# VALUATION OF A PRIVATELY-HELD COMPANY BY IMPLEMENTING DISCOUNTED CASH FLOW MODEL

SELMAN UYSAL

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VALUATION OF A PRIVATELY HELD COMPANY BY IMPLEMENTING DISCOUNTED CASH FLOW MODEL

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Approval of the Graduate School of Social Sciences

_____

Yrd. Doç. Dr. Alp Limoncuoğlu

Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Arts.

_____

Doç.Dr. Ayla Oğuş Binatlı

Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Financial Economics

_____

Doç Dr. Hasan Fehmi Baklacı

Supervisor

Examining Committee Members

Doç Dr. Hasan Fehmi Baklacı _____

Yrd. Doç. Dr. Habil Gökmen _____

Yrd.Doç.Dr.Arıkan Tarık Saygılı _____

ABSTRACT

VALUATION OF A PRIVATELY HELD COMPANY BY IMPLEMENTING

DISCOUNTED CASH FLOW MODEL

UYSAL, SELMAN

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The objectives of this thesis are to review the theoretical literature on company valuation, to define Discounted Cash Flow (DCF) Valuation in detail based on findings and to implement Discounted Cash Flow Valuation on a privately held firm. This implementation is composed of appropriate successive steps.

According to DCF model, free cash flows of the company is discounted by weighted average cost of capital (WACC). Free cash flows of the company are projected based on the industry, revenue, operating cost, capital expenditure, working capital and tax forecast. An overview of the industry, company's historical performance and its business plan are analyzed in the projection process. WACC is calculated based on the estimates of cost of equity and cost of debt. Cost of equity is estimated in accordance with the Capital Asset Pricing Model (CAPM) model. One of the variables in the CAPM formula is beta, which is measure of risk. Beta shows the sensitivity of the securities' returns to variations in the market returns. Beta is forecasted by using regression model. For publicly traded firms, we know the historical market datas, thus there is no difficulty for estimating beta of these firms. On the other hand, privately held firms do not have a market price history. Consequently there are difficulties for estimating beta of privately held firms. By means of the model explained in the study, the WACC of the company can be determined by calculating beta for privately held firm. Finaly, equity value of the company is calculated as the sum of the discounted value of cashflows throughout the defined projection period and the value of cashflows after the defined projection period less net financial debt.

Key Words: discounted cash flow, privately-held company, beta

# ÖZET


İNDİRGENMİŞ NAKİT AKIM MODELİ UYGULANARAK BİR HALKA AÇIK OLMAYAN İŞLETMENİN ŞİRKET DEĞERLEMESİ

SELMAN UYSAL

TEZ DANIŞMANI: DOÇ. DR. HASAN FEHMİ BAKLACI

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Aralık, 2009, 70 sayfa

Bu tezin amacı, şirket değerlemesi ile ilgili akademik literatürün incelenmesi, bu incelemenin sonuçları kullanılarak İndirgenmiş Nakit Akım yönteminin detaylı olarak tanımlanması ve bu değerleme yönteminin halka açık olmayan bir şirkete uygulanmasıdır. Uygulama imkan verdiği ölçüde birbirini takip eden adımlardan oluşmaktadır.

İndirgenmiş nakit akım (INA) yönteminde firmanın serbest nakit akımları ağırlıklı ortalama sermaye maliyeti (AOSM) ile iskontolanmaktadır. Firmanın serbest nakit akımları, şirketin yer aldığı endüstri, satışları, maliyetleri, yatırım harcamaları, işletme sermayesi ve hesaplanan vergi tahminlerine bağlı olarak projekte edilmektedir. Şirketin yer aldığı endüstri, şirketin geçmiş yıl performansları ve işletme planı projeksiyon sürecinde analiz edilmektedir. AOSM, özkaynak maliyeti ve borçlanma maliyeti tahminlerine bağlı olarak hesap edilir. Özkaynak maliyeti, Finansal Varlıkları Fiyatlama Modeli (FVFM) ' ne uygun olarak tahminlenir. FVMF' nin formülündeki değişkenlerin bir tanesi de; riski ölçmeyi yarayan beta dır. Beta; menkul kıymetlerin getirilerinin, piyasa getirisindeki değişmelere olan duyarlılığını göstermektedir. Beta katsayısı, regresyon modeli kullanılarak tahmin edilmektedir. Halka açık olan şirketlerin piyasa verilerini bildiğimizden, bu şirketlerin beta katsayılarının tahmininde bir zorlukla karşılaşılmaz. Diğer yandan halka açık olmayan şirketlerin beta tahmininde zorluklar yaşanmaktadır. Çalışmanın önerdiği uygulama ile elde edilen bulgular neticesinde, değerlemeyi yapan kişi firmanın AOSM oranını kullanırken halka açık olmayan bir şirket için beta hesaplayabilmektedir. Sonuç olarak, belirli bir surede ve bu süre sonrasında tahminlenen serbest nakit akımları toplanarak iskonto edilir, bu değerden şirketin net finansal borcunu çıkardığımızda şirket değerine ulaşılır.



Anahtar Sözcükler: indirgenmiş nakit akım, halka açık olmayan işletmeler, beta

To my country…

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## 1. Introduction

What makes privately held companies[1] different from the traded firms in terms of valuation? Why is valuation difficult for privately held companies? Does the valuation of privately held companies require new concepts? How can the value of privately held companies be estimated in practice? This paper attempts to answer these questions by means of analyzing the valuation of privately held company Seferkaya by using Discounted Cash Flow (DCF) model. The paper contains a case study in order to demonstrate the practical implications inherent in the DCF model of privately held firms.

Privately held firms are not traded on the stock market which means that there is no market value available for these firms. Accordingly, it is difficult to use a valuation method that assesses a privately held firm's fair market value. Privately held firms can be valued under standards of value. The most acceptable standard is fair market value which is the price which the asset would change hands between a willing buyer and the seller with the reasonable knowledge of the relevant facts (Feldman, 2005). A privately held firm's value is based on the future benefits it can generate to its owners. DCF method would be the most appropriate valuation method since ''future benefits (free cash flows) '' is a key value driver of DCF method[2].

[1]According to the Free Encyclopedia firms that are not listed on a stock exchange is defined as privately held businesses: ' A privately held firm is a firm that is not a public company'...' the shares are held by a small group of individuals often members of one or a small group of families or otherwise related individuals (or other firms).

[2] According to Damodaran (2001b); DCF valuation is based on expected future cash flows and discount rates. DCF approach is easiest to use for firms.

According to Copeland et al. (2000) the DCF Model is the most popular valuation technique in practice. The DCF model is also called free cash flow valuation. Free cash flow is the most appropriate cash flow for valuing privately held firms since it reflects the cash flow generated by a company's operations that is available to the firm's capital claimers, that is the firm's debt and equity holders. Free cash flow is defined as the firm's real operational cash flow.

Discounted Cash Flow Analysis requires; both the firms' expected cash flow and its required rate of return to be determined. The most common method to calculate a traded firm's required rate of return is Capital Asset Pricing Model (CAPM). Beta in CAPM model is used to measure risk. Normally beta is calculated by comparing the volatility of a stock compared to an index over a period of time; however this requires that the company to be publicly traded (Brealy and Myers, 2000).

Valuation of a privately held firm has a range of additional issues compared to a valuation of publicly traded company. For example stock market data are not available which make the estimation of cost of capital difficult. Further, the annual report is less informative, which make projections of future cash flows more uncertain.

## 2. Shareholder (Enterprise) Value

The theories on shareholder value have a history back to 1950s. Shareholder value started with a result of work done known as the Capital Asset Pricing Model (CAPM) which argues that the returns both received and expected by investors are related to the risk incurred by owning particular financial assets. As it is commonly understood, the higher the risk the greater the return should be. The main feature of the CAPM Model which is the shareholder view of the world is that there is a risk weighted discount factor that assess the shareholder value today and tomorrow's developments, profits and cash flows.

Shareholder value was accredited considerable appraisal by a publication of '' Creating Shareholder Value '' by Rappaport in 1986. According to Rappaport (1995);

Shareholder Value = Corporate Value[3] - Debt (Formula 2.1)

In 1990's it is stated that shareholder value is feasible, highly desirable and has substantial benefits not only to shareholders but also to the stakeholders.[4] (Copeland et. al., 2000)

[3] According to Rappaport (1995); Corporate Value is the value of the total firm or business unit including; present value of cash flow from operations during the forecast period and residual value which represents the value of the business for the period beyond the forecast period.

[4] A shareholder owns part of a company through stock ownership, while a stakeholder is interested in the performance of a company for reasons other than just stock appreciation. Stakeholders could be employees, bondholders, customers, suppliers.

Valuation of firms can be done for many reasons; including determining a fair price to offer an acquisition target, appraising an acquisition offer, or finding out the value of acquiring firm. Some of the reasons for valuation are further discussed below.

### 2.1 The Significance of Value Determination

Value should not be confused with the price. Price is the quantity agreed between the seller and the buyer in the sale of a company, but the value is determined by the perceptions about the company and industry, economies of scale and economies of current and future scope (Fernandez, 2007). A valuation may be used for a wide range of purposes:

1- *Asset and Merger Valuations;* anyone who wants to sell an asset needs to get a fair price, so the valuation of asset is very important for the owner as well as for the buyer. A proper valuation of an enterprise provides information that is necessary to make an offer that has a reasonable chance of accepted basis of negotiation. The number of merger and acquisitions involving privately held firms has increased considerably in recent decade.

2- *Public Offerings*; Valuation is used to justify the price at which the shares are offered to the public.

3- *Loan Applications* to financial institutions are evaluated on more favorable conditions if the application is accompanied by a recent valuation report.

4- *Legal Settlements, Inheritances and Wills*; Spin-off or division of property transactions require valuation report.

5- *Measuring Performance*. The value of the company can be used to measure the performance of the business. If a company predicts its cost of equity, fixed assets of the firm can be managed more accurately. Valuation of the company and its business units provides information to identify sources of economic value creation within the company.

6- *Valuation of Listed Companies*; Valuation is used to compare the value with the share's price on the stock market and to decide whether to sell, buy or hold the shares. Valuation is also used to make comparisons between companies.

**2.2 Valuation Models**

The equity value of an enterprise is equal to the value of the shareholders' claims in the company (Frykman and Tolleryd, 2003). In the following sections, three basic equity valuation methods will be explained in detail namely;

- Asset Based Valuation Approach
- Income Based Valuation (Discounted Cash Flow) Approach
- Price Multiple Models Approach

Within these three approaches of valuation models, Income Based Valuation Approach is the most often applied (Bruner, 1998). The income based valuation approach models rely on forecasts. However DCF Method is the most accurate and flexible method for valuing companies. (Koller, 2005)

### 2.2.1 Asset Based Valuation Approach

The Asset Based Valuation Approach determines the enterprise value by adding the sum of the parts of the company. The book value of an asset in the balance sheet reflects its historical cost. It might deviate from market value if the earning power of the asset changes significantly. That's why the market value of the existing tangible assets of a company is very important for valuation. A company's book value is the value of the shareholders' equity stated in the balance sheet. This quantity is also the difference between total assets and liabilities. (Fernandez, 2007)

The value-basis balance sheet is different from the contents of the cost-basis balance sheet in two ways (Pratt et. al., 2000): Firstly, the balance of the asset and liability accounts has been re-valued and secondly, several new assets may have been added. When the values of assets and liabilities match their market value, the adjusted book value is obtained. According to (Pratt et. al., 2000); there are six steps in the process of establishing a value-basis balance sheet.

1. Obtain or develop a cost-basis balance sheet.
2. Determine the asset and liabilities on the cost-basis balance sheet that require a revaluation adjustment.
3. Identify off-balance sheet asset or contingent assets that should be recognized and valued.
4. Identify off-balance sheet liabilities or contingent liabilities that should be recognized and valued.
5. Estimate the value of the various assets and liabilities accounts identified in steps two through four.

6. Construct a value basis balance sheet, based on the indicated values concluded during steps one through five, and quantify the subject value.

The primary disadvantage of this method is that, it can be very expensive and time consuming. It may also require the involvement of appraisal specialists to value several in tangible assets (Pratt et. al., 2000). This method is best suited for companies which have many assets that are easy to value, such as investment companies and real estate firms.

### 2.2.2 Price Multiple Model Approach

Price Multiple Approach determines the enterprise value by comparing the company to other companies in the same industry. Price multiple model is used when a good set of comparable companies exists and when the company's fundamentals are not difficult to forecast (Fernandez, 2001). Price multiple model relies on choosing the assets with the similar characteristics in the market which is already priced. Two main steps are explained by Damadoran (2001b) to calculate the price multiple model valuation.

- The value drivers are selected such as earnings, revenues, number of customers to compare the assets.
- The market value of the comparable assets has to be found in order to undertake a comparison.

The most common used multiples are accounting based multiples. Four main multiples are identified which are commonly used in the price multiple approaches in the valuation of common stocks (Stowe et. al., 2002):

- Relative earnings valuation method: P/E[5] ratio or earnings multiple.
- Relative revenue valuation method : P/S[6] ratio
- Relative cash flow valuation method: P/EBIT, P/EBITDA, EV/EBITDA ratios[7]
- Relative asset valuation method: P/B.[8]

Expression of ''price'' in the multiples as explained by Stowe et.al. (2002) is the equity value of the firm. For a firm listed in the stock exchange, market capitalization or equity value is the product of the share price times number of shares. Enterprise value is defined as the total market value capitalization minus net financial debt.

Academic literature yields only few contributions concerning the accuracy comparison between DCF and Price Multiple Models. Much of the existing literature is based on the seminal work of Kaplan and Ruback (1996). They examine 51 leveraged buyouts and compare DCF and Price Multiple Model estimations of firm value with actual transaction prices. Historical EV/EBITDA ratio is used as a value driver.

[5] P/E ratio: Price to Earnings.
[6] P/S ratio: Price/Sales per share.
[7] EBIT-Earnings Before Interest and Taxes,
EBITDA-Earnings Before Interest, Taxes, Depreciation, Amortization,
EV-Enterprise Value-Market value of equity+market value of debt-cash and cash equivalents.
[8] P/B- Price / Book value of equity.

Findings are reported that DCF method is more accurate than Price Multiple Model. They claimed that cash flow projections from internal sources can improve DCF valuation accuracy.

### 2.2.3 Discounted Cash Flow (Income Based) Valuation

DCF Analysis is a financial modeling technique based on assumptions regarding the cash flow to a business. As an accepted methodology within the income approach to valuation, DCF Analysis involves the projection of cash flows to a business. To this projected cash flow series, an appropriate, market derived discount rate is applied to income stream associated with the business (International Valuation Standards, 2003).

Following the stock market crash of 1929, DCF analysis gained popularity as a valuation method for stocks. Irving Fisher in his book (1930), '' The Theory of Interest '' and John Burr William's text (1938) ''The Theory of Investment Value'' first normally expressed the DCF method in modern economic terms.

Later Gordon (1962) extended the William's Model by introducing a dividend growth component in the late 1950's and early 1960's.

In recent years, the literature for estimating the value of a firm and the value of the equity has been expanded. Copeland, Koller and Murrin (2000), Rappaport (1995) were current pioneers in modeling the free cash flow to the firm, which is widely used to derive the value of the firm.

Recently Damadoran (2001b) introduced an equity valuation model based on discounting a stream of cash flows to equity at a required rate of return to shareholders.

Today DCF Model is the most commonly used tool among financial analysts when valuing both publicly traded and privately held firms. Survey results by Bruner et. al. (1998) show that DCF is the dominant investment valuation model used by most financial companies and financial advisers.

DCF approach is well grounded in theory, simple to use mechanistically, and works well in stable environments (Damodaran, 2001b).

Discounted Cash Flow Valuation allows a substantial amount of flexibility in terms of changes in sales and expenses, but faces a potential difficulty due to dependency on two important inputs; the discount rate and growth rate of the cash flows (Reilly and Brown, 2000).

The DCF analysis measures the value of a company as a function of three variables (Copeland et.al., 2000);

- How much free cash can the company generates,
- Timing of these cash flows,
- The uncertainty (risk) associated with these cash flows.

The theory of discounted cash flow (DCF) valuation models is based on the time value of money, next section time value of the money and net present value will be defined.

### 2.2.3.1 Net Present Value

Net Present value[9] is derived from the Time Value of Money theory, which states that a certain amount of money received today is worth more than the same amount received in the future (Damodaran 2001b)

If we have a series of free cash flows, $FCF_1$, $FCF_2$, ,,,,,,,, $FCF_n$ then the Net present value of these cash flows is calculated as follows:

$$NPV = \frac{FCF_1}{(1+r)^1} + \frac{FCF_2}{(1+r)^2} + \ldots\ldots\ldots + \frac{FCF_n}{(1+r)^n} \qquad \text{(Formula 2.2)}$$

Thus, NPV method utilizes discounting of free cash flows at an appropriate discount rate. Free cash flow is a company's operating cashflow after investment but before considering new debt. Copeland et. al. (2000) defines free cashflow as: '' Free Cash Flow (FCF) is a company's true operating cash flow. It is after-tax cash flow generated by the company available to all providers of the company's capital, including creditors and shareholders. It can be thought of as the after tax cash flow that would be available to the company's shareholders if the company had no debt.''

---

[9] $NPV = \frac{FV}{(1+r)^n}$ Where; PV is present value, FV is future value, r is annual discount rate, n is the number of years.

DCF analysis estimates the value of a company as the sum of the present value of its free cash flows over a forecast period between five to ten years and a terminal value at the end of this forecast period, based on the weighted average cost of capital (WACC) as the discount rate (Higson and John, 2000). DCF approach can be expressed as follows:

$$V = \sum_{t=1}^{T} \frac{FCF_t}{(1+WACC)^1} + \frac{TV}{(1+WACC)^T} \qquad \text{(Formula 2.3)}$$

Where;

TV : Terminal Value in period t,

$FCF_t$ : Free Cash Flow of period t,

T : Planning horizon period ,

WACC : Weighted Average Cost of Capital.

In DCF Method, the valuation process is divided into two stages. First stage is to estimate the cash flow for a finite number of years in the future and calculate the present value for every single year. Years that should be forecasted depends on the stability of the revenue stream and viability of the industry. However Pratt (2000) argues that it is not possible to make a reliable forecast for more than 10 years in to the future.

A business still has a value after the final year of the forecast period and this is called terminal value (West and Jones 1999). The terminal value can be estimated by assuming that the cash flow from the last year in the forecasted period is perpetuity and is discounted back to today. The DCF analysis is based on the going concern assumption, which means that the company and its cash flow will exist forever. In the next section value drivers that are used in DCF method will be analyzed.

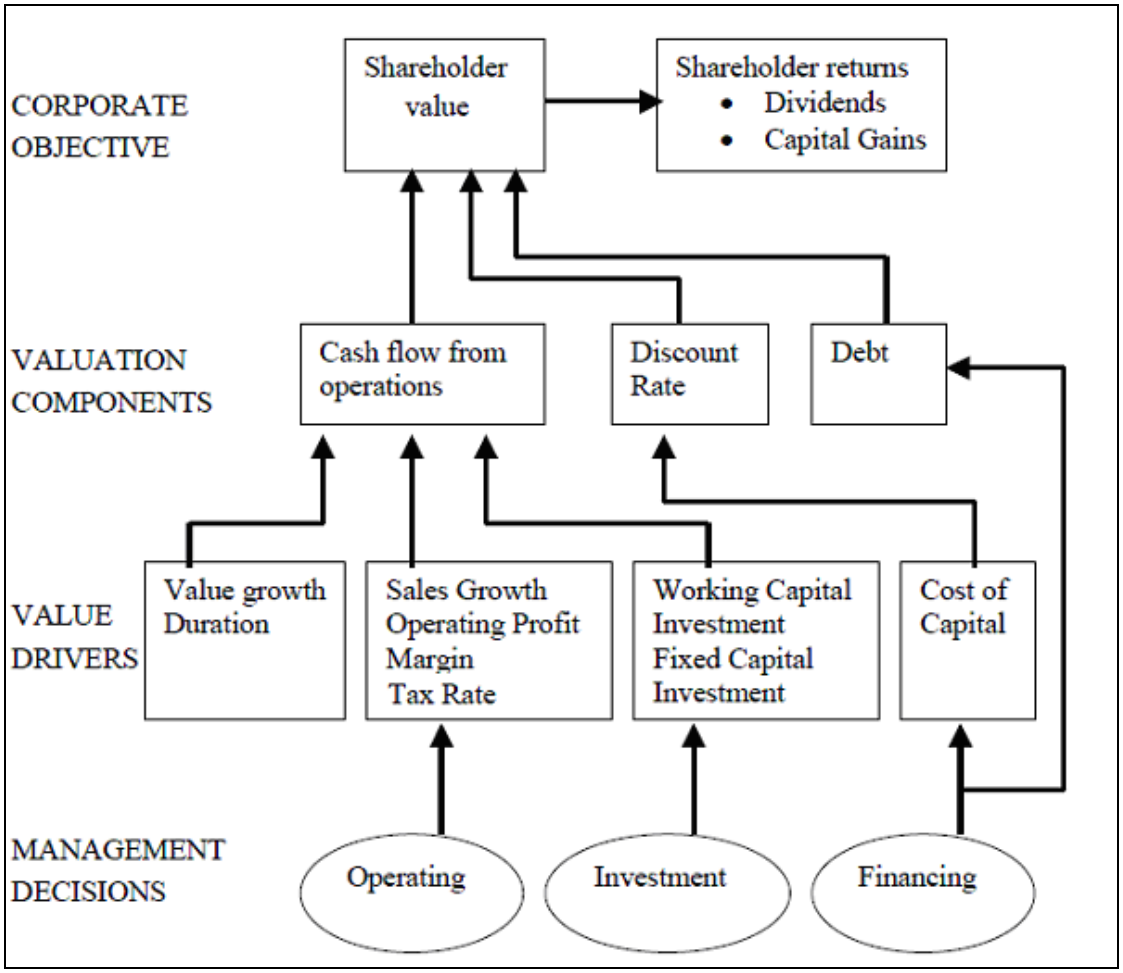
#### 2.2.3.2 Value Drivers of ''Discounted Cash Flow Valuation''

The cash flows generated by firms are determined by so-called value drivers introduced by Rappaport (1995). According to Rappaport (1995); value driver is any variable influencing enterprise's value such as Sales growth rate[10], ebitda margin[11] and the capital expenditure[12]/sales ratio. Rappaport (1995) summarizes the relationship between shareholder value and value drivers in the following Table 2.1.

Starting point of the below Table 2.1 is the distinction between the three areas; operational, investment and financial management. The major value creation factors of these areas are described as ''value drivers''. Operating decisions such as pricing policy, distribution policy have an impact on ''Sales growth'' or ''Operating profit margin'' value drivers.

[10] Sales Growth Rate is percentage change in sales compared to base year amount.
[11] Ebitda Margin is '' Earnings Before Interest Tax Amortization Depreciation / Sales''
[12] Capital Expenditure (Fixed Capital Investment) is a new fixed asset unit or increase in existing fixed asset.

**TABLE 2.1 Key Value Drivers of Shareholder Value**




(Rappaport, 1995 '' Rappaport's Shareholder Network'')

Investment decisions like ''high inventory levels'' or ''expansion of capacity '' have an effect to ''working capital'' and '' fixed capital investment'' value drivers. The ''Cost of Capital'' value driver is determined by the business risks from the operations and company's financial risk. This refers to the capital structure defined as '' the relationship between debt and equity financing''.

In this section three most used DCF models are discussed, namely;

- Dividend Discount Model
- Free Cash Flow Discount Model
- Residual Income Model

### 2.2.3.3 Dividend Discount Models

Stockholders expect to receive two types of cash flows; the dividends in the period over which the stock is owned and the selling (market) price at the end of the holding period. The market price however is again determined by the dividends the owner of the security expects to receive over his holding period. Thus, the market price can be replaced again by a stream of dividends, until the entire value of the stock is expressed in terms of dividends. Consequently, even from the perspective of an investor with a finite investment horizon, the value of a stock always depends on all expected future dividends. The Dividend Discount Model (DDM) is the theoretically most correct model for firm (Miller and Modigliani, 1961). According to this method, a share's value is the net present value of the dividends expected to be received.

$$V = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \ldots\ldots\ldots + \frac{D_t}{(1+r)^t} + \frac{P_t}{(1+r)^n} \qquad \text{(Formula 2.4)}$$

$$\text{with } P_t = \frac{D_{t+1}}{(1+r)^{t+1}} + \frac{D_{t+2}}{(1+r)^{t+2}} + \ldots\ldots\ldots + \frac{D_n}{(1+r)^n}$$

Where, V: Value of the stock in t=0,

D(n): Dividend to be paid n years from now,

$P_t$: Market price in period t,

n: Number of years that asset will generate dividends for investors,

r: The appropriate discount rate.

The most widely known discounted dividend model is the Gordon Growth Model (Gordon, 1962). It expresses the value of a stock based on a constant growth rate of dividends. The Gordon growth model equation can be used as follows;

$$V = \frac{D_1}{(r - g)} \qquad \text{(Formula 2.5)}$$

Where, V: Value of the stock,

D: Dividend to be paid ,

g: Constant growth rate of dividends,

r: The appropriate discount rate.

Even though DDM Model is theoretical correct valuation model, it has some major weaknesses related to practical application. The missing link between value creation and value distribution leads a problem in forecasting dividends, as it is difficult to forecast payout ratios.

According to Penman (2001) DCF is the most suitable for the valuation of the companies which currently have positive cash flows and their future cash flows and risk can be estimated with degree of certainty. Below Table 2.2 Penman (2001) discusses distinction between dividend discount model and discounted cash flow models.

**TABLE 2.2 Comparisons of Discounted Cash Flow Methods**

| *Valuation Model* | *Advantages* | *Disadvantages* | *When it works best* |
|---|---|---|---|
| *Dividend Discount Model* | Dividends are fairly stable in the short run | • Dividend payout is not related to value<br>• The model ignores capital gains | When company has fixed payout ratio |
| *Discounted cash flow* | Cash flows are not affected by accounting policies | • Free cash flows does not measure value added in the short run;<br>• Investments are treated as a loss of value;<br>• Requires longer forecasting period to recognize cash inflows from investments | When the investment pattern produces constant free cash flow or constant growth rate |

(Penman, Financial Statement Analysis and Security Valuation, 2001)

Sorensen et. al. (1985) and Miller (1986) concluded that the companies that pay more dividends do not obtain a growth in their share price. More dividends which are distributed to its shareholders instead of making new investments reduce growth.

### 2.2.3.4 Free Cash Flow Discount Models

Although dividends are the actual cash flows paid out to stockholders, the discounted free cash flow (DFCF) models are based on the cash available for distribution but not necessarily distributed to shareholders. Common equity can be valued either directly discounting free cash flow to equity (FCFE) or indirectly by calculating the value of the firm using free cash to the firm (FCFF) and then subtracting debt from this value.

Cash flows of a company can be calculated differently depending on how the data is presented.( Kaplan and Ruback, 1995 ). Two different ways are shown below Table 2.3

**TABLE 2.3 Cash Flow Derivation**

| | |
|---|---|
| Net income | EBIT |
| + Depreciation | - Corporate tax |
| + Amortization | + Depreciation |
| + Change in deferred taxes | + Amortization |
| - Change in net working capital | + Change in deferred taxes |
| + Interest[13] | - Change in net working capital |
| - Capital expenditures | - Capital expenditures |
| + After-tax assets sales | + After-tax assets sales |
| = Capital Cash Flows (FCFE) | = Capital Cash Flows (FCFF) |

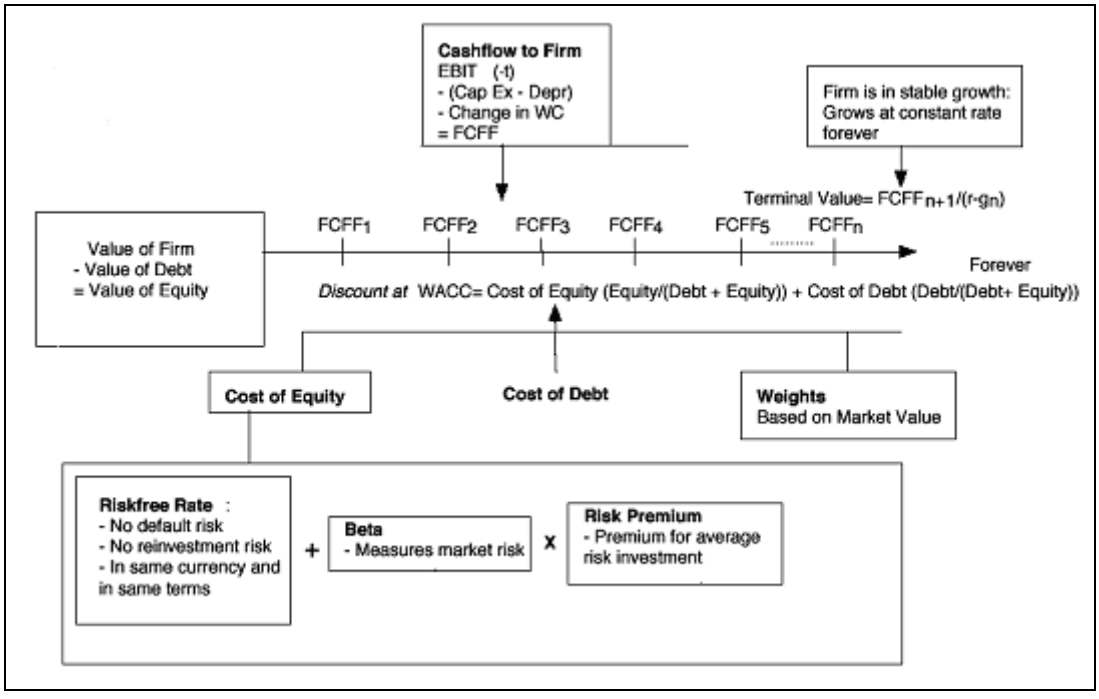
( Kaplan and Ruback, 1995 )

[13] Free cash flow to the equity is calculated by subtracting from the net income the interest and principal payments (after tax) made in each period to debt holders and adding the new debt provided.

FCFE is the cash flow available to the company's suppliers of equity capital after all operating expenses (including interest and taxes) and principal repayments have been paid, and necessary investments into short term assets (working capital) and long term assets (net capital expenditures) have been made (Fernandez, 2007). It is called 'free' cash flow to equity to indicate that it is the amount of money free to distribute to equity investors without negatively affecting the continuation of the business.

An alternative approach to discounted free cash flow valuation is the use of FCFF instead of FCFE. Under this method, the value of the firm is obtained by discounting expected cash flows to the firm, i.e. the cash flows after covering all operating expenses and taxes, but prior to debt payments, at the weighted average cost of capital (WACC). If the company had no debt, the free cash flow would be identical to the equity cash flow. Below Table 2.4. shows the calculation of FCFF.

**TABLE 2.4 Valuing a Firm by Using Free Cash Flow Model**




(Damodoran, 2004)

### 2.2.3.5 Residual Income Models

Residual Income (RI) is the net income after deducting for the investors opportunity cost in generating this net income (the cost of capital or required rate of return). Recognized by economists since the 1970's, residual income is based on the premise that in order for a firm to add wealth to its owners, it return on its invested capital should be higher than the total cost of capital. A company can have positive income but may still not be adding value in dollar terms for shareholders if does not earn more than the dollar cost of equity capital.

Commercial variations of the model have resulted in 'brand name' products such as Stern Stewarts's '' Economic Value Added (EVA) '', or Mc Kinsey's Economic profit model. All these models are based on the concept of residual income developed by Edwards and Bell (1961), and Ohlson (1995).

EVA is calculated by the following formula:

$$EVA = NP - (IC*WACC) \qquad \text{(Formula 2.6)}$$

Where: NP: Net Operating Profit after Tax

IC: Invested Capital[14]

WACC: Weighted Average Cost of Capital

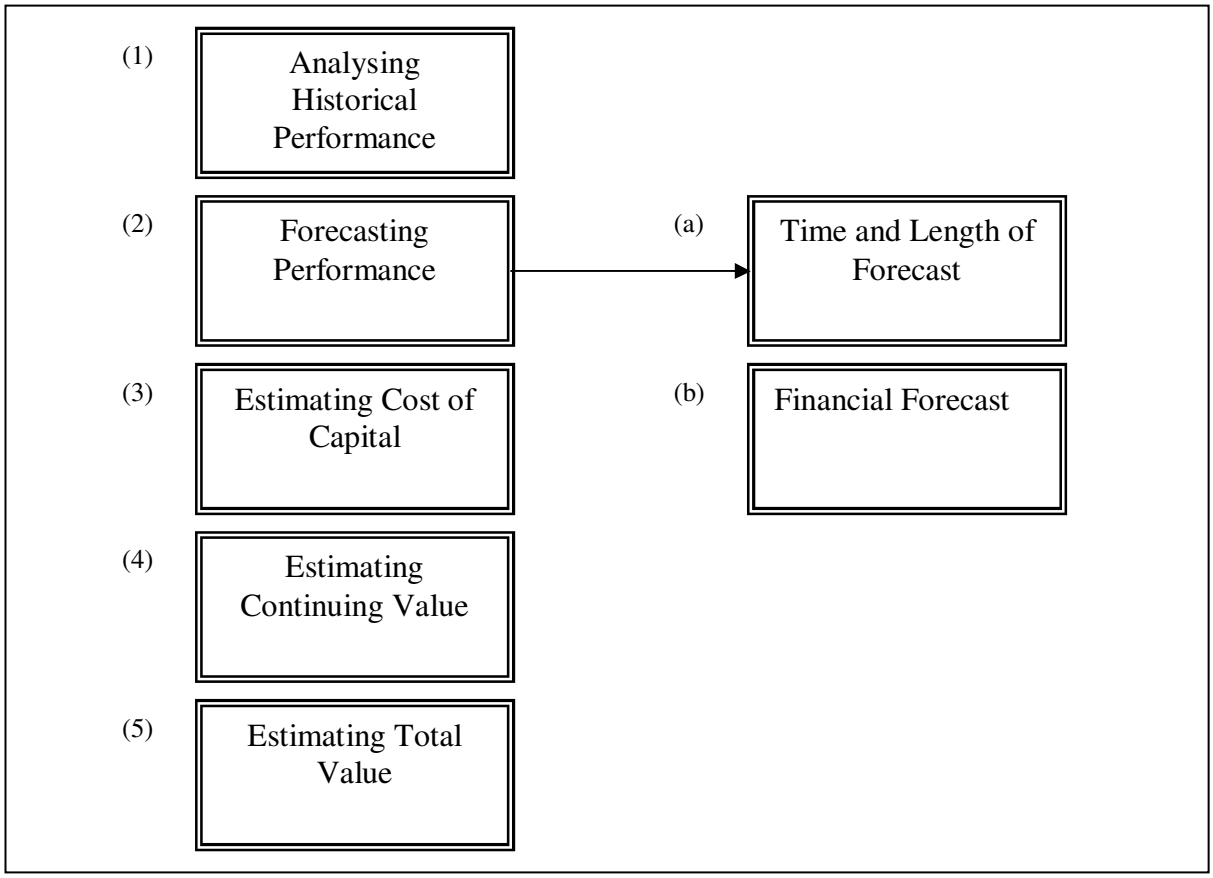
[14] Invested Capital is total equity and liabilities of the company.

Demirakos et al. (2003) found that the DCF approach is far more popular than the EVA approach. Based on an examination of 105 analysts' reports from international investment banks, residual income approach is only applied in two cases. The DCF approach is applied in 38 reports.

### 3. Building a Discounted Cash Flow Model

The valuation process includes five important steps before a value can be estimated. The framework of these steps is based on Copeland et. al.'s (2000) approach described in the book ''Valuation: Measuring and Managing the Value of Companies''

**Table 3.1 The Valuation Model**




(Copeland, 2000)

### 3.1 Analysing the Historical Performance and Financial Statement Analysis

Understanding the firm's past performance provides essential perspective for developing and evaluating forecasts of future performance. This approach assumes that the firm has a history, which is not always the case. Historical performance analysis should focus on the key value drivers within the firm. Financial statement analysis is the important part of the valuation process and based on historical information provided. Financial statements are used to calculate ratios. Commonly used operating and credit ratios are shown below Table 3.2. and Table 3.3.

**Table 3.2 Operating Ratios**

| **Ratio** | **Definition** | **Unit** |
|---|---|---|
| Revenue growth rate | $\frac{\text{Current year revenues - Last year revenues}}{\text{Last year revenues}}$ | % |
| Gross margin percentage | $\frac{\text{Gross margin}}{\text{Sales revenues}}$ | % |
| Operating margin percentage | $\frac{\text{Operating income}}{\text{Sales revenues}}$ | % |
| Days receivables outstanding | $\frac{\text{Average accounts receivable balance}}{\text{Sales revenues / 365}}$ | Days |
| Days payables outstanding | $\frac{\text{Average accounts payable balance}}{\text{Cost of goods sold / 365}}$ | Days |
| Inventory turnover | $\frac{\text{Cost of goods sold}}{\text{Average inventory balance}}$ | Times |

(Akguc, 1995)

Operating ratios are used to measure the profitability and capital efficiency. Expansion of the sales volume of the company is measured by ''sales growth rate''. The revenues available to pay other costs after the product costs have been paid is measured by ''gross margin percentage''. ''Operating Margin Percentage'' shows operating profit before taxes and interest expense. Days receivable outstanding shows how well the company is collecting its receivables. Days payables outstanding ratio is used to represent company's available trade credit. Company's efficiency is measured by inventory turnover ratio.

Days receivables outstanding, days payables outstanding, and inventory turnover ratios are used to interpret the company's working capital usage.

**Table 3.3 Credit Ratios**

| Ratio | Definition | Unit |
|---|---|---|
| Current ratio | $\frac{\text{Current assets}}{\text{Current liabilities}}$ | Amount |
| Quick ratio | $\frac{\text{Cash and short-term investments}}{\text{Current liabilities}}$ | Amount |
| Debt to equity ratio | $\frac{\text{Debt}}{\text{Shareholder's Equity}}$ | % |
| Interest coverage ratio | $\frac{\text{Earnings before interest and taxes}}{\text{Interest expense}}$ | Times |

(Akguc, 1995 )

Credit ratios are used to measure company's ability to repay obligations on a timely basis. Company's liquidity is measured by current ratio. The quick ratio is like the current ratio, measures company's ability to pay its obligations. The company's financial leverage is measured by debt to equity ratio. The interest coverage ratio measures the number of times expense has been earned.

### 3.2 Forecasting Performance

One of the most important stages in valuation is to forecast the firm's financial statement which requires a forecast of firm's performance. It is hard to predict the future but a careful analysis can give some information about firm's future performance. The following section contains discussion of steps to develop financial forecast. The list of items provided below includes steps required to develop a financial forecast.

1. Determination of the length and level of detail of forecast.

2. Translation of the strategic perspective into financial forecasts. Sales growth, cost and capital expenditures are forecasted.

3. Developing proforma income statement and balance sheet.

4. Estimation of free cash flows for an explicit forecast period.

### 3.2.1 Forecast Period

Forecasting deals with the future. The greater the distance of the forecast period from the period which was used to construct the forecasting model, the greater is the difficulty in making the forecast and the greater is the risk that the actual result differs from the forecast. It is recommended to use a forecast period of five to fifteen years when conducting a valuation. (Copeland et. al. 2000), (Koller et. al. 2005)

### 3.2.2 Forecasting Sales, Cost and Capital Expenditure

Sales is sales price multiplied by quantity sold (Penman, 2001). Sales are the key element in the valuation process of a firm. Forecasting sales growth[15] is an important step, and involves a difficult task of predicting future development like markets, management etc. (Brealy and Myers, 2000). Sales growth rates can be estimated in three different ways: First, historical growth rates can be adapted, assuming that the past conditions will prevail in the future. Collecting and analyzing relevant historical information in order to evaluate the historical performance is crucial for reasonable forecasts of future performance. The analysis is performed by calculating historical financial ratios such as sales growth, profit margins[16]. Second approach is using analysts' estimates, suggesting that growth is exogenous.

[15] Sales Growth is defined as change in sales/sales $_{t-1}$, where t is time.
[16] Profit Margin is defined as operating profit / sales.

Third approach is to see growth as a function of quality and quantity of firm investment. This endogenous approach emphasizes the importance of the present. (Damodaran, 2001a).

By employing profitability assumptions, earnings are forecasted after deducting the cost of production from the sales revenues. The first earning measure of a firm is '' Gross Profit'' which equals the profit of the company after cost of goods sold is deducted.

$$\text{Gross Profit}_{(t)} = \text{NetRev}_{(t)} - \text{COGS}_{(t)} \qquad \text{(Formula 3.1)}$$

Where, $\text{Gross Profit}_{(t)}$ : The gross profit in period t,

$\text{NetRev}_{(t)}$ : Net sales revenues of the firm in period t

$\text{COGS}_{(t)}$ : Cost of goods sold for the firm in period t.

From the gross profit formula, the operating profit is calculated as follows:

$$\text{Operating Profit}^{17}_{(t)} = \text{Gross Profit}_{(t)} - \text{OPEX}_{(t)} \qquad \text{(Formula 3.2)}$$

Where, $\text{Operating Profit}_{(t)}$ is the operating profit of the firm in period t,

$\text{Gross Profit}_{(t)}$ corresponds to the gross profit of the firm in period t

$\text{OPEX}_{(t)}$ corresponds to operating expenses of the firm in period t.

[17] Operating profit is also equivalent to earnings before interest and tax, which is abbreviated as EBIT.

As COGS and OPEX include non-cash expenses such as depreciation and amortization expenses, EBIT should be adjusted with these non-cash expenses in order to measure ‘’Earnings before interest, tax, depreciation[18] and amortization[19] expenses’’, which is abbreviated as EBITDA.

$$EBITDA_{(t)} = EBIT_{(t)} + Depr_{(t)} + Amort_{(t)} \qquad \text{( Formula 3.3 )}$$

Where, $Depr_{(t)}$ : The depreciation charges in period t

$Amort_{(t)}$ : The amortization charges in period t.

Operating cash flows should be adjusted with capital expenditure[20], which is firm’s reinvesting measure for future sales growth. Capital expenditure might be either for requirement for maintenance of existing asset or for expansion such as production capacity increase.

The common procedure in valuation is to take the revenue and cost forecasts as a reference and estimate the components of FCF as a function of revenue. This procedure is called the ’’ Percentage of sales approach ‘’ and is based on the reasonable assumption that revenue is in effect the main driver for these costs and capital expenditures (Brealy and Myers, 2000). To apply this method, historical average of these components as a percentage of revenue is calculated and multiplied by the forecasted revenue to estimate the cash flows.

[18] Depreciation refers to prorating a tangible’s asset’s cost over that asset’s life.
[19] Amortization refers to spreading an intangible asset’s cost over that asset’s useful life.
[20] Capital expenditure is the current year’s net PPE (Property, Plant, Equipment) minus last year’s (PPE) plus this year’s depreciation.

This method assumes that the relationships that have held consistently in past will continue to hold in the future at the same intensity.

Next section will examine the definition and development of the proforma financial statements.

### 3.2.3 Developing Proforma Financial Statements

Using the sales forecast, a five year proforma income statement is projected. The pro forma income statement is similar to historical income statement, except that it projects the future instead of describing the past. The pro forma balance sheet is used for calculating the change in working capital and allocation of fixed assets, current assets and current liabilities.

A factor that can change cash generated by the firm is the working capital needs. Working capital is the difference between current assets (inventory, cash and trade receivable) and current liabilities (accounts payable). Any investment in this measure of working capital ties up cash. Increase in working capital ties up more cash since is a cash outflow. On the other hand, a decrease in working capital releases cash since is a cash generating item.

Working capital[21] can be defined as follows;

$$WC_{(t)} = TradeRec_{(t)} + INV_{(t)} - TradePay_{(t)} \qquad \text{(Formula 3.4)}$$

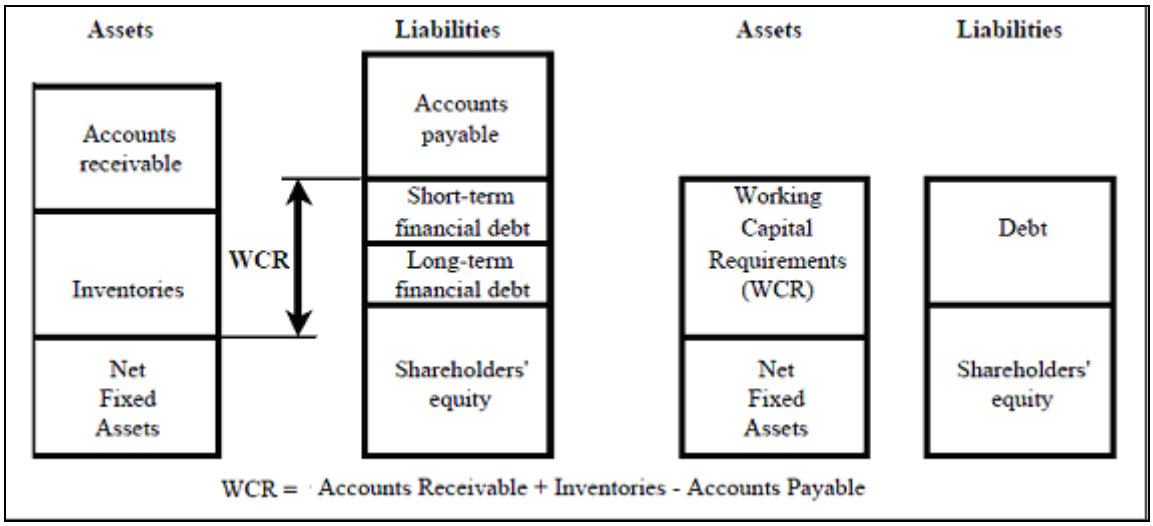
Where, $TradeRec_{(t)}$ corresponds to the trade receivables in period t,

$INV_{(t)}$ corresponds to the inventory level in period t,

$TradePay_{(t)}$ corresponds to the trade payables in period t,

$WC_{(t)}$ corresponds to the Working Capital level in period t.

**Table 3.4 Working Capital Requirement**




(Source: Fernandez, 2007)

[21] Cash and marketable securities are the best example of working capital items that we exclude from our definition of ΔNWC, as they are the firm's stock of excess liquidity. ( Damadoran, 2004 )

Based on this definition, change in working capital can be defined as;

$$\Delta WC_{(t)} = \Delta WC_{(t)} - \Delta WC_{(t-1)} \qquad \text{(Formula 3.5)}$$

Where $WC_{(t)}$ corresponds to the Working Capital level in period t.

### 3.2.4 Estimating Free Cash Flows for an Explicit Forecast Period

The free cash flow is the operating cash flow, that is, the cash flow generated by operations, without taking into account financial debt. It is the money that would be available in the company after covering fixed asset investment and working capital requirements, assuming that there is no debt and, therefore, there are no financial expenses. Free cash flow of a firm is expressed as in Formula 3.6.:

**Formula 3.6 Calculation of Free Cash Flow**

| |
|---|
| Earnings Before Interest and Tax (EBIT)<br>(-) Tax on EBIT<br><br>**= Earnings after tax**<br><br>(+) Depreciation Expense<br>(-) Capital Expenditure<br>(-) Increase in Working Capital<br><br>**= FREE CASH FLOW** |

(**Source**: Fernandez 2007, Copeland et. al. 2000)

### 3.3 Estimating Cost of Capital

The investors expect to be compensated for the opportunity cost of investing in one particular firm instead of other firms with similar risk. The DCF valuation states that the value of a firm is the sum of all future cash flows to their owners discounted at their required rate of return. A discount rate[22] therefore default's the opportunity costs borne by investors when buying a company's assets or providing capital. The opportunity cost weighted by their relative contribution to the company's total capital is called weighted average cost of capital (WACC) (Penman, 2001, Pratt, 2000).

The DCF method uses the WACC as the discount rate to convert the expected future cash flow into present value and formulated as follows:

$$WACC = K_e \frac{V_E}{V_E + V_D} + K_d (1 - t_x) \frac{V_D}{V_E + V_D} \qquad \text{(Formula 3.7)}$$

Where;

WACC : Weighted Average Cost of Capital,

$V_E$ : Value of Equity,

$V_D$ : Value of Debt,

$K_E$ : Cost of Equity,

$K_D$ : Cost of Debt,

$t_X$ : Tax Rate

[22] The discount rate reflects not only the opportunity cost for the investor, but at the same time the cost of equity capital for the company. The terms 'discount rate', required rate of return', and cost of equity capital' therefore are used interchangeably.

In a survey, of leading practitioners, including the most senior financial officer of 27 large corporations, the most active financial advisors in mergers and acquisitions, and the best seller graduate level textbooks, Bruner et. al. (1998) found that ''the WACC is the dominant discount rate used in DCF analysis.''

Graham and Harvey (2001) also reported that 58,8 percent of the firms surveyed use a single company wide discount rate (WACC) to evaluate projects.

Calculating the WACC for a firm requires three estimations, namely; the cost of financing, for both debt and equity and their relative weights in the financing structure. In subsequent sections, these requirements will be discussed briefly:

### 3.3.1 Capital Structure

The purpose of this section is to give an overview of the theories on capital structure decisions of a company. Capital structure is defined as the composition of the total amount of capital that is shown on the right-hand side of a balance sheet. Capital structure management is defined as choosing optimal amount of debt and equity to finance assets.

The theoretical basis of WACC has been laid out initially in Modigliani and Miller's work (1958). The traditional view of the relationship between the debt-equity ratio and the cost of capital has been challenged by Modigliani and Miller (M-M) in perhaps the most famous article ever written on the theory of finance (Modigliani and Miller, 1958).

According to (M-M), the cost of capital is not affected by the debt-equity ratio, it is assumed to be constant and equal to the cost of equity in a firm which has no debt. This result appears so unlikely at first sight and requires closer attention. The total market value of two firms which are identical except their debt-equity ratios must be the same and their WACCs must be the same. If they were not, investors could improve their position by selling the shares of one and buying shares in the other, which would alter the relative prices of shares until the WACCs become equal. The level of gearing is therefore irrelevant to the WACC and the value of the firm.

The starting point for the M-M proposition lies in a very rigorous set of assumptions:

- There are no taxes
- The capital market is efficient and competitive
- There are no transaction costs
- There are no costs associated with bankruptcy
- Shareholders can borrow on the same terms as corporations
- The cost of debt is constant, whatever the level of gearing

Debt to equity ratio varies greatly between different companies, even within the same industry. Capital intensive industries such as utilities, banks, real estate developments, petroleum and mining rely heavily on debt, while pharmaceutical companies and service companies are equity financed.

Target weights should be used to determine the cost of capital. Using target debt to equity ratio and constant WACC (for all future years) will lead to a reasonable valuation (Koller et al. 2005).

The following findings about target debt / equity capital structure are based on telephone survey by Bruner et. al. (1998). As seen below Table 3.5, the majority firms use target weight debt equity ratio in WACC formula.

**Table 3.5 Survey Findings for Target Capital Structure**

| | Corporations | Financial Advisers | Text/Tradebooks |
|---|---|---|---|
| What weighting factors do you use? Target vs. current debt/equity | *Target/Current*<br>52% - Target<br>15% - Current<br>26% - Uncertain<br>7% - N/A | *Target/Current*<br>90% - Target<br>10% - Current | *Target/Current*<br>86% - Target<br>14% - Current |

(**Bruner**, 1998 )

Three approaches are recommended to develop a target capital structure for the company (Koller et al. 2005).

- Find the company's current market based capital structure
- Review the capital structure of comparable companies
- Review the management's financing policy and its implications for the target capital structure.

### 3.3.2 Cost of Debt

The cost of debt is determined by the risk free rate, the default risk of the firm and the tax advantage associated with the debt. The cost of debt is computed by adding the default spread to the risk free rate as shown below Formula 3.8. (Damodaran, 2001 b)

$$\text{Pre-tax Cost of Debt} = \text{Risk Free Rate} + \text{Default Rate} \quad \text{(Formula 3.8)}$$

The rating and default spread of a firm are found by calculating the interest coverage ratio of the firm.

$$\text{Interest Coverage Ratio} = \text{EBIT} / \text{Interest Expense} \quad \text{(Formula 3.9)}$$

Where,

EBIT : Earnings Before Interest Tax (Sales Revenue – COGS – OPEX )

Based on interest coverage ratio calculation, corresponding default spreads are shown below Table 3.6. based on credit ratings schemes.

**Table 3.6 Ratings, Interest Coverage Ratios and Default Spreads**

| Interest Coverage Ratio | Rating | Spread |
|---|---|---|
| > 12,5 | AAA | 1,25% |
| 9,5 - 12,5 | AA | 1,75% |
| 7,5 - 9,5 | A+ | 2,25% |
| 6 - 7,5 | A | 2,50% |
| 4,5 - 6 | A- | 3,00% |
| 4 - 4,5 | BBB | 3,50% |
| 3,5 - 4 | BB+ | 4,25% |
| 3 - 3,5 | BB | 5,00% |
| 2,5 - 3 | B+ | 6,00% |
| 2 - 2,5 | B | 7,25% |
| 1,5 - 2 | B- | 8,50% |
| 1,25 - 1,5 | CCC | 10,00% |
| 0,8 - 1,25 | CC | 12,00% |
| 0,5 - 0,8 | C | 15,00% |
| < 0,5 | D | 20,00% |

(Source: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ratings.htm updated January 2009)

The cost of debt is simply the after tax cost of borrowing for a firm ( Fernandez, 2007 ).

### 3.3.3 Cost of Equity

The cost of equity may be defined as the rate of return that shareholders require on the ordinary shares of the firm in order to persuade them to continue holding those shares, or more formally: ‘ the minimum rate of return that the company must earn on the equity-financed portion of its investments in order to leave the market price of its stock unchanged (Copeland et. al. 2000).

According to Graham et al. seventy three percent of CFO's always or almost always use the CAPM to estimate their cost of capital far more any other method. Bruner et. al. (1998) found that 85 % of firms in their survey use the CAPM to determine the cost of equity. Thus, CAPM model will be explained in subsequent section followed by an application in analysis section.

#### 3.3.3.1 CAPM Model

To estimate the cost of equity, the Capital Asset Pricing Model CAPM[23] is widely applied. In 1960's William Sharpe independently developed a sophisticated reasoning that has become known as the Capital Asset Pricing Model or the CAPM (Brealy and Myers 2000). Professor Sharpe won the Nobel Prize in economics for his capital asset pricing work. In essence the CAPM is the required rate of equity equal to the return on risk free securities, plus the company's systematic risk (beta) multiplied by the market price of risk ( equity risk premium ).

The cost of equity according to CAPM is composed of two elements: the risk free rate and the risk premium appropriate for a firm (Copeland, 2000). The CAPM made it possible to calculate the required rate of return which is used as the discount rate to discount the estimated future cash flow in valuation methods.

[23] CAPM formula: $K_e = r_f + \beta(r_m - r_f)$, Where, Ke : Cost of Equity, rf : The risk free rate, rm : Market rate of return, β : Beta of the company, (rm – rf ): Market risk premium

If market risk premium is estimated as the addition of country risk and equity risk, then the formula can be written as follows;

$K_e = r_f + \beta$ (equity market risk + country risk premium) (Formula 3.10)

The CAPM is based on the following assumptions (Pratt et. al., 2000)

- Investors are risk averse,
- Rational investors seek to hold efficient portfolios- that is, portfolios that are fully diversified,
- All investors have identical investment time horizons,
- All investors have identical expectations about such variables as expected rates of return and how capitalization rates are generated,
- There are no transaction costs,
- There are no investment-related taxes,
- The rate received from lending money is the same as the cost of borrowing money,
- The market has perfect divisibility and liquidity (investors can readily buy or sell any desired fractional interest).

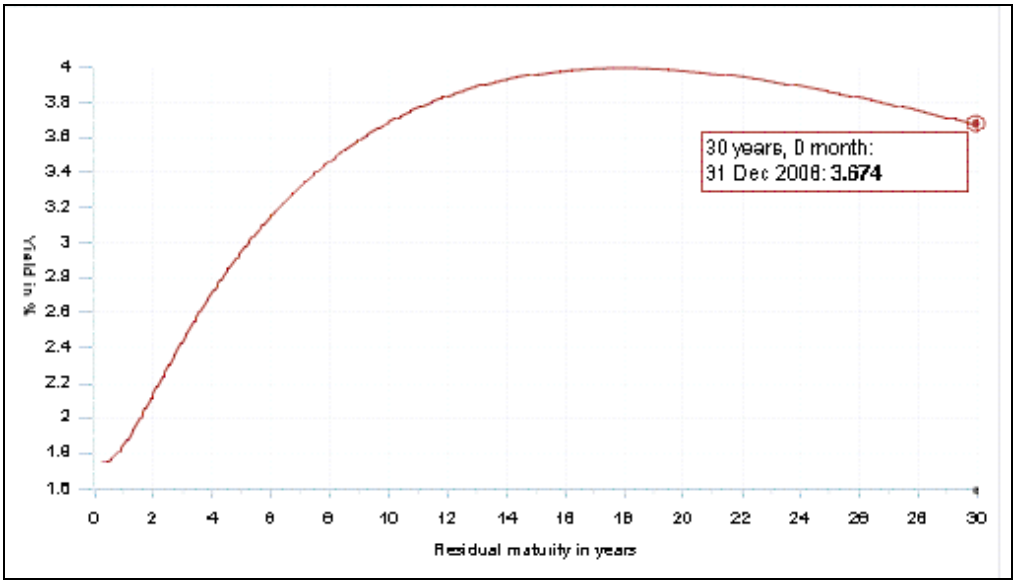
The risk free rate is the return on a security or a portfolio of securities which has no default risk and is completely uncorrelated with returns on other investment instruments in the economy. The securities that have the lowest default risk are government securities and therefore the interest rate on government securities can be used as the risk free rate of return (Pratt et. al., 2000).

A recent survey of highly regarded companies shows that about two-thirds of the companies use the rate on long-term 30-year Treasury bonds (Bruner et. al., 1998).

The difference between the return on a common stock and the return on government securities is called the equity risk premium (Annin et. al., 1998).

A risk free rate consistent with the currency used in the valuation is estimated. The analysis in this study will be made in Euro, thus risk free rate for Euro zone should be calculated. Accordingly, AAA- rated Euro Area Central Government Bond is used in this study. The yield curve of this bond is given in the Figure 3.1.

**Figure 3.1 EURO Area Central Government Bond Yield Curve**




( http ://www.ecb.int/stats/money/yc//html/index.en.html )

Bond ratings and appropriate default spreads are summarized below in Table 3.7.. Long term country risk premium is estimated by obtaining country rating from Moody's website. Default spreads are estimated based upon traded country bonds over a default free government bond rate. The emerging market average of 1.5 (equity markets are about 1.5 times more volatile than bond markets) is used to estimate country risk premium. Historical risk premium for a mature equity market 5 percent is added to default spread to estimate the total risk premium.

(Damodaran, 2004)

**Table 3.7 Country Default Spreads and Total Risk Premiums**

| Rating | Country Bond Default Spread | Country Risk Premium | Total Risk Premium |
|---|---|---|---|
| **A1** | 100 | 150 | 6,50% |
| **A2** | 125 | 188 | 6,88% |
| **A3** | 135 | 203 | 7,03% |
| **Aa1** | 75 | 113 | 6,13% |
| **Aa2** | 85 | 128 | 6,28% |
| **Aa3** | 90 | 135 | 6,35% |
| **Aaa** | 0 | 0 | 5,00% |
| **B1** | 600 | 900 | 14,00% |
| **B2** | 750 | 1125 | 16,25% |
| **B3** | 850 | 1275 | 17,75% |
| **Ba1** | 325 | 488 | 9,88% |
| **Ba2** | 400 | 600 | 11,00% |
| **Ba3** | 525 | 788 | 12,88% |
| **Baa1** | 150 | 225 | 7,25% |
| **Baa2** | 175 | 263 | 7,63% |
| **Baa3** | 200 | 300 | 8,00% |
| **Caa** | 900 | 1350 | 18,50% |
| **Ca** | 1100 | 1650 | 21,50% |

(Source: www.moodys.com, updated January 2009)

Default spread for Turkey has been calculated on the rating received from Moody's, which is Ba3. This level shows a default spread of 525 basis points, or a 5,25 percent.

For the emerging markets, country risk premiums are about 1,5 times more volatile than developed markets. In order to calculate total risk premium for a specific country, the 5 percent equity risk premium for a mature market is added to the country risk premium and a 12, 88 percent total risk premium is found for Turkey.

#### 3.3.3.2 Beta Measurement

The beta is a relative measure of risk. It measures risk added on to a diversified portfolio, rather than total risk, (Copeland et. al., 2000) recommends the use of the CAPM to calculate the required rate of return for discounting cash flow in the valuation process. Beta represents the firm specific risk of an investment and measures the relative volatility of the given instrument with respect to the market.

A beta less than 1 indicates the instrument has historically been less volatile than the market and vice versa. According to Damodaran (2002); there are two different methods to estimate the value of beta for unlisted firms, namely accounting beta and bottom-up beta. These methods are explained in detail in the subsequent section.

#### 3.3.3.2.1 Accounting Beta

Stock price data is not available for private firms. However accounting earning data can be derived from these firms' financial statements. Therefore it is possible to regress changes in a private firm's accounting earnings against an equity index ( such as S&P, ISE 100) to estimate an accounting beta (Damodaran 2004).

$$\Delta \text{Earnings}_{\text{private Firm}} = a + b\,\Delta \text{Earnings}_{\text{index}} \qquad \text{(Formula 3.11)}$$

The slope of the above regression b is the accounting beta for the firm. Limitation with this approach is that earnings are subject to accounting judgments.

#### 3.3.3.2.2 Bottom-Up Beta

The second approach to estimate beta for private firms is called bottom-up betas, which means that average beta for all the publicly traded companies in the same industry (peer companies) is used as the beta for the privately held firms in that industry. The betas of publicly traded companies are levered, meaning that the debt/equity ratio is reflected in their beta. A higher degree of financial leverage leads us to expect that the firm would be subject to higher risk. The beta for the equity in a firm with debt is called the levered beta. The unlevered beta in a firm is determined by the type of business and the operating leverage.

The betas have to be made unlevered which is adjusted by the use of the following formula:

$$\beta_{UNLEVERED} = \frac{\beta_{LEVERED}}{(1+(1-\text{tax})(D/E)} \qquad \text{(Formula 3.12)}$$

Where;

$\beta_{LEVERED}$ : Average beta of the peer publicly traded companies in the same industry,

$D/E$ : Average debt to equity ratio of the peer publicly traded companies.

To calculate the privately held company's beta an adjustment has to be made to reflect the privately held firm's financial leverage. Target debt/equity ratio for privately held firm can be used to estimate the beta of the firm.

$$\beta_{\text{Private Firm}} = \beta_{\text{Unlevered}}(1+(1\text{-tax rate})(\text{Target Debt/Equity})) \text{ (Formula 3.13)}$$

### 3.4 Calculation of Terminal Value and Total Equity Value

According to the discounted cash flow methodology, the value of the firm is the present value of its expected cashlows over its life. Since firms have infinite lives according to going concern assumption, valuation is undertaken at two stages: the explicit forecast period[24] and the post horizon period[25].

[24] Practitioners use no longer than five years for the explicit period. (Levin and Olsson, 2000)
[25] During the explicit forecast period the firm transforms into a steady state and reaches the steady state in the post horizon period. Steady state assumption is defined as ''income statements, balance sheets and cash flows variables in the terminal value grow at constant rate''

| | | | | |
|---|---|---|---|---|
| Value = | Present value of free cash flow **during** explicit forecast period | + | Present value of free cash flow **after** explicit forecast period (post horizon period) | (Formula 3.14) |

The present value of cashflows to firm after the forecast period is called ''terminal value[26]'' and formulated as follows:

$$TV_n = \frac{FCF_t (1 + g_{cg})}{(WACC_t - g_{cg})} \qquad \text{(Formula 3.15)}$$

Where;

$TV_n$ : Expected Terminal Value,

$FCF_t$ : Free Cash Flow of Terminal year

$g_{cg}$ : Expected sales growth during constant growth period,

$WACC_t$ : Weighted Average Cost of Capital.

To estimate the terminal value, the constant Gordon growth model is applied (Copeland et.al, 2000). The Gordon growth model assumes that a company's cash flow beyond the terminal year will grow at a constant rate (g) in steady state consistent with the assumed terminal growth rate.

[26] *Continuing value* or *horizon value* is sometimes used instead of *terminal value* in valuation literature.

Recent studies have indicated that the terminal value calculations are crucial for the accuracy of a valuation model. In the applications of the corporate valuation, terminal value accounts from 50 percent to 125 percent of the total company value. ( Kırlı, 2005) According to Copeland et al (2000); terminal value often accounts 60 - 80 percent in a DCF model.

The terminal growth rate in steady state assumption cannot exceed the overall growth rate of the economy, since no company grows forever at a rate higher than the growth rate of the economy in which it operates. (Koller, 2005)

Once the terminal value and the free cashflows are estimated, they are discounted back to the present and equity value of the firm using the Formula 3.15. The calculation of enterprise value was formulated in Formula 3.16. as follows;

$$EV = E - D \qquad \text{(Formula 3.16)}$$

Where;

EV : Enterprise Value

E : Equity Value

D: Net Debt

Finally, to get the value per share, the values of the firm's liabilities (financial debt), preferred stock, and other short term liabilities should be subtracted to get Value of Common Equity, divided by the amount of stock outstanding which provides the stock value per share. (Damodaran, 2001 b)

## 4. Implementation of DCF Valuation on '' Seferkaya Aquaculture Products''

### 4.1 Company Overview

Seferkaya is located in Gerence gulf. Company owns strategically 2 different farming areas in production fields. The licenses which are gathered for fish production are 750 Ton / year. There are not any legal and jurisdiction problems for the following years.

Sea bass and gilt head bream are produced in the off shore type cages and nets. Fish farms are established with the permissions of 10 different ministerial offices and 50 different associations. This process takes at least 3 years and the production will commence by renting sea surface areas. The fish farm system is newly established and modern since all the investments are done in the past 2 years.

In production process, the computer program Aquaris[27] is being used and all records, growth programs, cost data, feeding, deaths, all fixed and variable costs, depreciations can be observed. All sorts of statistical information and analyses can be done and current sales strategies can be formed in the market by the use of this program.

[27] A special computer program for planning the fish production.

### 4.2 DCF Valuation of Seferkaya – Projection of Cashflows

Revenue projections are developed based on the assumptions on industry growth and price increases. The relation between these variables is defined based on historical data and expectations.

#### 4.2.1 Historical Financial Statements

Seferkaya's financials are prepared in accordance with Turkish Tax Regulations. Balance sheet and income statement information for Seferkaya Aquaculture Products is provided in Table 4.1. and Table 4.2.

**Table 4.1 Summary Balance sheet of Seferkaya Aquaculture Products**

| HISTORICAL BALANCE SHEET (EURO) | 2005 | 2006 | 2007 |
|---|---|---|---|
| **TOTAL CURRENT ASSETS** | **2.934.255** | **3.088.689** | **3.251.252** |
| Cash or Cash Equivalents | 496.271 | 522.391 | 549.885 |
| Trade Receivables | 532.775 | 560.816 | 590.333 |
| Inventories | 1.905.208 | 2.005.482 | 2.111.034 |
| **TOTAL FIXED ASSETS** | **519.116** | **546.438** | **575.198** |
| **TOTAL ASSETS** | **3.453.371** | **3.635.128** | **3.826.450** |
| | | | |
| **TOTAL CURRENT LIABILITIES** | **1.695.039** | **1.784.252** | **1.878.160** |
| Financial Loans | 805.942 | 848.360 | 893.011 |
| Trade Payables | 889.097 | 935.892 | 985.149 |
| **LONG TERM LIABILITIES** | **1.067.658** | **1.123.850** | **1.183.000** |
| Financial Loans | 1.067.658 | 1.123.850 | 1.183.000 |
| **TOTAL SHAREHOLDER'S EQUITY** | **690.674** | **727.026** | **765.290** |
| **TOTAL LIABILITIES** | **3.453.371** | **3.635.128** | **3.826.450** |
| **Key Financial Ratios** | | | |
| Current Ratio | 1,7 | 1,7 | 1,7 |
| Quick Ratio | 0,6 | 0,6 | 0,6 |
| Debt to Equity Ratio | 4,0 | 4,0 | 4,0 |
| Days Payables Outstanding | 238 | 226 | 214 |
| Days in Inventory | 511 | 484 | 458 |
| Days Receivables Outstanding | 114 | 108 | 102 |

It takes 18-20 months for sea basses and 13 -15 months for gilt head breams to reach selling sizes of 350 gr. So, the average days in inventory ratio is between 458-511 days. Average days of trade receivable ratio is 102-114 days, average payment period is 214-238 days between the years 2005-2007. Thus, average cash convergence cycle is 346 days, which almost corresponds to a year.

**Table 4.2 Summary Income Statement of Seferkaya Aquaculture Products**

| HISTORICAL INCOME STATEMENTS (EURO) | 2005 | 2006 | 2007 |
|---|---|---|---|
| **Net Sales** | **1.708.656** | **1.898.507** | **2.109.452** |
| Cost of Sales (-) | (1.361.547) | (1.512.830) | (1.680.922) |
| **GROSS PROFIT or LOSS** | **347.109** | **385.677** | **428.530** |
| Operating Expenses (-) | (188.584) | (209.538) | (232.820) |
| **OPERATING PROFIT** | **158.525** | **176.139** | **195.710** |
| Other Income or Expenses (Net) | 252.035 | 277.239 | 304.962 |
| Financial Expenses | (247.695) | (275.217) | (305.797) |
| **EARNINGS BEFORE TAX** | **162.865** | **178.160** | **194.875** |
| Tax (-) | (32.573) | (35.632) | (38.975) |
| **NET PROFIT or LOSS** | **130.292** | **142.528** | **155.900** |
| Key Financial Ratios | | | |
| Sales Growth Rate | *12%* | *11%* | *11%* |
| Gross Margin Rate | *20%* | *20%* | *20%* |
| Operating Profit Margin | 9% | 9% | 9% |
| Interest Coverage Ratio | 0,64 | 0,64 | 0,64 |

### 4.2.2 Industry Information

Sea agriculture has become more important due to global warming which caused decline in harvest areas and products. Within the increasing population plan of the world, all countries started to give more importance to fish. Although in Europe the fish consumption per person is 22 kg, it is still 4 kg in Turkey. Since the increase of fishing quotas set by world countries and the increasing fishing pressure on natural fishing stocks, shortage of supply is provided by farm fishing.

Newly introduced environment law and tough standards caused many fish farms to close by the end of the year and most of them will be faced up with bankruptcy. 46 % of fish consumption is produced by fish farms in the world. This rate is approximately 8 % in Turkey.

With the recent regulations, all the environmental, capacity, license problems were solved, and after these developments it is not possible to get new licensed places for fish farming. Thus, licensed companies will be more important in the near future. In recent past, in the fish farming sector, international companies (such as; Fiord Marine, a Norway company) started taking over publicly-traded companies (such as Selonda, Nireus, Helenka, Galeksidi) in Greece. Below in Table 4.3 and 4.4 Turkey and Greece's fry production amounts are provided.

**Table 4.3 Fry Production in Turkey**

(Data is taken from Turkish Federation of Aqua Culture and Fisheries)

| ( .000 unit ) | | 2005 Actual | 2006 Actual | 2007 Actual | 2008 Actual | 2009 Projected |
|---|---|---|---|---|---|---|
| **Gilt head bream** | | | | | | |
| | *Ton* | 72.500 | 117.500 | 123.700 | 69.000 | 57.000 |
| | *% Change* | | 62% | 5% | -44% | -17% |
| **Sea bass** | | | | | | |
| | *Ton* | 120.000 | 110.500 | 138.700 | 179.500 | 155.000 |
| | *% Change* | | -8% | 26% | 29% | -14% |
| ***Total*** | | 192.500 | 228.000 | 262.400 | 248.500 | 212.000 |
| | *% Change* | | 18% | 15% | -5% | -15% |

**TABLE 4.4 Fry Production in Greece**

| ( .000 Unit ) | | 2005 Actual | 2006 Actual | 2007 Actual | 2008 Actual | 2009 Projected |
|---|---|---|---|---|---|---|
| **Gilt head bream** | | | | | | |
| | *Ton* | 210.000 | 252.000 | 302.400 | 224.640 | 190.944 |
| | *% Change* | | 20% | 20% | -26% | -15% |
| **Sea bass** | | | | | | |
| | *Ton* | 90.000 | 108.000 | 129.600 | 120.960 | 102.816 |
| | *% Change* | | 20% | 20% | -7% | -15% |
| ***Total*** | | 300.000 | 360.000 | 432.000 | 345.600 | 293.760 |
| | *% Change* | | 20% | 20% | -20% | -15% |

(Data is taken from FEAP[28] )

In Greece it is expected that fry production will decrease by 35 % by the end of 2009 compared to 2007, within this period, decrease in gilt head bream supply will be % 41 and in sea bass it will be 22 %.

Due to the decrease in supply of fry production, the price of fish is expected to increase. This year total fry production has decreased 5 % in Turkey and it is expected to decrease 15 % in the following year. Therefore, by the end of 2009 the fry production will decreased by 20 % when compared to 2007. It is expected that fry gilt head bream production will decrease 61 % by the end of 2009, compared to 2007 whereas Fry sea bass production will increase by 15 %. Below in Table 4.4 Turkey's historical and projected fish production figures are provided .

[28] FEAP: Federation of European Aquaculture Producers

**TABLE 4.5 Fish Production in Turkey**

(Data is taken from Ministry of Agriculture)

| Ton | | 2008 Actual | 2009 Projected | 2010 Projected |
|---|---|---|---|---|
| **Gilt head bream** | | | | |
| | *Ton* | 30.925 | 17.250 | 14.250 |
| | *% Change* | | -44% | -17% |
| **Sea bass** | | | | |
| | *Ton* | 34.675 | 44.875 | 38.750 |
| | *% Change* | | 29% | -14% |
| ***Total*** | | 65.600 | 62.125 | 53.000 |
| | *% Change* | | -5% | -15% |

In government's 8th development plan, assuming under the same consumption pattern, by the year 2023 with increasing population, country's needs for Fishery products will be 1,2 million ton per year. Considering that the current fish production is 65.600 ton per year in Turkey, it can be recognized that the sector's potential for the following years are considerably high.

### 4.2.3 Earnings Forecast

Seferkaya sells sea bass and gilt head bream in the market. The fries of sea bass and gilt head bream are taken from incubation places when they are weighted approximately 2-5 grams and are generally caged in the months of March and June. When the fries of sea basses are 2 grams they are vaccinated first time against vibriosis[29]. Their second vaccine is done when they reach 12 grams in their cages. In markets sea basses are sold (200-300 gr) , ( 300-400 gr) , ( 400-600 gr),(600-800 gr), ( 800-1000 gr) and over kilos. Sea bass' export demand is very strong.

[29] Vibriosis is a fish disease caused by an infection with bacteria of the *Vibrio* genus.

Sea bass is popular in European countries with its taste and it can be sold in domestic and overseas markets in fresh and processed (fillet, frozen, etc.) forms.

In addition to this, exporting of gilt head bream has been elevated in recent years. Sea bass is profitable product because of the low conversion of bait to meat. When the sizes of the sea basses get bigger, the profit margins increase exponentially. Exporting seabasses, is a natural way to hedge the Company's currency rate risk. Revenue projections of Seferkaya are provided in Table 4.6

**Table 4.6 Sales Assumptions of Seferkaya**

| Sales and Other Revenues | | | | | | |
|---|---|---|---|---|---|---|
| **EURO** | | **2009 Projected** | **2010 Projected** | **2011 Projected** | **2012 Projected** | **2013 Projected** |
| **Gilthead bream** | | | | | | |
| | *Ton* | 322 | 378 | 315 | 315 | 315 |
| | *Unit Price* | 3,53 | 3,67 | 3,86 | 3,86 | 3,86 |
| ***Total Gilthead bream Sales*** | | **1.134.982** | **1.385.685** | **1.214.640** | **1.214.640** | **1.214.640** |
| **Sea Bass Sales** | | | | | | |
| | *Ton* | 267 | 323 | 408 | 408 | 408 |
| | *Unit Price* | 3,29 | 3,55 | 3,66 | 3,66 | 3,66 |
| ***Total Sea Bass Sales*** | | **880.127** | **1.148.018** | **1.491.227** | **1.491.227** | **1.491.227** |
| **Total Sales** | | **2.015.109** | **2.533.703** | **2.705.867** | **2.705.867** | **2.705.867** |
| | *Total Ton* | 589 | 701 | 723 | 723 | 723 |
| | *% Growth* | *21%* | *26%* | *7%* | *0%* | *0%* |
| **Supporting Incentive Revenues** | | **253.014** | **246.479** | **232.507** | **221.426** | **212.895** |
| **Total Sales and Other Revenues** | | **2.268.123** | **2.780.182** | **2.938.374** | **2.927.293** | **2.918.762** |

It is assumed that the sales will increase 21% in 2009, 26% in 2010 and 7% in 2011, and sales growth will be constant in future periods under the given assumptions below.

The fries planned to be purchased between the years 2009 and 2013 as follows;

- In 2009, 1.200.000 units gilt head bream and 800.000 units sea bass,
- Between the years 2010–2013, 1.000.000 units of Gilt head bream and 1.000.000 units of sea bass are projected.

1.00 YTL incentives are applying to per kg based on the Council of Ministers' decision on 25 February 2005.

Both in Turkey and Greece, fry production decreases in years 2008 and 2009 when compared to previous years. Due to this reason, beginning from the year 2009, the grown up fish supply will be less than its demand; so the firm expects the prices to be higher. The fish prices were conservatively estimated and fixed in Euro between the years 2011 and 2013.

Seferkaya cost projections are based on historical profit margins and are consistent with previous ratios.

The conversion ratio of the bait to the fish and the growth ratio of the fish are projected by the help of computer programs, in which the weight of the fish, its cost and its consumption of bait can be projected. For sea bass, 1.75 fcr[30] and for gilt head bream 1.90 fcr are accurate targets, and those targets are aims of the Company. Input costs are purchased for installments.

[30] Feed conversion ratio (FCR) is calculated from the number of kilos of feed that are used to produce one kilo of fish

Cost projections and cost structure for Seferkaya are provided in Table 4.7.

**Table 4.7 Cost Projection and Cost Structure of Seferkaya**

| Cost and Expense Assumptions | | | | | |
|---|---|---|---|---|---|
| (EURO) | 2009 Projected | 2010 Projected | 2011 Projected | 2012 Projected | 2013 Projected |
| Fry | 280.000 | 383.400 | 378.000 | 378.000 | 378.000 |
| Bait | 1.303.107 | 1.435.722 | 1.207.737 | 1.207.737 | 1.207.737 |
| Vitamin and Vaccine | 27.089 | 27.089 | 27.089 | 27.089 | 27.089 |
| Labour | 192.208 | 192.208 | 192.208 | 192.208 | 192.208 |
| TOTAL COGS | 1.802.404 | 2.038.419 | 1.805.034 | 1.805.034 | 1.805.034 |
| Depreciation | 106.623 | 85.281 | 50.249 | 33.754 | 27.990 |
| Maintenance and Fuel | 87.369 | 81.653 | 75.000 | 75.000 | 75.000 |
| Sales Expense | 81.664 | 76.322 | 72.002 | 68.573 | 65.936 |
| Insurance | 31.262 | 31.262 | 31.262 | 31.262 | 31.262 |
| Rent | 71.858 | 67.157 | 63.356 | 60.339 | 58.018 |
| Other General Expenses | 28.173 | 26.330 | 24.840 | 23.657 | 22.747 |
| Total Operating Expenses | 406.949 | 368.005 | 316.708 | 292.584 | 280.953 |
| TOTAL COST AND EXPENSES | 2.209.352 | 2.406.423 | 2.121.741 | 2.097.618 | 2.085.986 |
| Percentage of COGS | | | | | |
| Fry | 16% | 19% | 21% | 21% | 21% |
| Bait | 72% | 70% | 67% | 67% | 67% |
| Labour | 11% | 9% | 11% | 11% | 11% |

The proportion of the cost items to the total COGS are as follows between 2009 – 2013;

- Fry cost is 16-21 % of COGS ,
- Bait cost is 67-72 % of COGS,
- Labor cost is 9-11 % of COGS.

### 4.2.4 Working Capital Forecasts

Working capital projections are estimated by using percentage of sales method. Seferkaya runs with a working capital approximately 80 % of its sales. Details of working capital calculations are explained in Table 4.8.

**Table 4.8 Working Capital Projections of Seferkaya**

| Change in Net Working Capital Calculation | | | | | | |
|---|---|---|---|---|---|---|
| **Euro** | **2009 Projected** | **2010 Projected** | **2011 Projected** | **2012 Projected** | **2013 Projected** | **Terminal Year Projected** |
| Net sales | 2.268.123 | 2.780.182 | 2.938.374 | 2.927.293 | 2.918.762 | 2.918.762 |
| **Working Capital** | | | | | | |
| Account receivables | 621.403 | 874.068 | 1.153.525 | 1.144.699 | 1.137.905 | 1.137.905 |
| Inventory | 2.222.141 | 2.513.119 | 2.225.384 | 2.225.384 | 2.225.384 | 2.225.384 |
| Account payables | 1.036.999 | 1.172.789 | 1.038.512 | 1.038.512 | 1.038.512 | 1.038.512 |
| **Net Working Capital Need** | 1.806.546 | 2.214.398 | 2.340.396 | 2.331.570 | 2.324.776 | 2.324.776 |
| **Change in Net Working Capital Need, +/(-)** | **199.853** | **407.853** | **125.998** | **-8.826** | **-6.794** | **-6.794** |
| **Percentage of Sales ( NWC / Net Sales )** | 80% | 80% | 80% | 80% | 80% | 80% |

### 4.2.5 Free Cash Flow Estimation

To reach the projected sales target, no capital expenditure is planned for future periods, since all the properties and equipments are new.

Effective tax is forecasted based on the operating profit of Seferkaya and 20 % is used as the effective tax rate. Free cash flow to Seferkaya is calculated in Table 4.9.

**Table 4.9 Cash Flow Projections of Seferkaya**

| CASH FLOW PROJECTIONS | | | | | |
|---|---|---|---|---|---|
| **EURO** | **2009 Projected** | **2010 Projected** | **2011 Projected** | **2012 Projected** | **2013 Projected** |
| **Total Sales and Other Revenues** | **2.268.123** | **2.780.182** | **2.938.374** | **2.927.293** | **2.918.762** |
| Cost of Good Sold (-) | **(1.802.404)** | **(2.038.419)** | **(1.805.034)** | **(1.805.034)** | **(1.805.034)** |
| **Gross Profit or Loss** | **465.719** | **741.763** | **1.133.340** | **1.122.259** | **1.113.729** |
| *Gross Margin* | *21%* | *27%* | *39%* | *38%* | *38%* |
| General Expenses and Depreciation | **(406.949)** | **(368.005)** | **(316.708)** | **(292.584)** | **(280.953)** |
| **Operating Profit / EBIT** | **58.770** | **373.758** | **816.632** | **829.675** | **832.776** |
| (-) Effective Tax | 11.754 | 74.752 | 163.326 | 165.935 | 166.555 |
| (-) Net change in Working Capital | 199.853 | 407.853 | 125.998 | (8.826) | (6.794) |
| (+) Depreciation | 106.623 | 85.281 | 50.249 | 33.754 | 27.990 |
| **Free cash Flow to Firm** | (46.214) | (23.565) | 577.556 | 706.320 | 701.005 |

The breakdown of the total expenses and cost figures are gathered from the Table 4.7. and sales figures are derived from the Table 4.6.

### 4.3 DCF Valuation of Seferkaya – Estimation of the Discount Rate

Formula 3.7. is used to calculate the WACC for Seferkaya. For this purpose, cost of equity, cost of debt and capital structure of Seferkaya should be estimated.

#### 4.3.1 Cost of Equity Estimation

Estimation of the cost of equity for Seferkaya is undertaken pursuant to CAPM approach according to the Formula 3.10. As Seferkaya is a privately held company, beta is estimated by calculating bottom up beta in Formula 3.12., using average beta of publicly traded firms in the same industry. Unlevered average industry bottom up betas are calculated below in Table 4.10.

**Table 4.10 Unlevered Beta of Industry Average**

| Industry Average Unlevered Beta | | | |
|---|---|---|---|
| Company Name | Debt/Equity | Beta | Unlevered Beta |
| AEFES | 1,33 | 0,37 | 0,18 |
| ALYAG | 1,28 | 0,42 | 0,21 |
| BANVT | 1,99 | 0,80 | 0,31 |
| CCOLA | 1,13 | 0,82 | 0,43 |
| ERSU | 0,26 | 0,73 | 0,60 |
| KENT | 1,12 | 0,80 | 0,42 |
| KNFRT | 1,64 | 0,90 | 0,39 |
| KRSTL | 0,32 | 0,87 | 0,69 |
| PENGD | 2,18 | 0,84 | 0,31 |
| PETUN | 0,41 | 0,84 | 0,63 |
| PINSU | 0,41 | 0,94 | 0,71 |
| PNSUT | 0,53 | 0,81 | 0,57 |
| SKPLC | 3,24 | 0,82 | 0,23 |
| TATKS | 2,57 | 0,80 | 0,26 |
| ULKER | 1,28 | 0,78 | 0,38 |
| VANET | 1,78 | 0,65 | 0,27 |
| Average | 1,34 | 0,76 | 0,41 |

The average unlevered beta for the industry is 0,41. An adjustment has to be made for unlevered industry average beta to reflect Seferkaya's optimal financial leverage by the use of Formula 3.13.

$$\beta_{\text{Seferkaya}} = 0{,}41\,(1+(1-0{,}20)(0{,}20)) \quad \text{(Formula 3.13.)}$$

$$\beta_{\text{Seferkaya}} = 0{,}4756$$

Calculation of cost of equity for Seferkaya using CAPM Model is provided in Table 4.11.

**Table 4.11 Cost of Equity Estimation for Seferkaya**

| COST OF EQUITY | |
|---|---|
| **Risk Free Rate** | **3,67%** |
| Turkey Country Risk Premium | 12,88% |
| Unlevered Beta of the Firm | 0,476 |
| **Risk Premium For The Firm** | **6,13%** |
| **Cost of Equity For The Firm** | **9,80%** |

### 4.3.2 Cost of Debt Estimation

Cost of Debt is calculated according to the Formula 3.8.. Default spread in the Formula 3.8. is found by calculating interest coverage ratio in the Formula 3.9. EBIT and Interest Expense of Seferkaya can be found in Table 4.2.

$$\textbf{Interest Coverage Ratio}_{\text{ Seferkaya}} = 195.710 / 304.797$$

$$= 0,64$$

The interest coverage ratio for Seferkaya is 0,64, and the associated ratings is found in Table 3.6. which indicates a bond rating of ‘’C’’ for Seferkaya. The default spread for this rating is 15 %.

$$\textbf{Cost of Debt}_{\text{ Seferkaya}} = 3,67\ \% + 15\ \%$$

$$= 18,67\ \%$$

### 4.3.3 WACC Estimation

The weighted average cost of capital is simply the weighted cost of the capital supplied by the debt and equity financiers at different costs. In order to compute WACC, the market value of debt and equity should be considered.

The debt/equity ratio should reflect the general financing composition of the company and the industry instead of the Seferkaya's current level. With that respect, the financing policies of the other global aquaculture firms investigated. From this point 20 percent debt – 80 percent equity is accepted as capital structure for Seferkaya.

Based on these assumptions, WACC of Seferkaya is calculated according to Formula 3.7. as described in Table 4.12.

**Table 4.12 WACC Estimation of Seferkaya**

| WACC of SEFERKAYA | |
|---|---|
| **Cost of Equity** | **9,80%** |
| Weight of Equity | 80% |
| **Cost of Debt ( after tax )** | **14,9%** |
| Tax | 20% |
| Weight of Debt | 20% |
| **WACC ( after tax )** | **10,83%** |

### 4.4 Terminal Value Calculation of Seferkaya

Terminal value is calculated according to the Formula 3.15. Since company generates most or all of its cashflows from domestic economy, terminal growth rate is estimated with respect to growth of overall economy. 1,1 percent is taken as the growth rate for the terminal growth rate calculation. Calculation of terminal value for Seferkaya is shown in Table 4.13.

**Table 4.13 Calculation of Terminal Value of Seferkaya**

| Terminal Value | | |
|---|---|---|
| **WACC** | | **10,83%** |
| Terminal Growth Rate | | 1,1% |
| Cash Flows to the firm at 2013 | € | 701.005 |
| **Terminal Value at 2013** | € | **7.285.923** |
| **Discounted Terminal Value at 2008 end** | € | **4.357.654** |

### 4.5 Equity Value Calculation of Seferkaya and Sensitivity Analysis

Discounted cash flows between the years 2009 - 2013 is added to the discounted terminal value, enterprise value is calculated according to the Formula 2.3.

$$\text{Value} = \frac{-46.21}{(1+0,11)^1} + \frac{-23.565}{(1+0,11)^2} + \frac{577.556}{(1+0,11)^3} + \frac{706.320}{(1+0,11)^4} + \frac{701.005}{(1+0,11)^5} + \frac{\frac{(701.005*1,01)}{(0,11-0,01)}}{(1+0,11)^5}$$

Total DCF Value $_{\text{Seferkaya}}$ = 5.608.501 Euro

As of 31.12.2007, which is last declared balance sheet date, Seferkaya has a long term financial debt position of 1.183.000 Euro and short term financial debt position of 893.011 Euro. Seferkaya's total financial debt is 2.076.011 Euro. To calculate net financial debt position, cash and cash equivalent balance of 549.885 Euro is subtracted from total financial debt and 1.526.126 net financial debt position is calculated.

In below Table 4.14, the equity value of Seferkaya which is calculated by discounted cash flow method is found by subtracting net financial debt from the enterprise value and 4.082.375 Euro is calculated.

**Table 4.14 Calculation of Equity Value of Seferkaya**

| Equity Value of SEFERKAYA as of 31.12.2008 | | |
|---|---|---|
| Discounted Cash Flows to the Firm | € | 1.250.847 |
| Discounted Terminal Value | € | 4.357.654 |
| **Enterprise Value** | **€** | **5.608.501** |
| Less :Net Financial Debt | -€ | 1.526.126 |
| **Equity Value** | **€** | **4.082.375** |

**Table 4.15 Sensitivity Analysis**

Finally, a sensitivity analysis is made with WACC and terminal growth rate.

| Sensitivity Analysis | | | | |
|---|---|---|---|---|
| | | 9,83% WACC -1 % | 10,83% WACC | 11,83% WACC + 1 % |
| 1,10% | Terminal Growth Rate | 4.332.097 | 4.082.375 | 3.845.487 |
| 2,10% | Terminal Growth Rate + % 1 | 5.569.037 | 4.629.736 | 3.886.696 |
| 3,10% | Terminal Growth Rate + % 2 | 6.495.920 | 5.318.767 | 4.414.739 |

## 5. Conclusion

Company valuation theory is being implemented for market transactions, merger and acquisitions, public offerings, company restructurings and budgeting etc. The purpose of this study is to establish and apply discounted cash flow method for privately held firms. This was implemented by conducting a literature study and a subsequent case study.

Privately held firms do not have market price so, it is not able to estimate the beta in the same way as beta is estimated for traded firms. However it is possible to value privately held firms using Discounted Cash Flow Analysis by making some adjustments for the require rate of return. Cash Flows to firm were projected by historical financial performance, capital expenditures, working capital policy. Require rate of return was calculated by target capital structure, cost of debt of the company and risk premium for the country. Projected cash flows were discounted to the end of 2008 at discount rate to find the enterprise value of the company Seferkaya. Finally, net financial debt is deducted from the enterprise value in order to calculate the equity value.

‘’Merger and acquisition’’ is an important practice area for valuation to find the fair value of the target firm. Despite the fact that merger and acquisition deals in Turkey declined 30 percent in 2008 on a year-on-year basis, excluding privatization, the total value of such deals was still significant for the economy, reaching $18.4 billion. Correct valuation of Turkish companies from merger and acquisition point has become a crucial point for each investor and the seller.

In parallel with the draft of the new Turkish Commercial Code, restructuring of Turkish conglomerates and restructuring activities like spin offs necessitate the usage of company valuation methods in Turkish corporate management world.

According to draft Turkish Commercial Code every capital stock company has been obliged to create a website, to allocate a part for information society services and draft defines the information society as a society that has access to information. Valuation report is one of the documents that should be published in the website.

I hope this thesis can give better understanding of DCF valuation to privately held firms' owners and practitioners.

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## APPENDIX A (Questionnaire asked to Seferkaya)

1-) Can you please give the financials for the years 2006, 2007,2008 including Balance Sheet and Income Statements ve General Ledger?

2-) Can you please prepare projected budgeted income statements for the years 2009, 2010, 2011, 2012 and 2013 ?

3-) What would be projected capital structure (Debt/equity ratio) for Seferkaya Aquaculture?

4-) Can you please give me the list and time of projected capital expenditures ?

5-) What would be the projected inventory turnover, accounts receivable turnover and accounts payable turnover ratios?

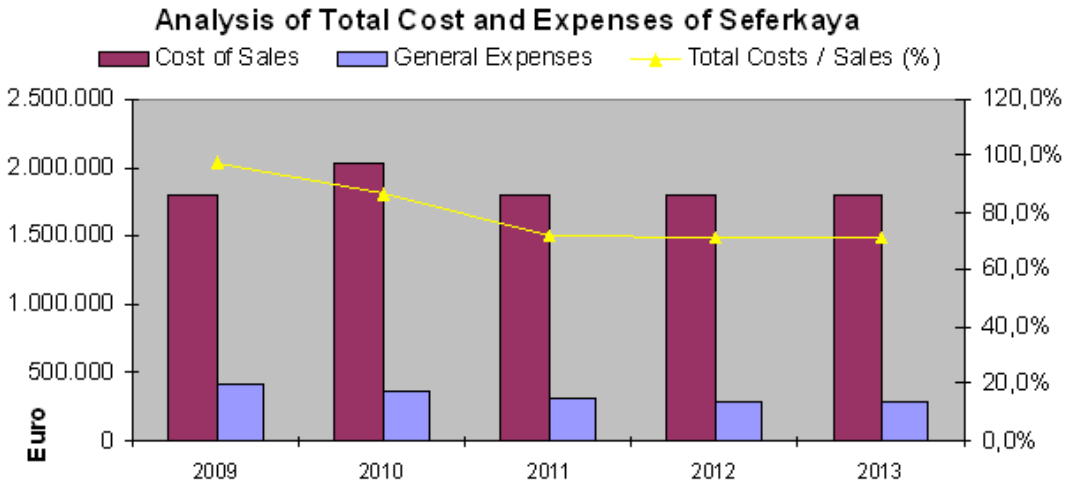
6-) Can you please prepare detailed depreciation Table for Seferkaya Aquaculture?

7-) What is your dividend distribution policy?

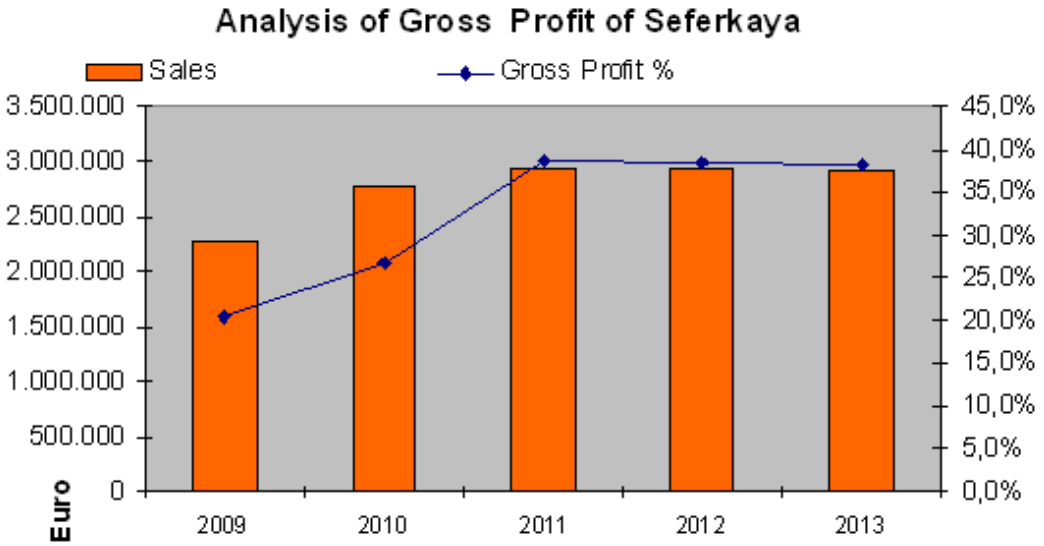
8-) Can you please prepare Cost of Goods Sold Table.

## APPENDIX B ( Analysis of Seferkaya and the Industry)

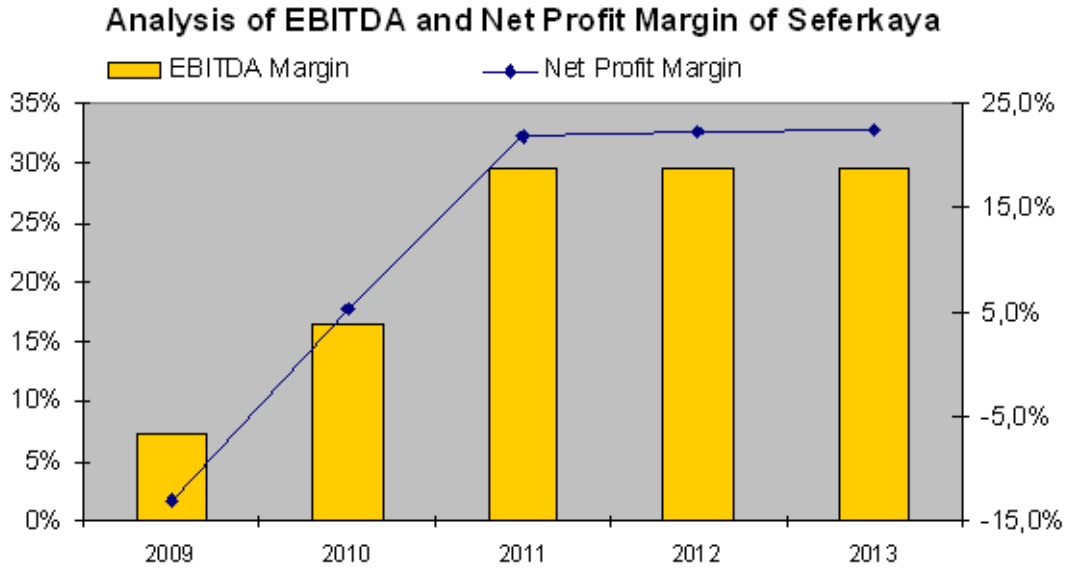
Below figure summarized the total cost and expense of Seferkaya for the period from 2009 to 2013.



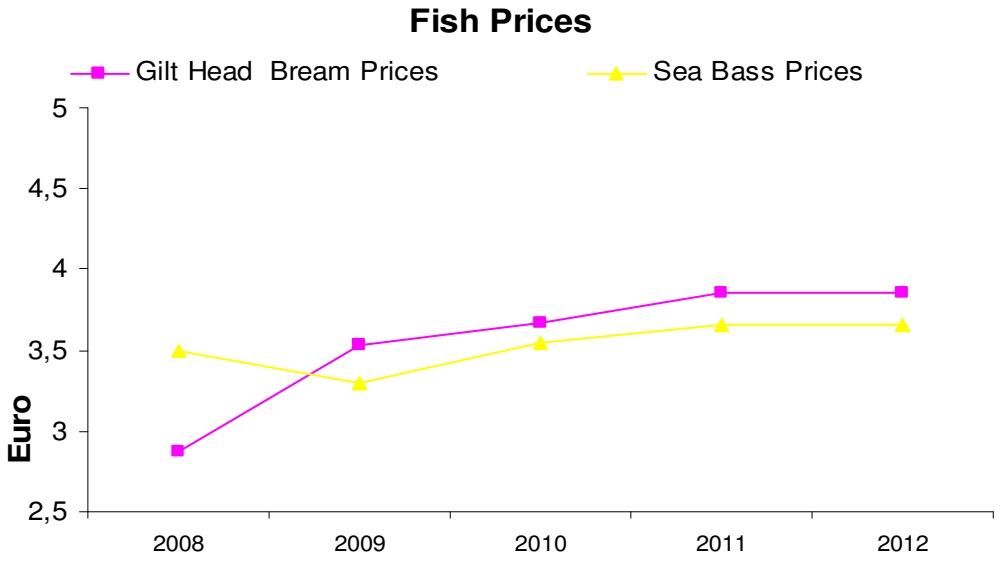

Below figure summarized the sales and gross profit margins for the period from 2009 to 2013.



Below figure summarized EBITDA and net profit margins for the period from 2009 to 2013.




Below figure shows projected fish prices between the years 2009-2012.



Below figure shows projected fish production and fish prices for the years 2009 and 2010.