are the most important factor affecting the value of clubs. On the other hand, the fact that the clubs are not profit-oriented organizations cause them to overspend in the hope of ensuring sportive success, and consequently announcing losses, or even if they make profit, the amounts are low compared to the business volume and unstable. These should be taken into account when trying to determine a valuation model for the clubs.

3. MODEL

3.1 The Model

Considering the inapplicability of valuation methods to clubs, the study aimed to suggest a model for Turkish Super League clubs to estimate their equity value that occur in the stock market, based on the independent variables estimated to be meaningful in determining the share prices.

The fundamental idea behind this model is that the equity valuation methods developed for profit maximising entities are not suitable for football clubs due to their not for profit characteristics. Therefore it is pointless to try to apply these methods to football clubs. Instead, the main argument of this study is that an asset based valuation method would shed light to the club valuation issue. Since these firms do not aim profit, their valuation should be similar to non-operating firms. However, unlike firms that ceased operations, clubs have considerable intangible values in their assets due to their ongoing activities. Thus, an asset based valuation, by marking to market all the assets including the intangibles a club has would be a suitable tool to estimate club equity value.

The figure 3.1 points out the elements that is considered effective in value of club equity. In an asset based valuation, the current value of debt would be deducted from the total value of assets that marked to market to reach equity value. While assuming that the book value of current assets does not vary far from the market values[4], to bring fixed assets to market value is usually a more difficult task. Particularly the lower liquidity and marketability of fixed assets complicates to determine a fair value.

Unlike other companies, intangible assets ("Player Transfer Costs" in the figure) consisting of player transfer fees are of special importance in the case of clubs. In most cases, this is the account in which the clubs make the most possible investment they can afford. This situation should be viewed normal since the clubs are sporting organizations and the management success is evaluated parallel to sportive success. On the other hand, this is the account that usually differentiates most from the market value.

[4] We omit cases such as applying LIFO principle for inventory accounting in inflationary environment and the inventory does not go below a certain minimum level.

For this reason, if the possible outgoing transfer value of players' is taken into account, it should play an important role in the club valuation model.

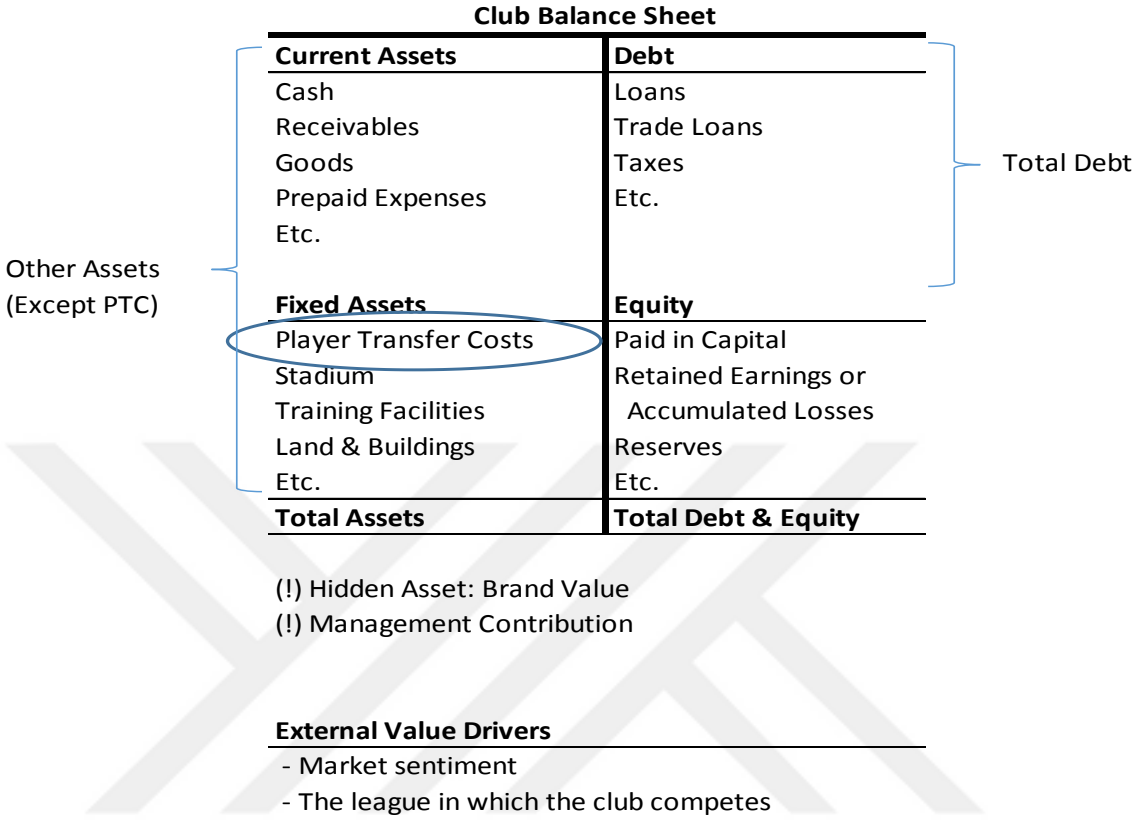


Figure 3.1 Sample Club Balance Sheet and Sources of Value

Other Assets in the figure show miscellaneous accounts (except the team) that clubs invest to continue operations. For the sake of simplicity, it is assumed that the book values for Other Assets are a good proxy for their market values. Nevertheless, if it is known that an asset account substantially differs from the market value and the market value is sizable among other assets, it should definitely be treated individually and marked to market. By adding up mark to market values of all assets, we come to total market value of all assets on the balance sheet of a club.

Unlike the companies that are non-operating (thus asset based valuation is suitable), clubs have another very important asset outside of their balance sheet that is the brand which all their activities are based on. A non-operating company may have no or considerably fallen brand value. But a football club is building its brand by sportive successes, touching values and identities of their members and fans, and public relation activities, no matter these efforts over all result profit or not. Therefore, the study argues

that the suggested model should include the brand value too, but the matter is how to mark to market the value of brand.

In this study, it is assumed that total revenues of a club is a good proxy for its brand value. The reason for assuming revenues as proxy for brand value is, the higher the brand value means, the higher the number of fans, the wider the club is known and supported. Consequently, it turns higher number of spectators, match day revenues and merchandise sales. Similarly, the higher the value of club brand, the higher the licencing fees and advertisement revenues as well as sponsorship income, since other brands' willingness to appear next by the club will be higher. Accordingly, revenues are accepted as a proxy for brand value which should be a factor in the model.

Although profit is not the ultimate target for clubs, the importance of economic-wise management cannot be ignored for clubs either. It is assumed that a management that runs the club with financially sound policies should contribute to the value of the club. For companies with profit maximising objective, earnings figure (supported by cash flows from operations) that is taken into account for valuation purposes already contains this element. For football clubs however, another measurement needed to proxy the quality of economic-wise management. It is assumed that a Cash Flow item could be a proxy for the economic-wise management contribution to the value of club. During the trials stage, also other measurements have been used such as Net Profit (Loss) and Operating Profit to test whether any of these items significantly affects the value.

Apart from the factors specific to clubs, there are also some macro factors effective in prices of other assets in an economy. Investment appetite and / or market sentiment are common terms used to describe this tendency. For example, in organized markets like stock exchanges, prices in general move up and down, reflecting optimistic or pessimistic expectations, respectively. It is assumed that this investment sentiment has an effect on club shares as well, like for any other shares it does. In organised markets, the general price levels are measured by indexes composed of prices of securities traded in that market. Accordingly, an index of stock market, in which the shares subject to study are being traded, should be added to the model.

An important point when choosing an index is; indexes are generally classified in two groups: Price Indexes and Return Indexes. While price indexes are calculated on the basis of prices of the securities included in the index, return indexes are calculated on the

basis of all returns provided from those securities in the index, including returns like dividends and interest along with capital appreciation. It is believed that the index to be included in the proposed model, should be a price index, since it reflects only the change in general price levels for the securities.

Another factor counted important is the one affecting the value of clubs following a relegation to a lower league or promotion to a higher one. In other words, club values do change depending on the popularity and revenue potential of the league in which the clubs compete in. This factor is expected to be same for all clubs participating in the same league. Thus, this factor should be included in the model with a constant term. That means, every club which participated in a certain league has a constant value and this value changes either by the change in the value of the league or change by the league in which the club participates.

In addition to the constant term derived from the league, considering a persistence coefficient less than "1" to be applied on the constant term for those clubs more likely to relegate would be judicious. For clubs with high competitiveness in the top league, this factor may be considered "1" which means that the value of this club fully contains the value arisen from the league.

Having explained the factors that assumed effective in determining the equity values of clubs, following model for valuation is suggested:

Equity Value of Club

= Persistence x AVG League Constant per Club
+ b1 × Brand Value + b2 × Team Value + b3 × Other Assets Value
+ b4 × Economic wise Management Contribution + b5 × Total Debt
+ b6 × Market Sentiment Contribution

where b_1, b_2, ...b_6 are factor coefficients.

Although all the factors included in the model have a positive sign, this does not mean it is expected that all variables affect the dependent variable positively. Particularly, the Total Debt figure is expected to affect club value adversely. The Econ-wise management contribution sign may change depending on the sign of the parameter, which means a positive value contribution is expected if the cash flow is positive. Similarly, other factors representing different value sources are expected to have positive sign.

4. MODEL TESTING

To test the model, as much as clubs publicly traded in an Exchange, and participating in the same league are needed. As mentioned in part 2.12, Turkey is the second to Denmark with the highest number of clubs publicly traded in stock exchange. Therefore the four Turkish clubs, Besiktas, Fenerbahce, Galatasaray and Trabzonspor are chosen to test the model, due to their common features and familiarity of the clubs and the market to us.

4.1 Description of Variables

The proposed asset based model is presented below:

Equity Value of Club

= Persistence Factor x AVG League Constant per Club
+ b1 × Brand Value + b2 × Team Value + b3 × Other Assets Value
+ b4 × Economic wise Management Contribution + b5 × Total Debt
+ b6 × Market Sentiment Contribution

In the model, the Persistence Factor represents the likelihood that the club will remain in the league for the foreseeable future. In this case, the four clubs included in the study are commonly accepted that the most competitive ones. Therefore, the Persistence Factor value for these clubs was assumed to be close to “1”.

The Average League Constant per Club term measures the value of a club that is attributed to the league in which the club competes in. In other words, it is assumed that some part of the club value is inherently related with popularity of the league in which the club competes. The ALC term stands for this standard value for each league. This constant value is derived after running the statistical software to find the best fitting coefficients of factors affecting the club value.

Brand Value is one of the most important factor in the model but at the same time difficult to mark to market. Then, the brand value is proxied by revenues, which is

assumed to be perfectly related. Accordingly, club revenues in the model were used since the higher value club brand is assumed to reflect higher revenue generation.

The team is the most important asset for a club aiming sportive success. Therefore, the team is usually the most invested and valued asset on a club balance sheet. However, the book value and the mark to market value of the team substantially differs, making the book value figure, commonly presented as "Intangible Fixed Assets" on balance sheets, meaningless. In fact, the Intangible Assets account on the balance sheet reflects the unamortised balance of player transfer costs. Obviously, this balance has no relevance with the real transfer revenue generation potential of the team. To reflect a better mark to market value of the team, player values provided from www.transfermarkt.com are used. The player values on this site are updated twice a month.

Other assets include all assets of clubs except the Intangible Fixed Assets. In this case, all the four clubs do not have substantial fixed assets (apart from intangibles) on the balance sheet and other assets are mainly current in nature. Therefore, the book value of these assets are assumed as a good proxy for their mark to market value.

Economic-wise management measures the contribution of the management by its practices and policies while running the club in a balance between sportive competitiveness and financial sustainability. To measure the success of the management in this sense, several indicators have been tried and Free Cash Flow is chosen since the trials revealed its significance. The definition of "Free Cash Flow" is the sum of cash flow from operations and investment activities including both working and fixed capital investments. It is the balance following the effect of "Cash Flow from Fixed Capital Investments" and before the "Cash Flow from Financing Activities" on the Cash Flow Statements prepared in accordance to the IFRS.

Indebtedness is measured by total debts. Since the IFRS requires to bring debt accounts to reporting date values, the book value of total debt figure is assumed as a good proxy for mark to market value of total debts.

Finally, to reflect the market sentiment, "Borsa Istanbul XU100 Price Index" is assumed as a proxy, since the used shares in testing are traded at Borsa Istanbul.

The variables used in the model are abbreviated in the following E-VIEWS output tables as follows:

Table 4.1 Variables Used in the Model

Variable	Description
Y	i^{th} club market value at t^{th} time
XR	i^{th} club revenues at t^{th} time
XT	i^{th} team value at t^{th} time
XO	i^{th} club assets other than fixed intangible at t^{th} time
XD	i^{th} club total debt at t^{th} time
XF	i^{th} club econ-wise management contribution at t^{th} time
XC	Common (Price Index) variable for i^{th} club at t^{th} time

4.2 Data & Methodology

In this study, data of the four football clubs of which shares are traded on the stock exchange in Turkey were used. These clubs are Besiktas, Fenerbahce, Galatasaray and Trabzonspor in alphabetical order. These four clubs are those with the most fans in Turkey and at the same time that have the most championships in Turkish Super League. There are no other football club shares in Borsa Istanbul, the Turkish Stock Exchange, thus no club excluded from the study.

The clubs have some differences one from another. For example, Besiktas competes in 14 sportive branches while Fenerbahce, Galatasaray and Trabzonspor competes in 10, 14 and 6 branches respectively. While the first three, Besiktas, Fenerbahce and Galatasaray, are known as the top three biggest and are all from Istanbul, Trabzonspor is the 4th among the Turkish Super League clubs and comes from another province, Trabzon. The organisation structure of these clubs are gathered around a founding association, the club. All amateur sportive activities are carried on in this main club association. The membership to the club is identified as membership to this association as well. These clubs have several subsidiaries that they have a controlling share for various commercial activities. In addition, football activities are separated from

the association structure and transferred to a special subsidiary which operates as the football branch of the club. In fact, these special purpose entities which were set up as limited liability company to operate football activities of the clubs are themselves a football club. All the four football club companies considered in this study have these similar characteristics. They all have similar structures and operations which is solely football activities. Since the shares are traded in the same market, the clubs are subject to same regulations, applying the same financial reporting standards, and disclosing the financials on the same dates.

The data covers 24 observations for each club, 96 observations in total. Each observation includes six independent variables, assumed to be significant in determining the value of clubs and the observed club value, the dependent variable. The independent variables are Revenues for the last four quarters, Team Value which consists of potential transfer value of players, Assets other than Fixed Intangible that is Total Assets minus the book value of players, Total Debt and Free Cash Flow to Firm for the last 12 months.

The data is gathered from three different sources. All financial reports obtained from Borsa Istanbul, Public Dissemination Platform (KAP Kamuyu Aydınlatma Platformu, 2018). From this site, the dissemination dates of the financial reports are also available. Borsa Istanbul 100 Index values are taken from the bulletin data on Borsa Istanbul website (Bülten Verileri, 2018). And finally, Team Value figures are taken from (Transfermarkt, 2018).

All the clubs subject to this study have financial years starting on 1 June and ending on 31 May. The study includes the data beginning from 2011 June – 2012 May financial year to the end of 2016 June – 2017 May financial year. It was aimed to use a wider range of data in the study. However, this is the widest available data where all the four clubs figures are comparable. Because, although these club shares are offered to public and started to trade between 2002 and 2005, the structures of the companies were different than a football club and not comparable with one another before 2011/12 season. Particularly, the special purpose vehicle companies of Fenerbahce, Galatasaray and Trabzonspor were structured as a kind of income sharing form when the shares offered to public. However, these structures were causing cash outflows to the investors even though the clubs were making losses in their overall activities. Considering that these structures were not sustainable in the long run, all the three clubs aimed to

transform these entities to a football club form and initiated a reorganisation programme in 2010 and 2011. By the end of financial year June 2010-May 2011, all three clubs had transformed the structures of these entities to a football club. Since Besiktas was already set up as a football club, all four shares became comparable by the beginning of June 2011-May 2012 Financial Year. Thus the study data covers back as far as comparison is meaningful.

The financial reports obtained from the public dissemination platform, and then the quarterly differences calculated for flow statements, which are Income Statement and Cash Flow Statement, for each quarter. Following, last four quarter figures are summed to reach trailing four quarter figures. From these statements only trailing four quarter revenues and trailing four quarter free cash flow used in modelling. For each observation in the study trailing four quarter revenues and trailing four quarter free cash flow figures are taken as explanatory independent variables for the closing share price at the end of the day following the day of financial statements dissemination.

Team value figures are obtained from www.transfermarkt.com.tr. The website is a popular source in football sector to view likely transfer prices of players, as well as values of teams as the total transfer value of players. The website revise team values twice in every month. Historic team values are also available. Team values are available until far back 2010 for mid and end of every month, as of this thesis is written in January 2018. For each observation in the study, the most recent available team value is taken as an explanatory independent variable for the closing share price at the end of the day following the day of financial statements dissemination.

Team values on football club balance sheets are represented as intangible fixed assets. These values usually have the most weight in the total assets of the club balance sheets, as the most important asset. This value is important because clubs compete with the team on the pitch and the market value is considered as a proxy for the talent capacity of the team. As described above, the values from transfermarkt.com website are taken as a proxy for the market value of the team. For the remaining assets, book value is assumed to be a close proxy for their market value. Therefore, book value of intangible fixed assets deducted from total assets of clubs to reach the Assets Other than Fixed Intangible. Although this figure is included in the model, it is presumed that sources spent on things

other than players would not to be significant, unless a club owns its stadium, training facilities, etc.

Another balance sheet item used as an independent variable in the model is total debt of the club. All the four clubs included in the study are subject to regulations set by the Capital Markets Board of Turkey and therefore they report financials in accordance to the International Financial Reporting Standards ("IFRS"). According to the IFRS debt figures must be adjusted to reflect real values on the date of reporting (IFRS 9 Financial Instruments, 2018). In consequence, the book value of total debt on the balance sheet date may be considered a good approximation of market value. Then, for the total debt figure in the model, paid in capital is deducted from total liabilities.

The dependent variable is next day closing share price, following the dissemination day of the financial statements. It is assumed that the market is fully efficient and all the information is reflected to the prices without lag. Note that financial statements are disseminated after the trading is closed according to the rules of Borsa Istanbul.

In this study, four different cross-sectional units are examined between seasons 2011/12 and 2016/17 as quarterly. Since the number of observations for each unit is same and the number of time periods is larger than the number of cross-sectional units, the approach is a long balanced panel. Panel data analysis is a statistical method, widely used in social sciences and econometrics to analyse two dimensional (typically cross sectional and longitudinal) panel data (Maddala, 2001). Panel data analysis, when compared with time series and horizontal section analysis, allows the researcher to work with a wider data set and reduces the trend effect. This results better parameter estimates with higher significance and consequently more effective econometric forecasts to be obtained.

In modelling non-stationary time series before 1980's, many economists used linear regressions between dependent and independent variables which are thought to be explanatory. However, Nobel laureate Clive Granger and Paul Newbold showed that this approach could produce spurious correlation, since standard detrending techniques can result in data that are still non-stationary (Granger & Newbold, 1974). Granger's 1987 paper with Robert Engle formalized the cointegrating vector approach, and coined the term cointegration (Engle & Granger, 1987). This study employs cointegration regression approach in testing the model for equity values of clubs.

The descriptive statistics of variables are presented below.

Table 4.2 The Descriptive Statistics of the Data for the Variables

	Y	XR	XT	XO	XD	XF	XC
Mean	587.284.491	256.776.844	334.003.782	286.182.194	605.912.243	-59.618.541	76.687
Median	501.600.000	229.239.644	321.600.750	208.173.564	543.474.262	-61.188.956	77.624
Maximum	1.425.600.000	582.858.585	576.187.100	702.182.066	1.317.350.166	151.761.022	108.715
Minimum	92.750.000	66.704.358	174.957.900	55.456.223	63.109.907	-302.819.872	57.357
Std. Dev.	351.090.143	141.773.145	98.422.943	200.698.075	312.891.308	78.779.669	11.199

4.3 Line Graphs of Variables

The line graphs of the variables are presented below. The purpose of this is to examine the clubs based on each variable individually as well as the variables in the panel data with all its components.

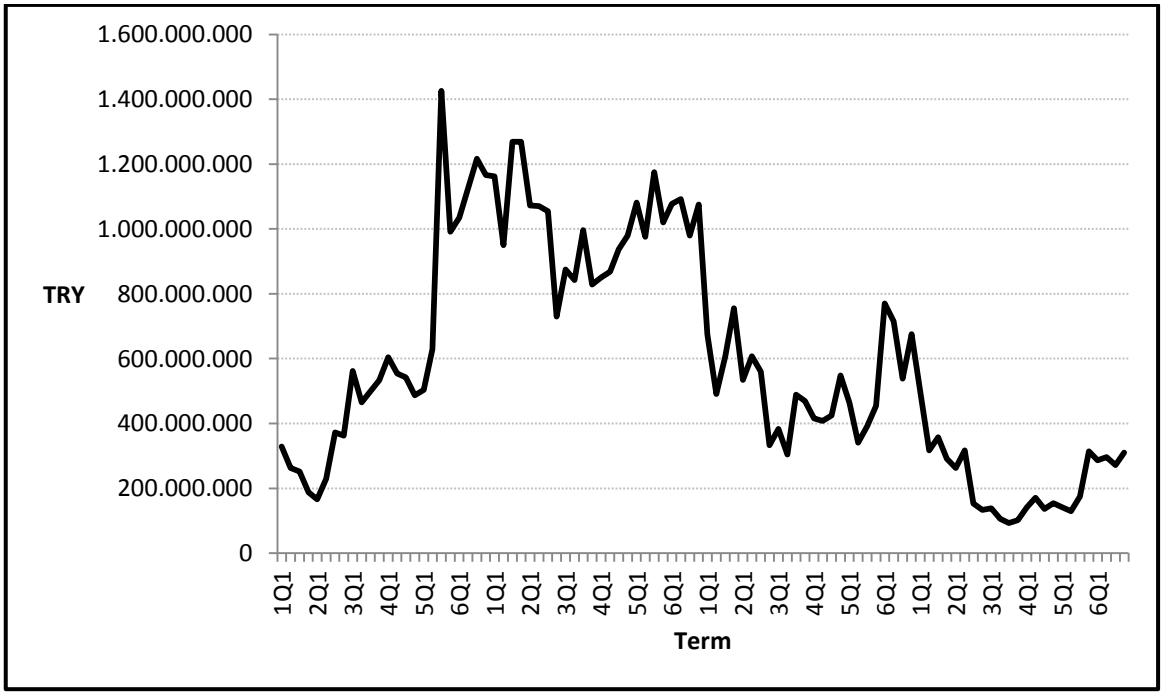


Figure 4.1 Market Value of Clubs

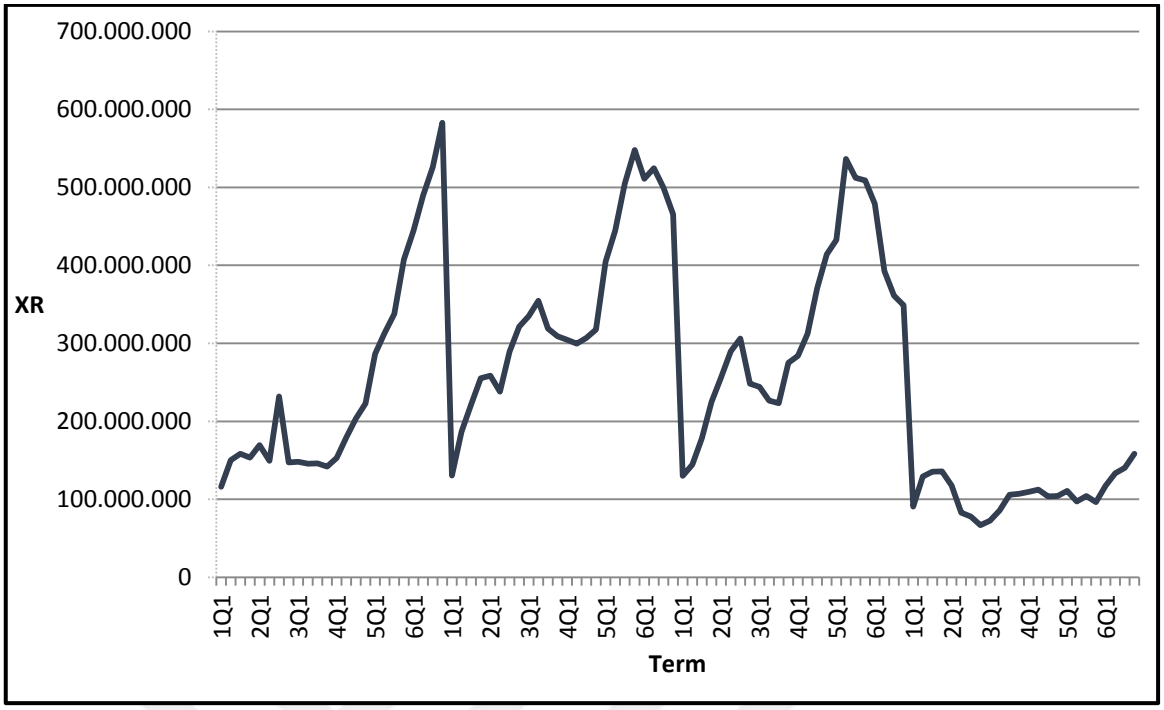


Figure 4.2 Revenues of Clubs

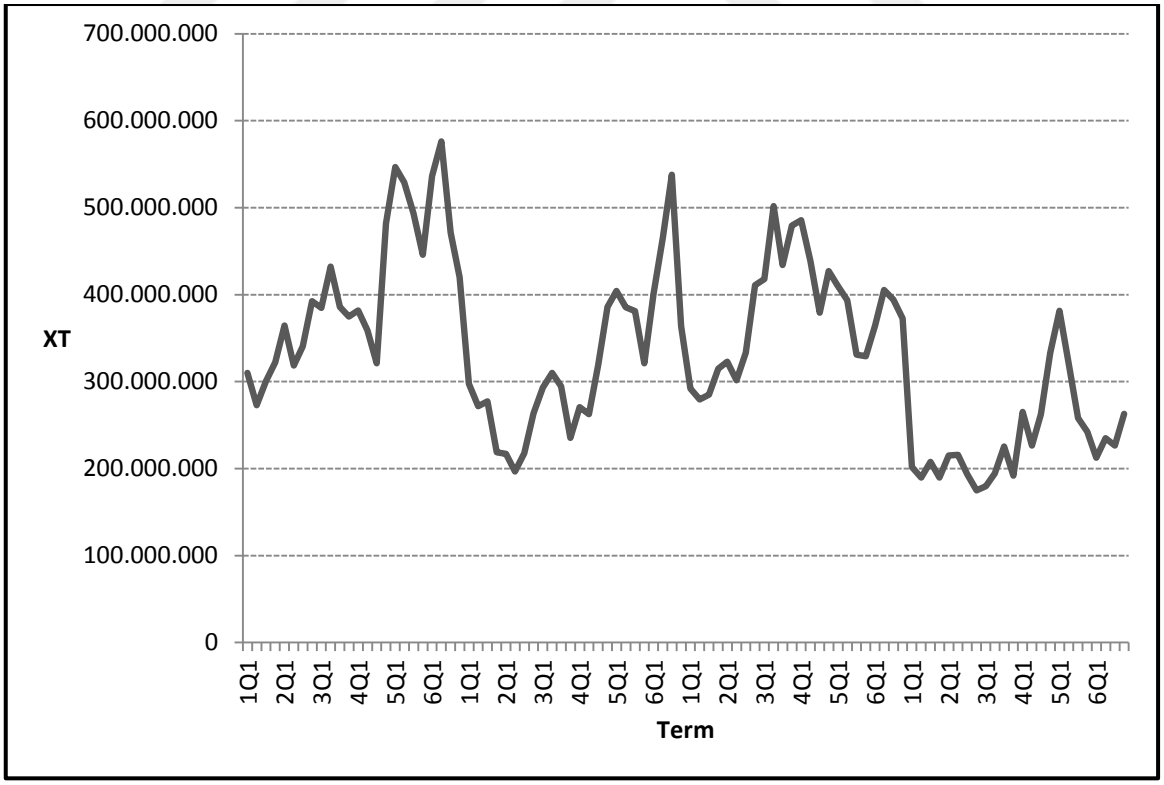


Figure 4.3 Team Values of Clubs

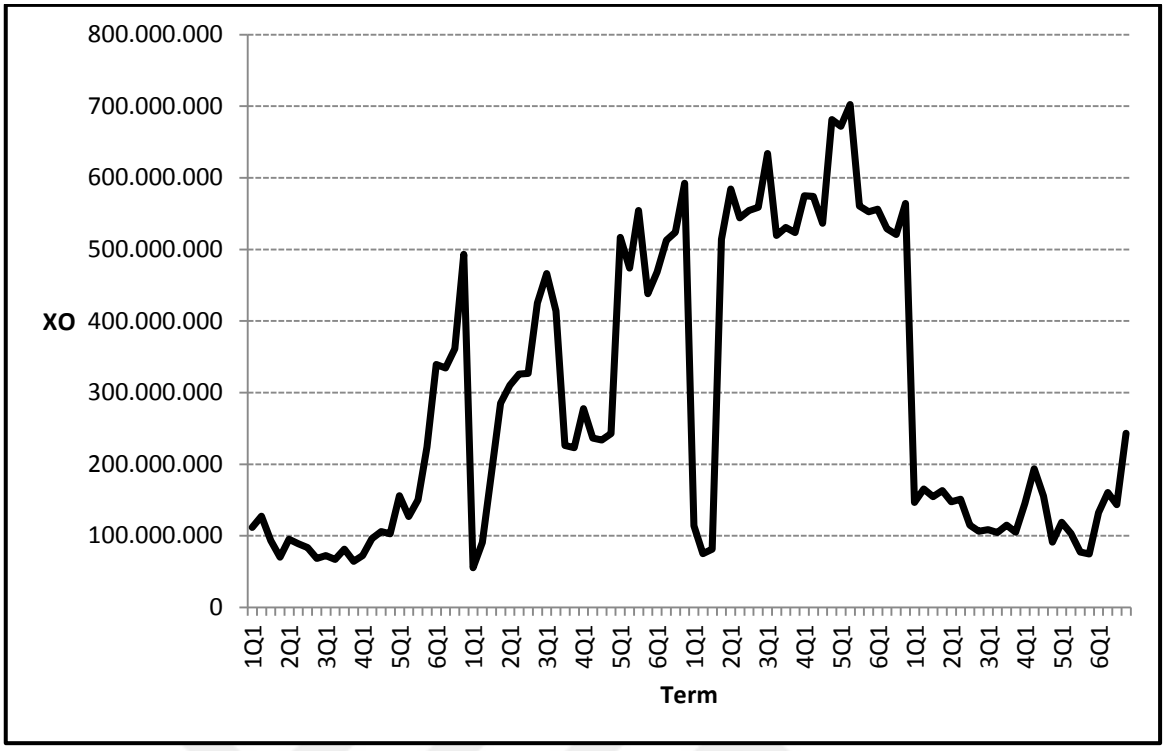


Figure 4.4 Other Assets (Non-Team Assets) of Clubs

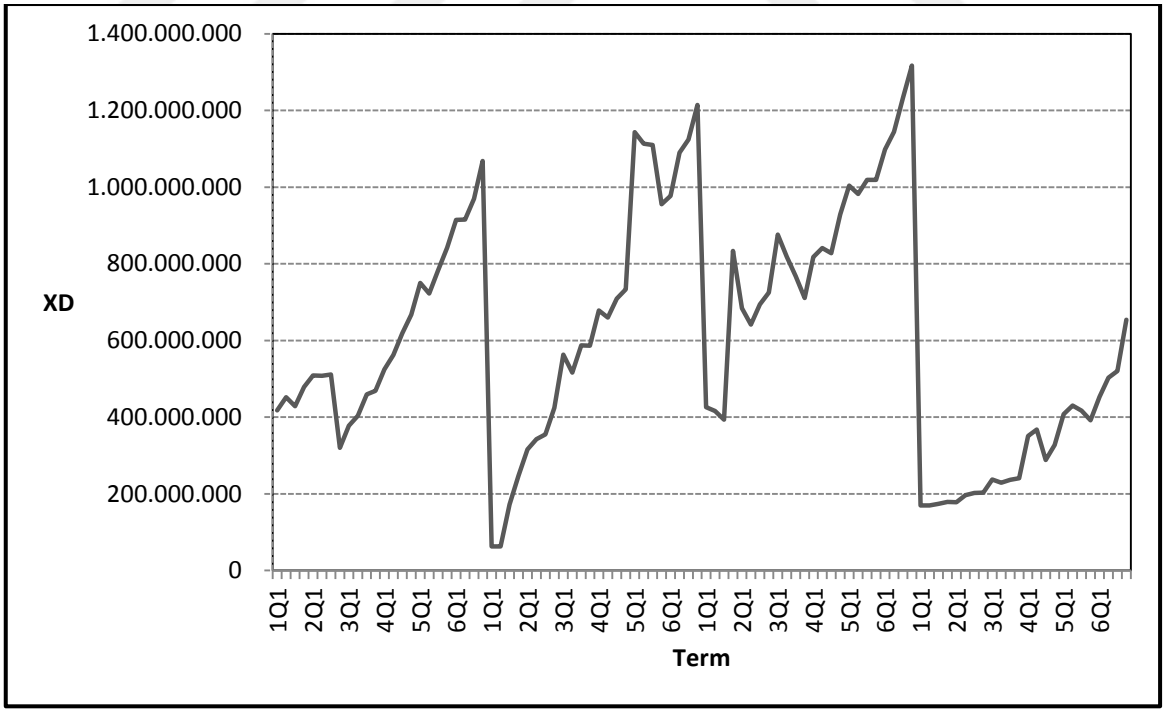


Figure 4.5 Total Debts of Clubs

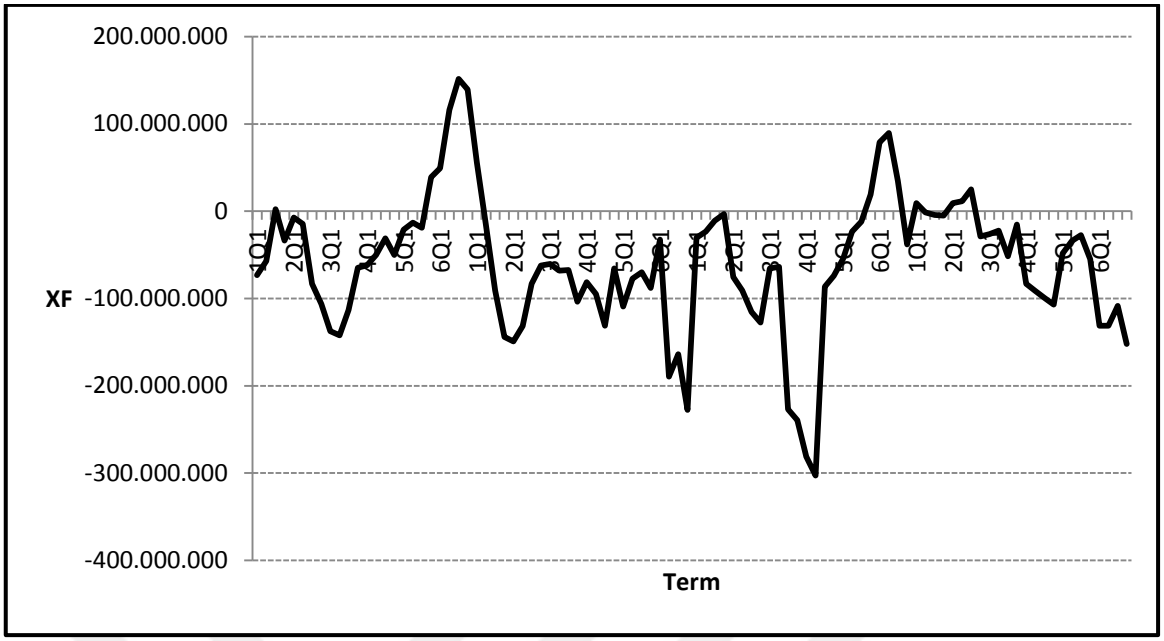


Figure 4.6 Cash Flow of Clubs

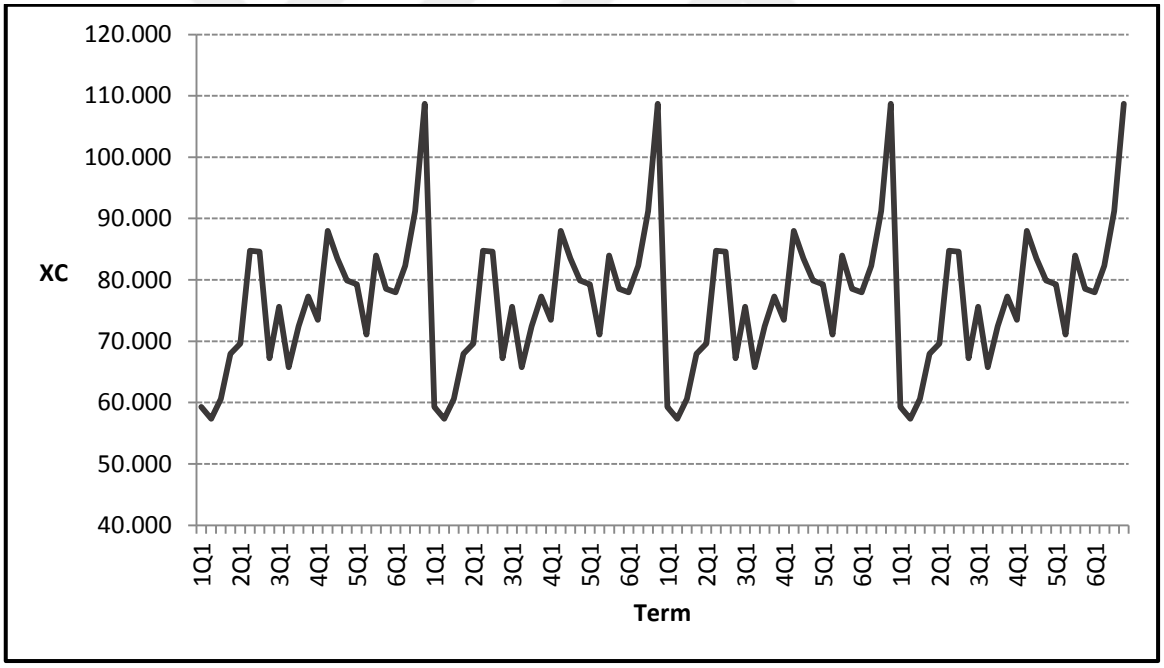


Figure 4.7 Borsa Istanbul 100 Index (Common Variable)

When the graphs are viewed, the sudden and / or systematic volatility (as increases or decreases) for all variables draw attention. As a result of visual examination of the graphs, it may be said that the variance and mean of the variables are not stable. In other words, the variance and mean are changing over time and therefore the series can

be said to be non-stationary. If this is the case, these series cannot be worked on for a regression.

To further test the variables' property in this sense, "Levine, Lin and Chu" and "Im, Pesaran and Shin" panel unit root tests are applied for all variables.

4.4 Examination of the Stationarity of the Variables Used in the Study

Before testing the variables for being stationary, log transformation for dependent variable is done to balance the extreme fluctuations to a certain extend. Therefore the dependent variable will be named as Log (Y) hereafter.

Table 4.3 Panel Unit Root Tests

Variable	Unit root	Method	Model	Test statistics	P value
LOG(Y)	Common	Levin, Lin and Chu	None Intercept Intercept&Trend	0.24408 -1.11728 -1.69144	0.5964 0.1319 0.0454*
	Individual	Im, Pesaran and Shin	Intercept Intercept&Trend	-1.35706 -0.28030	0.0874 0.3896
XR	Common	Levin, Lin and Chu	None Intercept Intercept&Trend	3.21432 2.85042 0.22602	0.9993 0.9978 0.5894
	Individual	Im, Pesaran and Shin	Intercept Intercept &Trend	2.96327 -1.65988	0.9985 0.0485*
XT	Common	Levin, Lin and Chu	None Intercept Intercept &Trend	0.45515 -0.74792 -0.16052	0.6755 0.2273 0.4362
	Individual	Im, Pesaran and Shin	Intercept Intercept &Trend	-0.51327 -1.83915	0.3039 0.0329*
XO	Common	Levin, Lin and Chu	None Intercept Intercept &Trend	1.87388 2.62197 2.77407	0.9695 0.9956 0.9972
	Individual	Im, Pesaran and Shin	Intercept Intercept &Trend	1.97701 3.66528	0.9760 0.9999
XD	Common	Levin, Lin and Chu	None Intercept Intercept &Trend	4.36372 2.31517 -0.65367	1.0000 0.9897 0.2567
	Individual	Im, Pesaran and Shin	Intercept Intercept &Trend	4.05041 -0.28028	1.0000 0.3896
XF	Common	Levin, Lin and Chu	None Intercept Intercept &Trend	-0.24075 3.25758 2.58389	0.4049 0.9994 0.9951
	Individual	Im, Pesaran and Shin	Intercept Intercept &Trend	1.52218 1.41273	0.9360 0.9211
XC	Common	Levin, Lin and Chu	None Intercept Intercept &Trend	1.99821 1.99095 5.19567	0.9772 0.9768 1.0000
	Individual	Im, Pesaran and Shin	Intercept Intercept &Trend	0.69885 -2.55112	0.7577 0.0054**

*: significant at $\alpha = 0.05$ **: significant at $\alpha = 0.01$

Whether the variables contain common or individual unit root were tested by panel unit root tests "Levine, Lin and Chu" and "Im, Pesaran and Shin", and the obtained outputs were given in the table above. The panel unit root test by Levin, Lin and Chu were done with three variations; the pure model (none), the model with the intercept and the model with both intercept and trend term. With the second panel unit root test, "Im, Pesaran and Shin", the stationarity is examined with the models with intercept only and with intercept and trend. Viewing the table entirely, it was found that all p values, with only a few exceptions, were greater than the α significance levels (0.01 and 0.05) used. Thus, it can be concluded that all the variables are not stationary.

To ensure the stationarity of the variables, first differences are taken and the panel unit root tests are performed again for the new series obtained. The results are presented in the table below.

Table 4.4 Panel Unit Root Tests of Log Y and 1st Differences of Independent Variables

Variable	Unit root	Method	Model	Test statistics	P value
ΔLOG(Y)	Common	Levin, Lin and Chu	None	-11.4474	0.0000**
			Intercept	-10.7770	0.0000**
			Intercept and Trend	-8.05968	0.0000**
	Individual	Im, Pesaran and Shin	Intercept	-9.48629	0.0000**
			Intercept and Trend	-7.60860	0.0000**
ΔXR	Common	Levin, Lin and Chu	None	-5.24736	0.0000**
			Intercept	-2.79976	0.0026**
			Intercept and Trend	-4.38820	0.0000**
	Individual	Im, Pesaran and Shin	Intercept	-3.24172	0.0006**
			Intercept and Trend	-4.93322	0.0000**
ΔXT	Common	Levin, Lin and Chu	None	-8.96853	0.0000**
			Intercept	-5.09746	0.0000**
			Intercept and Trend	-3.63653	0.0001**
	Individual	Im, Pesaran and Shin	Intercept	-6.86635	0.0000**
			Intercept and Trend	-5.49876	0.0000**
ΔXO	Common	Levin, Lin and Chu	None	-5.43608	0.0000**
			Intercept	-3.55684	0.0002**
			Intercept and Trend	-5.96914	0.0000**
	Individual	Im, Pesaran and Shin	Intercept	-3.25753	0.0006**
			Intercept and Trend	-5.63821	0.0000**
ΔXD	Common	Levin, Lin and Chu	None	-8.02236	0.0000**
			Intercept	-7.78465	0.0000**
			Intercept and Trend	-5.90603	0.0000**
	Individual	Im, Pesaran and Shin	Intercept	-7.71018	0.0000**
			Intercept and Trend	-6.94873	0.0000**
ΔXF	Common	Levin, Lin and Chu	None	-7.65189	0.0000**
			Intercept	-3.81611	0.0001**
			Intercept and Trend	-4.23973	0.0000**
	Individual	Im, Pesaran and Shin	Intercept	-4.71478	0.0000**
			Intercept and Trend	-4.31625	0.0000**
ΔXC	Common	Levin, Lin and Chu	None	-10.0324	0.0000**
			Intercept	-9.96544	0.0000**
			Intercept and Trend	-9.06778	0.0000**
	Individual	Im, Pesaran and Shin	Intercept	-8.55773	0.0000**
			Intercept and Trend	-7.32339	0.0000**

*: significant at α = 0.05 **: significant at α = 0.01

The table shows that all p values are smaller than α significance levels (0.01 and 0.05), meaning that all variables have become stationary when the first differences are used.

4.5 Examining the Existence of Long Term Relation Between Variables (Panel Cointegration Tests)

In the econometric literature, one of the most important analyses proposed for non-stationary variables is cointegration. Cointegration, in other words; examining the long run relation among variables or the situation where the variables move together and in aggregate, can be the case only if the variables are non-stationary and become stationary when same level differences are taken.

As a result of the panel unit root tests performed above, the conclusion is that all variables in this study were not stationary and that the first differences of all variables were stationary. For this reason, the panel cointegration tests, recommended by Kao and Johansen were applied in order to examine whether all the variables are related in the long term, and the results are given below.

Table 4.5 Kao (Engle-Granger Based) Cointegration Test Results

	t-Statistic	**Prob.**
ADF	-2.073647	0.0191
Residual variance	0.050106	
HAC variance	0.045177	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D (RESID)
Method: Least Squares
Date 12/17/17 Time:14:09
Sample (adjusted): 2011Q2 2016Q4
Included Observations: 92 After Adjustments

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
RESID (-1)	-0.299279	0.068317	-4.380716	0.0000

R-squared	0.173391	Mean dependent var	-0.007858
Adjusted R-squared	0.173391	S.D. dependent var	0.259131
S.E. of regression	0.235597	Akaike info criterion	-0.042579
Sum squared resid	5.051037	Schwarz criterion	-0.015168
Log likelihood	2.958624	Hannan-Quinn criter.	-0.031516
Durbin-Watson stat	1.937711		

In the Kao test based on the Engle-Granger approach, since the probability value of 0.0191 which corresponds to the ADF test statistic is $< \alpha = 0.05$, it can be concluded that cointegration exists among the variables examined.

Table 4.6 Johansen Fisher Cointegration Test Results

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)				
Hypothesized No. of CE (s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Rob.
None	18.28	0.0192	27.52	0.0006
At most 1	7.099	0.5260	3.796	0.8750
At most 2	4.355	0.8238	1.742	0.9879
At most 3	3.965	0.8602	1.745	0.9879
At most 4	3.944	0.8622	2.492	0.9621
At most 5	4.517	0.8077	4.365	0.8227
At most 6	6.360	0.6070	6.360	0.6070

* Probabilities are computed using asymptotic Chi-square distribution.

The test used for econometric data by Johansen is adapted to panel data and two different Fisher statistics (from trace test and from max-eigen test) were obtained.

The hypothesis are given respectively as, no cointegration equation could be written, at most one cointegration equation could be written, at most two different cointegration equations could be written, and so on. The Prob. values corresponding to Fisher test statistics for Prob. (none) = 0,0192 & 0,0006 $< \alpha$ and Prob. (at most 1) = 0,5260 & 0,8750 $> \alpha$ =0,05. Thus it can be concluded that there is a cointegration among the variables and at most one cointegration equation can be written.

4.6 Testing Long-Run Relationships of Variables: Cointegrating Regression

Table 4.7 Cointegrating Regression Results

Dependent Variable: LOG (Y)				
Method: Panel Fully Modified Least Squares (FMOLS)				
Date 12/17/17 Time:14:25				
Sample (adjusted): 2011Q2 2016Q4				
Periods included: 23				
Cross-sections included: 4				
Total panel (balanced) observations: 92				
Panel method: Pooled estimation				
Cointegrating equation deterministics: C				
Coefficient covariance computed using sandwich method				
Long-run covariance estimates (Bartlett kernel, Newey-West fixed bandwidth)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
XR	1.97E-09	5.18E-10	3.799879	0.0003
XT	1.78E-09	6.99E-10	2.544062	0.0128
XO	-8.06E-10	3.60E-10	-2.235689	0.0281
XD	-6.19E-10	2.71E-10	-2.283201	0.0250
XF	1.30E-09	5.64E-10	2.301445	0.0239
XC	1.02E-05	4.91E-06	2.071746	0.0414
R-squared	0.760100	Mean dependent var		19.96636
Adjusted R-squared	0.733769	S.D. dependent var		0.712838
S.E. of regression	0.367807	Sum squared resid		11.09314
Long-run variance	0.209146			

Forecast: YF	
Actual: LOG (Y)	
Forecast sample: 2011Q1 2016Q4	
Included observations: 96	
Root Mean Squared Error	0.359604
Mean Absolute Error	0.285912
Mean Abs. Percent Error	1.448933
Theil Inequality Coefficient	0.009000
Bias Proportion	0.003472
Variance Proportion	0.049588
Covariance Proportion	0.946940

As we come to the conclusion that there is a long term relationship among all variables based on the two cointegration tests described above, the above given cointegrating regression model was derived using the Panel Fully Modified Least Squares (FMOLS) estimation method. Here, it should be noted that the Sandwich method, a

robust technique for estimating the coefficient covariance matrix against possible heterogeneous variances were used.

The estimated parameters of the independent variables used in the model are given under the heading "coefficient". From there, a cointegrating regression model can be written. Taking into consideration the Prob. values for the independent variables, all the Prob. values are smaller than $\alpha = 0.05$ significance level. Therefore, it can be stated that all independent variables in the model are significant and thus make a meaningful contribution to explain the dependent variable.

4.7 Testing the Validity of Model Assumptions

The validity of the model assumptions are examined for the suitability of the model and the outputs obtained are given below. As a result of examining whether the residuals are stationary, Prob values for all tests (Levin, Lin and Chu; ADF; PP) are smaller than α significance levels (0.01 and 0.05). Therefore, it can be said that the residuals are stationary.

Table 4.8 Stationarity Tests for Residuals

Method	**Statistic**	**Prob.****	**Cross-section**	**Obs**
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.04160	0.0000	4	88
Null: Unit root (assumes individual unit root process)				
ADF – Fisher Chi-square	29.7279	0.0002	4	88
PP – Fisher Chi-square	30.9117	0.0001	4	88

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Secondly, the normality test was performed for the residuals. Prob of the Jarque-Bera test statistic is 0,657366 > $\alpha = 0,05$. Therefore, it can be concluded that the residuals are coming from normal distribution.

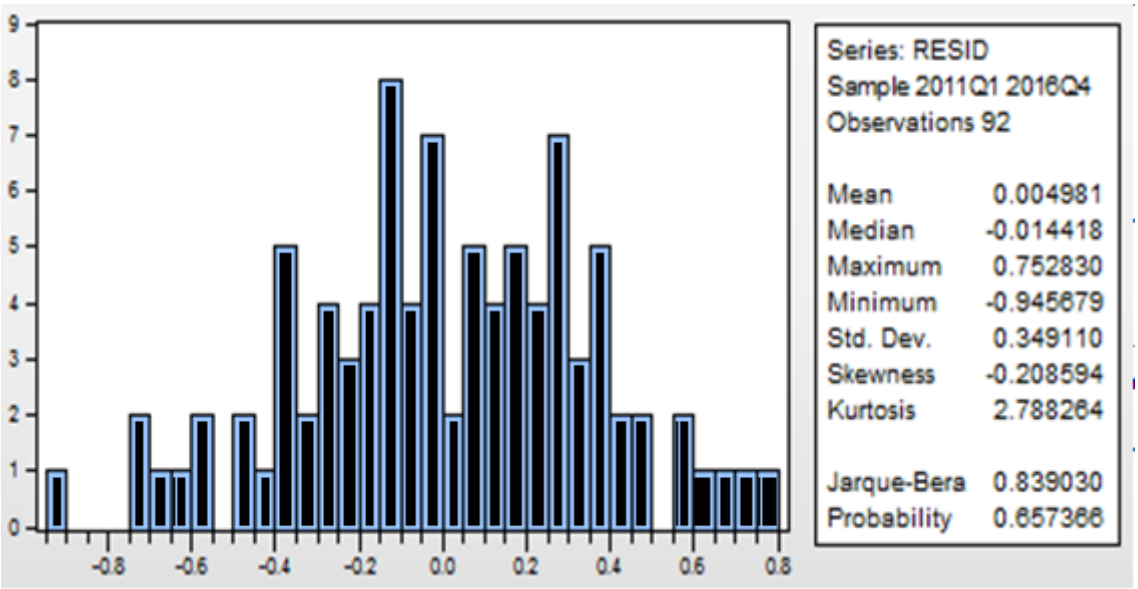


Figure 4.8 Histogram & Normality Test for Residuals

In case there are multiple independent variables in an analysis, it is necessary to test whether there is multicollinearity among these variables. After setting up the model, uncentred Variance Inflation Factor (VIF) values calculated to observe if there is a multicollinearity. The VIF values which are smaller than 10 displays that there is no multicollinearity to affect the results of the model adversely.

Table 4.9 Testing Multicollinearity among Variables

Variable	Coefficient Variance	Uncentered VIF
XR	2.68E-19	4.228412
XT	4.88E-19	3.104100
XO	1.30E-19	3.377285
XD	7.35E-20	6.829206
XF	3.18E-19	2.343658
XC	2.41E-11	2.481602

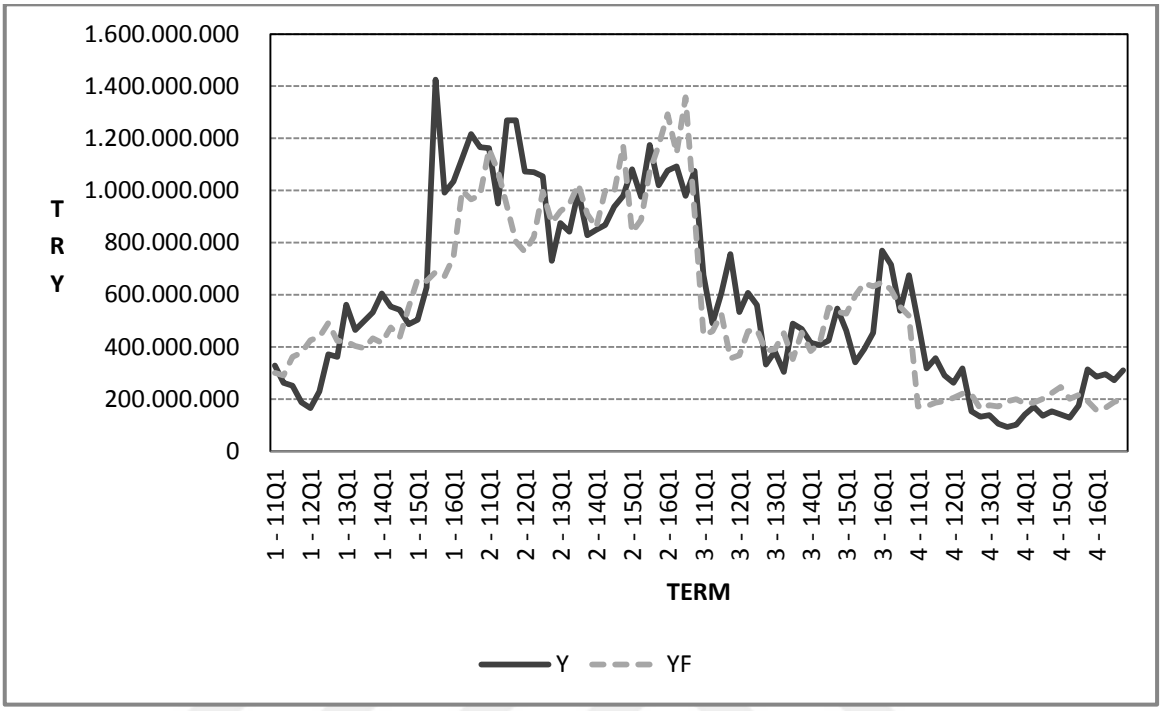
The correlations between the independent variables used in the study were presented in the following table.

Table 4.10 Correlations between Variables

Correlation Probability	XR	XT	XO	XD	XF	XC
XR	1.000000					
XT	0.568701 0.0000	1.000000				
XO	0.755730 0.0000	0.407380 0.0000	1.000000			
XD	0.844575 0.0000	0.683509 0.0000	0.767160 0.0000	1.000000		
XF	0.089428 0.3862	-0.033345 0.7471	-0.184678 0.0717	-0.013625 0.8952	1.000000	
XC	0.391328 0.0001	0.222458 0.0294	0.324716 0.0012	0.533278 0.0000	-0.091173 0.3770	1.000000 .....

According to this table, there are some strong positive relationships between some variables, for example 0,84 between XD and XR, and 0,77 between XD and XO. However, when the independent variables evaluated fundamentally, it is considered that there is no essential influence affecting one another. For instance, it is not the case that the revenue of the company increases due to the increase of the debts or vice versa. As a result, it is accepted that there the correlation seen between limited variables can be ignored. For this reason, it is evaluated that the time series for independent variables could be used in modelling the share prices of the football clubs that is the dependent variable in this study.

4.8 Comparing the Model Estimations with the Observed Values



Y:Forecast *F: Estimate*

Figure 4.9 Model Estimations vs. Observed Values

Table 4.11 Model Estimations vs. Observed Values

Time	Y	YF	%D	Time	Y	YF	%D	Time	Y	YF	%D	Time	Y	YF	%D
1 - 11Q1	328.800.000	300.692.727	-9%	2 - 11Q1	1.162.500.000	1.158.896.878	0%	3 - 11Q1	674.716.420	445.209.132	-34%	4 - 11Q1	498.750.000	171.446.996	-66%
1 - 11Q2	262.400.000	291.199.291	11%	2 - 11Q2	950.000.000	1.073.486.762	13%	3 - 11Q2	490.702.851	460.453.974	-6%	4 - 11Q2	317.500.000	172.427.776	-46%
1 - 11Q3	252.000.000	361.942.182	44%	2 - 11Q3	1.268.750.000	940.001.015	-26%	3 - 11Q3	607.802.395	527.042.032	-13%	4 - 11Q3	357.500.000	186.624.073	-48%
1 - 11Q4	187.600.000	378.525.602	102%	2 - 11Q4	1.268.750.000	803.938.372	-37%	3 - 11Q4	755.570.867	355.897.875	-53%	4 - 11Q4	291.250.000	192.880.672	-34%
1 - 12Q1	165.600.000	426.347.217	157%	2 - 12Q1	1.072.500.000	765.086.506	-29%	3 - 12Q1	534.475.776	368.746.988	-31%	4 - 12Q1	262.500.000	204.389.089	-22%
1 - 12Q2	229.600.000	438.733.614	91%	2 - 12Q2	1.070.000.000	821.887.674	-23%	3 - 12Q2	607.802.395	459.730.617	-24%	4 - 12Q2	317.500.000	220.511.201	-31%
1 - 12Q3	372.000.000	491.795.637	32%	2 - 12Q3	1.055.000.000	995.211.571	-6%	3 - 12Q3	560.404.960	466.408.623	-17%	4 - 12Q3	153.000.000	218.353.987	43%
1 - 12Q4	362.400.000	422.845.852	17%	2 - 12Q4	730.000.000	876.610.494	20%	3 - 12Q4	332.479.062	385.461.743	16%	4 - 12Q4	133.000.000	162.685.455	22%
1 - 13Q1	561.600.000	420.509.615	-25%	2 - 13Q1	875.000.000	920.428.750	5%	3 - 13Q1	383.361.602	391.420.785	2%	4 - 13Q1	138.500.000	177.263.574	28%
1 - 13Q2	465.600.000	404.281.675	-13%	2 - 13Q2	842.500.000	947.813.269	13%	3 - 13Q2	304.598.219	452.394.154	49%	4 - 13Q2	105.750.000	171.222.581	62%
1 - 13Q3	499.200.000	395.779.760	-21%	2 - 13Q3	996.250.000	1.024.259.524	3%	3 - 13Q3	489.177.000	352.967.487	-28%	4 - 13Q3	92.750.000	191.355.286	106%
1 - 13Q4	532.800.000	433.821.795	-19%	2 - 13Q4	828.750.000	909.415.906	10%	3 - 13Q4	468.614.250	455.963.822	-3%	4 - 13Q4	102.000.000	200.139.385	96%
1 - 14Q1	604.800.000	415.776.750	-31%	2 - 14Q1	850.000.000	859.147.442	1%	3 - 14Q1	415.584.000	384.121.534	-8%	4 - 14Q1	141.000.000	182.525.998	29%
1 - 14Q2	554.400.000	474.796.005	-14%	2 - 14Q2	867.500.000	999.203.001	15%	3 - 14Q2	408.008.250	415.473.241	2%	4 - 14Q2	171.000.000	187.103.453	9%
1 - 14Q3	542.400.000	436.418.776	-20%	2 - 14Q3	937.500.000	993.252.299	6%	3 - 14Q3	424.242.000	551.573.815	30%	4 - 14Q3	136.000.000	200.912.071	48%
1 - 14Q4	487.200.000	552.210.963	13%	2 - 14Q4	980.000.000	1.172.699.025	20%	3 - 14Q4	547.618.500	535.668.224	-2%	4 - 14Q4	154.000.000	223.512.375	45%
1 - 15Q1	504.000.000	659.883.836	31%	2 - 15Q1	1.081.250.000	839.178.430	-22%	3 - 15Q1	463.203.000	527.783.976	14%	4 - 15Q1	141.000.000	246.191.465	75%
1 - 15Q2	628.800.000	653.072.905	4%	2 - 15Q2	976.000.000	887.932.054	-9%	3 - 15Q2	340.908.750	596.054.268	75%	4 - 15Q2	129.000.000	201.159.039	56%
1 - 15Q3	1.425.600.000	686.758.611	-52%	2 - 15Q3	1.174.751.200	1.072.725.823	-9%	3 - 15Q3	391.341.600	644.389.168	65%	4 - 15Q3	175.000.000	216.377.799	24%
1 - 15Q4	991.200.000	671.349.712	-32%	2 - 15Q4	1.020.342.400	1.172.935.621	15%	3 - 15Q4	454.545.000	632.672.778	39%	4 - 15Q4	314.000.000	192.461.536	-39%
1 - 16Q1	1.034.400.000	744.495.786	-28%	2 - 16Q1	1.076.902.400	1.292.844.630	20%	3 - 16Q1	770.129.100	648.354.715	-16%	4 - 16Q1	286.000.000	157.496.172	-45%
1 - 16Q2	1.123.200.000	998.831.370	-11%	2 - 16Q2	1.092.173.600	1.142.429.547	5%	3 - 16Q2	715.150.800	619.482.664	-13%	4 - 16Q2	296.000.000	167.508.572	-43%
1 - 16Q3	1.216.800.000	966.077.896	-21%	2 - 16Q3	979.619.200	1.357.374.813	39%	3 - 16Q3	538.527.600	555.015.655	3%	4 - 16Q3	272.000.000	189.310.433	-30%
1 - 16Q4	1.166.400.000	981.987.015	-16%	2 - 16Q4	1.075.205.600	917.430.677	-15%	3 - 16Q4	675.302.355	518.787.988	-23%	4 - 16Q4	310.000.000	200.712.289	-35%

Max +/- %20 43 estimations out of 96

Min +/- %50 14 estimations out of 96

4.9 Testing Long-run Relationships of Variables: Cointegrating Regression (The case without TSPOR)

To explain the long run relation among variables, another trial is carried on, by excluding observations of Trabzonspor, whose values and characteristics are considerably different from other three clubs, from the panel data.

Table 4.12 Cointegrating Regression Results (The Case without TSPOR)

Dependent Variable: LOG (Y)				
Method: Panel Fully Modified Least Squares (FMOLS)				
Date 12/17/17 Time:14:47				
Sample (adjusted): 2011Q2 2016Q4				
Periods included: 23				
Cross-sections included: 3				
Total panel (balanced) observations: 69				
Panel method: Pooled estimation				
Cointegrating equation deterministics: C				
Coefficient covariance computed using sandwich method				
Long-run covariance estimates (Bartlett kernel, Newey-West fixed bandwidth)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
XR	1.48E-09	3.98E-10	3.703350	0.0005
XT	3.06E-09	5.05E-10	6.056649	0.0000
XO	-1.02E-09	2.75E-10	-3.722232	0.0004
XD	-8.96E-10	2.05E-10	-4.372722	0.0000
XF	2.02E-09	3.90E-10	5.174408	0.0000
XC	1.87E-05	3.43E-06	5.449046	0.0000
R-squared	0.625828	Mean dependent var		20.26644
Adjusted R-squared	0.575938	S.D. dependent var		0.502470
S.E. of regression	0.327208	Sum squared resid		6.423921
Long-run variance	0.124005			

Forecast: YF	
Actual: LOG (Y)	
Forecast sample: 2011Q1 2016Q4	
Included observations: 72	
Root Mean Squared Error	0.304666
Mean Absolute Error	0.237230
Mean Abs. Percent Error	1.177667
Theil Inequality Coefficient	0.007515
Bias Proportion	0.000244
Variance Proportion	0.041274
Covariance Proportion	0.958482

The above given cointegrating regression model is derived by using panel Fully Modified Least Squares estimation method. In this model, all the independent variables are more significant in explaining the dependent variable compared to the previous one.

Furthermore, examining the validity of model assumptions presented below, it can be concluded that no problem exist from the aspects of being stationary, normality of the residuals, and multicollinearity among the variables.

Table 4.13 Results of Testing Stationarity of Residuals (The Case without TSPOR)

Method	**Statistic**	**Prob.****	**Cross-section**	**Obs**
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.71435	0.0000	3	66
Null: Unit root (assumes individual unit root process)				
ADF – Fisher Chi-square	31.8180	0.0000	3	66
PP – Fisher Chi-square	33.0341	0.0000	3	66

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

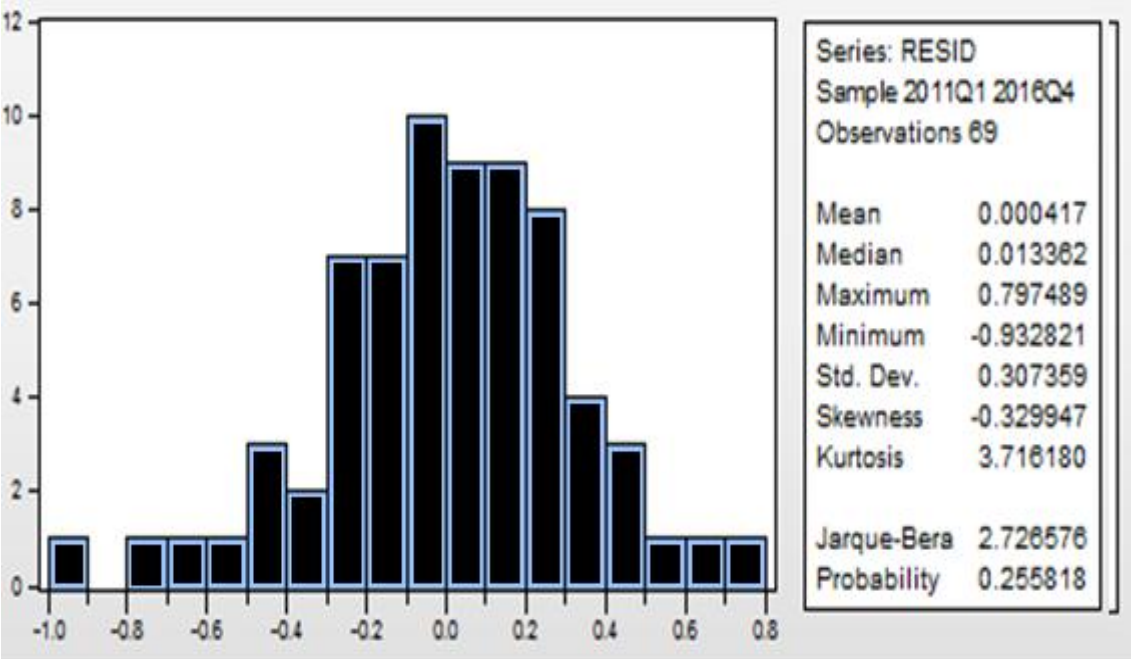
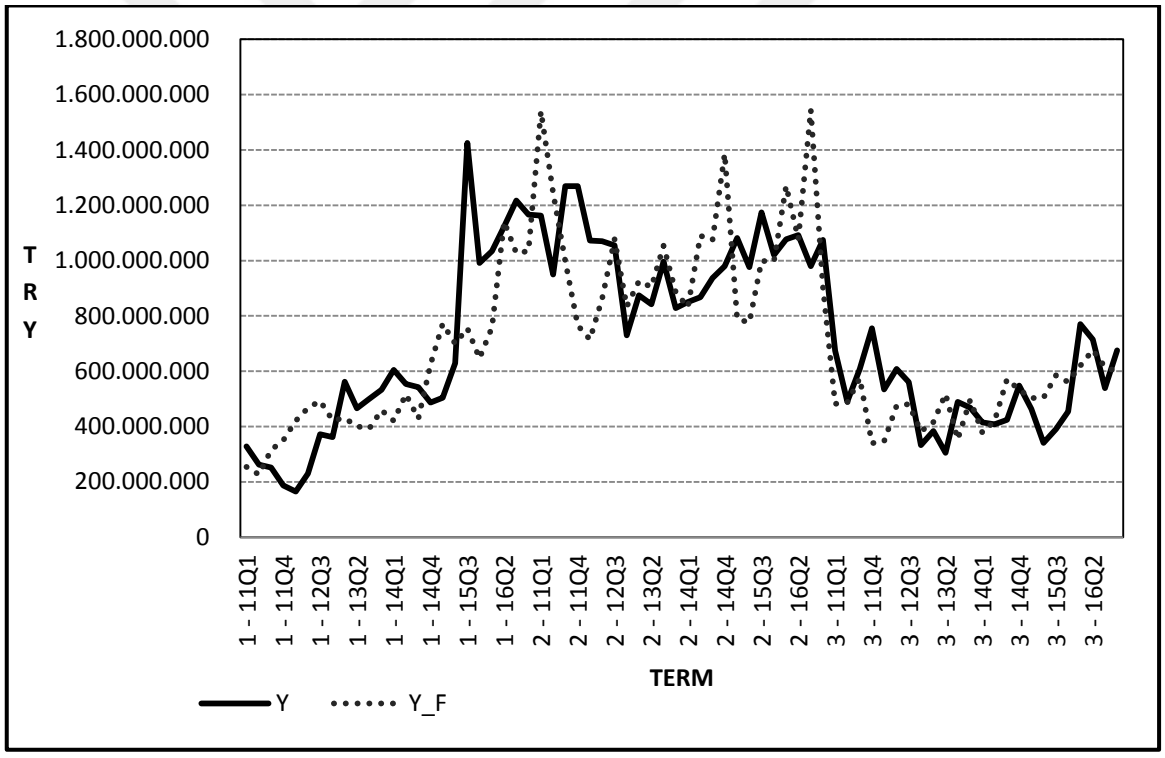


Figure 4.10 Histogram & Normality Test for Residuals (The Case without TSPOR)

Table 4.14 Testing Multicollinearity among Variables (The Case without TSPOR)

Variable	Coefficient Variance	Uncentered VIF
XR	1.59E-19	3.503416
XT	2.55E-19	2.558168
XO	7.54E-20	2.734437
XD	4.20E-20	5.696137
XF	1.52E-19	1.927343
XC	1.17E-11	2.379210

4.10 Comparing the Model Estimations with the Observed Values (The Case without TSPOR)



Y:Forecast *F: Estimate*

Figure 4.11 Model Estimations vs. Observed Values

Tablo 4.15 Model Estimations vs. Observed Values

Time	Y	Y_estimate	%D	Time	Y	Y_estimate	%D	Time	Y	Y_estimate	%D
1 - 11Q1	328.800.000	253.831.071	-23%	2 - 11Q1	1.162.500.000	1.540.102.195	32%	3 - 11Q1	674.716.420	481.990.740	-29%
1 - 11Q2	262.400.000	226.391.610	-14%	2 - 11Q2	950.000.000	1.245.390.980	31%	3 - 11Q2	490.702.851	487.085.185	-1%
1 - 11Q3	252.000.000	315.852.715	25%	2 - 11Q3	1.268.750.000	998.321.223	-21%	3 - 11Q3	607.802.395	575.328.528	-5%
1 - 11Q4	187.600.000	349.988.785	87%	2 - 11Q4	1.268.750.000	765.655.418	-40%	3 - 11Q4	755.570.867	340.353.371	-55%
1 - 12Q1	165.600.000	420.900.200	154%	2 - 12Q1	1.072.500.000	715.397.708	-33%	3 - 12Q1	534.475.776	346.813.166	-35%
1 - 12Q2	229.600.000	467.315.707	104%	2 - 12Q2	1.070.000.000	861.681.245	-19%	3 - 12Q2	607.802.395	475.179.123	-22%
1 - 12Q3	372.000.000	492.223.606	32%	2 - 12Q3	1.055.000.000	1.076.895.355	2%	3 - 12Q3	560.404.960	480.499.070	-14%
1 - 12Q4	362.400.000	423.131.039	17%	2 - 12Q4	730.000.000	833.546.130	14%	3 - 12Q4	332.479.062	382.513.599	15%
1 - 13Q1	561.600.000	430.445.978	-23%	2 - 13Q1	875.000.000	925.939.587	6%	3 - 13Q1	383.361.602	416.008.005	9%
1 - 13Q2	465.600.000	400.966.301	-14%	2 - 13Q2	842.500.000	904.206.368	7%	3 - 13Q2	304.598.219	517.856.560	70%
1 - 13Q3	499.200.000	392.250.417	-21%	2 - 13Q3	996.250.000	1.053.734.936	6%	3 - 13Q3	489.177.000	353.465.070	-28%
1 - 13Q4	532.800.000	458.566.142	-14%	2 - 13Q4	828.750.000	885.651.162	7%	3 - 13Q4	468.614.250	495.584.051	6%
1 - 14Q1	604.800.000	420.711.012	-30%	2 - 14Q1	850.000.000	831.853.705	-2%	3 - 14Q1	415.584.000	377.979.656	-9%
1 - 14Q2	554.400.000	517.438.982	-7%	2 - 14Q2	867.500.000	1.090.252.434	26%	3 - 14Q2	408.008.250	420.162.243	3%
1 - 14Q3	542.400.000	428.999.804	-21%	2 - 14Q3	937.500.000	1.074.659.806	15%	3 - 14Q3	424.242.000	571.553.222	35%
1 - 14Q4	487.200.000	624.266.034	28%	2 - 14Q4	980.000.000	1.386.399.960	41%	3 - 14Q4	547.618.500	532.728.272	-3%
1 - 15Q1	504.000.000	771.386.105	53%	2 - 15Q1	1.081.250.000	788.924.968	-27%	3 - 15Q1	463.203.000	503.555.197	9%
1 - 15Q2	628.800.000	700.281.332	11%	2 - 15Q2	976.000.000	776.208.314	-20%	3 - 15Q2	340.908.750	504.549.423	48%
1 - 15Q3	1.425.600.000	755.387.742	-47%	2 - 15Q3	1.174.751.200	998.580.422	-15%	3 - 15Q3	391.341.600	584.708.373	49%
1 - 15Q4	991.200.000	647.003.577	-35%	2 - 15Q4	1.020.342.400	998.324.716	-2%	3 - 15Q4	454.545.000	561.111.825	23%
1 - 16Q1	1.034.400.000	758.496.470	-27%	2 - 16Q1	1.076.902.400	1.269.938.857	18%	3 - 16Q1	770.129.100	620.424.080	-19%
1 - 16Q2	1.123.200.000	1.141.025.344	2%	2 - 16Q2	1.092.173.600	1.077.677.461	-1%	3 - 16Q2	715.150.800	676.780.870	-5%
1 - 16Q3	1.216.800.000	1.026.995.293	-16%	2 - 16Q3	979.619.200	1.544.142.535	58%	3 - 16Q3	538.527.600	615.449.166	14%
1 - 16Q4	1.166.400.000	1.033.739.823	-11%	2 - 16Q4	1.075.205.600	903.714.377	-16%	3 - 16Q4	675.302.355	599.432.423	-11%

Max +/- %20 35 estimations out of 72

Min +/- %50 7 estimations out of 72

4.11 Findings

Confirming the general view that revenue is the most important factor in determining the equity value of clubs, the Revenue variable in the model is found to be the most significant one. It also has the biggest positive coefficient value, that is 1,97E-09. In fact, many analysts and researchers also consider the brand value as the main reason for clubs being valuable, despite to their non-profit feature. However, the stronger brand a club has, the higher the revenues it can generate through broadcast rights, match day revenues, advertisement and sponsorship income, etc. A stronger brand also relates to a wider fan base in most cases, which directly affects the revenues. Therefore, Revenue figure is actually a good proxy for brand value. And if a club has a stronger brand, it has higher reputation, celebrity and fame, causing investors to be attracted to own these clubs.

The second most important factor is Team Value with probability value of 0,0128, almost significant at 0,01 level. It appears that the most important factor in achieving sportive success is also has great importance in the eyes of the investors. The higher team value also relates to higher revenues to a certain extend. The Table representing correlations between variables shows that the correlation between Revenue and Team Value variables as 0,58 with probability of less than 1%. Although the correlation between variables may be viewed as problematic, it is ignored here considering its relatively low level and lack of direct causality. The brand and team values may be seen as complementing each other to build up the total fame of the club, with some interaction in between. Thus, the reflection of higher team value to increased attractiveness for the ownership of the club is confirmed by the model.

To include the contribution of management's economic-wise performance, the Net Profit / Loss, Operating Profit / Loss and Free Cash Flow (FCF) figures were tried as proxy, being the third variable. The Free Cash Flow here is the balance after “Cash Flow from Fixed Capital Investments” and before the “Cash Flow from Financing Activities” in the Cash Flow Table prepared according to IFRS. The trials unveiled that only FCF results a meaningful relation with the dependent variable with a probability of 0,0239. That means, investors see the management as adding value to the club, to the extend that the company leaves cash available to all capital providers (including debt providers), after all operating expenses have been paid and necessary capital investments have been made.

Confirming the fact that clubs are not profit oriented organizations, Profit / Loss figures did not result meaningful and significant coefficients in the trials.

The XU100 Index of Borsa Istanbul is chosen as a proxy to reflect the general investment appetite of the investors in the market. Since this variable was same for all clubs' observations at time t, it is named as the Common Variable in the study. The model confirms that the general investment atmosphere is effective in determining the equity values as predicted with significance level below 5%.

The financial leverage of the company is an important factor in valuing equity. In relation to this, while previous studies used the leverage ratios, the total debt and financial debt values are tested as a proxy for the leverage in this study. Trials brought out that Total Debt figure was a better proxy for leverage and it has a negative coefficient as expected, with a probability value of 0,0250.

One of the most interesting results of the study is related with the other assets in the model. This variable represents the book value of assets of the clubs except the intangible fixed assets (unamortised part of player costs). By this variable, it is aimed to see the effect of the investments that the club makes to assets other than player transfers, to the equity value of the club. Surprisingly, the sign of the coefficient is negative and it is found meaningful at 5% significance level. This result indicates that club investors adversely value the investments made to areas other than the team. It seems that investors would be happier if the club had a higher valued team, rather than owning assets such as stadium, training facilities, etc.

In order the obtained model works more consistently, it is important that the current sample data are derived from similar entities. Considering the four clubs studied, Besiktas, Fenerbahce and Galatasaray are more like one another and usually referred as the Three Bigs. Therefore, another model is derived using the data that excludes Trabzonspor observations. The results showed that all the conclusions remain same while the significance of the variables substantially improved, where all probabilities have fallen below 1%. That means, using a model derived from the like-clubs would work much better in predictions.

The study contributes to the existing literature by proposing a model for the equity valuation of clubs, founded on asset based valuation, taking into account the marked to market values of intangible assets namely; team value, brand value, and contribution of economic-wise quality of the management.

The model provides shareholders a tool to evaluate the fairness of the share prices in the market, based on the factors included in the model and the data used in testing. It is obvious that the model coefficients should be updated with reiterations using renewed data as the time passes. Using more in depth data with higher number of clubs would also increase the power of the model. However, like no other tool, the model is not an ultimate one alone, to conclude about a share price whether it is overvalued or undervalued. Thus shareholders should use this model along with others available and applicable.

An important implication for managers is, they should try to maximise the value of their team, the core asset of the club decisive its sportive competitiveness, with the limited sources of the clubs. It seems investors appreciate when the team value is increased. While doing this however, managers should also be cautious about the trade-off between increased sportive competitiveness and the financial distress that the increased indebtedness causes. The model foresees that FCF is the measure for economic-wise management that investors regard in valuation.

There is also implication for regulators as well. The model suggests that club management is penalised by investors (as it adversely affect the club value) for the investments made in areas other than the team. Therefore, government authorities should take necessary actions to provide incentives for investments in sports facilities. Government could also make the necessary investments itself and provide the facilities to clubs with favourable conditions if the sportive success of the country is targeted.

6. CONCLUSION

This study examines the difficulties in equity valuation of football clubs and suggests a model to estimate equity values of major clubs in Turkish Super League.

Football clubs, like other sport clubs, are set up to compete in their relevant sporting field, football, no matter in what form they were established. Therefore, even if some clubs are organised as limited liability companies rather than an association, profit maximization is not an objective. This is true for those publicly traded club companies whose shares are bought and sold every day. These companies rarely announce profits, and if they do, the profit figures are small relative to their business volume compared to other businesses and unstable. In fact, most of the times they announce losses due to over-spending to player transfers and wages in the hope to ensure a possible championship. This outcome is not surprising, since there is always a tendency to spend if there is an income left over expenses, due to the main objective of clubs; success on the pitch.

As a result of not being a profit maximising entity, football clubs are not suitable for valuation with the methods commonly taught in finance courses. Lacking dividends and predictable profits, make dividend yield and P / E models impossible to use. Rare football companies generate positive cash flows and these are transitory in general. Thus, no discounted cash flow model is applicable. Negative book values are common in the sector, making P / BV ratio comparison non sense. P / S ratio may be an alternative but finding a peer club with similar leverage and asset structure may be hardly difficult. Therefore, there are some attempts in literature to value club shares although limited. This study suggests a model to estimate and factors affecting the equity value of football clubs.

The proposed model for the equity valuation of clubs, founded on asset based valuation, takes into account the marked to market values of intangible assets namely; team value, brand value, and contribution of economic-wise quality of the management. While the study uses some independent variables that used before, some new variables such as “Other Assets except the Fixed Intangibles”, “Total Debt” (previous studies used leverage ratios), Free Cash Flow and Stock Exchange Price Index were also introduced. The model is tested by employing a cointegrating regression approach using fully

modified least squares method on the panel data gathered from the four clubs publicly traded at Borsa Istanbul between 2011/12 and 2016/17 seasons inclusive. Although the technique is relatively new, it is commonly used by economists to avoid spurious regression. The assumptions of the model are also examined, confirming the validity of the model. All variables were found to be significant predictors of football clubs' equity value with expected sign. As a test of robustness considering that the top three clubs are more likely to be comparable to one another, an alternative model test is done by excluding TSPOR data. The results show an increase in significance level of the independent variables as expected.

The study provides investors a new tool to judge the fairness of the value of football club shares and hence has important policy implications.

An interesting finding is that investors penalise the clubs for the investments made to assets other than the team, by affecting the share prices adversely. The implication of this finding is, managers should minimize the investments to assets other than team. It appears that investors are happier if a club directs most of its sources to strength its team, the main asset assumed to reflect the sportive competitiveness of the club. This finding also explains the difficulty of clubs spending on infrastructure facilities and the need for government incentives for these expenditures.

Club managers should also direct the club so that the operational and investment activities result a positive cash flow. The model predicts that free cash flow derived from operational and investment activities is positively reflected to club share values whereas tests with Profit (Loss) figures showed no significant relation. This result is consistent with the not for profit feature of football clubs.

Another implication of the study is, the necessity to limit the borrowings of clubs. As the clubs are not for profit entities, there is no Return on Equity concept. Therefore, borrowing today is actually discounting tomorrow's income to cash today. In other words, when a club spends borrowed money, it actually spends from tomorrow's revenues. In practice, clubs tend to overspend and turn to borrowing in order to achieve less certain sportive success, leaving the burden to following years (and managements). Accordingly, the total debt factor in the proposed model reflects negatively to club share value. It divulges that debt is a deprecating factor and should be limited, particularly for those clubs belong to or set up as association where managements come and go with

congress decision and bear no responsibility for the debt they made and left. For a non-profit entity, borrowing can only be justified if it is related with a project with positive net present value.

The study provides investors a new tool to judge the fairness of the value of football club shares. However, like no other valuation tools, it is not an ultimate one and has its own limitations. First, in order to apply the model, club shares already traded in the market are required. Secondly, the data used in testing should be updated continuously to reflect the current market dynamics. Thirdly, once tested with data from a certain league, the model cannot be applied to clubs from other leagues. Nevertheless, considering the current paucity of methods available for valuing club shares, the model is thought to be a worthy one.

This study covers the football clubs from the equity investors' perspective. However, the importance and value of clubs from social perspective and implications derived from the proposed model cannot be ignored. Sports in general play a significant role in lowering the tensions and building a sense of union among the society. It is also an effective tool to prevent youth from harmful habits and creating a healthy society. All these positive external effects of sports help lowering crime rates, and reducing the health expenditures of governments, eventually increasing the overall welfare of societies. Considering the social functioning of sports and the finding that the proposed model suggests less investment is better for clubs whose main objective is sportive success, governments should be more active in investing or providing sufficient incentives for sports facilities and infrastructures.

The study has some important constraints. First the model is tested with limited data. Including the data from different markets would result several problems. First of all, clubs in different economies have differing organisational structures. In addition, differing accounting and financial reporting applications adversely affect the comparability of the figures of the clubs. The dissemination dates for financial information are different for each market. Moreover, the financial years are different in some cases. All these differences prevent to obtain information at certain time t from different sources and process them. Consequently, the data set includes observations from the four clubs traded in Borsa Istanbul.

In Turkey, the most popular four sports clubs, namely Besiktas, Fenerbahce, Galatasaray, and Trabzonspor, formed their football branches as a company and went public in the beginning of 2000's. While Besiktas formed its football branch as a company with its entire revenues and expenses, other three clubs formed some unusual structures which were gathering some football related revenues but excluding expenses with the purpose of creating profitable and thus more valuable economic entities during IPO's. These structures, although formed as a company, were essentially revenue sharing entities. The three clubs, considering that these structures were not to the benefit of themselves in the long term, they all shifted the structures of their publicly offered companies to a football club form with its entire revenues and expenses in 2010 and 2011. Therefore, only the data, following the mentioned transformation, can be considered comparable and relevant for football clubs.

Another constraint is the times in a year that the publicly traded companies disseminate financial statements. All the clubs subject to study have financial years beginning in June and ending in May next year. To create the data set used, all disseminated financial figures are included relating to the period from June 2011 to May 2017. Thus, the data include four observations in each financial year for each club. If it was possible to access the clubs financial data more often, it would be possible to increase the number of observations.

Limited data restricted us to include more factors in the model for testing. For example, only Team Value is used as a factor in the model. If there was another important asset, big in amount and differing from market value, it should be included in the model. However, the limited length of the data restricted us to include more factors.

Revenues appear to be the most important factor determining the equity value of clubs. To improve the strength of the model, only consistent revenues could be used, leaving the transfer revenues out. Decomposing revenues was not an easy task however, due to different accounting and reporting practices among the clubs. Some clubs present transfer amount in revenues, and cost of the outgoing player in the cost of goods sold, while some clubs net transfer revenue and cost and present the balance as other income on income statements. Therefore, decomposing the revenues and using only consistent items in the model can be subject to a further study.

This study puts forward five club specific factors and one common factor for estimating the market value of clubs. Further study may be carried on other factors affecting the value of clubs such as recent sportive success, important transfers and management changes.

The frequency of the data used in the study was four times in a year. The limiting factor here with the least frequency was the financial data which is disseminated each quarter as regulatory requirement for publicly traded companies. Other variables in fact could be obtained more often, for example, team values are updated twice in a month at Transfermarkt website. Therefore a further study may also be repeated with more often observations but unbalanced variables.

Finally, although the study focuses on football clubs due to their popularity, the ideas mentioned here may be applied to all other sporting entities that put sporting success in front of financial return and sustainability.

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APPENDIX – 1: BJKAS Data

Data	Term	XR	XT	XO	XD	XF	XC	Y
B1	1Q1	116.117.876	309.953.800	111.751.326	417.595.461	-73.298.440	59.300	328.800.000
B2	1Q2	150.102.546	272.773.800	127.386.366	452.057.856	-57.255.523	57.357	262.400.000
B3	1Q3	158.285.565	300.494.935	93.614.684	428.312.742	2.313.082	60.583	252.000.000
B4	1Q4	153.475.240	322.188.990	70.095.464	479.067.612	-33.624.954	67.937	187.600.000
B5	2Q1	169.484.179	364.344.795	94.994.484	508.996.000	-7.305.635	69.603	165.600.000
B6	2Q2	149.261.551	318.461.760	89.146.819	507.917.878	-14.705.547	84.755	229.600.000
B7	2Q3	231.798.014	340.720.185	83.413.672	510.896.370	-83.098.027	84.581	372.000.000
B8	2Q4	147.426.786	392.321.670	68.254.920	320.472.639	-106.408.487	67.232	362.400.000
B9	3Q1	147.917.316	384.893.510	72.565.633	377.308.896	-137.377.751	75.640	561.600.000
B10	3Q2	145.505.061	432.150.565	66.988.427	403.744.591	-142.161.880	65.764	465.600.000
B11	3Q3	146.169.012	385.888.440	81.210.089	459.459.633	-113.068.018	72.429	499.200.000
B12	3Q4	142.106.681	374.750.545	64.504.086	468.702.791	-64.904.240	77.271	532.800.000
B13	4Q1	152.829.920	381.650.645	72.530.627	524.922.130	-61.929.005	73.494	604.800.000
B14	4Q2	179.199.520	358.992.480	95.935.206	562.026.394	-50.187.269	88.006	554.400.000
B15	4Q3	203.487.515	321.012.510	106.114.087	619.372.524	-31.052.337	83.514	542.400.000
B16	4Q4	222.818.633	481.842.270	102.741.329	667.199.696	-50.295.556	79.910	487.200.000
B17	5Q1	286.293.224	546.862.030	155.913.635	749.877.402	-21.107.529	79.300	504.000.000
B18	5Q2	313.675.826	529.187.505	126.718.372	722.276.312	-13.197.401	71.073	628.800.000
B19	5Q3	337.655.432	493.207.840	150.191.855	783.800.240	-18.885.988	83.988	1.425.600.000
B20	5Q4	407.548.058	445.746.030	223.864.991	841.996.961	38.962.009	78.525	991.200.000
B21	6Q1	444.469.765	536.315.200	339.253.018	914.411.113	49.117.956	77.976	1.034.400.000
B22	6Q2	489.566.127	576.187.100	334.433.595	915.391.278	116.100.911	82.300	1.123.200.000
B23	6Q3	525.865.395	471.252.150	361.394.492	970.051.857	151.761.022	91.240	1.216.800.000
B24	6Q4	582.858.585	420.139.800	493.006.993	1.068.439.780	139.543.216	108.715	1.166.400.000

APPENDIX – 2: FENER Data

Data	Term	XR *(TRY)*	XT *(TRY)*	XO *(TRY)*	XD*(TRY)*	XF*(TRY)*	XC	Y*(TRY)*
F1	1Q1	130.627.685	297.708.335	55.456.223	63.338.989	55.683.377	59.300	1.162.500.000
F2	1Q2	186.491.717	271.644.555	90.915.051	63.109.907	-15.129.649	57.357	950.000.000
F3	1Q3	221.596.525	277.342.080	188.907.329	172.543.927	-90.682.593	60.583	1.268.750.000
F4	1Q4	255.082.828	218.669.280	285.116.933	247.138.403	-143.902.782	67.937	1.268.750.000
F5	2Q1	258.485.609	216.768.150	310.107.830	315.924.020	-149.357.799	69.603	1.072.500.000
F6	2Q2	238.083.346	196.509.600	325.670.051	343.042.332	-131.734.431	84.755	1.070.000.000
F7	2Q3	289.334.377	217.620.000	326.572.510	355.034.748	-83.298.429	84.581	1.055.000.000
F8	2Q4	321.294.988	263.856.125	425.290.780	424.852.689	-62.212.180	67.232	730.000.000
F9	3Q1	335.107.249	293.171.320	466.286.282	562.692.056	-60.448.907	75.640	875.000.000
F10	3Q2	354.752.650	310.104.760	413.835.858	516.076.571	-68.185.885	65.764	842.500.000
F11	3Q3	318.953.856	294.425.040	226.321.242	587.496.612	-67.290.546	72.429	996.250.000
F12	3Q4	309.077.354	235.312.583	222.925.221	586.343.490	-103.602.898	77.271	828.750.000
F13	4Q1	304.438.155	270.646.423	277.515.911	678.601.722	-81.259.385	73.494	850.000.000
F14	4Q2	299.667.203	262.576.602	236.472.210	659.787.507	-94.867.936	88.006	867.500.000
F15	4Q3	307.181.118	319.198.880	233.860.185	709.157.959	-131.228.201	83.514	937.500.000
F16	4Q4	317.610.262	386.052.700	242.559.809	733.531.883	-65.377.264	79.910	980.000.000
F17	5Q1	404.582.223	404.202.370	516.899.667	1.143.676.750	-109.155.595	79.300	1.081.250.000
F18	5Q2	444.483.172	385.670.670	474.056.424	1.113.445.225	-77.289.083	71.073	976.000.000
F19	5Q3	504.877.349	381.041.790	554.485.209	1.109.952.702	-69.861.433	83.988	1.174.751.200
F20	5Q4	548.229.359	320.983.350	437.903.626	955.145.813	-87.913.412	78.525	1.020.342.400
F21	6Q1	511.162.043	401.191.020	468.516.938	977.353.082	-32.679.585	77.976	1.076.902.400
F22	6Q2	524.672.440	465.840.500	512.747.902	1.090.011.748	-189.615.718	82.300	1.092.173.600
F23	6Q3	499.415.864	538.007.000	524.140.278	1.124.351.051	-163.985.984	91.240	979.619.200
F24	6Q4	465.677.922	363.774.510	592.397.363	1.214.139.052	-227.850.848	108.715	1.075.205.600

APPENDIX – 3: GSRAY Data

Data	Term	XR *(TRY)*	XT *(TRY)*	XO *(TRY)*	XD*(TRY)*	XF*(TRY)*	XC	Y*(TRY)*
G1	1Q1	129.927.315	292.047.600	114.097.449	426.322.793	-30.464.013	59.300	674.716.420
G2	1Q2	144.417.960	279.651.430	75.242.304	415.809.456	-23.424.109	57.357	490.702.851
G3	1Q3	178.609.990	285.124.050	81.281.933	393.472.329	-10.902.871	60.583	607.802.395
G4	1Q4	224.787.875	314.698.475	513.946.416	833.361.324	-3.153.941	67.937	755.570.867
G5	2Q1	256.392.496	322.812.055	584.472.166	684.009.858	-75.336.163	69.603	534.475.776
G6	2Q2	289.652.683	301.694.400	544.132.028	641.744.569	-90.948.599	84.755	607.802.395
G7	2Q3	306.053.085	333.244.665	554.203.154	693.734.228	-115.478.429	84.581	560.404.960
G8	2Q4	248.321.965	410.861.880	558.828.058	724.611.659	-127.451.940	67.232	332.479.062
G9	3Q1	243.988.668	417.914.940	634.090.303	876.231.516	-65.636.796	75.640	383.361.602
G10	3Q2	226.681.273	501.716.020	519.482.914	818.545.071	-63.837.962	65.764	304.598.219
G11	3Q3	223.318.427	434.233.380	530.699.205	767.853.184	-226.936.531	72.429	489.177.000
G12	3Q4	275.013.117	479.386.193	523.562.220	711.081.734	-239.350.645	77.271	468.614.250
G13	4Q1	284.122.794	485.490.203	574.788.257	818.072.050	-281.143.380	73.494	415.584.000
G14	4Q2	312.452.869	438.542.720	573.974.538	840.773.948	-302.819.872	88.006	408.008.250
G15	4Q3	370.794.566	379.327.690	536.590.012	827.402.620	-86.349.214	83.514	424.242.000
G16	4Q4	414.272.337	427.252.000	681.095.585	929.050.415	-73.983.114	79.910	547.618.500
G17	5Q1	432.687.210	409.855.550	671.869.198	1.004.196.807	-54.615.816	79.300	463.203.000
G18	5Q2	536.502.110	393.726.025	702.182.066	982.085.383	-23.436.944	71.073	340.908.750
G19	5Q3	512.272.466	330.849.500	560.759.525	1.019.190.637	-11.908.639	83.988	391.341.600
G20	5Q4	508.853.220	329.069.820	552.418.823	1.018.859.492	19.060.890	78.525	454.545.000
G21	6Q1	478.879.519	364.625.910	556.136.437	1.098.342.647	79.175.142	77.976	770.129.100
G22	6Q2	392.624.948	405.533.860	529.025.616	1.143.868.171	89.806.702	82.300	715.150.800
G23	6Q3	361.289.722	394.394.000	520.662.496	1.232.952.618	35.131.238	91.240	538.527.600
G24	6Q4	348.997.589	372.718.080	564.382.668	1.317.350.166	-38.148.780	108.715	675.302.355

APPENDIX – 4: TSPOR Data

Data	Term	XR *(TRY)*	XT *(TRY)*	XO *(TRY)*	XD*(TRY)*	XF*(TRY)*	XC	Y*(TRY)*
T1	1Q1	90.725.274	201.931.525	146.548.095	170.077.424	9.416.205	59.300	498.750.000
T2	1Q2	129.382.333	189.832.440	165.514.725	169.526.940	-1.476.244	57.357	317.500.000
T3	1Q3	135.424.789	207.769.920	154.688.253	173.758.228	-4.242.108	60.583	357.500.000
T4	1Q4	135.931.333	189.803.640	162.934.010	178.693.081	-5.194.425	67.937	291.250.000
T5	2Q1	117.738.567	215.152.200	147.620.800	177.969.737	9.404.333	69.603	262.500.000
T6	2Q2	82.986.197	215.926.620	150.905.607	196.197.063	11.446.931	84.755	317.500.000
T7	2Q3	77.769.444	193.233.937	114.843.665	202.691.586	24.922.924	84.581	153.000.000
T8	2Q4	66.704.358	174.957.900	106.555.077	203.119.617	-28.890.201	67.232	133.000.000
T9	3Q1	72.417.644	179.588.060	108.547.885	237.054.365	-26.281.891	75.640	138.500.000
T10	3Q2	85.635.438	194.298.620	104.351.658	228.800.873	-22.281.773	65.764	105.750.000
T11	3Q3	105.581.407	225.415.410	114.770.353	236.371.682	-51.652.139	72.429	92.750.000
T12	3Q4	106.903.417	191.923.200	104.818.131	240.417.186	-15.450.232	77.271	102.000.000
T13	4Q1	109.455.910	265.260.229	145.466.993	350.722.838	-83.216.915	73.494	141.000.000
T14	4Q2	112.317.767	226.535.122	193.421.907	367.992.262	-91.225.790	88.006	171.000.000
T15	4Q3	103.908.028	262.650.902	155.465.599	288.591.986	-99.279.877	83.514	136.000.000
T16	4Q4	104.238.738	332.766.774	90.973.378	327.490.766	-106.885.561	79.910	154.000.000
T17	5Q1	110.607.635	381.327.135	118.863.087	407.713.567	-48.245.917	79.300	141.000.000
T18	5Q2	97.074.505	320.213.355	103.387.256	430.687.239	-33.828.773	71.073	129.000.000
T19	5Q3	104.028.329	258.164.050	77.212.455	417.022.572	-27.259.255	83.988	175.000.000
T20	5Q4	96.377.303	242.212.230	74.642.357	391.878.395	-54.795.309	78.525	314.000.000
T21	6Q1	117.325.059	212.526.580	132.172.569	453.165.011	-131.082.727	77.976	286.000.000
T22	6Q2	133.454.673	234.867.600	160.495.640	502.662.652	-131.357.227	82.300	296.000.000
T23	6Q3	140.375.437	226.584.500	143.283.112	520.566.944	-108.500.507	91.240	272.000.000
T24	6Q4	158.496.112	262.994.490	243.099.649	654.434.276	-151.957.107	108.715	310.000.000

CURRICULUM VITAE

Engin Dumanlı, born in 1963, graduated from Dokuz Eylul University Business School with finance major in 1984. Then, he completed the Business Administration Postgraduate Programme at Istanbul University in 1985. After some professional experince in banking sector, he received a scholarship from The British Council to study in the UK and achieved to receive MSc degree in International Banking and Financial Studies from Heriot-Watt University, Edinburgh in 1993. He also completed the Advanced Studies in Football Management Programme of University of Lausanne, organised in partnership with UEFA in 2017.

His professional carrer includes officer and managerial positions in several banks and capital market institutions in Turkey. Since 2008, he serves as the General Manager of Fenerbahce Football Inc. Co., the football organisation of one of the most popular sport clubs in Turkey.