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The Discounted Cash Flow Approach to Corporate Valuation Empirical Evidence on the Companies Listed in Al Quds index

Shadi Azzam Shaker Milhem

21012239

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Prepared By:
Shadi Azzam Shaker Milhem

21012239

B.Sc Accounting and Finance from a Al Quds University - Palestine

Supervisor: Dr. Ibrahim Awad

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Prepared By: Shadi Azzam Shaker Milhem
Registration No: 21012239

Supervisor: Dr. Ibrahim M. Awad, PhD.

Master Thesis submitted and accepted, Date: 7/11/2015
The names and signatures of examining committee members are as follows:

Head of committee: Dr. Ibrahim Awad Signature:.....

Internal examiner: Dr. Afif Hamad Signature:.....

External examiner: Dr. Mohmoud Hadad Signature:.....

Jerusalem – Palestine

1437-2015

Dedication

To

My Father and Mother

My Wife Manal Tayem

My Son Omar

My friends Iyad Al Halaseh and AbedAlrahman AlEwesat

Shadi Azzam Shaker Milhem

Declaration

I certify that this thesis submitted for the degree of Master, is the result of my own research, except where otherwise acknowledged, and that this thesis (or any part of the same) has not been submitted for a higher degree to any other university or institution.

Signed……

Shadi Azzam Shaker Milhem

Date: November 11, 2015

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Shadi Azzam Shaker Milhem

Abstract:

Many companies in the Palestine Exchange (PEX) do not disclose enough information about the risks they are exposed to. The goal of this research is to introduce the reader to the companies' valuation techniques using Discounted Cash Flow, often referred to as "DCF", in order to calculate the companies' values based on the disclosed financial information related to the Palestinian firms listed in PEX. This study compares the results concluded using this method with other valuation methods.

In this research, various corporate valuation theories are discussed, and selected corporate valuation techniques are applied for the valuation of companies listed in PEX.

The corporate valuation theories being applied in this research are; the Discounted Cash Flow (DCF) model, the Dividend Discount Model (DDM) and the Residual Income Model (RIM). In addition to using one method for determining the expected rate of return on a company's stock, i.e. the capital asset pricing model (CAPM). Based on the corporate valuation analysis made, the DCF model is selected as the primary corporate valuation model in this thesis, and the Capital Asset Pricing Model (CAPM) is chosen to estimate the cost of equity for the company. Finally, the analysis using graphs and sensitivity analysis and scenarios is conducted in order to evaluate whether the results obtained are reasonable and to show the divergence between the output values.

The companies values using the Discounted Cash Flow (DCF) model are calculated based on the forecasted Free Cash Flow (FCF) in the explicit forecasting period (the horizon period) and the estimated continuing value after the explicit forecast period (after horizon period).

The study results are compared with equity values of the companies listed in PEX, .Table 9 shows that.

The DCF model shows whether the company's value is understated or overstated as well as the differences between the equity spot value and actual value using the DCF when it is near the actual value. In most cases, the model shows that the company's Fair Market Value (FMV) is always overstated over its calculated intrinsic value using DCF. The difference between the DCF and the other methods is that DCF is the most reliable method in all conditions, e.g. in the cases of undeclared dividends the DCF will not affect the company's evaluation. Adding to that, when DCF is used to evaluate companies facing losses the value of the stock will not be a negative value.

The DDM is not a reliable evaluation model in the case of no dividends, for examples GMC, TNP, UCI and WATANYIA are all companies which did not declare any dividends during the year 2013. However, if the companies do not declare dividends it does not mean that the value of the companies is Zero. Accordingly, the value of the companies using DDM in the case of no dividends will be zero, which seems to be unreasonable. Furthermore, evaluation of the companies that are facing losses using the RIM will show negative values of the companies.

The equity values obtained from the DCF, DDM and RIM are compared with those published in PEX. These differences in these values are likely to be due to undisclosed information and demand and supply factors.

العنوان : طريقة القيمة الحالية للتدفقات النقدية المستقبلية في تقيم الشركات (دراسة تطبيقية على الشركات المدرجة في سوق فلسطين للأوراق المالية)

اسم الباحث: شادي عزام شاكر ملحم

اسم المشرف : د .ابراهيم عوض

ملخص

العديد من الشركات في سوق فلسطين للأوراق المالية لا تقوم بشكل كاف بالإفصاح عن البيانات المالية وخصوصا بما يتعلق بالمخاطر المستقبلية التي قد توجهها وذلك لعدم وجود معيار افصاح محاسبي يلزم هذه الشركات عن الافصاح الكامل عن المخاطر المستقبلية والخسائر التي قد تنجم عن هذه المخاطر.

تهدف هذه الدراسة بشكل اساسي الي تعريف المستخدمين للبيانات المالية بأكثر الطرق المالية ملائمة في تقيم الشركات المساهمة وخصوصا استخدام طريقة القيمة الحالية للتدفقات النقدية المستقبلية او ما يعرف ب (DCF) وذلك من خلال استخدام البيانات المالية المتاحة والمفصح عنها في السوق المالي الفلسطيني, كذلك هدفت هذه الدراسة الى مقارنة اكثر الطرق استخداما في تقيم الشركات ومقارنتها مع طريقة القيمة الحالية للتدفقات النقدية المستقبلية وذلك لمعرفة أي من هذه الطرق اكثر ملائمة وموضوعية في تقيم الشركات.

ان الطرق النظرية والعملية التي تم تطبيقها وفحصها في هذه الدراسة بالإضافة الى طريقة القيمة الحالية للتدفقات النقدية المستقبلية (DCF) هي طريقة نموذج خصم الارباح او ما يعرف ب (DDM) وطريقة العائد المتوفر او ما يعرف ب (RIM). بالإضافة الى ذلك تم استخدام نموذج تسعير اصل رأس المال

"CAPM" لحساب معدل العائد المتوقع لكل شركة ضمن عينة الدراسة وذلك للمساعدة في حساب قيمة الشركات باستخدام الطرق المشار اليها اعلاه.

كذلك تم الاستعانة بالرسوم البيانية واداه تحليل الحساسية للمتغيرات (Sensitivity Analysis) والاخذ بعين الاعتبار عدة سناريوهات متوقعه بالتزامن مع المتغيرات المقترحة من الباحث بحيث تم استخدام كل طريقة من الطرق الثلاث مع عدة سيناريوهات متوقعه للمساعدة في تقيم الشركات ضمن كل حالة متوقعة.

تم تقييم الشركات باستخدام القيمة الحالية للتدفقات المستقبلية من خلال حساب قيمة الشركات خلال فتره الافق المتوقع او ما يعرف ب ("The horizon period") وما بعد فتره الافق الى ما لا نهاية او ما يعرف ب ("After the horizon period ") أي انه تم اخذ قيمة الشركة بتوقع ادائها على اعتبار ان الشركة ملتزمة بمعيار الاستمرارية او ما يعرف محاسبيا ب (Continuity).

خلصت الدراسة و من خلال تقيم الشركات باستخدام الطرق الثلاث اعلاه الى ان طريقة القيمة الحالية للتدفقات النقدية المستقبلية هي اكثر الطرق ملائمة في حساب قيمة الشركات المدرجة في سوق فلسطين حيث اظهرت الدراسة ومن خلال الفحص والبحث الى ان القيمة المحسوبة من خلال (DCF) اظهرت قيمة اقرب الى الواقع بالمقارنة مع قيمة الاسهم المتداولة في سوق فلسطين حيث بالرجوع الى الجدول رقم (9) نجد ان قيمة التباين في قيمة الشركات باستخدام (DCF) كانت اكثر دقة وموضوعية بالمقارنة من الطرق النظرية الاخرى المتاحة, كذلك اظهرت الدراسة والنتائج التي حصلنا عليها الى ان اسهم الشركات المدرجة والتي تم اعادة تقيمها بالطرق الثلاث في معظم الاحيان كانت مقيمة في السوق بقيمة اعلى من قيمتها الحقيقية, وهذا قد يعود الى ان البيانات المالية التي تم الافصاح عنها لا تعكس بشكل دقيق كل المعلومات والمخاطر عن الشركات.

وجدت الدراسة ايضا ان استخدام متوسط النتائج او متوسط قيمة الشركات باستخدام الطرق الثلاث ضمن عينة الدارسة قد يعطي نتيجة افضل في كثير من الاحيان من استخدام طريقة مستقلة حيث ان استخدام المتوسط للنتائج في الطرق الثلاث ساعد في تقليل الخطأ الناتج عن التحيز في استخدام معيار معين في حساب قيمة كل شركة.

كذلك خلصت الدراسة الى انه في كثير من الاحيان لا يمكن استخدام طريقة نموذج خصم الارباح او ما يعرف ب (DDM) وذلك في حال لم تقم الشركة بعملية توزيع للأرباح حيث تصبح هذه الطريقة عديمة الجدوى في كثير من الاحيان, وكذلك الحال في طريقة العائد المتوفر او ما يعرف ب (RIM) حيث انه لا يمكن حساب القيمة عندما تحقق الشركة خسارة وهذا لا يعني بالضرورة انه لا يوجد قيمة الشركة بمجرد حصول خسارة سنوية فيها.

اوصت الدراسة الى استخدام طريقة القيمة الحالية للتدفقات النقدية يمكن في كثير من الاحيان ان يعطي نتائج اكثر دقة لقيمة الشركة بالمقارنة مع الطرق النظرية الاخرى المستخدمة في التحليل والتقييم حيث ان طريقة القيمة الحالية للتدفقات النقدية المستقبلية وبالرغم من التعقيد في طريقة الحساب كانت اكثر الطرق ملائمة من حيث عدم التحيز لأي متغير وملائمتها للظروف التي قد تحيط بالشركة خلال فتره التقييم.

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List of abbreviations

DCF	Discounted Cash Flow
EBIT	Earnings Before Interests and Taxes
PEX	Palestinian Security Exchange
DR	Discount Rate
FCF	Free Cash Flow
FMV	Fair Market Value
IPO	Initial Public Offering
LIBOR	London Interbank Offer Rate
M&A	Mergers and Acquisitions
NI	Net Income
NOPAT	Net Operating Profit After Taxes
NPV	Net Present Value
P / E	Price Earnings Ratio
ROA	Return on Assets
ROE	Return on Equity
T	Tax Rate
T-Bill	US Treasury Bill
T-Bond	US Treasury Bond
TV	Terminal Value
CAPM	Capital Asset Pricing Model
COD	Cost of Debt
COE	Cost of Equity

List of Annexes:

Annex A: Excel application of the DCF, RIM and DDM model for the sample companies which is includes:

- The reformulated statements of shareholders' equity
- Original balance sheets
- The reformulated balance sheets
- Original income statements
- The reformulated income statements
- Calculation of equity value using the DCF model
- Calculation of equity value using the RIM model
- Calculation of equity value using the DDM model
- Data for CAPM
- Calculation of *Ri* using the (Capital Assets Pricing Model) (CAPM)
- Calculation of Weighted Average Cost Of Capital(WACC)

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Chapter (1): Study Overview

1.1. Background

Generally, the main goal of financial accounting is to produce reliable financial information to assist the prudent users (e.g. creditors, Investors, stockholders, etc.) in making their investment/disinvestment decisions. According to Accounting Standards, accounting information shall be disclosed for the public to help them in making their decisions.

This study discusses the different theories of corporate valuation, and how to apply the most appropriate methods to evaluate companies listed in PEX. This study closely examines theoretical and practical aspects of the widely used Discounted Cash Flow (DCF) valuation method, Dividend Discounted Method (DDM) and Residual Income Method (RIM). Our study will assess the advantages of each method as well as several weaknesses and disadvantages. A special emphasize is placed on the valuation of companies using the DCF method. Research found that the Discounted Cash Flow method is the most reliable method to analyze even complex situations. However, the DCF method is subject to assumptions and even slight changes in the underlying assumptions of an analysis which can drastically alter the valuation results. Practical case study examples of these implications are given using a scenario analysis, sensitivity analysis and graphs (Cabedo, 2003).

Inadequate disclosure of risks is one of the main weaknesses in the annual reports issued by the listed companies in PEX. Although, the companies are obliged to disclose information about the risks through the local and international standards (i.e. IAS No. 32 and 39, issued by International Accounting Standard Board IASB, 1995, 1999, and SFAC No. 133 issued by Financial Accounting Standard Board FASB, 1998), many companies still do not disclose enough information about risks.

The DCF method is a standard procedure in modern finance and it is, therefore, very important to thoroughly understand how the method works and what its limitations and their implications are. In addition, this study requires some knowledge of accounting and corporate finance, as well as a good understanding of general economic coherencies.

In the course of this study, we focus on examining the divergence between the companies' Fair Market Value (FMV) and Calculated Value using the evaluation models mentioned above, and assess the reliability of DCF in comparison with other evaluation models. This exercise is performed using financial data from annual financial reports of companies listed in PEX.

According to (Cabedo, 2003), investors must evaluate the information disclosed by firms in order to determine the level of risks they are exposed to. The investors will take this decision based on the values of the binomial "expected return and risk". Under the present model of accounting information disclosure, investors must work as outsiders by interpreting this information and inferring company risk levels from it. Obviously, the disclosure of information about risk would improve this situation: the company, using internal data, would directly establish levels of the various risks it faces.

1.2. Formulas/Notations Consistency:

Many formulas or equations are stated in the literature reviewed with different notations, the notations of some formulas are changed when necessary in order to achieve consistency overall the research. Furthermore, due to the fact that there are several abbreviations used throughout this research a list of abbreviations, "list of abbreviations sheet", was created on a separate page in the introductory pages of this research.

In the next sections the study will discuss the theoretical framework which includes an analysis of the previous studies and defining the required variables. Furthermore, the researcher will propose an empirical application to improve the theoretical section.

1.3. Data sources:

The study uses cross sectional data obtained from the published financial annual reports of companies listed in PEX to achieve the study objectives. All the information and references that are used in this thesis, whether from articles, other research thesis, news, researches, the internet or books, is publically available. For the purpose of calculating the companies return using CAPM, the data of daily stock prices of the sample listed companies and Al-Quds index over the period of January2013 till December 2013 is used.

1.4. Description of Palestinian Exchange (PEX):

It was recommended to establish a financial market for securities in the Palestinian territories to attract capital and support investments in financial, service, industrial, and commercial corporations. In July, 1995 the Palestine Exchange (PEX) was established to promote investment in Palestine and it became a public shareholding company in February 2010 responding to principles of transparency and good governance. PEX operates under the supervision of the Palestinian Capital Market Authority. According to PEX website, there are 49 listed companies on PEX as of 31/12/2013 with market capitalization of about USD 2.9 billion distributed across five main economic sectors; banking and financial services, insurance, investments, industry, and services. Most of the listed companies are profitable and trade in Jordanian Dinar, while others trade in U.S. Dollars. Only stocks are currently traded on PEX, but there is potential and readiness to trade in other securities in the future. In 2009, PEX ranked thirty third amongst the worldwide security markets, and came in second in terms of investor protection in the regional security market.

On the 7th of July 1997 PEX adopted Al-Quds index as a general indicator for the daily market movements and it consisted of thirteen corporations and was considered to represent all the market. Also, PEX adopted 100 points as a base value of Al-Quds index at that date.

In 2013, PEX increased the number of firms included in Al-Quds index to 15 firms. This decision came in response to the increase in the number of listed companies. In addition, PEX has adopted a general index which includes all the listed companies as well as sectors' indices including five sub-indices; insurance index, banking index, investments index, industry index, and services index (table No. 1 depicts the companies included in Al-Quds index).

Table No. 1: Companies listed in Al-Quds Index in the PEX market. (PEX website)

Sector	**Company Name**	**Market Code**
Industry	Birzeit Pharmaceuticals	BPC
	Golden Wheat Mills	GMC
	Jerusalem Cigarette	JCC
Insurance	National Insurance Company	NIC
Banking	Arab Islamic Bank	AIB
	Bank of Palestine	BOP
	Palestine Islamic Bank	ISBK
	The National Bank	TNB
Services	Palestine Telecommunications	PALTEL
	Palestine Electric Company	PEC
	Watanyia Mobil Company	WATANYIA
Investment	Palestine Development and Investment	PADICO
	The Palestine Real Estate Investment	PRICO
	Palestine Industrial Investment Company	PIIC
	Union Construction and Investment	UCI

1.5. Statement of the problem:

The main concern of any investor in the stock market is to know the intrinsic value of a stock or what the companies are and how much a company is worth. The important question is: What is the most appropriate valuation technique an investor would use to make an investment decision?

We found that most companies in PEX do not disclose all the required information about their economic and financial situation (i.e. the risk they are exposed to), which constitutes the main information for decision makers. Many investors use the publicly available information to make their investment/disinvestment decisions by evaluating the economic and financial position of the company and its risks.

The overall objective of this research is to discuss different theories of corporate valuation, determine which theories are most relevant for valuing the companies listed in PEX, and apply them to estimate the companies' intrinsic values.

1.6. Justifications of the Study:

This study aims at finding the divergence between the Fair Market Value (FMV) of the stock prices and the estimated value which may help the users of financial statements to make their investment decisions. In addition, this study can help market participants with a better understanding of companies evaluation techniques for the companies listed in PEX. The study is based on the available information published to the public by using an advanced model i.e. DCF and other supporting models e.g. CAPM and WACC.

However, the DCF model is a great tool to analyze what assumptions and conditions are needed to be fulfilled in order to reach a certain company value. The company valuation using Discounted Cash Flow is a valid method to assess the company's value if a special precaution is put on the validity of the underlying assumptions. In comparison to other valuation models, the validity of the DCF method almost completely depends on the quality

and validity of the data being used in the analysis. If used wisely, the DCF valuation is a powerful tool to evaluate the values of a variety of assets and also to analyze the effects that different economic scenarios have on a company's value, (Nassaka&Rottenburg 2011).

The range of reasonable rates for discount factor and perpetual growth rate depends on each firm, its business situation and many more variables. In general it can be said that the more risky a firm is, the higher its capital costs (WACC) are. The perpetual growth rate should be the same for all industries, since according to the arbitrage theory; on the long run all companies and industries will grow by the same rate, (Florian Steiger, 2008).

The lack of information about the risks is one of the main weaknesses in the accounting information disclosed by firms. Nowadays, companies are obliged to issue a few items of this kind of information. Thus, International Accounting Standard Board IASB (1995, 1999), under rules IAS No. 32 and 39, and the Financial Accounting Standard Board FASB (1998), under rule SFAC No. 133 only establish the compulsory disclosure of market risks arising from the use of financial assets. Likewise, the SEC (1997) through its FFR 8, oblige listed companies to disclose the market risks arising from adverse changes in interest and foreign exchange rates and in stock and commodity prices. However, the rules do not refer to any other risks affecting firms, such as non-financial risks and financial risks other than market risks (Cabedo, 2004).

This research aims to evaluate the companies listed in Al Quds Index based on the publicly available information, and one of the main objectives of this research is to assess the effect of inadequate disclosures on the stock prices by quantifying the companies' values using financial models e.g. (DCF, DDM and RIM). A large segment of users or investors are incapable of understanding the financial statements to build their investment decisions due to the unclear company values published to users.

1.7. The research objectives:

The general purpose of this master thesis is to analyze and discuss different theories of corporate valuation as well as to determine which theory or theories are relevant for valuing the companies listed in PEX, and apply them to estimate the companies' value and to find which companies are overstated/or understated. The models that will be used to test this hypothesis include the Discounted Cash Flow (DCF) model, the Dividend Discount Model (DDM) and the Residual Income Model (RIM). In relation to the DCF model, and for the purpose of determining the expected rate of return on a company's stock, the Capital Asset Pricing Model (CAPM) will be used. The corporate valuation models and theories will be analyzed based on previous literatures which, for example, include a discussion of advantages, disadvantages, strengths and weaknesses of the different models and theories.

With respect to valuating the companies, a financial analysis of each company will be performed. In the financial analysis, the relevant corporate valuation theories and models will be applied. As part of the analysis, companies' financial statements will be reformulated in order to identify the companies' main value drivers.

The equity value of companies that is estimated based on financial models applied will be compared to spot equity value published in the market. If there are considerable variances between the results, possible reasons for the differences will be discussed.

According to (Nassaka&Rottenburg, 2011), recently many companies plan to expand their business through more Acquisitions and Mergers (A&Ms) with other firms, and are also going for international markets, therefore, the need for efficient evaluating models has been increased. There are "probably almost as many motives for A&Ms as there are bidders and targets" (Mukherjee, Kiymaz, & Bake, 2004, p. 8; Thomson One Banker, 2008), but the transaction volumes indicate the importance that A&M activities have for the worldwide economy and underline the necessity for efficient methods to adequately value companies.

The companies listed in PEX were used as a case study to test the valuation models in this research due to their interesting financial histories. Between the years 2002-2013 the companies suffered a massive decline in their values due to incorrect valuation such values, and it is challenging to value these companies using untraditional financial valuation tools. This research study will direct investors, bankers and other users of the financial statements to the most appropriate model for evaluating the companies' values and to the most appropriate tools of corporate evaluation models.

The objectives of this research are to analyze and discuss different theories of corporate valuation, determine which theories and models are relevant for valuing companies listed in PEX, and apply them to estimate the firms' value. The theories that will be examined include:

- The Discounted Cash Flow (DCF) model;
- The Dividend Discount Model (DDM);
- The Residual Income Model (RIM).

With respect to the DCF model, the method for determining the expected rate of return on a company‘s stock will be evaluated, which is the Capital Asset Pricing Model (CAPM) in our case. The corporate valuation theories will be analyzed based on a literature review that, for example, includes a discussion of advantages and disadvantages of the different theories.

Based on the financial analysis the relevant corporate valuation theories were applied to companies listed in PEX, and the companies' financial statements were reformulated in order to identify the companies’ main value drivers. Based on the financial analysis also, the companies' value, equity value and share price were determined.

The DCF method is based upon forward-looking data and, therefore, requires a relatively large amount of predictions for the future business situation of the company and the economy in general; minor changes in the underlying assumptions will result in large differences in the

company's value (Florian Steiger, 2008). It is therefore very important to know which assumptions are used and how they influence the outcome of the analysis hence; we can refer to the input as the level of risk the company exposes. For this reason, this research will introduce the key input factors that are needed for the DCF analysis and examine the consequences that changes in the assumptions have on the company's value.

The specific objectives of this study are: 1) Testing the divergence between the companies' Fair Market Value (FMV) and estimating Calculated Value using different evaluation techniques to assess the reliability of using DCF model over other models; 2) Discussing the strengths and weaknesses of the different theories; 3) Discussing different theories of corporate valuation techniques; 4) knowing which assumptions are used and how they influence the outcome of the analysis for each evaluating technique; and 5) to find out the most proper technique that could be used to evaluate the Fair Market Value (FMV) of the stock prices which may help the users of financial statements to make their investment decisions. In addition, this study can help people with a better understanding of Palestinian stock market published information.

Moreover, the DCF analysis is a great tool to analyze what assumptions and conditions have to be fulfilled in order to reach a certain company value. The company valuation using DCF is a valid method to assess the company's value if special precaution is put on the validity of the underlying assumptions. Like all other financial models, the validity of the DCF method almost completely depends on the quality and validity of the data that is used as input. If used wisely, the DCF valuation is a powerful tool to evaluate the values of a variety of assets and also to analyze the effects that different economic scenarios have on a company's value, (Nassaka&Rottenburg, 2011)

1.8. The structure of this research:

The structure of this research is as follows: Chapter 1. An introduction to the study, Chapter 2. The literature review, Chapters 3. The methodology, Chapter 4. Corporate valuation models, the relevant theories are identified and empirical tests are performed on the case companies, and finally chapter 5. Contains a discussion of the results, conclusion and policy implications.

Chapter (2): Literatures review

2.1. Summary of previous researches related to this research:

In this section we will review some of the previous research studies that are directly related to this research, and will start discussing the DCF as the primary tool used to evaluate the companies' value and to see what does previous research talks about in terms of the reliability of DCF. In general, the value of an asset equals the present value of the cash flow that it will generate in the future. This methodology can be used to value single projects, investments and also whole companies. What matters in relation to the present value of the cash flow is the timing of the cash flow and the risk level, (Benninga and Sarig, 1997). According to (Damodaran, 1996), valuation methods can be generally grouped into the following three categories: discounted cash flow valuation, relative valuation and contingent claim valuation. Discounted cash flow methods forecast future cash flows of an asset and discount them at a given rate in order to get the asset's present value. Relative valuation methods determine the value of an asset by comparing variables such as earnings, cash flows, book value or sales, and contingent claim valuations apply option pricing models to measure the value of an asset. These methods can lead to different results depending on the assumptions used in each method. (Benninga and Sarig, 1997) recommended using more than just one valuation method to estimate the firm value because there is a great deal of uncertainty in relation to value estimation as it involves predicting future returns of the company, and if the different methods give similar results it implies that the estimated value is sensible. Based on (Benninga and Sarig, 1997) various valuation models and theories will be discussed and the relevant methods will be used to analyze the companies' values. The focus will be on the following evaluation models:

- The Discounted Cash Flow (DCF) model;
- The Dividend Discount Model (DDM);

- The Residual Income Model (RIM).

Nowadays, the Discounted Cash Flow (DCF) model is the most commonly used valuation method when valuing a firm.

(Arumugam, 2007) declared that valuation models, where all the future profits of the firm are specified (called fundamental valuation models demand much of the analyst), both concerning knowledge about the firm's activities and about possible developments of the market where the firm is present. There are different fundamental valuation models. The common factor is that the value of the stock is determined by the present value of the future cash flows that the firm's activities give rise to.

These valuation models are usually divided into two categories: DDM and DCF models. The difference is that the first discounts the dividends that the firm is expected to pay its shareholders, while the second discounts the free cash flow that the firm's activities are expected to raise.

Many researchers have examined the validity of one or more valuation methods to predict the most reliable market value. (Kaplan &Ruback, 1995) examined the Discounted Cash Flow model to estimate market values in a sample of 51 companies. The outcomes showed that the results were within a 10% variation of the market value. The study performed by (Dechow et al. 1999) concluded that the simple valuation models that capitalize analysts' earnings forecasts using perpetuities present better results in explaining stock prices. Conversely, (Bernard, 1995) examined tests to verify the discounted dividends and the residual earnings models ability to explain stock prices variation; results indicate the residuals earnings model as the most effective (the dividends method explained 29% of the stock prices while the residual earnings explained 68%).

(Penman and Sougiannis, 1998), compare the accuracy of firm value estimates based on the Dividend Discount Model (DDM), the DCF and the Residual Income (RI) approaches, respectively. They find that the residual income model yields more accurate firm value estimates than the DCF and DDM models. However, their findings are in conflict with the fact that the RI, DCF and DDM models are equivalents and, thus, from a theoretical perspective, must yield the same value estimates. If different present value models provide different results it must be due to improper implementation. Consequently, the studies conjecture that valuation models may yield different value estimates in practice as security analysts apply the models incorrectly (e.g., estimate the terminal value incorrectly). The studies, however, do not provide evidence that the implementation of valuation models is flawed, (Petersen and Plenborg, 2009).

(Sweeney, 2002) and (Lund-holm and Keefe,2001) among others, provide evidence that valuation models based on the present value concept yield exactly the same firm value estimates. (Sweeney, 2002) shows that accrual accounting models (e.g., RI-model) and cash flow models (e.g., FCF-model) provide the same value estimates if two conditions are met: (a) forecasts are internally consistent, and (b) discount rates are consistent with value addictively as derived by (Modigliani and Miller, 1958)

(Lund-holm and Keefe,2001) list a number of assumptions that must be fulfilled in order to ensure proper execution and application of the present value approaches. They point out that "even in a practical implementation or large sample study, the models should still be equivalent – for every firm in every year" (p. 315). (Lund-holm and Keefe 2001) also detect a number of methodological errors in the studies of (Penman and Sougiannis, 1998), (Francis et al., 2000) and (Courteau et al. 2001), which are define as inconsistent forecast errors, incorrect discount errors and missing cash flow errors, respectively. The relevance of the "comparison studies", therefore, relies on the conjecture that similar methodological errors are found in practice.

In his research, (Tareq, 2012) concludes that from an empirical point of view, RIM leaves the researchers in the same position as the DDM. The valuation relation cannot be implemented without estimating the future book values. In order to estimate future book values, researchers must estimate future dividends. However, once future dividends are estimated, the book value and the earnings estimates become redundant, and the researchers may have just as well used the DDM. Researchers have been arguing on the superiority of one model over the other, (Tareq, 2012) focused on the empirical reason for this difference between the models. He has shown that with the terminal value, both models provide the same value estimates. In the absence of the terminal value or when the asset grows at a perpetual growth rate residual income model fails to provide true value estimate. In his research, he showed that if the growth rate in the ending book value is not less than the cost of capital, the transversality condition in the ending book value becomes void. As a result, RIM provides a constant present value of the ending book value which makes RIM a superior technique over DDM in the empirical analysis of valuation.

The work of Hess et al. delivered several important messages. They agreed with (Penman/Sougiannis, 1998), that RIM is more robust against different steady state assumptions if less than ideal conditions are given. Furthermore, it is worthwhile to enhance even the RIM with the proposed dirty surplus correction to yield smaller valuation errors. However, they also showed that these models are equivalent if they are properly adjusted given complete forecasted financial statements. Based on their theoretical and empirical findings they suggested, in line with other researchers, that subsequent efforts should be directed to the important issue of how future payoff forecasts can be improved. Finally, the proposed model they introduced provided a guideline and a starting point for this issue since it shifts the research question from “what is the best model” to “how could valuation be improved”.

In addition, many research articles discussed the effect of disclosed information on the stock prices. As we will use the disclosed information from PEX as a primary source of information, we will discuss the importance of disclosed information on the companies' value as shown in previous researches. We will start with (OHLSON, 1979), who examined the impact of information disclosed by firm on the stock prices behavior; OHLSON discussed the effects of disclosure on the stock prices. The assumptions of his research were as follows: if future prices are sensitive to future disclosures then the current prices may depend on future disclosure policies even though the current information is the same. It is shown that disclosure leads to increased variability in stock price. He concludes that disclosure environments are relevant in the pricing of a security. It has been shown that the price of a security at time zero depends on knowledge about what data is to be disclosed at future trading points. It has also been shown that systematic risk and expected return is unaffected by the disclosure environment. Based on OHLSON's advice, we will use the disclosed information as a primary source of information to evaluate the companies.

However, there is currently no study that analyzes and examines the divergence between the companies' Market Value (FMV) and Calculated Value as a result of inadequate disclosures on listed companies in PEX by quantifying the companies' values using different evaluating models. In addition, no literature investigated the correlation between the companies' Fair Market Value (FMV) and Calculated Value for the companies listed in the PEX.

2.2. Hypotheses Formulation:

As mentioned above, this study investigates different enterprise valuation techniques of the companies listed in PEX in order to find the most appropriate evaluating techniques and to assess the reliability of using the DCF model. Many researchers found that DCF model is the most appropriate tool used to evaluate the companies. (Nassaka & Rottenburg, 2011) found that the DCF is a great tool to analyze what assumptions and conditions have to be fulfilled in

order to find a company's value. Added to this the company valuation using Discounted Cash Flow is a valid method to assess the company's value if special precaution is put on the validity of the underlying assumptions. Like all other financial models, the validity of the DCF method almost completely depends on the quality and validity of the data that is used as input. If used wisely, the DCF valuation is a powerful tool to evaluate the values of a variety of assets and also to analyze the effects that different economic scenarios have on a company's value. In addition, (Luehrman, 1998) found that DCF analysis is a very powerful and great tool that is not only used to value companies but also to Price Initial Public Offerings (IPOs) and other financial assets. It is such a powerful tool in finance, that it is so widely used by professionals in investment banks, consultancies and managers around the world for a range of tasks that it is even referred to as "the heart of most corporate capital-budgeting systems". Two hypotheses were developed regarding the assessment of the reliability of DCF as the most reliable evaluation technique used to evaluate the companies values' in companies listed in PEX.

The research Hypothesis:

Hypothesis 1;

- H_0: The DCF is not a proper evaluation technique that can be used to evaluate companies values.

Hypothesis 2:

- H_0: The shares FMV of the companies listed in Al Quds Index are not highly correlated with estimated value calculated using DCF model.

Chapter (3): Research Methodology

3.1. Introduction

The general objective of company valuation techniques is to give interested stakeholders, e.g. owners, potential buyers and other users, an indicator of what a company now is worth. There are different techniques and methods to determine the real value of the firm; in this section we will highlight the most popular evaluation techniques, i.e. DCF, DDM and RIM.

We have chosen the companies listed in PEX as study sample and used the information disclosed to the public in PEX as a primary source of data to evaluate the companies' values, we will test the divergence between the companies Fair Market Value (FMV) and companies calculated values using the above mentioned techniques. In this section we will also discuss, in details, the benefit and shortfall of each method.

To find the value of DCF the following variables will be calculated: Forecasting Free Cash Flows (FFCF), estimating Weighted Average Costs of Capital (WACC), estimating the Terminal Values (ETV) and interpreting results (discussed in details in the next sections). In addition, the daily stock values for the companies listed in PEX are used to measure expected return for each company, which is the return that we have to use in calculation of the WACC discount rate. Finally, we will use the sensitivity and scenario analysis to investigate the relationship between the different variables, this technique was widely used in the previous literature researches and we found that its an appropriate method to achieve our research objectives.

3.2. Course of the Investigation

This research started with a brief introduction on valuation techniques in general and shows how valuation techniques can be used to assess and evaluate the companies' values. Afterwards the basic idea behind the DCF valuation technique was introduced and compared with other evaluation models (i.e. DDM and RIM). In addition, the key input factors were explained and discussed, since it is most important to gain a deep understanding on how the input is computed using each method of evaluation to state the companies' values, the DCF was used as a primary tool of evaluation. In the next step, a sensitivity analysis was conducted using financial data of fifteen companies listed in PEX. The study sample consists of fifteen companies in different sectors to test the hypothesis. Towards the end, a conclusion has been drawn on the advantages and disadvantages of the DCF valuation technique compared with DDM and RIM.

3.3. Scope of the Analysis

In the course of this study, we will apply various techniques and methods to calculate the companies' values to measure the reliability of DCF model in evaluating the companies' values depending on disclosed information in PEX. The above mentioned approach is similar to that of (Hirshleifer, 2003), (Richardson and Welker 2001), (Abedelghany, 2004), (Cabedo and Tirado,2003), and (Hung and Collins 2002). The DCF approach values a company based on its future expected cash flows discounted at a rate that reflects the riskiness of the cash flows. As such, the study employs specific models to determine the companies' values. Since this research is on an advance level, it requires a good knowledge of advance accounting and corporate finance, and mathematical finance as well as a good understanding of general economic coherencies.

3.4. Analysis of corporate valuation theories

3.4.1. Discounted Cash Flow (DCF)

This section will introduce the method of company valuation using discounted cash flows, often referred to as "DCF". The DCF method is a standard procedure in modern finance and it is, therefore, very important to thoroughly understand how the method works and what its limitations and their implications are. The DCF approach values a business based on its future expected cash flows discounted at a rate that reflects the riskiness of the cash flows as shown below.

Table No. 2: The valuation process using the DCF model.

Forecasting Free Cash Flow	Estimating Cost of Capital	Estimating Terminal Value	Calculating and Interpreting Results
▪ Identify components Free cash flow. ▪ Develop historical Perspective. ▪ Determine forecast Assumptions and scenarios. ▪ Decide forecast Horizon. ▪ Prepare the forecast.	▪ Develop target capital structure. ▪ Estimate cost of equity. ▪ Estimate cost of non-equity sources of capital.	▪ Determine the relationship between terminal value and cash flow (e.g., enterprise value as a multiple of EBITDA, P/E multiple, FCF perpetual growth rate, etc.). ▪ Estimate terminal value (i.e., continuing value beyond forecast horizon). ▪ Discount to the present.	▪ Develop results. ▪ Perform sensitivity analysis. ▪ Interpret results within decision context.

According to (Penman/Sougiannis, 1998) and (Florian Steiger, 2008), there are advantages and disadvantages of using DCF model in evaluating the companies' values. The DCF is more flexible than other valuation approaches in considering the unique circumstances of a company, but it is also very sensitive to estimates of cash flow, terminal value and the discount rate. Therefore, the DCF method is subject to massive assumption bias and even slight changes in the underlying assumptions of an analysis can drastically alter the valuation results. Theoretically, the main advantages of using DCF are 1) Provides an objective

framework for assessing a company's risk and cash flows to estimate value; 2) Requires users to think about key drivers of value; 3) May be used when no "pure play" comparable companies are available. While the disadvantages of using DCF are 1) Extremely sensitive to cash flow projections which may be inherently difficult to predict, particularly as the projection horizon lengthens; 2) Terminal value may be distorted by incorrect estimations of either cash flow or terminal multiples; 3) Validity of the discount rate depends on assumptions for beta and the market risk premium.

Step 1: The calculation of free cash flow:

The starting point of calculating the Discounted Cash Flow (DCF) is defining Free Cash Flow (FCF) by using the Bottom-Up Approach or Top-Down Approach. We will use the Bottom-Up Approach in our study since it's widely used in calculating the FCF as a starting point to calculate the DCF. The 1st step is to find the Net income as reported in the discoursed financial statement. The 2nd step, is to Add (subtract) non-cash expenses (income) by including depreciation and amortization expenditures, deferred taxes, and other non-cash items but excluding non-cash interest expense. The 3rd step, is to Subtract (add) increases (decreases) in working capital by including changes in accounts receivable, inventory, prepaid expenses, accounts payable, accrued liabilities. In some cases, it may be appropriate to include, as working capital, the minimum amount of cash necessary for operational purposes. The results of the 1st, 2nd and 3rd steps will equal adjusted cash flows from operations. In the 4th step, we add the interest expense by including non-cash interest expense. As long as we assume that initial excess cash and all interim cash flows are distributed to shareholders (i.e., no cash other than minimum cash balances accumulates in the forecast period), it is appropriate to exclude interest income on excess cash balances from the free cash flow calculation. In the 5th step, we subtract interest tax shield; which is calculated by multiplying the marginal tax rate by interest expense. In the 6th step, we

subtract capital expenditures by Going forward, it should include one-time, non-recurring cash flows to the extent they are planned. The result from the 1st to the 6th step equals Free Cash Flows to the unlevered Firm (FCFF) or the Cash flows are available to both debt and equity holders. The 7th step is to subtract cash interest paid. In the 8th step, we add interest tax shield which can be calculated by multiplying marginal tax rate by interest expense. The 9th step, we add (subtract) increases (decreases) in debt, preferred stock and minority interest. And finally in the 10th step, we subtract preferred dividends -Any cash payments to non-common equity claimholders results in less cash to common equity holders; the steps from 1st to 10th will equal free cash flow to the common equity (FCFCE) -Cash flows which are available only to common equity holders.

Step 2: The weighted average cost of capital (WACC):

In the wake of defining the FCFCE, we will calculate the discount rate (DR) to be used in calculating the DCF. Determining the discount rate requires extensive analysis of the company's financial structure and the current market conditions. The rate that is used to discount the FCFs is called the Weighted Average Cost of Capital (WACC), and it's one of the most important input factors in the DCF model. Small changes in the WACC will cause large changes in the firm value. The WACC is calculated by weighting the sources of capital according to the company's financial structure and then multiplying them with their costs. Therefore, the formula for the WACC calculation is:

$$WACC = Ke * \frac{Equity}{Equity + Debit} + Kd(1-t) * \frac{Debit}{Equity + Debit}$$

Or:

$$WACC = K_E\,(E/V) + K_D\,(1\text{-}T)\,(D/V) + K_P\,(P/V)$$

Where the:

K_E= Cost of common equity capital.

E/V = Ratio of market value of common equity to total firm value.

K_D = Cost of debt capital.

D/V = Ratio of market value of debt to total firm value.

T = Corporate marginal tax rate.

K_P = Cost of preferred equity capital.

P/V = Ratio of market value of preferred equity to total firm value.

Since no preferred stocks are issued in PEX there is no need to add KP = cost of preferred equity capital, and our calculations will be limited to common equity and debit. The WACC will be used to discount the FCFs that are used in the prediction our scenario analysis. The result is the NPV of the company in the scenario period, to which we will later add the terminal value, also makes uses of the WACC.

The WACC rate is required in the calculation of the cost of common equity capital rate (KE); we will use the Capital Asset Pricing Model (CAPM) to calculate the cost of common equity capital (KE) as it's the most proper technique used to calculate the KE in the previous literatures, since it used different variables.

The CAPM reveals the return that investors require for bearing the risk of holding a company's share. This required return is the return on equity (ROE) that investors demand in order to bear the risk of holding the company's share, and is therefore equivalent to the company's cost of equity. According to the CAPM, the required ROE, or in this case the cost of common equity capital rate (KE), is derived with the following formula (Ross, Westfield, & Jordan, 2008, p. 426):

$$K_E = R_F + \beta [R_M - R_F]$$

Where the:

K_E =Cost of common equity capital.

R_F =Risk-free rate.

β =Beta of the security.

$R_M - R_F$ = Market risk premium, or the expected return on the market portfolio minus the risk-free rate.

The CAPM has different assumptions:

Risk-Free Rate: 20-year US Treasury (or the longest available government security for foreign markets) or the yield on T-Bills or T-Bonds, professionals use the London Interbank Offer Rates (LIBOR) as an approximation for the short-term risk-free interest rates, since ". . . treasury rates are too low to be used as risk-free rates . . ." (Hull, 2008, p. 74). It is, therefore, common to use the LIBOR or the US T-Bills as the risk-free rate for valuation purposes.

Beta: Derived from the above equation,

$\beta = [K_E - R_F] / [R_M - R_F]$……the slope in the CAPM equation.

Beta is the slope of the regression line, (Brealey, Myers, & Allen, 2006, p. 220). The input factor β is the risk that holding the stock will add to the investor's portfolio (Rhaiem, Ben, &Mabrouk, 2007, p. 80). It is derived using linear regression analysis, where the excess return of the stock is the dependent variable and the excess market return is the independent variable.

In addition, beta should be calculated using historical adjusted betas based on a longer time frame, (5 years using monthly observations) for more stable and mature companies and a shorter period, (2 years using weekly observations) for dynamic, high growth industries or for recently restructured companies.

Although the CAPM approach is very useful to estimate the cost of equity, some scientists argue that the CAPM was developed for liquid assets (Michailetz, Artemenkov, & Artemenkov, 2007, p. 44) and, therefore, its significance for the valuation of illiquid assets,

like non-listed companies, should be subject to further research. In our case we will take the companies listed in PEX which have liquid assets and will ignore the limitation mentioned above, since all our samples are from listed companies in PEX.

Furthermore, the WACC rate requires calculating the Cost of Debit rate (KD); which is the interest rate that a company has to pay on its outstanding debt. The Interest rate costs are tax deductible in most economies, so that the true COD is lower than the interest rate a company pays out to its debt holders.

The KD after tax can be calculated as follows, where i is the interest rate on outstanding debt and t is the effective tax rate paid by the company:

$K_D = i * (1 - t)$

If the company has different kinds of outstanding debt, the K_D is the weighted average cost of debt of these different tranches, adjusted for tax:

$$KD = (1 - t) * \sum_{a=1}^{n} Wa\ ia$$

The WACC's full equation presented by plugging in the formulas for the KE and KD, we concluded the full formula for the WACC including all factors that influence the discount rate:

$$WACC = [D/(D+E)] * [i * (1 - t)] + [E/(D+E)] * [RF + \beta [RM - RF]]$$

The WACC is, therefore, determined by the KE, which is derived by applying the CAPM with its underlying assumptions for beta. The KD is derived from the interest rate that the company has to pay to its debt holders and by the tax rate that the corporation has to pay on its profits. Changing the assumptions for the cost of capital will have large effects on the result of the overall valuation process.

The WACC of a company depends on a variety of economic factors; especially the company's industry and the steadiness of its cash flows influence it. Companies with stable

cash flows in mature industries with low growth rates will typically have low capital costs (Morningstar, 2007, pp. 1-2).

It's important to note that using current figures for risk-free rate, beta, and credit spread (KD), and interest costs will lead to a fairly realistic approximation for the discount rate in most cases. However, to get an exact value, the company's future WACC must be used. Therefore, all input factors of the WACC formula have to be predicted, resulting in a leeway for the outcome of the DCF analysis.

Step 3: Identifying the continuing value "Terminal Value (TV) or horizon value",

The next step after determining the appropriate discount rate and variables required is to calculate the continuing value of the company; the continuing value is the NPV of all future cash flows that accrue after the time period that is covered by the scenario analysis. Due to the fact that it is very difficult to estimate price figures showing how a company will develop over a long period of time, the continuing Value is based on average growth expectations which are easier to predict.

A company's value can be determined by dividing the expected cash flows into two periods; cash flows during the explicit forecast period and cash flows after the explicit forecast period as stated below (Copeland et al., 2000; Russell, 2007; Jennergren, 2008;):

Terminal Value (TV) *= [PV of cash flows during the explicit forecast period]*

*+ [PV of cash flows **after** the explicit forecast period]*

First: The explicit forecast period is the period in which detailed forecasts of a company's cash flows are made for a given period up to a specific year, the horizon year (H).

Second: The next part of the formula is the continuing value (terminal value or horizon value), which is the value of the firm after the explicit forecast period. According to (Brealey & Myers et al. 2007), a firm‘s continuing value can be stated as:

$$TV = \sum_{n-1}^{\infty} \frac{FCFtv * (1+g)\wedge n}{(1+r)\wedge n} \quad \text{or} \quad TV = \frac{FCFtv(1+g)}{(r-g)}$$

The TV full equation is conducted by plugging in the formulas for the terminal value of cash flows during the explicit forecast period and terminal value of cash flows after the explicit forecast period; we get the full formula for the TV:

Full formula used to calculate the TV $= \sum_{n-1}^{\infty} \frac{FCFtv * (1+g)\wedge n}{(1+wacc)\wedge n} + \left[\frac{FCFtv(1+g)}{(r-g)}\right] / (1+\text{wacc})\wedge_{\text{horizon period}}$

The idea behind the terminal value is to estimate constant growth rates for the time following the time period that was analyzed more extensively. The constant perpetual growth rate (g), together with the WACC as the discount rate (DR) allows the use of a simple dividend discount model to determine the terminal value (Steiger, 2008). The determination of the perpetual growth rate is one of the most important and complex tasks of the whole Discounted Cash Flow analysis process, since minor changes in this rate will have major effects on the TV and consequently on the firm value in total. In most cases a perpetual growth rate should be between (0 - 5) %. It has to be positive since, on the long-term, the economy is always growing and according to economists any growth rate above 5% is not sustainable on the long-term. The perpetual growth rate should be in line with the nominal GDP growth (JP Morgan Chase, 2006).

The continuing value can be determined in two ways: one is to assume that the firm will be liquidated in the horizon year and estimate the value of its assets in that year (Damodaran, 2010), the other is to use the constant-growth formula, by assuming that the firm is going concern, i.e. it will continue to grow up to infinity after the horizon year (Brealey& Myers, 1991; Russell, 2007). The analysis of our samples in PEX will be based on the assumption that it is a going concern and the growth and discount rates are constant at horizon period.

It's important to note that in a going concern firm it is not realistic to precisely forecast free cash flow to the year infinity, thus, the horizon year, which is the year when the firm‘s business is expected to have a stable growth rate, is often used (Brealey and Myers, 1991; Morris, 1994; Russell, 2007).

Even though theoretically the computation of the continuing value seems easy, in reality it is challenging to estimate the development of a company between the horizon year and infinity. Several researches claim that continuing value calculations often account for more than half of the total firm value, and that a small change in the perpetual growth rate leads to major changes in the firm value (Morris, 1994; Brealey& Myers et al., 2007; Steiger, 2010). The large impact of the continuing value can be due to the fact that a firm‘s cash outflows in the explicit forecast period are caused by investments that are expected to generate cash inflows after the explicit forecast period (Copeland et al., 2000).

Step 4: Calculating the company value:

The final stage of calculating the DCF is finding the firm value. The value of the firm can be determined as the discounted FCF up to a horizon year (scenario period) plus the forecasted value of the firm at the horizon, both NPVs are then added together to give the enterprise value or the equity value (Brealey& Myers et al., 2007),.

$$PV = \frac{FCF1}{(1+WACC)} + \frac{FCF2}{(1+WACC)\text{^}2} + \frac{FCF3}{(1+WACC)}\text{^}3 + \ldots + \frac{TV}{(1+WACC)\text{^}h}$$

$$\overset{30}{\longrightarrow} \qquad \overset{\infty}{\longrightarrow}$$

The DCF analysis involves predicting Free Cash Flows for the next five to fifteen years. For this reason, it is necessary to make assumptions about a company‘s future situation (Steiger, 2010). Predicting the future always involves uncertainty and risk (Koller et. al, 2005), but methods such as scenario analysis, sensitivity analysis, decision trees and simulations can help in analyzing the uncertainty related to the valuation results, as well as ensure whether the assumptions used are realistic (Damodaran, 2007). Scenario and sensitivity analysis will be used in this research in order to analyze the effect of different assumptions about both macroeconomic and asset specific variables.Further analysis can be used, e.g. the equity value could be divided by the number of shares outstanding to determine a fair share price for listed companies.

Based on the above clarifications and after looking at the procedure and tools of the discounted cash flow analysis; this part includes an evaluation of the method's strengths and weaknesses advantages and disadvantages. One of the advantages of the DCF method is that it is intuitively easy to understand; the value of a company depends on its future cash flows (Morris, 1994). This method focuses on cash flows which is a real measure that is simple to explain. The DCF method also works regardless of a company‘s accounting principles (Penman, 2010). When analyzing a company using this method, the analyst performs a useful exercise by identifying a company‘s value drivers as well as examining its growth and risk (Damodaran, 2010). In general, the DCF method is perceived to be the best method for company valuations, but only if the company is profitable (Russell, 2007).

The limitations and disadvantages of the DCF method include its large dependency on WACC and continuing value assumptions, this is because small changes in these values have a considerable impact on firm value as stated earlier (Steiger, 2010; Copeland et al., 2000; Doreen Nassaka and Rottenburg, 2011). For this reason, the DCF method can be easily

manipulated by the analyst in order to achieve a given result. Additionally, it requires a great deal of information to determine a company‘s future cash flows, growth rates and discount rates. Similar to any other analytical tools, the DCF must be used with caution. The results from any model depend on the model‘s inputs: it is garbage in, garbage out” (Damodaran, 2010).

3.4.2. Dividend discount model (DDM)

According to (Doreen Nassaka and Rottenburg, 2011; Brealey et al., 2009), DDM is a stock valuation tool that is used to determine stock prices as the present value of future expected dividends discounted back at a certain rate. (Michaud and Davis, 1982), state that one of the main objectives of the DDM is to improve the process of stock valuation. The simplest DDM model is the DDM with no growth, where the discount rate (r) equals the rate of return demanded by investors investing in other stocks at the same risk level, P0 is the value of the stock and DIV1 is next year‘s dividend. The DDM with no growth can be stated as (Brealey et al., 2009):

$$P0 = \frac{DIV1}{(r)}$$

According to (Doreen Nassaka and Rottenburg, 2011) a more advanced DDM is the DDM with constant growth. This model assumes that a company‘s dividend payouts grow over the years. Because it is too time consuming to forecast dividends for every single year in the future, the calculations are simplified by forecasting dividends for the next period, and then forecasting a single growth rate with which the dividends will grow in all the following periods. It is assumed that there is an infinite number of periods in the model and the dividend growth rate (g) has to be less than the discount rate (r) (Brealey et al., 2009). The DDM with constant growth can be written as:

$$P0 = \frac{DIV1}{(r-g)}$$

(Doreen Nassaka and Rottenburg, 2011) state that if the growth is not constant the formula above cannot be used. Additionally, for mature industries growth is fairly stable and constant growth in DDM is a good model. According to (Penman, 1998), it is common in practice to forecast dividends for a limited number of years and then to calculate a terminal value at the horizon; this corresponds to the DDM with non-constant growth. In order to use the DDM with non-constant growth, it is necessary to set the investment horizon (H). Until the

investment horizon the dividends should be estimated for each period individually and after the investment horizon the company‘s growth is expected to settle down. In order to estimate the stock price, the dividends until the investment horizon year are discounted back to present value and at the end the terminal value is added. The terminal value is the estimated present value of the stock price at the horizon (Brealey et al., 2009). The formula for the DDM with non-constant growth is:

$$P0 = \frac{DIV1}{(1+r)} + \frac{DIV2}{(1+r)\text{^}2} + ... + \frac{DIVh}{(1+r)\text{^}h} + \frac{(DIV(1+g))}{(r-g)}$$

Moreover, the DDM can also be used to determine the cost of equity for a company. In the simple models, it is assumed that the only cost of equity a company has is the dividend payout. If the market price of the firm is known, the rate of return can just be isolated and it equals to the company‘s cost of equity (Mills and Robertson, 2004).

$$r = \frac{DIV0}{(P0)} + g$$

According to (Penman, 1998), it is often claimed in the literature that the DDM does not perform very well when a company’s value with a finite horizon has to be estimated. The calculation of terminal value is considered to be problematic in the financial literature, and many different formulas for calculating terminal value have been developed over the years. Whilst using alternative valuation models, such as Discounted Cash Flow model or Residual Income Model, it often results in a firm value that is similar to the firm value estimated using the DDM, it is the different ways of calculating terminal value that cause the largest variations (Penman, 1998). Terminal value basically consists of an estimate of all future cash flows, or in the case of DDM, all future dividends, and these are discounted back and summed up to a single number. According to (Penman, 1998), a calculation of terminal value

is only needed if the discounted payoffs, up to the horizon, do not capture the total value of the firm. A more detailed discussion of terminal value is given in section 3.3.1. step No. 3.

For the weaknesses, strengths, advantages and disadvantages of the DDM; according to (Hand and Landsman 2005; Doreen Nassaka and Rottenburg, 2011) there are various issues related to the use of the present value of expected future dividends as an estimate for the company value. In short, (Hand and Landsman, 2005) argue that dividends are often positively priced even when they should not be due to the financial situation of the company, and when these dividends are used to estimate the firm value the result is often wrong. (Hand and Landsman, 2005) suggest that dividends are positively priced because they are based on public information that is trying to predict a company‘s future abnormal earnings. This means that the price of the dividends is correlated with the analytical forecasts in the market, which can often be wrong, and not based on internal measures for a firm‘s ability to achieve abnormal earnings. (Hand and Landsman, 2005) found in their analysis that investors often misprice the current earnings and the equity value of a firm which leads to positively priced dividends. In contrast to (Hand and Landsman, 2005) study, (Fama and French, 1998) and (Akbar and Stark 2003) found a positive relation between firm value and dividends. The results of their analysis show that dividends are based on information about future expected cash flows and can therefore be used to estimate firm value. However, (Michaud et al. 1983), argues that the DDM contains little market valuation information and the firm value estimated using the DDM is, therefore, subject to error.

According to (Hand and Landsman, 2005) the main problem is information asymmetry between the information available to the managers of the company and the information available to the shareholders. The managers can pay out a certain amount of dividends to send a certain signal out to the shareholders and the market. For example managers can pay out high dividends to signal that they are doing a very good job and are expecting high abnormal returns in the future, and this is a situation where the principal-agency problem may

arise, i.e. managers who act as agents for the principals (the shareholders), will act in their own best interest (Grossman and Hart, 1983).According to (Hand and Landsman, 2005), under the agency cost hypothesis, it is argued that dividends are a more reliable measure if the current earnings of the company are positive and the company has free cash flow. On the other hand, under the profitability signaling hypothesis, it is argued that dividends are more reliable as a measure if the company is currently suffering from negative earnings, because if the company can afford to pay out dividends in such a state it must be because the managers are almost certain of future positive earnings. (Penman, 2010) states that dividends are not a good measure to estimate firm value because the company can obtain loans to finance the dividend payouts, and in this case dividends do not represent the earnings the company generates.

According to (Miller and Modigliani, 1961), the dividends are irrelevant to the calculation of firm value. They show in their article that a firm value depends on the firm‘s earnings and level of investment, they specifically point out the irrelevance of the dividends in relation to an acquisition. If an investor is interested in acquiring a firm, the investor is free to determine the level of the dividends in the future and the firm value calculated based on future expected dividends does not make sense in that case. The firm value is important to the acquirer and is based on the expected earnings of the firm and its investment opportunities, which will provide additional earnings in the future.

Implication on the DDM

According to (Doreen Nassaka and Rottenburg, 2011) the DDM is a type of the Discounted Cash Flow model. The essence of the DDM is the fact that it uses dividends as the proxy for cash flows. Using dividends to estimate firm value is widely criticized in the literature mainly because dividends are more often than not determined by the management, so they can be subject to manipulation and are therefore not as reliable as other proxies for cash flows. Additionally, using the DDM to estimate the value of private companies is problematic since private companies do not pay out dividends in the same way as public companies.

3.4.3. Residual income model (RIM)

(Ohlson, 1991; Doreen Nassaka and Rottenburg, 2011) argue that due to the dividend policy irrelevance concept presented in (Miller and Modigliani, 1961) the value of a firm should not be calculated based on dividends, but based on a more fundamental variable which does not depend on dividends. Based on (Ohlson, 1991) analysis; the variable earnings are a good replacement for dividends because earnings do not depend on dividends and could be used to estimate a company's value. As a continuation of his research from 1991, (Ohlson, 1995) defines a valuation model, which is based on residual income. However, according to (Xiaoquan and Bon-Soo 2005) the idea of the Residual Income model can be traced back to (Preinreich, 1938) and is thereby not a new discovery.

According to (Ohlson, 1995), residual income is the amount by which a company's net income exceeds the required return on the firm's equity. The residual income is thereby a measure of the additional value created for the shareholder, which is also known as abnormal earnings or economic value added (EVA). (Ohlson, 1995; Doreen Nassaka and Rottenburg, 2011) derives the RIM from the DDM using among other things the clean surplus relation to prove their point. The clean surplus relation states that the current book value equals the beginning book value with an addition of current earnings and a subtraction of current dividends. Mathematically the clean surplus relation is defined as:

$B_t = B_{t-1} + E_t - D_t$

Where, B is the book value for period (t and t-1), E is the earnings for period t and D represents the dividends for period t. (Ohlson, 1995; Doreen Nassaka and Rottenburg, 2011) derives the formula for the residual income model by isolating the dividends in the clean surplus relation, and replacing the dividend term in the dividend discount model with the obtained equation. After replacing the dividend term, (Ohlson, 1995) gets a formula for calculating firm value, which does not contain dividends. The residual income model is given by:

$$P0 = B0 + \sum_{t=1}^{\infty} \frac{RIt}{(1+re)\text{^}t} = Bo + \sum_{t=1}^{\infty} \frac{Et - reBt - 1}{(1+re)\text{^}t}$$

The RIM calculates the firm value by adding two parts: the current book value (B0) plus the present value of future residual income. Where Bt is the book value in period t, RIt is the residual income in future periods (RIt = Et – rBt-1), and *re* is the required rate of return on equity.

The residual income model, unlike other valuation models, puts emphasis on accounting data instead of financial data. All the numbers, except for the required rate of return on the firm‘s equity, are accounting numbers which can be obtained from the firms‘ financial statements (Ohlson, 1995). The book value used in the model is a sum of the book value of owners’ equity and the book value of operating net assets, which can be obtained from the balance sheet. And the residual income is based on operating earnings which can be obtained from the income statement (Skogsvik, 2002).

For the strengths, weaknesses, Advantages and disadvantages of the RIM, according to (Ohlson, 1995; Doreen Nassaka and Rottenburg, 2011), the residual income model moves the focus away from the well-known dividend discount model and instead the value of the firm is

calculated as a sum of current book value and present value of expected future abnormal earnings. The fact that the RIM is based on book value and abnormal earnings is a major advantage according to (Xiaoquan and Bon-Soo, 2005) because they believe that these variables contain more important information in relation to firm value than dividends alone, which are used in the DDM. Additionally, by estimating earnings instead of dividends it is necessary for the analysts to investigate the factors explaining the firm‘s performance which lead to a deeper understanding of the company‘s activities (Bernard, 1995; Penman, 2007). Furthermore, (Xiaoquan and Bon-Soo 2005) find the fact that the RIM does not use dividends to calculate the firm value very beneficial because it can easily be applied to companies, which do not pay out dividends on a regular basis.

According to (Penman, 2007), the fact that the RIM relies on accounting numbers can both be seen as an advantage and a disadvantage. It is an advantage that the already recognized book values can be used in the valuation model. On the other hand, accounting numbers can be manipulated and will affect the calculated firm value. For this reason, it is important to evaluate the quality of the numbers in the financial statements before applying them in order to obtain a useful result (Rees, 1997).

Even though the RIM is sensitive to accounting manipulation, there are some types of manipulation that it can actually be protected from. If accrual accounting is used to create earnings by, for example recording lower book values at present and recognizing higher income in the future would seem like the company is earning more, but in reality no additional value is created. In the RIM, this type of accounting will not result in a higher firm value because the beginning book value will be used in the calculation (Penman, 2007). An important observation made by (Skogvik, 2002) in relation to the RIM; the fact that it is not correct to treat the required rate of return on the firm‘s equity as a constant if the firm‘s capital structure is expected to change over time. However, applying different rates of return

to the model based on the expected capital structure makes the model much more complicated.

According to (Penman, 2007), there is often more weight on the continuing value compared to the value calculated up to horizon in the DDM and the DCF models. But in the RIM when the continuing value term is added there is more emphasis on the value created up to horizon, which can be estimated with more certainty than the value at horizon. (Penman, 2007) argues that because of this feature the results from the RIM are more certain compared to the results obtained using the DDM and the DCF. Additionally, previous researches undertaken by various authors have compared the performance of the DDM, RIM and the DCF model and concluded that the RIM gives more accurate value estimates and explains more of the variation in stock prices (Xiaoquan and Bon-Soo, 2005).

According to (Rees, 1997) it can be difficult to apply the RIM in practice because it contains expected abnormal earnings, which can be difficult to estimate. He states that it is important to use valid forecasts to predict reliable future abnormal earnings. Additionally, (Rees, 1997) claims that it might not be enough to look at book values and expected abnormal earnings to calculate firm value in practice, additional factors such as financial management of the firm, dividend payouts, debt levels and capital expenditure should also be considered.

To prove his statements, (Rees, 1997) performs a statistical analysis on a number of public limited UK companies, excluding financial companies, property companies and investment trusts. He tests whether dividends, amount of debt and capital investments have an impact on firm value. His analysis shows that earnings paid out as dividends have a higher impact on a firm's value than retained earnings, and that capital investments have a positive impact on a firm's value in contrast to debt which has a negative impact. (Ohlson, 2001) also states that all other factors that can affect a company's value should be investigated in addition to the value calculated using the RIM. Therefore, the RIM is not sufficient on its own to capture the actual value of the company.

Implication on the RIM

Based on the analysis performed in this section, it can be seen that the RIM is a relatively new model compared to the other popular valuation models such as the DDM and the DCF models. One of the important features that distinguish the RIM from the other valuation models is the fact that it is based on accounting numbers. Whether the use of accounting numbers is an advantage or a disadvantage is widely discussed issue in the literature, and there is no final conclusion on the discussion because there are both pros and cons.

3.4.4. Valuation process in general

According to (Benninga and Sarig, 1997) a standard valuation process of a company consists of five stages:

1- Study of the corporate environment:

(Benninga and Sarig, 1997) write that this stage is necessary to understand the firm‘s operations and market conditions, and to form some expectations about the future development which can be used in the forecasting stage. In this research it is done by performing an overview on the companies news and the general information from the Market.

2- *Examination of the firm’s expected financial performance:*

According to (Benninga and Sarig, 1997) it is necessary to analyze the firm‘s historical financial performance and forecast the firm‘s future expected financial performance. The historical performance of a sample companies is analyzed by reformulating the company‘s financial statements.

3- *Conversion of the firm’s expected financial performance to values:*

The forecasted cash flows (CF) of the companies are discounted back to Present Values and a firm value is obtained (Benninga and Sarig, 1997). For sample companies selected the forecasted FCF are discounted back by using WACC and added to the discounted continuing value, the full details are discussed in the next sections.

4- *Exploration of alternative valuation techniques:*

In this stage, alternative valuation techniques were considered to verify the firm value obtained in the third step (Benninga and Sarig, 1997). In this study, valuation techniques of DDM and RIM are applied to the samples selected fromPEX, to verify the results from the DCF model. In our study we also used the DCF as a primary tool of evaluations.

5- *Consideration of the implications of the estimated values:*

Finally, the results obtained from the above valuation techniques should be considered in a relevant context, i.e. discussed in relation to the purpose of the valuation (Benninga and Sarig, 1997). This is done in section 4.6.2 where obtained results are discussed and compared to FMV to check the differences.

Chapter (4): Empirical tests, results and analysis:

4.1. Introduction:

As mentioned before, this study aims at measuring the reliability of using the DCF model, as well as investigating correlated links between fair market value of the stocks traded under Al Quds index and calculated values using the DCF model. Furthermore, investigating the relationship between the results from other evaluation models with results from the DCF model

4.2. Preliminary Analysis:

Charts analysis enables investors and traders to study the past and present time series observations in order to make reasonable predictions and wise choices. However, investors consider fundamental analysis and technical analysis to make their decisions. Investors rely on fundamental analysis, by understanding and measuring the value of stock, in order to determine future stock prices. On the other hand, technical analysis looks at historical data of a security to detect market movements in order to predict its future prices as well as to study market movements. For this purpose, we use graphs to see stock movements for the selected companies listed in PEX. Table (3) below illustrates stock prices calculated using DCF, RIM and DCM compared with spot value of the stock price. Graph analysis have been discussed and shown in the next sections. The variable on the y-axis represents the value of stock, whereas the variable on the x-axis is the company name as shown in the next sections. These graphs represent fluctuation of the stock prices that resulted from each evaluation model which help analysts to detect market patterns and do predictions.

As mentioned before, many researchers tested the correlated links between stock prices calculated using Discounted Cash Flow (DCF), Dividend Discounted Model (DDM) and Residual Income Model (RIM). They found that regression analysis indicated a significant relationship between the companies' value calculated using DCF and spot value of the stock

prices. There is consistency between the trend of spot price and calculated prices. This also confirms that there is a significant relation between the trend of spot price and calculated prices.

Table No.3: Stock Spot prices compared to calculated stock prices using the selected valuation techniques.

Company Name	Spot Value	RIM	DCF	DDM
AIB	1.170	0.774	0.802	0.459
BOP	3.240	1.352	4.109	1.257
BPC	3.030	5.474	3.231	2.727
GMC	0.900	-1.505	0.518	0.000
ISBK	1.500	2.331	1.187	0.606
JCC	1.130	2.367	0.993	0.708
NIC	3.600	7.562	3.337	4.126
PADICO	0.650	-0.071	0.318	0.000
PALTEL	5.820	6.521	5.551	10.736
PEC	1.430	1.574	1.391	2.018
PIIC	2.100	6.717	1.814	0.040
PRICO	1.180	0.137	0.703	0.096
TNP	0.440	-0.082	0.753	0.000
UCI	0.430	-0.082	0.753	0.000
WATANYIA	1.050	0.226	0.448	0.000

4.3. Valuation of companies using the DCF model, empirical test:

The DCF method for companies that offer one type of business in one industry can be set up by using the four steps that are discussed in section 3.3.4. The following sections include a DCF analysis of sample companies using the five steps that were mentioned before.

4.3.1. Step 1: Choice between using consolidated or unconsolidated financial statements:

As the first step in valuing companies (Damodaran, 2009) suggests to choose between valuing the company as a whole using consolidated financial statements or valuing the different business units separately. The first determinant of the decision is the availability of information for the company. The companies selected as a sample for this study provide consolidated financial statements for the whole corporation in the annual report for 2013, there is, however, no accounting information available for the different subsidiaries. The second point that is important to consider is how different the various business units are. If the differences in terms of, for example, risk and growth are not very big the company should be valued as consolidated (Damodaran, 2009). Even though there are some differences in terms of risk and growth in the business units located in developed and developing countries, companies' revenues from developing countries are at a relatively low level compared to the revenues generated from businesses in developed countries. For this reason country specific risk and growth are assumed not to have a significant effect on a firm's value. Additionally, there is insufficient information to determine risk and growth rates for each company.

4.3.2. Step 2: Calculation of free cash flow:

According to (Koller et. al, 2005) and as mentioned in section 3.3.1, the main drivers of a companies' value are: the return on invested capital (ROI), the fact that growth rate and free cash flow cannot be directly determined from a company's annual report. Thus, it is

necessary to reformulate these statements so as to identify a company's operating items, non-operating items and financial structure.

The reformulated statement of shareholders' equity provides the overall profitability measure: the return on shareholders' common equity (ROE), which together with growth determines the company's value. The reformulated balance sheet and income statement provide more details about the sources of profitability and growth, i.e. the drivers of ROE and growth, which will be used for forecasting of the free cash flow and valuing the company (Penman, 2010).

Companies' consolidated financial statements, which are used in the analysis of the company, are prepared according to the International Financial Reporting Standards (IFRS) in the stipulated period. Listed companies in PEX are obliged by the low to prepare their financial statements in accordance to IFRS. The financial statements are assumed to be reliable (provide a true and fair view of the company's financial position) because they are signed by the independent auditor (companies' annual report, 2013).

4.3.2.1. The reformulated statement of shareholders' equity (SE)

The reformulated statement of shareholders' equity shows all the transactions that affect equity in a company. This statement also corrects the fact that the earnings in the reported income statement are not complete, by identifying comprehensive income (Penman, 2010). Furthermore, the profitability of the owners' investment for the period (ROE) and the growth in equity from business activities can be calculated from the data in the shareholders equity statement (Penman, 2010).

4.3.2.2. The reformulated balance sheet

According to (Penman, 2010), the balance sheet is reformulated by categorizing the different balance sheet items into operating assets, financial assets, operating liabilities and financial obligations. Afterwards, the net operating assets are calculated as:

$$\textit{Net operating assets} = \textit{Operating assets} - \textit{Operating liabilities}$$

It is decided to analyze the financial statements of companies selected from Al Quds Index for the year 2013. The balance sheets for 2013 as well are reformulated balance sheets are enclosed in Annex A. As it can be seen from the reformulated balance sheets, some of the companies have net financial obligations rather than net financial assets or vice versa for the year under test. In the case where companies have net financial obligations rather than net financial assets, means that these companies are financing their operations mainly through debt rather than equity.

4.3.2.3. The reformulated income statement

(Penman, 2010) stated that it is necessary to reformulate the company's income statement by grouping the different items presented in the original income statements into operating items and financing items. The operating items are divided into operating income from sales and other operating income in order to identify the profitability from trading with customers. Furthermore, the reformulated income statement includes items from the reformulated statement of owners' equity and the obtained result from the reformulated income statement is, therefore, comprehensive income. A last important change in the reformulated income statement is the allocation of taxes. Taxes are allocated to the operating and financing items, so that the operating income from sales after taxes is not affected by the tax shield that financial expenses generate.

Penman (2010) also recommends using the marginal tax rate rather than the effective tax rate for the tax allocation purposes. For companies selected in our sample, the marginal tax rate is the Palestinian corporate tax rate, which was 28% in 2013. The reformulated income statement for the selected companies is presented in Annex A.

4.3.2.4. Trend analysis:

(Penman, 2010) suggested performing a trend analysis of the valued company‘s historical financial statements in order to have an overview of how the different items have changed over time. Thus, a trend analysis is made for Companies for the years 2010-2013, and a deeper analysis of the changes is performed in fundamental analysis section below.

Table4: Gross Profit Margin trend analysis of the selected companies form Al Quds Index for the years 2010-2013:

Company Name	2013	2012	2011	2010
AIB	0.7045	0.0736	0.1031	-0.1410
BOP	0.4059	0.4582	0.4472	0.6101
BPC	0.4060	0.4247	0.4200	0.4484
GMC	0.1627	0.1862	0.2792	0.3099
ISBK	0.3770	0.3676	0.2147	0.1038
JCC	0.0594	0.0930	0.0370	0.0433
NIC	0.4113	0.4512	0.1490	0.1492
PADICO	0.2413	0.1955	0.3854	0.2584
PALTEL	0.8096	0.7756	0.7781	0.7669
PEC	0.1818	0.4838	0.2854	0.2587
PIIC	0.2069	0.1139	0.0928	0.3050
PRICO	0.2167	0.2758	0.5198	0.5741
TNP	0.6450	0.6795	--	--
UCI	0.7411	0.6325	0.5561	0.5278
WATANYIA	0.4482	0.4166	-0.8789	-26.704

Table 4 shows that the gross profit margin has grown for most of the companies in all the years in the stipulated period, and the total growth in gross profit margin from 2010 to 2013 for the sample companies above fluctuated between (-2% to 10%). The gross profit margin has in general grown at a rate that is close to the growth rate of operating revenues, which means that the cost of sales have been relatively stable over the years. Operating income has grown substantially over the years for the most of the selected companies.

Looking for more trend analysis from the companies’ balance sheets, we find an increasing level of trade receivables in most listed companies which means that companies are allowing

its customer an increasing level of credit, which is not very good for the companies since it reduces the FCF to shareholders.

4.3.2.5. Technical analysis Section:

According to (Penman, 2010), the fundamental analysis of the drivers of ROE, i.e. *the profitability analysis*, can be performed at three levels: 1) the analysis of financial and operating liability leverage; 2) the analysis of the drivers of operating profitability, and; 3) the analysis of the profit margin and turnover drivers. Through *the profitability analysis*, it can be determined where the firm is now financially, and by understanding the present ROE of the firm, the analyst can predict whether the future ROE will be different from the current ROE. It's also beneficial to obtain technical analysis of the companies' performance to find the trend analysis and moving average to expect future growth. Examples are selected from our sample to check the trend analysis i.e. BOP, AIB and BPC as well as the growth in Al Quds Index compared with GDP trend.

Figure No. 1: GDP and Al-QudsIndex trend curves for the period from 2002 to 2012

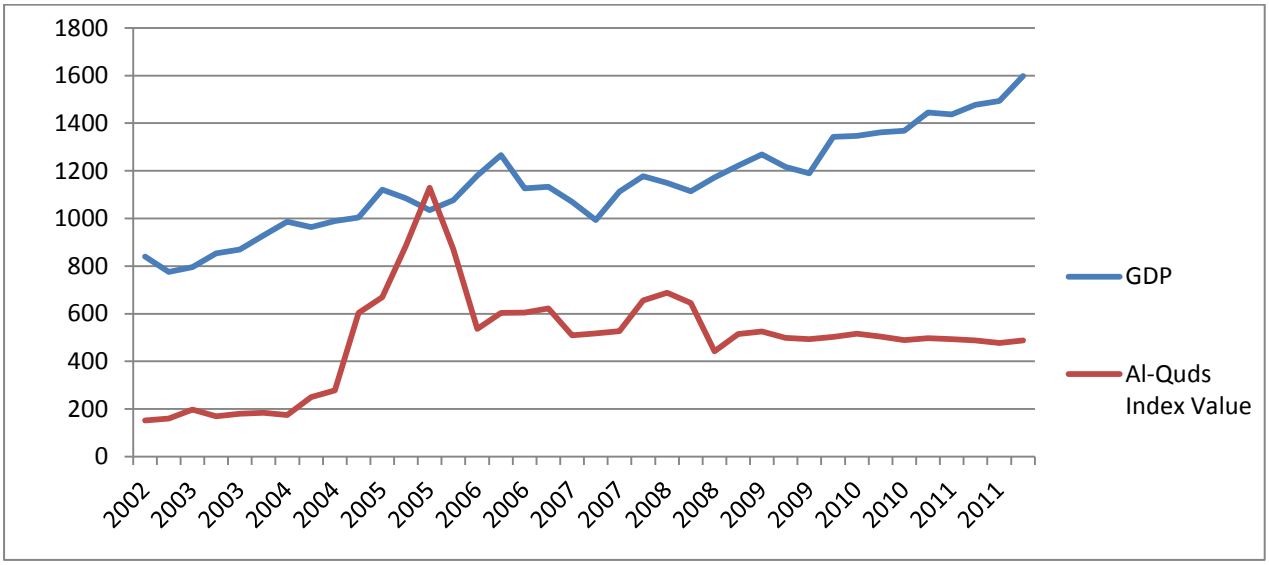
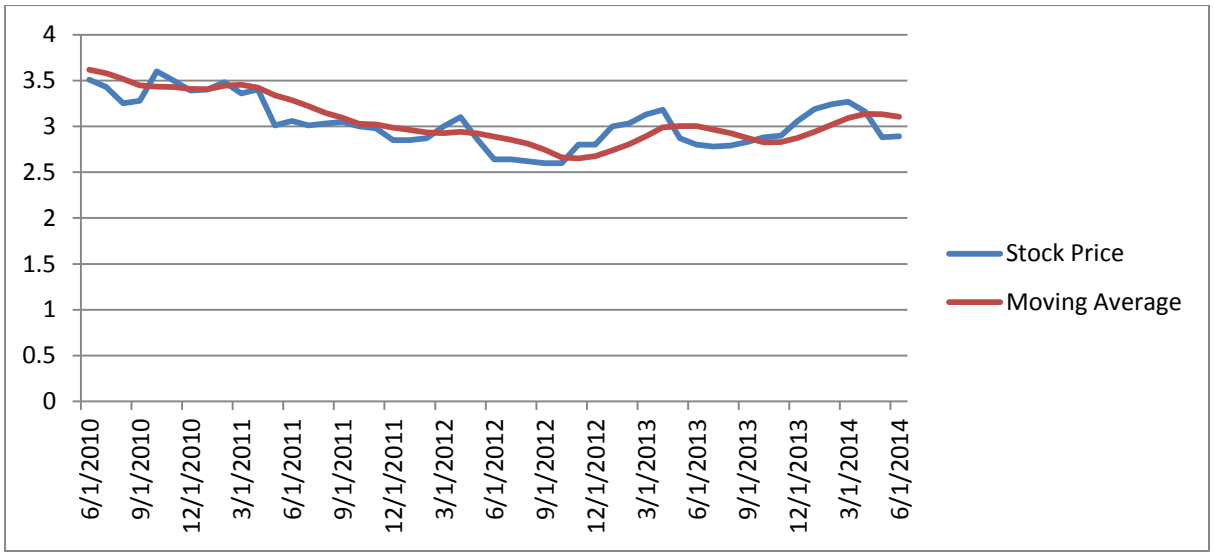


Figure No. 2: Stock trendscompared with Moving average for the stocksover the period of 2010–2014.

BOP:


4
3.5
3
2.5
2
1.5
1
0.5
0
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
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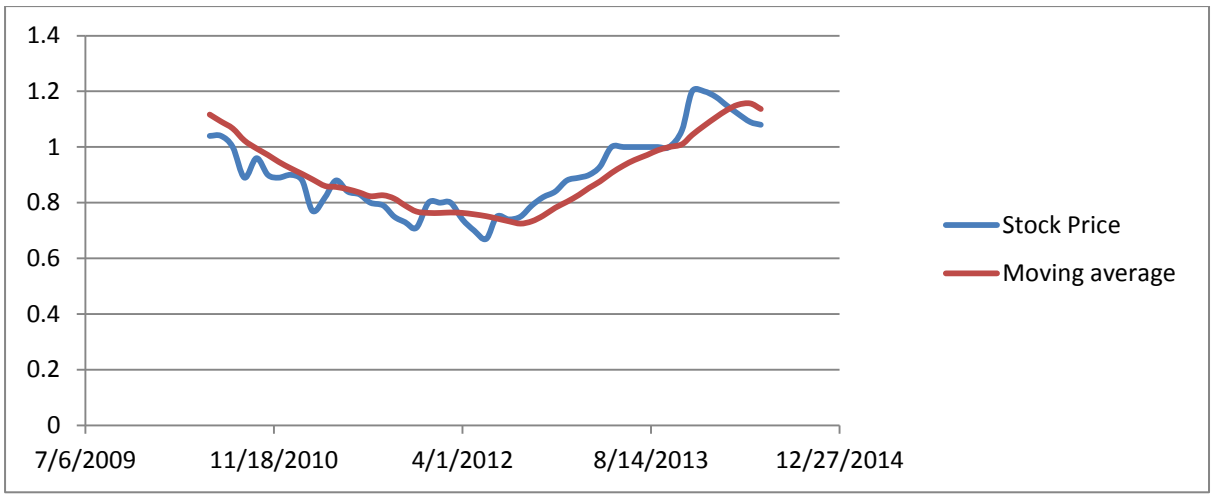
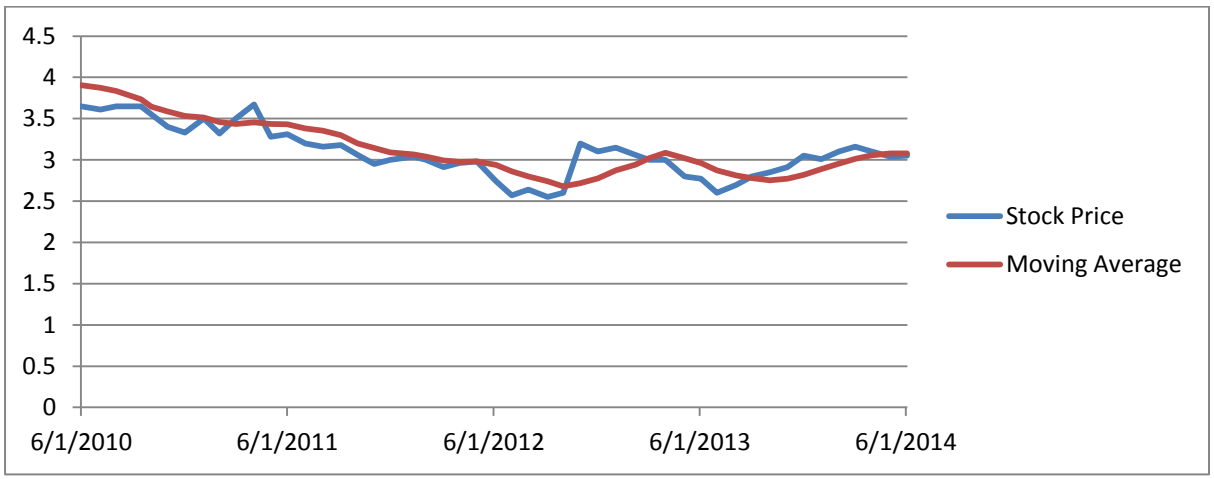
6/1/2013
9/1/2013
12/1/2013
3/1/2014
6/1/2014
Stock Price
Moving Average

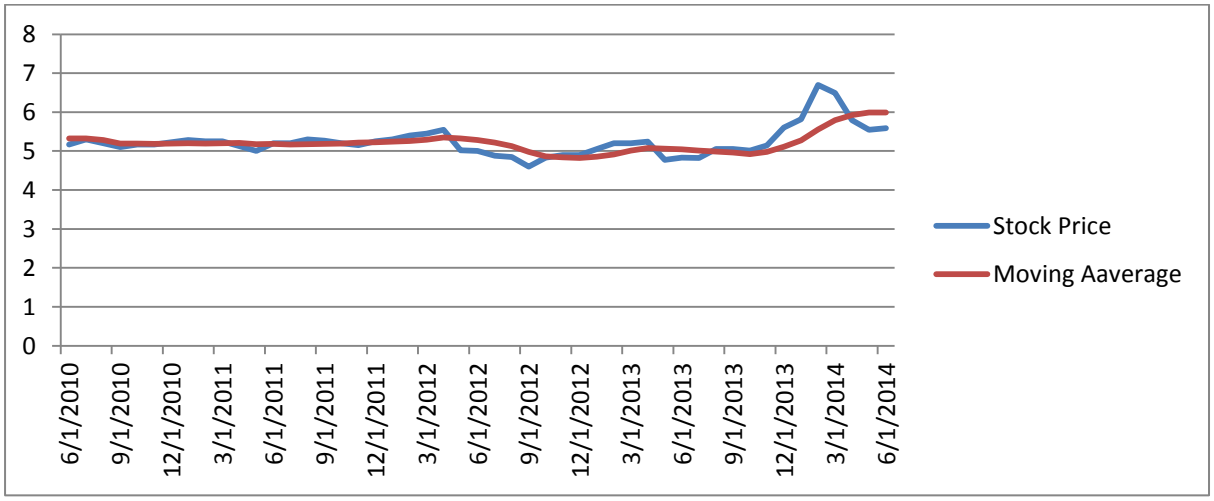
AIB:


1.4
1.2
1
0.8
0.6
0.4
0.2
0
7/6/2009
11/18/2010
4/1/2012
8/14/2013
12/27/2014
Stock Price
Moving average

BPC:


4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
6/1/2010
6/1/2011
6/1/2012
6/1/2013
6/1/2014
Stock Price
Moving Average

Paltel:


8
7
6
5
4
3
2
1
0
6/1/2010
9/1/2010
12/1/2010
3/1/2011
6/1/2011
9/1/2011
12/1/2011
3/1/2012
6/1/2012
9/1/2012
12/1/2012
3/1/2013
6/1/2013
9/1/2013
12/1/2013
3/1/2014
6/1/2014
Stock Price
Moving Aaverage

4.3.2.6. The amount of free cash flow:

In order to achieve a correct result from the DCF analysis, it is necessary to obtain the free cash flow (FCF) from the reformulated financial statements. This can be done in three different ways:

1) *FCF = operating income – change in Net operating assets*

   Where: operating income is gathered from the reformulated income statement and change in net operating assets is calculated from the reformulated balance sheet for the last two years.

2) *FCF = Net financial expense – change in NFO + net dividends + minority* interest in income – change in minority interest in the balance sheet

   Where: net financial expense is obtained from the reformulated income statement, the net dividends are from the reformulated statement of owners' equity and the last three items are obtained from the reformulated balance sheets.

3) Find FCF by reformulating the cash flow statement

If one of the first two methods is used to obtain the FCF, it is not necessary to reformulate the cash flow statement, but it is more useful to forecast the expected free cash flows that are necessary for the DCF valuation by forecasting the reformulated balance sheets and income statements, instead of forecasting the reformulated cash flow statements (Penman, 2010). Therefore it is decided to use method 1 to calculate the FCF for the DCF model and to forecast the FCF. The calculated FCF for the years 2013-2018 is illustrated in table 7.

4.3.2.7. Forecasting free cash flow:

According to (Nassaka&Rottenburg, 2011) in order to forecast FCF it is necessary to forecast its elements first, therefore, NOA and operating income are forecasted and used to calculate the FCF. The forecasts are made for a five year period from 2013-2018, as recommended by (Koller, 2005). Selected forecasts up to 2018 are presented in the following. (It is decided only to include forecasts up to 2018 in the presented tables due to the limited table space).

Forecasting sales:

In order to forecast sales for the samples companies three main areas that are suggested by (Penman, 2010) are investigated: the company's strategy, the market conditions and the company's marketing plan.

In relation to the sample companies expected future strategy we studied the disclosed information in reports published in companies' financial reports in PEX, and found that companies follow differentiation strategies; where it focuses on creating marginal growth rate in the upcoming year compared with the competitors. Furthermore, the companies are following a growth strategy and their strategy involves continuing growth mainly in the regional markets. The strategic analysis shows that business growth helps the companies to increase their capacity and service capabilities which enable the companies to serve more customers. The key factors for sales increase are organic growth and growth through business

expansion in the neighboring countries, e.g. Jordan, Egypt, Saudi Arabia and United Arab Emirates.

In relation to the market conditions, it is expected that the demand well be based on the graph analysis and increases in an upward economic development.

Gross Domestic Product (GDP) is an indicator of the level of the economic activity, e.g. companies state that when GDP is growing in the countries where the sample companies operates the economic activity changes accordingly. According to Palestinian Central Bureau of statistics (PCBS) GDP is expected to increase in the coming years, which is beneficial for companies listed in Al Quds index to achieve their targets for growth. The development in the GDP in the Palestine is presented in the graph above.

In order to forecast future sales of selected companies listed in PEX, historical growth levels in sales are analyzed first. From 2005 to 2013 the sales have increased continuously except for the year 2014.

The growth rate can be estimated in a number of ways.

- Using the company's historical average growth rate.
- Using an industry median or average growth rate.
- Using the sustainable growth rate

The study used the sustainable growth rate in evaluating the value of the sample listed firms, since the information used to estimate such rate is available at published financial information.

$$\text{Sustainable Growth Rate} = \text{ROE} \times \text{Retention Ratio}$$

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

Where

- Return on Equity (ROE) = Net Income / Equity
- Payout Ratio = % of earnings paid out as dividends
- Retention Ratio = % of earnings retained for investment

Table No. 5: Annual growth rate used to estimate the sales for the selected companies as follows:

Company Name	Rate used	Rate calculated based on the sustainable growth rate equation above
AIB	3.00%	6.74%
BOP	1.00%	19.79%
BPC	0.80%	5.08%
GMC	2.00%	1.55%
ISBK	2.00%	11.93%
JCC	1.50%	3.90%
NIC	1.50%	29.00%
PADICO	3.20%	8.82%
PALTEL	0.75%	30.09%
PEC	1.50%	2.03%
PIIC	1.00%	13.53%
PRICO	1.00%	-3.61%
TNP	1.00%	2.68%
UCI	1.00%	2.68%
WATANYIA	1.00%	-70.02%

Table No.6 The amount of FCF for the selected companies is as follows:

Company Name	2014 USD/JD	2015 USD/JD	2016 USD/JD	2017 USD/JD	2018 USD/JD
AIB	42,581,263	9,449,005	9,575,818	9,695,803	9,807,329
BOP	95,153,285	90,489,189	90,192,124	89,849,110	89,444,905
BPC	2,871,175	2,143,272	2,107,709	2,072,556	2,035,620
GMC	98,047	52,792	16,799	30,266	32,049
ISBK	23,989,310	2,048,315	4,766,075	4,703,075	4,749,390
JCC	1,213,225	1,147,456	1,180,961	1,214,568	1,247,836
NIC	931,071	3,186,864	3,139,133	3,088,171	3,032,218
PADICO	15,329,440	12,878,666	13,125,387	13,379,405	13,633,045
PALTEL	50,520,655	38,998,664	33,150,907	26,428,107	18,683,171
PEC	4,617,060	4,474,065	3,185,866	3,267,473	3,040,112
PIIC	2,702,205	1,989,449	591,628	925,407	889,211
PRICO	4,314,271	690,337	824,558	807,866	789,968
TNP	297,867	242,341	242,741	242,642	241,915
UCI	297,867	242,341	242,741	242,642	241,915
WATANYIA	6,269,995	5,528,365	5,762,219	5,993,728	6,218,632

4.3.3. Step 3: Estimating the weighted average cost of capital

According to (Damodaran, 2009) it is often necessary to adjust the risk levels for companies that are incorporated in emerging markets. This is because the risk of operating in an emerging market is usually higher compared to operating in a developed market, the discount rates assigned to the companies must be adjusted to represent the actual operating risk and to avoid an overvaluation of the companies. Especially in Palestine since the political environment is always fluctuated.

Table No. 7: The weighted average cost of capital (WACC) for the selected companies:

Company Name	Equity USD/JD	Debt USD/JD	Adjusted Cost of Debt used	Cost of equity according to CAPM	WACC
AIB	62,321,764	407,492,937	7%	0.015966432	6.30%
BOP	251,387,235	2,096,658,708	7%	0.027988077	6.60%
BPC	51,769,516	12,983,584	7%	0.027988077	3.60%
GMC	16,041,454	2,610,963	7%	0.016319729	2.40%
ISBK	63,463,651	438,788,179	7%	0.01573599	6.30%
JCC	17,939,705	27,283,967	7%	0.031578416	5.50%
NIC	27,071,969	52,199,742	7%	0.002252402	4.60%
PADICO	418,844,000	389,829,000	8%	0.021433033	5.10%
PALTEL	502,687,000	163,525,000	7%	0.017983509	3.10%
PEC	79,219,347	38,887,757	7%	0.027184575	4.10%
PIIC	30,714,304	17,496,376	7%	0.004398909	2.80%
PRICO	76,893,837	41,574,446	9%	0.018163113	4.40%
TNP	39,502,725	1,680,594	7%	0.017516679	2.00%
UCI	39,502,725	1,680,594	7%	0.017516679	2.00%
WATANYIA	91,365,999	188,396,033	7%	0.025001666	5.50%

As stated in the previous sections WACC can be calculated by determining its three components: the after-tax cost of debt, the cost of equity and the company's target capital structure (Koller et. al, 2005). Thus, the formula for WACC is (Brealey& Myers et al., 2007): As a part of calculating the WACC we have to determine the cost of equity and cost of debt.

4.3.3.1. The calculation of the cost of debts:

As mentioned in the previous sections, the companies' cost of debt can be determined by the following three factors: the risk free rate, the default spread and the tax rate.

First: determining the risk free rate

It is a common practice to use the Year to Maturity (YTM) from the U.S.Treasury Bond as the risk free rate, because it is assumed to have higher liquidity and lower credit risk compared to normal corporate bonds of other European countries. The 10-year U.S. Treasury bond with maturity in 2023 has currently a YTM of 2.9% and this rate is used as the risk free rate in the WACC calculation.

As stated above, the companies' risk free rate used in the case study is 2.9% which is almost 3% of the amount that has been used in calculating the WACC.

The default spread will be determined by: a) using the market interest rate on long-term bonds which is 5.01%. b) by using the average return on the market index the listed companies enrolled or traded.

Thus, the default spread determined in the case of using interest rate on long-term bonds:

R*mb*-R*f* = 5.01%- 3%. Yearly base

The default spread determined in the case of using Market Interest Rate is:

R*m*-R*f* = 15.80%- 3%. Yearly base

By using the corporate marginal tax rate and according to the Palestinian tax Law fixed at 15%, the company's after tax cost of debt is determined as:

After tax cost of debt = (Risk free rate + Default spread) (1- marginal tax rate) = (2.9%+6.21%)(1-15%) =7.659%.*

We will use the second method to calculate the default spread to calculate the R*i* using the CAPM

The after tax cost of debt of 7.659% is used in the companies' WACC calculation below.

The selected companies' cost of equity:

The selected companies' cost of equity can be determined by the CAPM, which is discussed in the previous sections. The inputs to the CAPM: the risk free rate, beta and the market risk premium for the selected companies are determined in this section. The companies' risk free rate is already determined to 3.0%, the beta and the market risk premiums are determined in the bellow section.

Table No. 8: Calculation of Market risk premium and Beta

Company Name	Stock average return	Risk free	Market Risk/Return	Beta	Cost of Equity (CAPM)	Market Risk Premium
AIB	0.60%	0.06%	0.30%	0.52	1.60%	0.2461%
BOP	(0.05%)	0.06%	0.30%	0.07	2.80%	0.2461%
BPC	(0.05%)	0.06%	0.30%	0.07	2.80%	0.2461%
GMC	0.34%	0.06%	0.30%	0.51	1.63%	0.2461%
ISBK	0.80%	0.06%	0.30%	0.53	1.57%	0.2461%
JCC	0.25%	0.06%	0.30%	(0.06)	3.16%	0.2461%
NIC	1.20%	0.06%	0.30%	1.03	0.23%	0.2461%
PADICO	0.93%	0.06%	0.30%	0.32	2.14%	0.2461%
PALTEL	0.28%	0.06%	0.30%	0.45	1.80%	0.2461%
PEC	0.09%	0.06%	0.30%	0.1	2.72%	0.2461%
PIIC	1.29%	0.06%	0.30%	0.95	0.44%	0.2461%
PRICO	(0.02%)	0.06%	0.30%	0.44	1.82%	0.2461%
TNP	(0.68%)	0.06%	0.30%	0.46	1.75%	0.2461%
UCI	(0.68%)	0.06%	0.30%	0.46	1.75%	0.2461%
WATANYIA	(0.21%)	0.06%	0.30%	0.19	2.50%	0.2461%

Estimating beta for the sample selected companies

As mentioned earlier the beta for public firms can be estimated by using: 1) accounting earnings, 2) using a private firm‘s ratios to get fundamental betas, 3) using average betas for similar public firms to get bottom up betas or the slop or 4) slope on the CAPM equation. Due to the fact that most of the selected companies have negative earnings in the analyzed period, option 1 is not used. According to (Damodaran, 2009) fundamental betas often have a low R2; therefore, option 2 was not used and only options 3 and 4 can be used. It has been decided to apply option 4, whereby bottom up betas are determined by using the market model regression. In order to determine the bottom up beta, returns from the companies'

return are regressed against the returns from the market to have the slope, and the market returns are determined based on Al Quds index. The regression results from the market model can be found in the electronic attachments which show the companies' resulting bottom-up beta.

Calculating the market risk premium

The extra return that investors demand for taking on risk i.e. the risk premium, depends on the risk measure, beta, and the market risk premium.

In order to calculate the market risk premium, the historical return index for the Al Quds Index was retrieved from PEX web site for the period 2013 as shown in the electronic AnnexA, Al Quds Index historical return. The market risk premium was calculated by using the arithmetic average (Koller et al., 2005) as shown in the electronic Annex A, market risk premium. As shown in this appendix, the resulting market risk premium is calculated to be 0.2461%.

The weekly calculated market risk premium of 0.2461% is considered to be high compared to the average market risk premium of 4.9% presented in the global Market Report Issued by Standard and Poor S&P. The calculated market risk premium is based on 52 weekly observations which might be a long enough period because it is what (Koller et al. 2005) suggested in analyzing the past 75 years. However, the data on the PEX web is site only available till the date of establishing the market in 1995 for the past 9 years. Therefore, there is no reason to believe that the calculated market risk premium is not correct. Since changes in market risk premium have direct effect on the resulting WACC, and small changes in WACC can have a large effect on the resulting company value.

Step 4: Calculating the continuing value

The continuing value for selected companies is calculated by using the constant-growth formula, which is discussed in section 3.3.1. To apply the constant-growth formula, it is

assumed that selected companies will go concern and grow at a constant long-term rate after the horizon year. In order to determine a reasonable long-term growth rate for the selected companies, the growth rate for the world economy is analyzed. The growth rate was estimated in table No. 5

The continuing value for the firms shown in the table No. 9 and calculated based on the following equation:

Full formula used to calculate the TV $= \sum_{n-1}^{\infty} \frac{FCFtv * (1+g)\text{^}n}{(1+wacc)\text{^}n} + \left[\frac{FCFtv(1+g)}{(r-g)}\right] / (1+\text{wacc})\text{^}_{\text{horizon period}}$

Table 9: The continuing value for the selected companies shown in the following table:

Company Name	Continuing Value
AIB	307,670,586.60
BOP	1,627,674,334.94
BPC	70,935,887.39
GMC	8,526,466.71
ISBK	112,285,765.34
JCC	31,856,093.06
NIC	100,401,801.10
PADICO	746,652,970.61
PALTEL	809,561,909.84
PEC	117,408,267.33
PIIC	49,328,630.39
PRICO	23,654,207.02
TNP	25,297,539.60
UCI	26,239,533.57
WATANYIA	138,636,464.27

4.3.4. Step 5: Calculating the company value:

As stated in the previous sections, the firm value can be calculated as:

$$PV = \frac{FCF1}{(1+WACC)} + \frac{FCF2}{(1+WACC)\text{^}2} + \frac{FCF3}{(1+WACC)\text{^}3} + \ldots + \frac{TV}{(1+WACC)\text{^}h}$$

$h \rightarrow \infty$

The NPV of the companies FCF up to the horizon period i.e. 2013-2018 and NPV of the companies' continuing value after the horizon period (forecast period) are adjusted by debt, non-controlling interest amount, cash and marketable are shown in the following table:

Table No. 10: PV of FCF and Companies continuing value.

Company Name	PV of FCF and Continuing value
AIB	39,073,203.86
BOP	300,886,400.40
BPC	59,776,877.47
GMC	7,764,741.30
ISBK	35,512,124.92
JCC	6,673,085.30
NIC	62,837,746.79
PADICO	262,046,216.26
PALTEL	730,330,814.06
PEC	83,436,887.58
PIIC	34,014,693.84
PRICO	20,249,033.81
TNP	24,108,218.70
UCI	24,509,218.60
WATANYIA	115,516,393.68

Companies' market value of equity per share is described in table 3. The companies' share price is determined as the equity value divided by the number of shares of each company (companies' value calculation is shown in the electronic annex A, valuation of the companies section).

Furthermore, since forecasting involves making assumptions about the companies' future, and predicting the future involves uncertainty as discussed in the previous sections, a scenario analysis is performed in the next section. The scenario and sensitivity analysis will help to analyze the uncertainty related to the valuation results.

4.4. Scenario analysis:

According to (Damodaran, 2007) it is a good idea to perform a scenario analysis in order to see how the estimated value of the asset changes under different scenarios. Since it is not

possible to predict the future, a scenario analysis can give an idea of, for example, how low or how high the asset value can become based on different possible future cash flows. It is then possible to determine the expected value of the asset by either applying weights to the different scenarios and estimate a weighted average value, or by choosing one of the scenarios as the expected outcome.

It is decided to perform a scenario analysis to analyze how companies' value and the corresponding share price change depending on different assumptions about the future growth rates. The scenario analysis contains a base case, a best case and a worst case scenario. All the calculations for the different scenarios can be found in the tables No. 11 & 12 and the detailed calculation can be found in annex A. The best case is the expected outcome which is used to estimate the firm value of companies in section 4.4.1 & 4.4.2, and is therefore not discussed further here. The best case and worst case scenarios are discussed below.

4.4.1 Best case scenario:

Table 11: Expected share value in the best case scenario:

Company Name	Best expected growth	lower expected WACC	Share Value based on the best scenario expectations
AIB	5.0%	6%	14.12
BOP	3.0%	4%	49.61
BPC	3.0%	4%	16.54
GMC	4.0%	5%	0.63
ISBK	5.0%	6%	7.86
JCC	3.0%	4%	11.75
NIC	4.0%	5%	37.05
PADICO	3.0%	4%	3.27
PALTEL	2.0%	3%	24.58
PEC	1.5%	2%	9.12
PIIC	2.0%	3%	5.04
PRICO	4.0%	4%	3.39
TNP	3.0%	4%	0.96
UCI	2.0%	3%	1.69
WATANYIA	5.0%	6%	9.83

In the best case scenario the growth rate until infinity is expected to be 1%, this is slightly below the average growth in the world economy of 3.83%.

In the best case scenario, it is assumed that the economy will grow in all the markets that companies operates in, which will affect the company‘s growth positively. Companies will therefore achieve its goal related to sales growth.

4.4.2 Worst case scenario:

In the worst case it is assumed that the economy will grow slowly, and the companies will not reach its goal of growth rate at any stage. The annual growth rates and corresponding WACC and share price under the worst case scenario are outlined in table 12.

Table12: Expected shares values in the worst case scenario:

Company Name	Lower expected Growth	Higher Expected WACC	Share value based on the worst case scenario
AIB	1.0%	4.00%	1.033
BOP	0.0%	6.55%	0.386
BPC	0.0%	8.00%	0.859
GMC	0.0%	4.50%	0.020
ISBK	0.0%	6.31%	0.023
JCC	1.0%	5.48%	0.171
NIC	1.0%	5.00%	3.493
PADICO	1.0%	3.00%	0.735
PALTEL	0.0%	3.50%	1.658
PEC	1.0%	5.00%	0.685
PIIC	0.0%	3.00%	0.781
PRICO	0.0%	5.00%	0.197
TNP	0.0%	4.00%	0.153
UCI	0.0%	2.50%	0.244
WATANYIA	0.0%	5.53%	0.223

Table No.13 summarizes the resulting enterprise values, equity value and share price under the different scenarios. The resulting values in the best case scenario are also affected by minor changes in the forecasted other operating expenses and other operating income, these changes are specified in the electronic Annex A; best case scenario analysis. In the worst case scenario other operating expenses and other operating income are set at a constant rate illustrated in the electronic Annex A, scenario analysis for the sample companies shown in the following table.

Table13: Companies values under the different scenarios:

The following tables show different scenarios on the change in the share value for each sample company as result on changing in sales growth and percentage of cost of sale:

AIB:

	Cost of Goods Sold					
Growth Rate	0.80200	-50%	-55%	-63%	-70%	-75%
	1%	0.16220917	-0.4298476	-1.42579309	-2.20602	-2.79807
	2%	1.40618873	0.66867489	-0.57195544	-1.54387	-2.28138
	3%	3.40794502	2.43636816	0.80200194	-0.47836	-1.44994
	4%	7.16313999	5.75247258	3.37947744	1.52047	0.109803
	5%	16.7710352	14.2369279	9.97410565	6.634606	4.100499
	6%	94.2229088	82.6324447	63.1352089	47.86105	36.27059

BOP:

	Cost of Goods Sold					
Growth Rate	2.00894	-45%	-50%	-55%	-60%	-65%
	1%	4.08974955	3.07818352	2.00894354	1.055051	0.043485
	2%	6.90798363	5.66188906	4.34474903	3.1697	1.923605
	3%	11.313861	9.70111701	7.9964232	6.475629	4.862885
	4%	19.1750431	16.9081052	14.511919	12.37423	10.10729
	5%	37.1783078	33.4131696	29.4333639	25.88289	22.11776
	6%	120.622928	109.913674	98.5938374	88.49517	77.78591

BPC:

	Cost of Goods Sold					
Growth Rate	3.23069	-0.45	-0.5	-0.6	-67.0%	-0.7
	0.4%	7.06458156	6.10013975	4.17125613	2.821038	2.242373
	0.6%	7.57520332	6.54528857	4.48545907	3.043578	2.42563
	0.8%	8.00453064	6.91956668	4.74963877	3.230689	2.579711
	1.0%	8.82844353	7.63783581	5.25662039	3.58977	2.875405
	2.0%	14.6342111	12.6991763	8.82910661	6.120058	4.959037
	3.0%	38.5494752	33.5479774	23.5449819	16.54289	13.54199
	4.0%	-70.8365734	-61.8123735	-43.7639737	-31.1301	-25.7156
	5.0%	-19.2205166	-16.8146306	-12.0028587	-8.63462	-7.19109

GMC:

	Cost of Goods Sold					
Growth Rate	0.5176	(0.60)	(0.70)	(0.84)	(0.86)	(0.90)
	1.00%	0.7960939	0.50367005	0.10219774	0.035792	-0.08118
	1.30%	1.03498321	0.66047313	0.14630362	0.061257	-0.08855
	1.50%	1.28438405	0.82417582	0.19235024	0.087843	-0.09624
	1.80%	1.97911321	1.28018483	0.32061739	0.161899	-0.11767
	2.00%	3.04629119	1.98066324	0.51764942	0.275659	-0.15059
	2.50%	-10.3010303	-6.78030336	-1.94665371	-1.14714	0.261151
	3.00%	-2.00210467	-1.33302242	-0.41443111	-0.26249	0.005142

ISBK:

	Cost of Goods Sold					
Growth Rate	0.71024	(0.05)	(0.08)	(0.11)	(0.15)	(0.20)
	0.01	0.41470945	0.28241199	0.15011454	-0.02628	-0.24678
	0.01	0.59263786	0.44716369	0.30168951	0.107724	-0.13473
	0.02	1.07222349	0.89123299	0.7102425	0.468922	0.167271
	0.03	1.84121906	1.60327968	1.3653403	1.048088	0.651522
	0.04	3.27477853	2.93067525	2.58657198	2.127768	1.554262

JCC:

	Cost of Goods Sold					
Growth Rate	0.66731	-70%	-80%	-85%	-94%	-94%
	0.5%	29.0173911	16.7081047	10.5534616	-0.22637	-0.5249
	1.0%	32.842892	19.0904494	12.2142281	0.17055	-0.16297
	1.5%	37.6305748	22.0719963	14.2927071	0.667309	0.289986
	2.0%	43.795667	25.91133	16.9691614	1.306984	0.873258
	2.2%	46.7886573	27.7752256	18.2685097	1.617529	1.156421
	3.0%	63.5960935	38.2421178	25.5651299	3.361429	2.746552

NIC:

	Cost of Goods Sold					
Growth Rate	4.2275	-70%	-85	-90.4%	-0.93	-0.95
	0.3%	11.130385	-3267.0628	3.21223489	2.186323	1.408578
	0.5%	11.7908778	-3434.53414	3.4666219	2.388093	1.57046
	1.0%	13.7662998	-3935.41258	4.22745038	2.991553	2.054619
	1.5%	16.3861508	-4599.68928	5.2364789	3.791876	2.696722
	2.0%	20.0272331	-5522.90448	6.63883196	4.904169	3.58912
	2.5%	25.4312236	-6893.11411	8.72016432	6.555003	4.913592

PADICO:

	Cost of Goods Sold					
Growth Rate	1.048	-0.6	-0.65	-68.4%	-0.7	-0.8
	1.5%	0.25060064	-0.0371518	-0.23205669	-0.3249	-0.90041
	2.0%	0.56164992	0.22560249	-0.00201429	-0.11044	-0.78254
	3.2%	1.98166505	1.42513936	1.04818487	0.868614	-0.24444
	3.5%	2.67277957	2.00894818	1.55931174	1.345117	0.017454
	3.9%	4.13891767	3.24744674	2.64362201	2.355976	0.573034
	4.0%	4.67446864	3.69984554	3.0396989	2.725222	0.775976

PALTEL:

	Cost of Goods Sold					
Growth Rate	5.55143	-0.04	-0.06	-7.1%	-0.08	-0.09
	0.75%	8.25387008	6.51092086	5.55142721	4.767972	3.896497
	1.00%	10.3767089	8.41893204	7.34117579	6.461155	5.482267
	2.00%	28.7406204	24.9244476	22.8236442	21.10827	19.20019
	3.00%	536.019225	480.867337	450.506219	425.7154	398.1395
	4.00%	-53.6644209	-49.1413464	-46.6513936	-44.6183	-42.3567

PEC:

	Cost of Goods Sold					
Growth Rate	1.39061	(0.45)	(55.00)	(0.58)	(0.65)	(0.70)
	0.5%	2.1099394	-586.85	0.706367	-0.0494	-0.58924
	1.0%	2.62981086	-683.862	0.993807	0.112882	-0.51635
	1.5%	3.34748761	-817.786	1.390615	0.336914	-0.41573
	2.0%	4.40238752	-1014.64	1.973875	0.666214	-0.26783
	3.0%	9.31729288	-1931.8	4.691352	2.200461	0.421253
	4.0%	90.9129153	-17158.2	49.806	27.67151	11.86116

PIIC:

	Cost of Goods Sold					
Growth Rate	1.81412	-0.65	-0.75	-82.0%	-85	-0.9
	0.60%	4.25107036	2.53674682	1.33672	-1441.78	-0.03474
	0.75%	4.62426093	2.78300725	1.49413	-1548.47	0.021127
	1.00%	5.38289612	3.28361429	1.814117	-1765.36	0.134692
	1.50%	7.7618262	4.85341907	2.817534	-2445.48	0.490808
	2%	13.0395843	8.33609811	5.043658	-3954.35	1.280869
	2.50%	34.7767772	22.680004	14.21226	-10168.9	4.534844

PRICO:

	Cost of Goods Sold					
Growth Rate	0.31757	-0.5	-0.55	-0.6	-73.3%	-0.8
	-0.40%	0.947257742	0.78829763	0.62933752	0.205392	-0.0065
	0.50%	1.19071492	0.99304628	0.79537765	0.268196	0.004703
	1.00%	1.382106707	1.15400769	0.92590868	0.31757	0.013513
	2%	2.006847026	1.67941729	1.35198756	0.478734	0.042269
	3%	3.541591341	2.97014461	2.39869787	0.874652	0.112911
	4%	13.30443323	11.1807414	9.05704948	3.393173	0.562282

TNP:

	Cost of Goods Sold					
Growth Rate	0.75338	-15.0%	-20.0%	-25.9%	-30.0%	-40.0%
	0.40%	0.69891155	0.57014742	0.41868771	0.312619	0.055091
	0.50%	0.75508156	0.61739611	0.45544263	0.342025	0.066654
	1.00%	1.21040156	1.00039891	0.75338183	0.580394	0.160388
	1.50%	2.64313886	2.20557857	1.69089525	1.330458	0.455337
	2%	-37.8659885	-31.8695981	-24.8163024	-19.8768	-7.88404
	3%	-1.37111844	-1.17110554	-0.93583897	-0.77108	-0.37105

UCI:

	Cost of Goods Sold					
Growth Rate	0.75338	-15%	-20%	-26%	-33%	-34%
	0.2%	0.60565707	0.49170428	0.35766653	0.195427	0.172636
	0.5%	0.75508156	0.61739611	0.45544263	0.259414	0.231877
	1.0%	1.21040156	1.00039891	0.75338183	0.454392	0.412391
	1.5%	2.64313886	2.20557857	1.69089525	1.067922	0.98041
	2.0%	-37.8659885	-31.8695981	-24.8163024	-16.279	-15.0797
	3.0%	-1.37111844	-1.17110554	-0.93583897	-0.65107	-0.61107

WATANYIA:

	Cost of Goods Sold					
Growth Rate	0.44774	-0.44	-0.45	-50.0%	-0.55	-60.0%
	0.30%	0.67055699	0.6056671	0.28121762	-0.04323	-0.36768
	0.50%	0.72969188	0.66208755	0.32406591	-0.01396	-0.35198
	1.00%	0.90037159	0.82493265	0.44773796	0.070543	-0.30665
	1.30%	1.02214538	0.94111673	0.53597349	0.13083	-0.27431
	2.00%	1.38676717	1.2890015	0.80017317	0.311345	-0.17748
	3.00%	2.25760088	2.11986185	1.4311667	0.742472	0.053776

As illustrated in the above tables, in the best case scenario any increase in the growth will increase price per share. In the worst case scenario the share price is estimated to be decreased. This shows that the companies' value and the corresponding share price are sensitive to changes in growth rates and costs. In case companies achieve a performance level similar to the one forecasted in the best case scenario, the share price will change significantly compared to the market traded prices based on the scenarios developed, which is of course very beneficial for investors. However, in case companies do not manage to do so well and will grow at a level similar to the worst case scenario, the investors can risk that the share price drops below the lowest IPO price of the companies, and investors will thereby suffer form loss.

4.5. Sensitivity analysis:

(Koller et al., 2005, Brealey and Myers et al., 2007 and Nassaka & Rottenburg, 2011) suggested performing a sensitivity analysis in order to evaluate the forecast model‘s robustness under different assumptions, for example by stating optimistic and pessimistic values for WACC and revenue growth. The changes in revenue growth are shown in table 14, thus this section will include a discussion of the optimistic and pessimistic values for the WACC.

To investigate the sensitivity of the DCF method, samples from the selected companies as case study will be used to test the validity of using the sensitivity analysis as a good tool to test the performance of the company based on the expectation made.

The WACC and the perpetual growth rate are two main input factors that have large effect on the outcome of the analysis.

Due to the importance of WACC and the significant effect of WACC on the shares' expected values, different scenarios are developed for each selected company in order to evaluate the effect of changes in companies' expected WACC on the enterprise value. It is assumed that the optimistic value represents a 1% decrease in WACC and the pessimistic value represents

a 1% increase in WACC as shown in tables below. (The calculations can be seen in the electronic annex A, sensitivity analysis).

Table 14: Sensitivity Analysis of WACC, with constant Perpetual growth rate and Cost of sales;

BPC: Shares value at constant COGS i.e. 67.0% rate at different WACC:

			Share Value
WACC	Optimistic	1%	42.2506665
		2%	8.08107202
		3.6%	3.23068923
	Pessimistic	4%	2.8226441
		5%	2.04877909
		6%	1.56943026
		7%	1.24323947
		8%	1.00683884

BOP: Shares value at constant COGS i.e. 55.3% rate at different WACC:

			Share Value
WACC	Optimistic	4.00%	10.8029867
		5.00%	6.01880662
		6.55%	2.00894354
	Pessimistic	6.70%	1.7369798
		6.80%	1.56322892
		6.90%	1.39536302
		7.00%	1.23308788
		7.10%	1.07612857
		7.20%	0.92422788

AIB: Shares value at constant COGS i.e. 56.6% rate at different WACC:

			Share Value
WACC	Optimistic	4.00%	13.25527357
		5.00%	4.30576031
		6.28%	0.802001935
	Pessimistic	6.40%	0.614153248
		6.50%	0.463199973
		6.60%	0.320597855
		6.70%	0.185669874
		6.80%	0.057810276
		6.90%	-0.06352456
		7.00%	-0.17882391

Table 14 clearly show that even slight changes in the WACC, which might not even be significant from an economist's perspective, will largely offset the determined fair share price from the base case scenario. For example increasing the WACC by from 1% to 3.6% in BPC will change the price from 42 to 3.

In addition, it can be seen that a 1% decrease in WACC for BOP leads to a 79.77% increase in the share price and PV of the continuing value. As for the pessimistic value, as illustrated in the above tables, a 1% increase in WACC in BOP leads to a 23.088% decrease in the share value.

Since it is very difficult to estimate the perpetual growth rate or the cost of capital, the determined fair share price can only be seen as guidance, and not as an absolutely exact value.

According to (Florian Steiger, 2008) the sensitivity to changes in the WACC can be expressed as the first derivative of the company value in respect to the discount rate, similar to the concept of bond duration. The formula below shows the approximate change in the company's value when modifying the WACC.

$$\frac{dV}{dr} = \frac{1}{1+WACC}\sum_{t=0}^{n}\frac{-t*FCFn}{(1+wacc)\text{^}n}$$

In conclusion, companies' estimated enterprise value is considerably sensitive to small changes in the WACC, thus this value should be interpreted with caution.

The next step in the sensitivity analysis is to assess whether changes in the perpetual growth rate or in the growth rate for the predicted period have a higher impact on the share price. Since both growth rates affect the nominal value free cash flow, the result of the analysis should be helpful to understand the importance that the terminal value has on the DCF analysis since all other factors are kept fix. If modifying the perpetual growth rate leads to larger changes than modifying the sales of the companies selected for the scenario period, the terminal value would be of significantly of higher importance than the scenario predictions for the first year.

The following tables show the share value with specific expected sales growth rate to check the effect on the share prices with the changes in the expected sales growth rate:

Table 15: The change in the Companies' shares value as a result in change in the sales growth.

AIB: Shares value at constant COGS i.e. 63.4% rate at different sales growth:

SALE	Share value
2.7%	0.30929
2.9%	0.62805
3.0%	0.80200
3.5%	1.85922
4.0%	3.37947
4.5%	5.75226
5.0%	9.97410
5.5%	19.5862
6.0%	63.1352

BOP: Shares value at constant COGS i.e. 55% rate at different sales growth:

SALE	Share value
0.70%	1.46
0.80%	1.64
0.90%	1.82
1.00%	2.01
1.50%	3.06
1.80%	3.80
2.50%	5.95
3.00%	8.00
3.50%	10.72

BPC: Shares value at constant COGS i.e. 56.6% rate at different sales growth:

SALE	Share value
0.60%	2.928765704
0.70%	3.04357842
0.75%	3.166198377
0.90%	3.230689231
1.00%	3.438277772
1.50%	3.58976959
2.00%	4.559482872
0.50%	6.120057853

The tables above clearly show that even slight changes in the sales expectation, which might not even be significant from an economist's perspective and world growth expectation, will largely offset the determined fair share price from the best case scenario. For example increasing the sales growth expectation by 2.7% to 6% in AIB will change the price from 0.3 to 63, as well as the BOP the changes of the expectation from 0.7 to 3.5 will change the price significantly from 1.4 to 10.7.

As expected, changes in the perpetual growth rate have a higher impact than changes in other factors. For example, an increase in the perpetual growth rate by 1%will result in a 5% higher share price, whereas a change by the same amount in the reduction in the tax rate expectation will only drive the fair share price up by 0.5%. As a result, the importance of the terminal value becomes evident again (Florian Steiger, 2008). It underlines the fact that the terminal

value includes all cash flows from the end of the scenario period up to infinity compared to just a few years in the scenario period. Therefore, the terminal value together with its underlying assumptions are the most important and influential part of the whole discounted cash flow analysis. As mentioned before it is very easy to slightly adjust the assumptions that influence the terminal value, without having to justify these changes since they are very small. However, these small adjustments will significantly change the terminal value and, thus, the value of the whole company.

4.6. Discussion of the results:

This section includes a discussion of the results that are found by using the DCF, DDM and RIM models.

4.6.1 The DCF model

Companies calculated values from the *DCF, DDM and RIM models* are shown in the following table:

Table No. 16: Companies calculated values from the *DCF, DDM and RIM models*

Company Name	Spot Value	RIM	DCF	DDM	Average
AIB	1.170	0.774	0.802	0.459	0.678
BOP	3.240	1.352	4.109	1.257	2.239
BPC	3.030	5.474	3.231	2.727	3.811
GMC	0.900	-1.505	0.518	0.000	-0.329
ISBK	1.500	2.331	1.187	0.606	1.375
JCC	1.130	2.367	0.993	0.708	1.356
NIC	3.600	7.562	3.337	4.126	5.008
PADICO	0.650	-0.071	0.318	0.000	0.082
PALTEL	5.820	6.521	5.551	10.736	7.603
PEC	1.430	1.574	1.391	2.018	1.661
PIIC	2.100	6.717	1.814	0.040	2.857
PRICO	1.180	0.137	0.703	0.096	0.312
TNP	0.440	-0.082	0.753	0.000	0.224
UCI	0.430	-0.082	0.753	0.000	0.224
WATANYIA	1.050	0.226	0.448	0.000	0.225

These values should be interpreted with caution because the DCF method is largely dependent on WACC and continuing value assumptions as concluded in the scenario and sensitivity analysis; the following example on BOP shows the effect on the continuing value as a result of change in the WACC assumptions:

Table No. 17: The companies' continuing value after the horizon period

BOP:

WACC	Continuing value at horizon period
4.00%	3,011,311,796.01
5.00%	2,258,483,847.01
6.55%	1,627,674,334.94
6.70%	1,584,900,945.27
6.80%	1,557,575,066.90
6.90%	1,531,175,489.50
7.00%	1,505,655,898.01
7.10%	1,480,973,014.43
7.20%	1,457,086,352.91

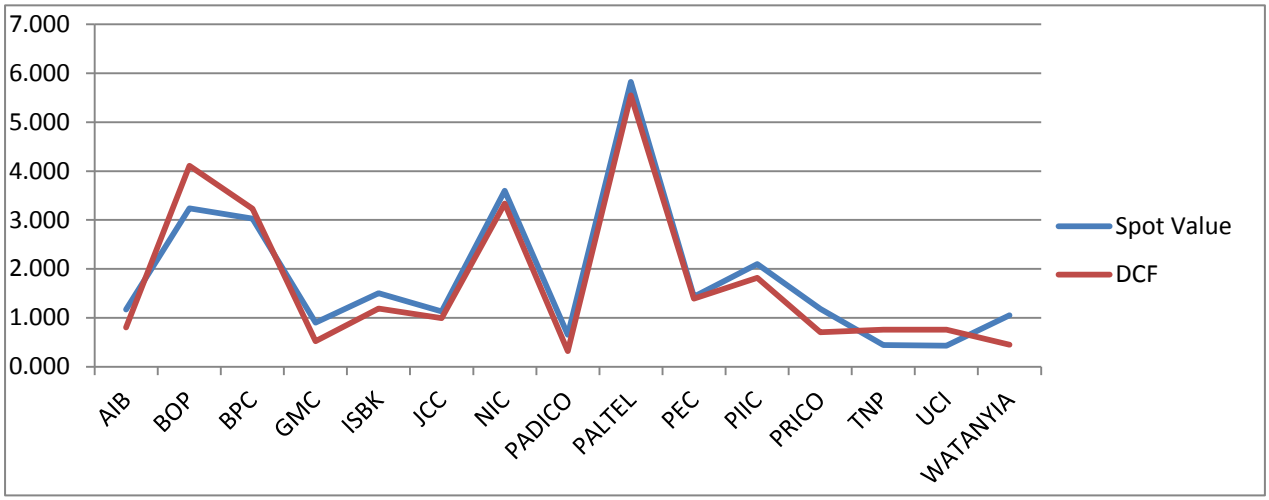
As in the example above the expected WACC rates are assumed to be between (4% - 7.2%) and this result is in a continuing value at horizon of 1,627 Billion, however, in the worst case scenario analysis when this WACC is assumed to be 7.2% (an increase of 0.65%) the continuing value at horizon is 1,457 million (an decrease of 10.4%). However, the reduction of the WACC in the best case scenario will cause the terminal value to increase by 85%.

Another illustration of the DCF model's dependency on the given assumptions is illustrated by the sensitivity analysis as it shows that a 1% change in the WACC results in large change in the firm value and share prices.

4.6.2 Graphs analysis:

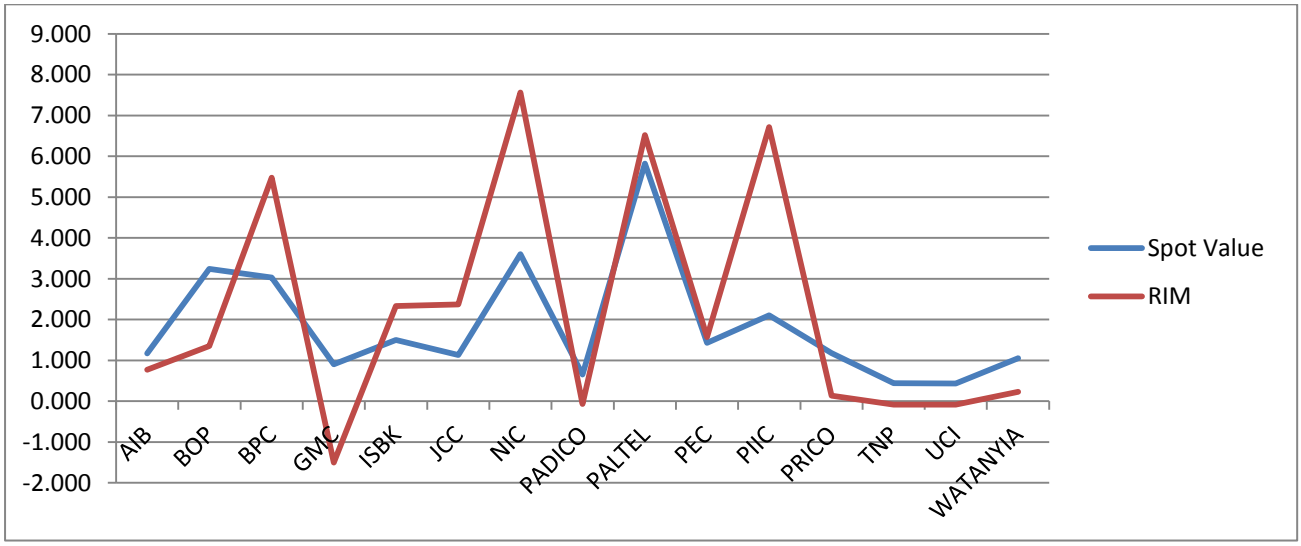
The following graph shows the relationship between the calculated amount based on DCF and spot value of the share:

Figure 3: Relationship between the calculated amounts based on DCF and spot value of the share



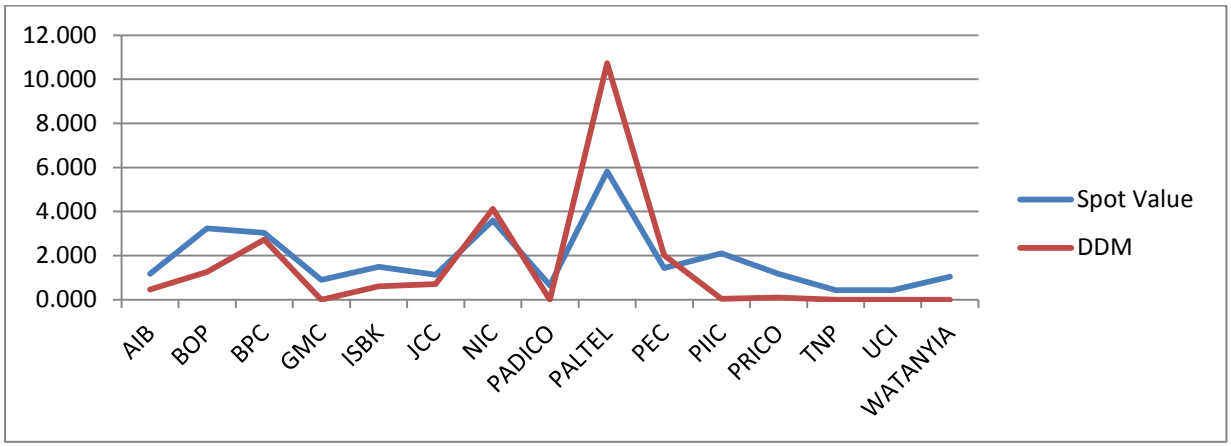
The following graph shows the relationship between the calculated amount based on RIM and spot value of the share:

Figure 4: Relationship between the calculated amounts based on RIM and spot value of the share



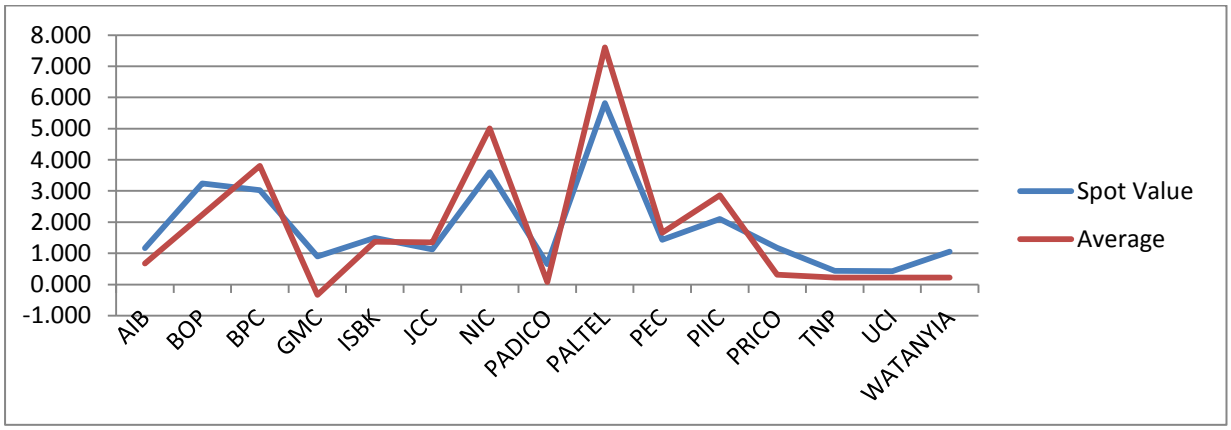
The following graph shows the relationship between the calculated amount based on DDM and spot value of the share:

Figure 5: Relationship between the calculated amounts based on DDM and spot value of the share



The following graph shows the relationship between the average calculated amount based on DDM, RIM and DCF models with spot value of the share:

Figure 6: Relationship between the calculated amounts based on Average Price calculated from three models and spot value of the share:



The above graphs explain the relationships between the real value of shares and calculated amounts. They reflect the relationship between prices calculated using DCF and real price per PEX, which shows that it is more fit to actual prices compared to other methods.

The enterprise and equity values obtained from the RIM lower than the enterprise and equity value obtained from the DCF and DDM.

The values from the RIM are generally lower than the values from the DCF analysis. Since the RIM is used to verify the results obtained from a company's net residual income after the required return from the invested capital, it can be discussed whether the value obtained from the DCF and DDMs analysis is overvalued.

Chapter (5): Conclusions, Policy Implications, and Further Research

5.1. Conclusion

Several studies used the DCF Model to evaluate companies, but the literature lacks any studies that used the DCF model to evaluate the companies listed in PEX. This study investigates the DCF model advantages and disadvantages compared with other models to test the reliability of results obtained from the DCF compared to other models, as well as the correlation between the results obtained from DDM and RIM with Spot value of the stocks traded in PEX. For the purpose of calculating the companies return using CAPM, the data of daily stock prices of the sample listed companies and Al-Quds index over the period of January2013 till December 2013 was used.

In this study, three corporate valuation models were discussed; the Residual Income Model, the Discounted Sash Flow model and the Dividend Discount Model. The sensitivity analysis shows that the DCF method is very sensitive to changes in the underlying assumptions. As discussed in the previous sections, any marginal changes in the perpetual growth rate will lead to huge variances in the continuing value and companies' equity values. Since the continuing value after the horizon accounts for a large portion of the company's value, it's very significant for the validity of the DCF method.

The advantage and disadvantage of the studied corporate valuation theories are discussed and identified in the previous chapters. Based on previous studies, it was decided to use the DCF model as the primary model to value all the companies listed in PEX and the CAPM as input to calculate the cost of capital for each sample firm.

Before the financial valuation of the companies, a trend analysis was conducted and included a study of the profitability of the company under study to help in evaluating the input for the models. As part of the DCF analysis the companies' financial statements for the period 2013 - 2018 were reformulated and analyzed and the historical amounts of the free cash flows were found. Based on the analysis of the historical financial statements of the selected companies,

the companies' future FCFs were forecasted in the horizon period i.e. from 2013-2018, and the PV of these FCFs was calculated (the full and detailed calculation will be found in the electronic annexes). In order to capture the value of the free cash flows after the horizon forecast period a continuing value was estimated.

Many underlying assumptions can be put to build the DCF model, since it is very easy to manipulate the DCF analysis to obtain the value by adjusting the inputs. e.g. a change in COGS rate or the perpetual growth rate or in the WACC by just a few points to reach the required value. It depends on the analysis judgments about the input factors to determine the possible situations, the Analysts or business professionals have no tools to estimate the input factors with that kind of exactness. The capital asset pricing model has been calculated for determination of the expected rate of return on a companies' stock and used as input to calculate the WACC which was used later as a discount rate in the DCF model. Furthermore, to account for the uncertainty of forecasts a scenario analysis with a best case and worst case scenarios have been conducted. The WACC used in the DCF analysis was calculated based on the actual cost of debts and estimated CAPM cost of equity, but due to the uncertainties in relation to the inputs of the WACC formula, a sensitivity analysis of WACC was carried out. In the sensitivity analysis a 2% lower optimistic value of WACC and a 3-4% higher pessimistic value of WACC were analyzed.

The following points summarize the conclusion of this study:

- The DCF analysis is a great tool to analyze what assumptions and conditions have to be fulfilled in order to reach a certain company value, for example, the analyst can build the required assumptions and estimations based on the market news or companies published information or he can use the trend analysis and technical analysis to build the assumptions he wants to be used based on these information. This is especially helpful in the case of capital budgeting and in the creation of feasibility plans and in the case where the analyst wants to be more optimistic or pessimistic.

- The validity and feasibility of the DCF model almost completely depends on the quality and validity of the data that is used as input. Companies' valuation using DCF is a valid method to assess the companies' value if special precaution is put on the validity of the underlying assumptions, like all other financial models.
- The Discounted Cash Flow valuation is a great tool to evaluate the values of a variety of assets and also to analyze the effects that different economic scenarios have on a company's value.
- Many analysts like (Florian Steiger and Koller et al., 2005, Brealey and Myers et al., 2007 and Nassaka&Rottenburg, 2011) argued that the range of reasonable rates for discount factor and perpetual growth rate depends on each specific firm, its business situation and many more variables. Generally, it can be said that the more risky a firm is the higher its capital costs (WACC) are. The perpetual growth rate should be the same for all industries, since according to the arbitrage theory, on the long run all companies and industries will grow by the same rate, and due to this reason we underline stable growth rate for all of the companies.

Accordingly, we conclude that using the DCF model in combination with other methods, like the DDM or RIM, is an effective approach to obtain a realistic range of appropriate companies values and using the average of these methods will help reaching unbiased values, as well as using high quality input will give high quality output based on the rule "garbage in garbage out". This combination of techniques is indeed the method that most companies, professionals, investment analyst and investment banks use today. When using several valuation techniques, the individual shortfalls are eliminated and the ultimate goal in the field of company valuation can be reached: determining a fair and valid company value.

5.2. Policy implication and future researches

To demonstrate the wide range of possible results of the DCF analysis, this study will analyze the value of the all listed stock in PEX using the DCF as a primary evaluation model.

The DCF is sensitive to any changes in the WACC, the perpetual growth rate in the economy and sales growth. For this reason, a best case scenario and worst case scenarios was used to obtain a fair reference value for one company's value. Afterwards a sensitivity analysis was conducted to examine the effects on this reference price modifying factors.

5.2.1. Policy Implications:

As aforesaid, it's unlikely to depend only on the disclosed information to invest in the companies, it is also important to investigate the stock's value and the stock fair intrinsic value. Accordingly, this study will direct the user of a financial statement to the most reliable evaluation technique to evaluate the values of companies. It used different evaluation techniques i.e. RIM, DDM and DCF models, and also discussed if there are any correlated links between the evaluation techniques included in this study

The conclusions of this study on each evaluation technique are important for the users of the financial statements, since the users can overcome the risk of uncertainty by conducting a sensitivity analysis and different scenarios about the value of the stock price.

The decline in PEX stock price during 2007 due to unfair value of the stock prices, and this led us to search for the most appropriate evaluation method to find more accurate and reliable methods to evaluate the stock prices.

The empirical results of the relationship between the three models indicate that there is a relationship among the three evaluation models and the spot value of the corporate stock. These results should be considered by investors.

Palestinian investors can consider these results when they manage their portfolios and evaluate individual companies rather than counting on general indicators like profit and fixed numbers. The models being used depend on underlying assumptions and depend on the future expectations and not just on close indicators, which in turn will help the users for best way to evaluate the companies' values.

This study is important for investors in Palestine since the results provide very important information on investment strategies in stock exchanges which, in turn, enables investors to take profitable decisions and achieve returns.

5.2.2. Further Research

Determining the companies' real intrinsic value is important for decision makers, academicians and professionals. In Palestine, empirical studies of these topics are still limited or do not exist. Limited and traditional evaluation techniques are used to test and investigate the company's value.

The valuation of the companies' value can be conducted by different ways in addition to RIM, DDM and DCF Models; the Real Options Valuation (ROV) and valuation using multiples can also be used. The ROV options are especially valuable in environments that are characterized by uncertainty, like Palestine, because they give the opportunity to make a decision after seeing how the events turn out. In order to value options, methods such as the Black-Sholes model and the Binomial model can be applied. In addition, Valuation using multiples is a broadly used supplementary method to the well-known Discounted Cash Flow method when it comes to company valuation (Benninga and Sarig, 1997). According to (Yoo, 2006) the popularity of this method is mainly caused by its simplicity. In general, multiples are the average price divided with a certain performance measure; therefore, many different multiples can be calculated for a firm. The primary ratio which is generally used to estimate a value is the price/earnings (P/E) ratio (Benninga and Sarig, 1997) and the two other ratios, which are commonly used, are the price/book value (P/B) ratio, and the price/sales (P/S) ratio (Damodaran, 1994).

Based on the above, the results of this study encourage researchers to use Real Options Valuation (ROV) and valuation using multiples in addition to the other evaluation techniques and to test the reliability of these techniques in evaluating the companies' values.

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