Valuation of Pfizer Inc. and analysis of new drug development project using a real option approach.

Author: Valdis Cvetkovs

Supervisor: Peter Lochte Jorgensen

April 2011
Aarhus
Abstract

This thesis investigates the world’s largest pharmaceutical company Pfizer Inc. from strategic and financial viewpoint in order to determine companies’ fair market value. The external analysis researches industry and global economic situation on the valuation date as well as states the future trends. Bases for valuation consist of discounted cash flow valuation. Additionally the real option valuation method is used to determine the value of experimental medicine at the beginning of its development process. The results are compared to the usual discounted cash flow valuation method and give an answer if development of new medicine shall or shall not be proceeded with.
Acknowledgment

I express sincere acknowledgement to my supervisor, Peter Lochte Jorgensen, for his help and support during the thesis writing process.
I am also thankful to personnel at Aarhus Business School during the whole study period.
I would like to thank my family and friends for supporting and encouraging me to pursue with this degree. Special thanks for support, inspiration and being next to through this two year master’s program besides my family to Jan Bernatzky, Mihail Kuklin and Boriss Kuzmin.
# Table of contents:

1. Introduction .................................................................................................................. 6
   1.1. Methodology ............................................................................................................. 6
   1.2. Problem Statement ................................................................................................. 7
   1.3. Brief introduction to Pfizer .................................................................................... 7
   1.4. Limitations: ............................................................................................................. 8

2. Analysis of companies’ historical performance: ......................................................... 9
   2.1. Accounting standards: ............................................................................................ 9
   2.2. Reformulation of financial statements: ................................................................. 9
      2.2.1. Capitalized expenses: ..................................................................................... 9
   2.3. Calculation of invested capital: ............................................................................... 11
   2.4. Net operating profit less adjusted taxes ............................................................... 12
   2.5. Revenue growth: .................................................................................................. 13
   2.6. Return on invested capital: ................................................................................... 14
   2.7. The Free Cash Flow: ............................................................................................ 16

3. Estimating Weighted average cost of capital ............................................................... 18
   3.1. Estimating the cost of equity: ................................................................................. 18
   3.2. Estimation of risk free rate: ................................................................................... 19
   3.3. Estimation of beta: ................................................................................................. 19
   3.4. Obtaining the Market risk premium: ...................................................................... 22
   3.5. Estimation of after tax cost of debt ....................................................................... 23
   3.7. Computing Weighted Average Cost of Capital and performing sensitivity analysis .................................................................................................................. 25

4. Strategic business analysis ......................................................................................... 27
   4.1. External analysis ..................................................................................................... 27
      4.1.1. Political and legal factors: .............................................................................. 27
      4.1.2. Economic factors: ......................................................................................... 28
      4.1.3. Social Factors: .............................................................................................. 31
      4.1.4. Technological factors: .................................................................................. 32
      4.1.5. Environmental issues. .................................................................................. 32
   4.2. The porters five force analysis: ............................................................................. 33
      4.2.1. Bargaining Power of Buyers: ........................................................................ 34
4.2.2. Bargaining Power of Suppliers: ................................................................. 34
4.2.3. Substitute products:.................................................................................. 34
4.2.4. Existing industry rivalry: ............................................................................ 35
4.2.5. Threat of new entrants: .............................................................................. 36
4.3. Current product portfolio: ............................................................................ 37
4.3.1. Biopharmaceuticals:..................................................................................... 37
4.3.2. Diversified products:................................................................................... 38
4.4. Analysis of competitors: ............................................................................... 41
4.5. Analysis of Industry, market scale and potential market growth................. 43
4.6. SWOT analysis. ............................................................................................. 44
5. Forecasting performance: .................................................................................. 47
6. Moving from enterprise value to value per share ......................................... 50
   6.1. Determining the enterprise value:................................................................. 50
   6.2. Determining the equity value:....................................................................... 50
   6.3. Debt and debt equivalents:........................................................................... 50
   6.4. Hybrid claims:............................................................................................. 51
   6.5. Sensitivity Analysis. ..................................................................................... 52
7. Valuing flexibility in research and development using real options. .............. 54
   7.1. The drug approval and research and development process. ................. 54
   7.2. Underlying risks: Market and technical:................................................. 56
   7.3. Estimating the net present value of new drug without flexibility: ............ 56
8. Real Option Valuation ....................................................................................... 59
   8.1 The structure of the valuation. ..................................................................... 59
   8.2. Building the binominal tree. ....................................................................... 60
   8.3. Valuation of the option. .............................................................................. 61
   Conclusion ......................................................................................................... 63
List of Literature.................................................................................................. 65
Appendices.......................................................................................................... 68
1. Introduction

1.1. Methodology

The main purpose of this thesis is to determine the fair market value of Pfizer Inc. The data used in research will be mostly secondary and quantitative, main sources will be stock exchange websites, Wharton Research Data Services database as well other open sources and statistics, including the information disclosed by Pfizer Inc. In order to understand Pfizer’s historical performance, a financial analysis will be performed based on companies’ financial statements and K-10 fillings for years 2004 - 2009. A strategic external and internal analysis will also be conducted. Macro level, industry level and company level analysis will estimate the factors that influence the company, and how these factors affect the value of Pfizer. At the macro level PESTEL analysis will be performed to describe the political, legal, social technological, environmental, and economical factors that could impact the growth, changes, and sources of the industry. Regarding industry level the Porter’s Five Force analysis will be utilized to draw the industry understanding in the industry context. In order to understand which of the mayor blockbuster drugs will require more investments, which will be in charge of sustainable revenue generation and from which revenues are expected to decline the Boston Matrix model will be used. The conclusion of strategic analysis will be presented in form of a SWOT analysis, and will be outlined based on the external and internal analysis. In order to perform strategic analysis the research of mayor industry competitors will be done through analysis of their annual reports and financial statements. Data for industry, market and global trends will be gathered from different sources to perform the external analysis. This part will be a foundation for estimating the growth and earning potentials for Pfizer in the long run. Financial analysis, will give an insight into historical trends and growth levels which affected the company value. Moreover, the estimates in this part are going to be used for identifying the future value creation drivers for Pfizer. Valuation will mainly be based on discounted free cash flow. The discount factor will be weighted average cost of capital which will include computation of its parameters. In order to calculate the cost of equity the Capital asset pricing model is used, whereby the equity risk premium will be estimated based on historical data from the S&P 500. Other parameters include risk free rate and estimation of beta. To estimate those parameters data from financial markets will be gathered.
In order to value flexibility of new drug development process the valuation using a binomial lattice with risk neutral probabilities will be applied.

1.2. Problem Statement

The main research question of this thesis: What is the fair market value of Pfizer, as of December 31th, 2009? In order to deliver a proper answer to the main research question the relative sub questions must be answered before. Those include the understanding of companies’ performance for the observable period of past five years, and forecasting of the possible companies performance for the next seven years. Also the weighted average cost of capital must be determined when conducting the discounted cash flow analysis. Furthermore the return on invested capital must be shown after the reformulation of the companies’ financial statement. As the fair market value is highly sensitive to small changes in different parameters used in calculations the sensitivity analysis must be performed in order to outline the possible impact of those changes. Besides the main research question the second research question needs to be answered. This question can be formulated as: should the new drug development project be undertaken or declined? To answer this questions the valuation of such project will be performed using a real option valuation method and the value will be compared with static net present value approach.

1.3. Brief introduction to Pfizer

Pfizer Inc. is the largest pharmaceutical company in the world. Its headquarters are located in New York, (USA). It stock is listed in 4 stock Exchange listings (New York Stock Exchange, London, Euronext, Swiss). It owns the cholesterol - lowering drug Lipitor, which brings in approximately quarter of its revenue and was the best-selling medicine in the world in 2009. Still the patent on Lipitor ends in 2012 (Pfizer K-10 filing, 2010) and thus a significant decrease in revenues is expected due to competition from generic manufacturers. As a largest player in the global market company can exploit the advantage in forms of economies of scope and scale which gives an advantage over competitors in forming alliances and in marketing activities. At the end of year 2009 companies’ portfolio of established products consisted of 600 items. Pfizer has also consistently paid the highest dividends to its shareholders in the industry. 90% of companies’ revenues come from biopharmaceutical business, but company has also

1.4. **Limitations:**

The gathering of data used in research will be limited to externally available information. The competitor analysis will include only the 4 mayor – large scale pharmaceutical peer companies. Further research of other industry rivals will not be carried out due to the page limit of these theses. Also real options valuation will be based on assumptions and industry specific empirical data due to externally undisclosed information of them to the general public.
2. Analysis of companies’ historical performance:

2.1. Accounting standards:

The consolidated financial statements include parent company and its subsidiaries. Also included are those operating outside the U.S. and are prepared in accordance with accounting principles generally accepted in the United States (U.S. GAAP).

As of January 1, 2009, Pfizer adopted a new accounting standard that retains the purchase method of accounting for acquisitions, but requires a number of changes to that method, including changes in the way assets and liabilities are recognized in purchase, accounting (Financial report 2010). Specifically, they require the capitalization of in-process research and development costs at fair value and require the expensing of transaction costs as incurred. Research and development (R&D) costs are expensed as incurred. These expenses include the costs of its proprietary R&D efforts, as well as costs incurred in connection with certain licensing arrangements (Pfizer financial report 2009).

2.2. Reformulation of financial statements:

The financial statements are highly influential by different factors, such as, choice of accounting principles, which make it quite difficult to precisely measure economic profitability Penman (2010). For this reason, the reformulation of raw financial statements is performed. The reformulation of financial statements has been done based on the methods described in “Valuation”, 5th edition by Koller, Goedhart and Wessels 2010.

2.2.1. Capitalized expenses:

Research and development expenses:

For Pfizer a pharmaceutical company with significant intangible assets, failure to recognize intangible assets can lead to significant underestimation of a companies invested capital and thus overestimate on return on invested capital (ROIC). For purpose of measuring company’s economic performance, any expense with benefits lasting more than a year should be treated as an investment, since it has created a
durable intangible asset: In this valuation Research and development (R&D) is a capitalized expense due to three reasons (Koller, 2010):

1) to represent historical investment more accurately;
2) to prevent manipulation of short-earnings;
2) to improve performance assessments of long-term investments.

The process performed to capitalize R&D is as follows: the year 2000 is set as a starting point for calculating R&D expenses as financial statements available to external public provide information on companies’ financial statements till this point of time. Harmonic mean is calculated to see the increase in R&D expenses for years 2000-2002 (the future years are not taken into account because R&D expenses increase due to acquisitions and mergers) this increase ratio is then used to calculate the appropriate R&D expenses to years 1994-1999. Additionally: Data in available for the thesis allows to count for additional depreciation— asset restructuring which represents the impact of changes in the estimated useful lives of assets involved in restructuring for years 2007-2009 and is related to R&D expenses. Also for years 2003-2009 acquisition-related in-process research and development charges are counted from Pfizer’s annual statement (due to activity in mergers and acquisitions in those years). Those two upper mentioned charges are deducted from annual R&D expenses to get an actual annual R&D expenses. A 10 year amortization schedule is used for R&D expense amortization, and amortization from first years R&D is deducted to receive ending accumulated R&D expenses. The table on capitalized R&D costs and calculated amortization can be seen in appendix I.

Leases, Pensions and other obligations:

In order to estimate the correct ROIC adjustments for operating leases has to be performed. It is clear that company that chooses to lease its assets will have artificially low operating profits and high capital productivity and it will lead to artificial boost in ROIC (Koller, 2010).

In this valuation in order to reflect operating leases appropriately, capitalization of leased assets on the balance sheet and corresponding adjustments to long term debt will be performed. As stated in note 16 of financial statement of Pfizer the lease payments
might require paying higher payments which may be directly related to increase on operating expenses.

As Pfizer does not disclose the value of leased assets in its financial statements the value of leased assets will be calculated using the following equitation:

\[
\text{Asset value } t-1 = \frac{\text{Rental expense}_t}{K_d^+ \cdot \text{Asset Life}} \quad [1]
\]

The information on operational lease expense (rental expense) is given on companies financial statements, asset life is assumed to be 10, 9 years based on a research (Lim, 2003) and the median observation of 7000 companies. For cost of debt, two interest rate sources are used. For year 2009 the cost of debt equals the rate stated for debentures, borrowings, and mortgages and as being less risky than the company’s unsecured cost of debt is assumed to be lower due to being secured by the underlying asset. For the rest of the observation years company’s financial statements do not provide such information and the rate for the cost of debt will be equal to Pfizer’s lowest AA rated bond yield trades closed at the beginning of the year related to each year’s match of the lease expense. The data on bond yields is obtained from “Trace” dataset, provided by Wharton research data services. The values of capitalized operating lease can be seen in appendix II.

2.3. **Calculation of invested capital:**

Invested capital is sum of operating working capital (operating current assets – operating current liabilities), Net property plant and equipment, capitalized operating leases and capitalized research and development expenses. (Koller, 2010) Additionally invested capital including goodwill as computed will show the invested capital plus acquired intangibles and goodwill less amortization and impairment. The invested capital for years 2004 -2009 can be seen in below table.
The huge difference between invested capital including and excluding goodwill arises from past mergers and acquisitions with Warner - Lambert (2000) Pharmacia (2003) Wyeth (2009). The main decrease in invested capital for years 2004-2008 was due to impairment of acquired goodwill and intangible assets. The significant increase in year 2009 was due to acquisition of Wyeth which led for huge increase in invested capital in forms of significant increase in goodwill intangibles and property plant and equipment. In 2009 invested capital totaled 190,699 million USD from which 110,000 million can be attributed to acquired intangibles and goodwill.

2.4. Net operating profit less adjusted taxes

In order to understand the Pfizer's after tax operating profit the company’s net operating profit less adjusted taxes must be computed. It excludes any income or gains generated from no operating activities, thus if compared to net income showed in companies annual financial reports which shows the profit available to equity holders NOPLAT will show the profit available to equity and debt providers or any other type of financing Koller (2010). For Pfizer the calculation of net operating profit less adjusted taxes (NOPLAT) was performed in a following way. Consolidated revenues from Pfizer's financial statements were used as starting point for computation of NOPLAT. The deductions were made for cost of merchandise sold, selling general and administrative expenses, depreciation, depreciation of capitalized research and development expenses and adjustments for other operating income (deductions). This lead to generation of earnings before interest taxes and amortization. As operating leases are capitalized the interest expense is added back to EBITA in order to eliminate the interest cost from
operating profit. This gives a result of adjusted EBITA. Further adjustments are made in form of operating cash taxes where marginal tax rate on operating activities is applied to adjusted EBITA to calculate the operating cash taxes from which increase in operating deferred taxes is subtracted. Afterword’s the reconciliation with net income is used to check for rightness of computed NOPLAT. For calculated NOPLAT and reconciliation with net earnings please see appendix III.

As can be seen in column chart the NOPLAT in year 2009 totaled 12.495 billion USD a decrease by 1.816 billion from previous year. The main cause for this decrease was due to increasing marginal tax rate on EBITA and change in operating taxes as well as increase in operating deferred taxes compared to previous year. (Financial report, 2010) The compounded annual growth rate for NOPLAT has been 6.02% for the last 5 years.

![NOPLAT (millions USD)](image)

Figure 2. Net operating profit less adjusted taxes of Pfizer for years 2005 - 2009 in millions USD. Source plotted by author.

### 2.5. Revenue growth:

The consolidated revenues of Pfizer have been fluctuating for the past 5 years. The cumulative annual growth rate for revenue growth has been small resulting in 0.4 %, for the years 2004 – 2009, while there has been increase in revenues of 1.7% for the last year. The main cause in revenue increase in past year is due to the acquisition of Wyeth (ended on October 15th) and following additions from sales of Wyeth’s products. The revenues from legacy Wyeth products counted for 3.3 billion of USD while the increase in revenue from Pfizer's products was 247 million of USD (Financial report, 2010). A significant growth was offset by unfavorable exchange rates to other world markets.
where Pfizer operates its business. The loss from foreign exchange translated into approximately 1.8 billion USD. The Revenue growth was unfavorably impacted by such biopharmaceutical products as Lipitor Norvasc and Chantix generally due to facing competition from generic drug manufacturers as well as competing products. In the meanwhile the mayor contributors to revenue growth were biopharmaceutical products Lyrica, Sutent, Lyrica had a 10% increase in sales resulting in revenue growth by 267 million USD. It is expected that due to acquisition of Wyeth revenues generated by its business units for full annual year in 2010 should impact the revenue growth by additional 13 billions USD. (In 2009 revenues have been impacted through the consolidated financial statement after the October 15th). Besides the recent merger and its impact on consolidated revenues Pfizer has not experienced mayor increase in revenues due to the luck of discovery of new blockbuster drugs which could boost the revenue growth. Also as majority of revenues are generated by Biopharmaceutical unit. The mature state of current best selling drugs has not and will not allow generating mayor growth in revenues. The revenue growth thus will be largely dependent on successful development of new drugs currently in the late stage of development in the product pipeline as well as commercial success of them. Additionally merger with Wyeth will allow boosting sales of combined entity in emerging markets (region with the highest expected growth in demand for pharmaceutical products).

Figure 3. Revenues of Pfizer Inc. for years 2004 - 2009 in millions. Source plotted by author.

2.6. Return on invested capital:

Return on invested capital (ROIC) measures the return companies earn on the net assets they invest in the business, independent of the capital structure employed. While an
extremely important measure, ROIC is often miscalculated and/or misused. (Bernstein, 2003). It is calculated by dividing net operating profit less adjusted taxes by invested capital (with and without acquired intangibles and goodwill). Alternatively it can also be calculated by multiplying earnings per divided by invested capital per unit by one minus tax rate (Koller, 2010). The value company creates for its capital providers is dependent on its ability to sustain high levels of ROIC which must be greater than its cost of capital.

As can be seen from the below graph the changes in return on invested capital have been similar for core operations of Pfizer and operations of its acquired businesses. Significant decline in year 2007 was caused by increase in operating liabilities to the government in form of income taxes payable. The significant decrease in ROIC for year 2009 was caused due to late acquisition of Wyeth. The Revenues from its acquired business operations in 2009 were generated only for two and a half month in the annual financial year of Pfizer, but the invested capital had immediate impact in form of increased property plant and equipment and operating working capital, as well as acquired intangibles and goodwill. As well it can be seen that there is huge difference between ROIC with and without goodwill and intangible assets. This clearly shows that great part of invested capital of Pfizer can be related to goodwill and intangible assets gained through acquisitions. The main driver of high ROIC levels for Pfizer is innovative products which if patent protected allow charging price premiums. A significant proportion of invested capital thus is devoted to research and development expenses and counts for approximately 30% of all invested capital including goodwill.

Figure 4. Return on invested capital including and excluding goodwill. Source plotted by author.
2.7. The Free Cash Flow:

The main investors for a company are usually its shareholders and creditors. Free cash flows belong to all investors; however, the total flow can be separated into two parts – those belonging to the creditors and those belonging to the shareholders (Saksonova, 2009). It is calculated by adding back depreciation expense and depreciation from research and development expenses to Net operating profit less adjusted taxes and subtracting net change in operating working capital, net change in capital expenditures. Additionally subtraction of investments in research and development is required (when reformulating financial statements regarding R&D expense they were capitalized and depreciated) because the yearly cash expenditures made were not previously counted and adjustment for tax on net change on capitalization of R&D. Additional deduction is made for investments in intangibles and goodwill.

![Free cash flow after goodwill (in millions)](image)

Figure 5. Free cash flow after goodwill of Pfizer Inc in millions USD. Source plotted by author.

As can be seen on the graph above Pfizer has been able to generate approximately 20 Billion USD to its debt and equity holders in its free cash flow for the years 2005 to 2008. Due to acquisition of Wyeth in 2009 the cash flow was negative and totaled 65,718 billions of dollars. The acquisition was paid in cash part by increase in long term debt (increase by 24, billions USD) use of retained earning funds and lowering of dividends payable, and by Pfizer’s stock (Financial report, 2010). The company issued bonds with face value of 13.5 billion, and acquired Wyeth’s long term debt obligations of 11 billion USD. Through the acquisition of Wyeth an amount of acquired intangibles assets and goodwill totaled 70 billion. Significant increase was also related to property plant and equipment previously been on Wyeth’s balance sheet and increase in net
operating working capital (due to acquired operations need for acquisition related). The decrease in free cash flow in year 2007 was mainly caused by increase in net working capital (significant changes in income taxes payable to year 2006). Although year 2009 had negative free cash flow in following years it can be expected that Pfizer will be able to generate over 20 billion USD to its debt and equity providers depending on how well its cost reduction program will impact the gross profit and how companies’ biopharmaceutical unit will be able to sustain or increase sales volumes.
3. **Estimating Weighted average cost of capital**

In valuating Pfizer the discounted cash flow will be used and it requires discounting the forecasts of free cash flow by the weighted average cost of capital (WACC). The WACC is used in finance for several applications, including Capital Budgeting analysis, EVA calculations, and firm valuation.

To estimate the WACC, the cost of equity, the after tax cost of debt and the companies target capital structures will be estimated. WACC simplest form can be seen in the below equitation:

\[
WACC = \frac{D}{V} K_d (1 - T_m) + \frac{E}{V} K_e
\]

Where the following abbreviations are stated as

- \(D/V\) = Companies target level of debt to enterprise value using market based (not book) values
- \(E/V\) = Target level of equity to enterprise value using market-based values
- \(K_d\) = Cost of debt
- \(K_e\) = Cost of equity
- \(T_m\) = Companies marginal income tax rate

The computation of weighted average cost of capital will be performed after determining the cost of equity, after tax cost of debt and the target mix between two securities.

3.1. **Estimating the cost of equity:**

In this thesis the CAPM model will be used in order to estimate the cost of equity. Capital asset pricing model (CAPM) is a significant accomplishment in finance. Through this model, risk and reward for bearing it are widely quantified. Its key idea is that the expected excess return of an asset is proportional to the expected covariance of the excess return of this asset with the excess return of the market portfolio. In other words, the difference in risk premium across assets largely depends on the difference
between riskiness of the returns on the assets. This explains why investors trade off return and risk (Roodposhti, 2010).

\[ E(R_i) = r_f + \beta_i [E(R_m) - r_f] \]  

\[ E(R_i) = \text{Expected return on Pfizer’s stock} \]
\[ r_f = \text{Risk free rate} \]
\[ \beta_i = \text{Stocks sensitivity to market} \]
\[ E(R_m) = \text{Expected return on market} \]

In following the risk free rate, beta and market risk premium must be calculated and obtained to estimate the cost of equity.

3.2. **Estimation of risk free rate:**

To estimate the risk free rate, government default free bonds must be used. In this paper the cash flow which will be discounted to value the Pfizer must be discounted by 10 year zero coupon bonds yield at valuation date. (Damodaran, 2008) Such bonds are also called STRIPS (separate trading of registered interest and principal securities). 10 year government STRIPS are more preferable than longer ones due to the higher liquidity: prices and yield premiums may not reflect their current value. Data obtained from European central bank states that yield on 10 year U.S. government zero coupon bonds was 4.1676 percent at the end of year 2009 (Reuters, 2010). This Yield will be used as risk free rate in valuation.

3.3. **Estimation of beta:**

Beta assesses the impact of movements in the market on the security of Pfizer Inc. To estimate how much the stock and entire market move together the beta is estimated to measure sensitivity by how stocks expected return is driven according to the CAPM. In order to do this a raw beta will be measured by regression and then using smoothing techniques will be smoothed. What they share in common is the observation that beta-coefficients are far from being stable. Despite the general consensus that the beta – coefficients are far from being stable, still the most widely adopted approach for
estimating beta is the ordinary least-squares regression. In its simplest form it is often based on the following model framework, known as the market (Eisenbeiss, 2007):

The market model is used to estimate beta:

$$R_i = \alpha + \beta R_m + \epsilon$$

[4]

The Pfizer Stock (ticker symbol PFE) return is regressed against the market return. The market return is obtained from S&P 500 indexes return for the appropriate period. The data for both the Pfizer’s Stock return (including dividends) and return on S&P 500 is obtained from “CRSP” dataset provided by Wharton research data services. The period used for data observations is 31.12.2004 - 31.12.2009, based on research by Alexander and Chervany (Estimation and stability of Beta, 1980) which suggests using 5 years as optimal period for measurement with monthly data. Monthly returns are used in order to lower systematic biases which could appear if more frequent return periods are used. The total of 60 data points will be used in regression Black (1972). The returns are regressed against value weighted well diversified portfolio S&P 500 which is best suggestion for U.S. listed blue chip companies as Pfizer is (Koller, 2010), as a proxy, because the market portfolio equals the value weighted portfolio of all assets, both traded and untraded (such as private companies and human capital) and is unobservable. The output of regression results can be seen in Appendix V.

The Output of the regression shows a raw Beta to be 0.75. Other outputs of the statistics performed shows that 28% of the variance of Pfizer is related to market risk and the rest - 72% are related to firm specific (idiosyncratic risk). Beta has a p value of approximately 0 meaning it is highly statistically significant. To dampen extreme observations towards the market overall average the smoothing technique of Marchal Blume is used. It suggests that betas revert to the mean. A simple smoothing process will be used.

Adjusted Beta = 0.33+ 0.67(Raw Beta)

This leads to adjusted beta result of 0.83.

In order to improve the precision of beta and check for validity of upper computed Pfizer’s beta the unlevered industry beta will be adjusted for cash and leverage. The
unlevered beta for drug industry is obtained from Stern University’s database. It includes 301 companies from Drug industry and observations result in unlevered beta for industry to be equal 0.98. The process for obtaining unlevered industry beta is as follows. The stock returns of 301 company where regressed against S&P 500 index. Second, each company’s market debt to equity ratio was calculated and by applying the lower shown equitation the unlevered betas for each company where calculated. Third the median of the unlevered betas was calculated to determine the industry unlevered beta (Damodaran, 2010).

\[ \beta_e = \beta_u \left( 1 + \frac{D}{E} \right) \]  

\[ \beta_e = \text{Beta equity} \]  
\[ \beta_u = \text{Beta unlevered (operating beta)} \]  
\[ D = \text{market value of debt} \]  
\[ E = \text{Equity value} \]

Market value of debt is defined as sum of both short term and long term debt (but not accounts payable or non-interest bearing liabilities), and the book value of debt is used as a proxy for market value of debt if the information on relevant parts could not be obtained. (Koller, 2010)

First unlevered beta should be corrected for cash because it reflects both its operating assets and the cash holdings of the firm. Since the latter should have a beta closer to zero, the beta of just the operating assets is estimated by using two numbers - the unlevered beta and the cash as a percent of overall firm value (in market terms). (Damodaran, 2008)

Unlevered Beta adjusted for cash = Unlevered Beta/ (1 - Cash/ Firm Value).  

Cash equals cash and marketable securities. Additionally short term investments are also added to total cash. Cash available and cash equivalents at the end of the fiscal year 2009 were 1,978 million USD. Additionally short term investments counted for 23,991 million USD which equals of total cash holdings of 25,969 million USD for Pfizer. Data obtained from Compustat showed market capitalization of Pfizer to be equal 146.7933 billion USD at end of year 2009. Inputting the data obtained the unlevered beta adjusted for cash can be calculated which due to the small proportion of cash compared to
market capitalization of the company leads to very small changes in unlevered beta after cash adjustments (beta stays approximately the same at 0.98).

Now in order to estimate equity beta for Pfizer the unlevered beta should be multiplied by leverage factor. Short term debt of Pfizer equals 5,469 million USD while long term debt outstanding is 43,193 million USD. Summing up the total debt outstanding at the end of fiscal year 2009 is equal to 48,662 million USD. Using the input data in order to perform the calculations the equity beta equals 1.304.

Summing up the results gained from adjusting unlevered Industry beta, equity beta of Pfizer obtained by regressing from only Pfizer’s stock, and adjusted version of this beta obtained the appropriate beta must be derived. As Pfizer is the world’s largest drug company and fact that its portfolio of drugs is diversified much better than its competitors must result in lower beta than industry average and leads to elimination of industry beta calculated in further discussion. The increase in long term debt in 2009 by 35 billion USD still requires some adjustments to equity beta obtained using the regression and dampening of extreme observations towards overall average is necessary. Due to upper mentioned factors the final estimated Pfizer’s beta will be equally adjusted beta and is 0.83.

3.4. Obtaining the Market risk premium:

Deriving the exact market risk premium (which is the difference between markets expected return and the risk free rate) is one of the most debated issues in finance. There is no single model for estimating the precise market risk premium. In this thesis the method suggested by (Koller, 2010) will be by measuring and extrapolating historical returns.

The S&P 500 index is used as a proxy again to determine total market return annual averages, for the period of 50 years. The historical market returns will be compared with the return on 10 year government bonds Koller (2010). The same source also states that compounding the historical arithmetic average leads to a biased discount factor, because the arithmetic average is measured with error, and there is a high probability that stock market returns are negatively correlated over time. In order to correct those factors J. Ritter in his article “The Biggest Mistakes We Teach” published by Journal of Financial Research (2002) suggested calculating multiyear returns directly from the data. Using this method a cash flow received in 10 years is discounted by the average 10 year
market risk premium instead of annual market risk premiums compounded 10 times. Using those suggestions the market risk premium used in valuating Pfizer equals 5.4 %.

Plugging all the parameters previously computed into the capital asset pricing model the obtained result for cost of equity equals 8,65%.

3.5. **Estimation of after tax cost of debt**

In order to estimate companies cost of debt the yield to maturity of the companies’ long term option free bonds will be used. The “Trace” dataset (From Wharton Research data services) will be used to obtain data on Pfizer’s debt and its yield. Additionally yield to maturity is only proxy for expected return, because the yield is actually a promised rate of return on a company’s debt (it assumes all coupon payments are made on time and the debt is paid in full) (Koller, 2010). An enterprise valuation based on the yield to maturity is therefore theoretically inconsistent, as expected free cash flows should be discounted by an expected return not a promised yield. Fortunately for companies (as Pfizer in this case) with investment grade debt, the probability of default is low and inconsistency is immaterial, especially when compared with the estimation error surrounding beta and the market risk premium. If estimating the cost of debt for a company with investment grade debt which is BBB or better, yield to maturity is a suitable proxy (Koller, 2010). In this thesis it will be used as proxy. Information from upper mentioned dataset includes the trades with Pfizer’s debt securities at the end of the year with yield outstanding. The yield on debt outstanding for the Pfizer’s bonds of 10 year maturity traded at the end of 2009 was 6.27 %. To Estimate the cost of debt we additionally have to multiply the obtained cost of debt by 1 – the marginal tax rate to determine the cost of debt on an after-tax basis. Marginal tax rate is equal to Statutory corporate tax rate in U.S. plus deviation in foreign subsidiaries tax rates compared to U.S. rate (net) for Pfizer in 2009 reported marginal tax rate equal to 20.3% . Plugging in the numbers leads to after tax cost of debt to be equal 5.001849 percent.’s.

3.6. **Estimating the Capital Structure.**

As the cost of equity and the after tax cost of debt have been estimated, the weighted average cost of capital can be calculated. The market not book value should be used to determine the target weights of debt and equity to enterprise value, as weighted average cost of capital represents the expected return on an alternative investment with identical
risk (Rauh, 2010). It is mainly because in order to return capital without changing the capital structure, management can repay debt and repurchase shares, but must do it at their market value. As stated at Pfizer’s annual financial statement all companies’ financial liabilities are measured at fair value on recurring basis using quoted prices for similar instruments in active markets or quoted prices for identical or similar instruments in markets that are not active or are directly or indirectly observable, the value of financial liabilities in its financial reports thus is equal to fair value as of December 31. Fair value of long term debt is obtained from TRACE database as of December 31, 2009. The book value of long term debt disclosed in companies’ financial statements was 43,193 million USD at the end of fiscal year 2009 and is a mix of debt with different maturities. The fair value stated in companies financial statements and after recalculation leads to valuation of current market value of debt to be equal 40.62 billion USD (a difference in approximately 3 billion USD from its par value). Still it’s worth noticing that after the acquisition of Wyeth the capital structure of Pfizer changed significantly (part of the acquisition was financed by issue of long term debt obligations and long term borrowings as well as addition of legacy Wyeth’s debt to merged entity’s balance sheet) (financial statement, 2010). This change in capital structure had a negative impact on the credit rating of long term debt outstanding. The mayor credit rating agencies (Moody’s and S&P) downgraded the company’s credit rating based on increase in financial leverage which impacted rise in cost of business erosion and cost of investor conflicts (besides increase in leverage companies’ ability to generate long term earnings and sustainable cash flow was under consideration due to pending patent expiration of companies flagship products).

To understand the company’s capital structure and measure financial leverage the debt to enterprise value ratio will be used and calculated for years 2004 – 2009. The enterprise value represents market value of Pfizer’s stock multiplied by number of shares outstanding at the end of fiscal year subtracted by cash and cash equivalents and addition to enterprise value of hybrid claims and debt and debt equivalents to enterprise value. The debt of Pfizer includes long and short term debt (bank loans as well as bonds issued) the market values for long term debt where used if it was possible (otherwise the dependency on book value of long term debt outstanding remained). When computing total debt of Pfizer Debt equivalents in forms of Capitalized operating leases, pension
benefit obligations, postretirement benefit obligations where also added to total amount of debt outstanding.

<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt to Enterprise value</td>
<td>0.13</td>
<td>0.14</td>
<td>0.11</td>
<td>0.14</td>
<td>0.21</td>
<td>0.34</td>
</tr>
</tbody>
</table>

Figure 6. Debt to enterprise ratio of Pfizer Inc. years 2004 - 2009. Source own plotted.

As can be seen from upper table the debt to enterprise value ratio increased significantly in year 2009. The increase in year 2008, was mainly caused by global downturn in capital markets which significantly reduced the share price of Pfizer reducing the enterprise value. The other cause for this impact was acquisition of legacy Wyeth. Still as stated in companies financial statement the leverage level is projected to decrease in next years. For companies with high returns, lower growth and business risk and the more fungible its assets and capabilities the more highly leveraged the company should be. (Koller, 2010) The companies can thus benefit from tax savings. Also the expected cost of business erosion for such company as Pfizer is low because companies assets and capabilities have different uses and would be valuable to new owners in case of distress situation which would lead to bankruptcy of the company. Still uncertainty on companies’ ability to sustain the revenue levels due to expiration of patent rights on its mayor products are not in favor to high leverage ratio. This lowers the companies’ credibility and puts additional pressure on its ability to repay the outstanding debt obligations.

3.7. Computing Weighted Average Cost of Capital and performing sensitivity analysis.

Combining all the information and results from computation of cost of debt, market values of equity and debt outstanding as well as enterprise value and marginal tax rate allows to compute the weighted average cost of capital of Pfizer. Plugging in the numbers obtained in equitation below leads to a weighted average cost of capital to be equal 8,5%.

In order to see how WACC changes by change in cost of debt and by changes of beta the sensitivity analysis will be performed. This analysis will allow seeing the possible
outcomes in situation when company’s earnings decrease leading to higher beta and higher cost of debt. (Such situation is highly possible due to the fact that mayor expiration on patent rights is planned in next years). Also due to financial crisis and weak economic situation globally the interest rates have been at historically low rates. This situation should change in the next years following the improvement in global economic situation. Due to this obstacle sensitivity analysis will show the possible outcomes for WACC.

<table>
<thead>
<tr>
<th>Cost of debt/ Beta</th>
<th>0.83</th>
<th>0.9</th>
<th>1</th>
<th>1.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,28%</td>
<td>8.50%</td>
<td>8.80%</td>
<td>9.22%</td>
<td>9.64%</td>
</tr>
<tr>
<td>7%</td>
<td>8.70%</td>
<td>9.00%</td>
<td>9.42%</td>
<td>9.84%</td>
</tr>
<tr>
<td>8%</td>
<td>8.97%</td>
<td>9.27%</td>
<td>9.69%</td>
<td>10.12%</td>
</tr>
<tr>
<td>9%</td>
<td>9.25%</td>
<td>9.54%</td>
<td>9.97%</td>
<td>10.39%</td>
</tr>
</tbody>
</table>

Figure 7. Changing weighted average cost of capital rate due to change in cost of debt and in beta. Source own plotted. (The underlined numbers are the current calculated WACC)

As can be seen in sensitivity analysis performed the change in beta plays the most significant role in sensitivity of WACC. This is reasonable because Pfizer's capital structure is based more on equity financing than on debt.
4. Strategic business analysis

4.1. External analysis

Political Legal Economical Environmental Social Technological analysis (PESTEL) is part of companies’ external analysis and is performed as part of companies’ strategic analysis. It assists in understanding the companies’ external factors at macro level which influence the development of the company.

4.1.1. Political and legal factors:

In general those factors refer to government policy such as degree of intervention in the economy. In healthcare system and pharmaceutical industry the political factors are of high importance. As Pfizer is international company a world’s leader globally in its industry political factors must be overlooked globally and domestically. Many countries have government sponsored healthcare systems, and political factors influence government expenditures in healthcare as well as determine the quality standards for products which affect the company’s profitability. The United States pharmaceutical industry operates differently than many other national industries. Consumers and patients do not pay for their drugs directly, but receive them through government run healthcare systems. Regarding the U.S. market the change in healthcare industry will extend services and insurance coverage to a larger part of the population (Financial report, 2010). The changes in healthcare industry are expected to take place in 2011. This will increase total sales amounts in pharmaceutical industry from operations in U.S., but would make large sales volumes dependent on government purchases. Another factor which will influence the industry in future years is upcoming annual fee on pharmaceutical manufacturers and importers which is based on their relative market share and impacts Pfizer directly and indirectly. This will also potentially affect research and development through the availability of new grants and tax credits available for U.S. based pharmaceutical companies (Morganlewis, 2010). Legislative changes have also been proposed that would allow the U.S. government to directly negotiate prices with pharmaceutical manufacturers on behalf of Medicare beneficiaries, which expectedly will restrict access to and reimbursement of Pfizer’s products. The income tax rate for U.S. companies has been 35% and is planned to stay at the same level (KPMG international, 2010). There have also been a number of legislative
proposals seeking to allow importation of medicines into the U.S. from countries whose governments control the price of medicines, despite the increased risk of counterfeit products entering the supply chain (Financial report, 2010). If importation of medicines is allowed, an increase in cross-border trade in medicine is subject to foreign price controls in other countries could occur and negatively impact Pfizer’s revenues. Also, healthcare reform in the U.S., if enacted, could increase pricing and access restrictions on Pfizer’s products and could have a significant impact on its business.

Pfizer also encounters similar legislative issues. During the second quarter of 2009, the Pharmaceutical Research and Manufacturers of America (Phrma), of which company is a member, announced an $80 billion commitment over the next decade to support healthcare reform in the U.S. Among other things, that commitment includes cost reduction of medicines for seniors and disabled Americans who are affected by the coverage gap in the Medicare prescription drug program. (Phrma web page, 2010)

4.1.2. Economic factors:

There are several economic factors that influence Pfizer, which include Economic growth, Interest rates & monetary policy, Government spending, Unemployment policy, Taxation, Exchange rates, Inflation rates, Stage of the business cycle, Consumer confidence.

As Pfizer is the world leader in pharmaceutical industry and 57 % of companies revenues account for global sales outside the U.S. the company’s performance and revenues are dependent on situation nationally in U.S. as well as globally (Financial report, 2009). The global economic downturn in year 2009 which was followed by economic weakness in global capital markets, world’s economy globally resulted in lower consumer spending. This downturn could have led to rising liquidity problems for Pfizer, but due to companies’ good operating assets, financial assets and still good accessibility to capital markets in form of credit lines and revolving credit Agreements Company is able to meet the liquidity needs. However companies business has been affected by bad economic situation as well as those of competitors and leads to global lower revenues and income from large companies. Companies Biopharmaceutical business line was experiencing global economic downturn mainly in its U.S. market. In
general consumers in order to reduce their spending when economy faces high
unemployment levels and salary cuts, prefer generics due lower price. Also
patients/consumers are forced to delay treatment and skip dosage requirements or just
using less effective treatments in order to reduce their spending. The economic decline
has increased the number of people in Medicaid program in which in several U.S. states
there are restrictions to high value added brand name drugs. According to IMF World
economies outlook, all advanced economies had a negative average GDP growth in
2009, which was equal to -3.2 %. The projections for years 2010 till 2011 are stated to
be 2.7% and 2.2% respectively. Regarding the whole pharmaceutical industry it has less
systematic market risk to economic situation because medical products are still
necessary, but as the main portfolio of Pfizer does not consist of generic products it
experiences impact on its sales volumes especially in emerging – developing markets.
As the projections for Global GDP growth in future years are stable this must result in
stronger revenues for Pfizer (not counting business risk), (World Bank report, 2010).
Unemployment rate in general also has impact on industry revenues especially in patent
protected, branded drug sales and the impact has been previously described above. It
also significantly impacts consumer confidence and increase in unemployment
significantly impacts their choice and spending. The empirical data and future
projections are listed in table below (International Monetary Fund, 2010)

<table>
<thead>
<tr>
<th>GDP Growth</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>World output</td>
<td>3</td>
<td>-0,6</td>
<td>4,2</td>
<td>4,3</td>
</tr>
<tr>
<td>Advanced Economies</td>
<td>0,5</td>
<td>-3,2</td>
<td>2,3</td>
<td>2,4</td>
</tr>
<tr>
<td>United States</td>
<td>0,4</td>
<td>-2,4</td>
<td>3,1</td>
<td>2,6</td>
</tr>
<tr>
<td>Japan</td>
<td>-1,2</td>
<td>-5,2</td>
<td>1,9</td>
<td>2</td>
</tr>
<tr>
<td>Emerging and Developing Economies</td>
<td>6,1</td>
<td>2,4</td>
<td>6,3</td>
<td>6,5</td>
</tr>
<tr>
<td>European Union</td>
<td>0,9</td>
<td>-4,1</td>
<td>1</td>
<td>1,8</td>
</tr>
</tbody>
</table>

Figure 9. GDP growth rate by countries and regions: historical (years 2008 -2009) and future (2010 -

<table>
<thead>
<tr>
<th>Unemployment rate</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Economies</td>
<td>5,8</td>
<td>8</td>
<td>8,4</td>
<td>8</td>
</tr>
<tr>
<td>Japan</td>
<td>4</td>
<td>5,1</td>
<td>5,1</td>
<td>4,9</td>
</tr>
<tr>
<td>Euro Area</td>
<td>7,6</td>
<td>9,4</td>
<td>10,5</td>
<td>10,5</td>
</tr>
<tr>
<td>United States</td>
<td>5,8</td>
<td>9,3</td>
<td>9,4</td>
<td>8,3</td>
</tr>
</tbody>
</table>

Figure 10. Unemployment rate by countries and regions: historical for period 2008 - 2009; and
The second largest market for Pfizer by Revenues is Japan with 9% of total Sales. The sales of Pfizer can be seen by region in the below table (Financial report, 2010)

![Sales by Region](image)

Figure 11. Sales of Pfizer Inc by regions. Source: Own plotted.

As nearly 57% of all Sales are generated outside domestic market, the change in foreign exchange rates (currency fluctuations) have significant impact on companies business and impact reported dollar value and results of operations. In 2009 due to the strong U.S. dollar position in FX markets relative to other worlds currencies decreased companies’ revenues and net income in many countries. As it’s hard to predict future exchange rates and thus future impact on company’s performance and revenues it can be stated that company uses financial instruments (Foreign currency forward exchange contracts, foreign currency Swaps) to lower the possible decrease in income from other countries. The prolonged financial crisis in EU, caused by sovereign debt crisis in Portugal, Spain, Ireland and Greece, followed by bailout of Greece and Ireland leads to instability in this region. This might lead to lower the EUR/USD exchanges rate and weak EUR currency while the economic situation in E.U. stays at the same level. Also companies’ loans, borrowings, interest rate risks, are subject to risk from changes in interest rates and foreign exchange rates. According to world economic outlook by international monetary fund the table below has been prepared.

<table>
<thead>
<tr>
<th>Economies:</th>
<th>Projections:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2007</td>
</tr>
<tr>
<td>Advanced</td>
<td>2.1</td>
</tr>
<tr>
<td>Emerging</td>
<td>6.4</td>
</tr>
</tbody>
</table>

Advanced economies: Europe, Japan, and North America;

Figure 12. Historical (2007 – 2009) and future inflation rates by advanced and emerging country segments. Source: international monetary fund.
Inflation also influences the operating business of Pfizer. The projections of inflation state it to be at low level, potentially high inflation rates could lead to an increase in the sales prices, cost of goods sold and wages. The inflation from 2007 – 2009 and projected inflation for 2010, 2011 and 2015 in the advanced- and emerging markets is shown in figure 12: From the table above, it appears that the mean inflation rate for the advanced countries is 2.2 and for emerging countries 5.9 and the expected future mean inflation rate is 1.9 and 4.5 respectively. Since Major markets of Pfizer are well developed economies, the stable inflation expectations after slump from average mean in previous period in 2009, will lead for stable increase in costs and other operational business expenses.

4.1.3. Social Factors:

Several social factors have influence on pharmaceutical industry and thus Pfizer. Factors which should be seen are, population growth, age proliferation, social mobility, employment patterns, attitudes to work, press public opinion, attitudes and taboos, lifestyle choices and likely Socio-Cultural choices. In general trends in social aspects lead to an effect of changes in demand on company’s products and impacts companies’ operational results. The population growth rate is important factor for Pfizer showing changes in number of potential customers and scale of market in future. The growth rate of world’s population has been decreasing from 1960 to 2010 and is expected to decrease further until the year 2050. In the U.S, the largest market for Pfizer by sales, the population growth is 0.9% and is assumed to stay close to this level in the next 5 years. The total world’s population will meet the barrier of 9 billion by year 2050, but what is more importantly the population being older by 65 by year 2030 will reach the number of 1 billion (International monetary fund, 2010). Also globally such factors as eating habits, increased automation, changing lifestyle (due to economic growth) will continue to cause chronic diseases. Obesity also is one of the factors which has a direct impact on sales of pharmaceutical drugs because it highly impacts the healthiness of population and causes chronic diseases such as cardiovascular diseases, diabetes cancer and serious other diseases. This problem has developed also in emerging and developing countries and furthermore will not only be an issue of developed countries. All the upper mentioned factors will enlarge the market and result in higher revenues for
mayor pharmaceutical players and industry in general; only lower growth rate of world’s population will impact future growth of companies’ sales.

4.1.4. Technological factors:

Company spends large part of its earnings on investments in Research and Development. The expenditures were 7.8 for year 2009; 7.9 for year 2008; 8.09 for year 2007, (Financial report, 2009). The revenue to R&D ratio has been fluctuating between 15-17% in the past recent years, and is one of the highest in industry, leading to significant technological advances. High research and development expenses will lead to development of patent protected products in future allowing sustaining the revenue level. The goal of the company clearly states that it needs to develop highly innovative products and bring them to market and they must address mayor unmet medical needs. (Financial report, 2009). The research is done internally as well in collaborations with other pharmaceutical companies, biotechnology companies and universities. Generally technological developments in form of new drug development are most important factors which determine future market shares and revenues of industry players.

As stated in companies 10K filling it had 500 projects in development, the projects which company believes have a high possibility of being approved and they are stated as projects from Phase 1 to registration count for 133. That includes 30 compounds for various oncology indications, 10 for Alzheimer’s disease eight compounds for pain, 11 compounds for inflammation six vaccines, 27 biologics. Drugs being at latest stage of being approved count for 34 programs (phase 3). All these candidates are foundation for companies’ new products.

4.1.5. Environmental issues.

Environmental issues are of mayor importance for Pfizer, most importantly the companies’ policy and procedures performed regarding environmental issues can increase or decrease companies value for its current or potential employees, customers and investors. Thus environmental issues impact the whole companies’ profitability and value and lead all mayor industry players to development of environmental policies. Regarding Pfizer and its environmental policy, it has developed three areas of strategic focus climate change mitigation, product stewardship, and access to clean water (protecting the environment, 2010).
If instead pharmaceutical companies do not create and invest in certain environmental policy this would lead to believes in society that company could pollute the environment and inefficiently exploiting resources and thus destroy companies’ image. According to the Worlds health organization, extreme weather flooding and changes in affections disease are patterns that will affect world’s economic outlook in most concerning emerging market countries. As global responsibility towards society demands companies, governments and public to take active part in reducing the climate change Pfizer in 1996 developed a standard regulating greenhouse emissions. As stated in companies’ web page its goal states to reduce greenhouse gas emissions emitted during research, manufacturing, transport and sales, in first and second generation goals. This effort has been recognized domestically and globally.

4.2. The porters five force analysis:

A competitive pressure is any external influence on an organization that acts to limit the profits it can earn. In performing valuation of Pfizer five kinds of competitive pressure must be taken into consideration that may be exerted on organizations ability to earn profits. Those five sources of competitive pressure were identified and analyzed in the 1970s by Michael Porter.

![Five Kinds of competitive Forces That Exert Competitive Pressure: competitive strategy (1979)](image)

The industry environment of an organization includes both competitive pressures and opportunities for cooperation within industry that must be carefully evaluated in designing an organizations concept. First five kinds of competitive pressure that can reduce the profits of the firm in an industry will be considered
4.2.1. Bargaining Power of Buyers:

Buyers of Pfizer’s products can be defined as wholesalers, retailers, hospitals, clinics, government agencies and pharmacies. Largest wholesale distributor accounts for 17% of all companies revenues and top three of all wholesalers count for approximately 38% of all revenues. This means that largest wholesalers have a significant buyer power when purchasing production of Pfizer due to companies’ revenue dependency on them. Apart from three largest wholesalers none of the business segments is dependent on anyone customer or group. Also the healthcare reform in U.S. will impact the industry: the larger amounts of drugs legislative changes have been proposed that would allow the U.S. government to directly negotiate prices with pharmaceutical manufacturers on behalf of Medicare beneficiaries, which expectedly will restrict access to and reimbursement of Pfizer’s products. However in general most of Pfizer’s drug portfolio contains patent protected drugs, which have unique characteristics and patient must rely on them. This on the other hand gives a very low buyer power for end customers and wholesale business in case of unique drugs for which the market demand is high.

4.2.2. Bargaining Power of Suppliers:

As Pfizer is the world’s largest pharmaceutical company and has the highest purchasing volumes in industry it gives advantage when bargaining with suppliers. Still regarding the purchase prices of raw materials and specifically selected agricultural-based materials fully depend on market conditions and short term imbalances between supply and demand.

As largest pharmaceutical companies in general depend on commodity supplies which are mainly based on global market prices, the volumes of purchasing amount are high. Pfizer still has an advantage when negotiating with suppliers, but if a vertical cooperation is started for large proportion of companies’ total purchases the supplier power increases in favor of suppliers.

4.2.3. Substitute products:

Currently Pfizer phases some but not major threat of substitute products. Its main product line is based on patent protected drugs which delivers and protects it unique characteristics. Still in emerging markets and in developing economies legislative
matters and import policies create threat of using substitute products in form of generics which lower the sales volumes and create unequal competition. In recent years countries have developed and will develop stronger policies and legal matters which protect the rights of patent owing companies in those markets. As patent protected drugs in most cases have unique characteristics the threat of substitute products is of low scale. The problem Pfizer will face is expiration of mayor patent rights on its bestselling products in next 2-3 years. This will immediately impact the outstanding competition from generic drug producers. Thus threat of substitute products (even considering that for pharmaceutical industry in general and more specifically for company which mainly generates its revenues from patent protected and newly developed drugs the threat of substitute products is low) is considered as high and could significantly impact future revenues of the company when facing the direct competition from large scale producers of low cost medicine which gives them advantage in forms of economies of scope and scale. Even now patent protected drugs face competition from generic production. For example Lipitor started to face the competition from generics Ravastain (Pravachol) and Simvastain (Zocor) already in 2006.

4.2.4. Existing industry rivalry:

The markets in which the company conducts its business and the pharmaceutical industry are highly competitive and highly regulated. The Company’s operations may be affected by technological advances of competitors, industry consolidation, patents granted to competitors, competitive combination products, new products of competitors, new information from clinical trials of marketed products or post-marketing surveillance and generic competition as the Company’s products mature. Additionally current patent positions are significantly challenged by industry competitors. If the company faces an adverse result in a patent dispute this could lead to impairment charges attributed to certain products and following price reductions and product displacements (Sanchez, 2004). The mayor factors of competition in pharmaceutical industry are rigorous search for technological innovations, and ability to market them in effective manner. Regarding the ability to market them effectively Pfizer actively uses external sources creating licenses and joint ventures. However introduction by new products and processes results in lower revenues, and typically in industry number of
compounds for particular treatment of disease even if protected by patents face competition from similar products after some time of introduction of new medicines. Pfizer’s direct competitors consist of global research based drug companies, smaller research companies which have more limited therapeutic focus as well as manufacturers of generic drugs and healthcare products. Additionally existing industry rivalry in three main market segments animal health, consumer healthcare and nutrition should be overlooked separately.

Animal Health: as Pfizer’s unit is the largest in the world the main method of rivalry depends on the particular products (competitors are unable to compete in terms of economies of scale and scope), the methods of competition depend on product innovation, quality, service and effective promotion. To veterinary professionals and consumers

Consumer healthcare products: mayor competitors are over the counter business units of industry rivals and retailers who carry their own private label brands. Internal rivalry mainly depends on such factors as resource availability in order to properly deploy development and promotion of products (this also includes technological advantage), the effectiveness of marketing activities, quality of new products and growth of lower cost private label brands. Pfizer has advantage over competitors in resource availability in technological field, but still faces strong competition if any of industry rivals discovers new drug technologies.

Nutrition unit: mainly the same competitors and competition factors as in consumer healthcare products except over the counter business units.

4.2.5. Threat of new entrants:

As pharmaceutical industry has few large scale industry players which dominate the market threat of new entrants is relatively low, and is more dependent on possible strategic alliances and mergers between the companies. The Pfizer’s merger with Wyeth in 2009 allowed creating a broader and more diverse portfolio and pipeline and strengthened companies’ position in technological advances as well as existing and possible position in new markets. This strengthened companies’ positions in market, but similar mergers could be expected by competitors. Other threat is small scale companies which could develop unique drugs and through mergers could grow their market share in specific market segments. Still due to unbelievably high resources needed in for of
technological development (the main success driver in drug industry) the threat of new entrants is low, and small successful new technology companies are usually acquired by large scale industry players as Pfizer who have better position with buyers and suppliers and could more effectively use its channels and resources to produce market and distribute the new drugs.

4.3. **Current product portfolio:**

The two main business segments Pfizer operates in are Biopharmaceuticals and Diversified.

4.3.1. **Biopharmaceuticals:**

The majority of companies’ revenues (91% of total revenues) come from biopharmaceutical products (Financial report, 2009). Nine products generated more than 1 billion USD in revenues in 2009. The business segments related to Biopharmaceuticals are: Primary care, Specialty Care, Established Products, Emerging markets and oncology established products that prevent and treat cardiovascular and metabolic diseases, central and nervous system disorders, arthritis, and pain, infectious and respiratory diseases, urogenital conditions, cancer, eye diseases, and endocrine disorder.

In total 9 leading products count for 56% of companies’ biopharmaceutical revenues, and thus is considered the mayor underlying of companies business. The main drivers in increase in revenues were revenues generated from acquisition of Wyeth operations (approximately 2.5 billion), and solid operational profits from legacy Pfizer’s products such as Lyrica, Sutent, Revatio. The solid performance in revenue generation was from products like Lyrica, Viagra, Revatio, Xalatan, Sutent. The loss of patent rights lowered the sales of Camtosar and Zyrtec. In international markets acquisition of Wyeth has added 4 % growth in revenues, and main product sales of Pfizer products increased by 3 % but were affected by unfavorable changes in exchange rates.
4.3.2. Diversified products:

Animal healthcare:

Regarding Pfizer’s animal healthcare unit (also one of the largest in the world). As well as in biopharmaceutical business segment revenues were impacted negatively by foreign exchange. Still this Pfizer’s business had flat revenues compared to 2008, and addition of Wyeth increased the revenues by 3%.

Consumer healthcare products:

Over the counter health care products, such as pain therapies cold/cough/allergy, remedies, dietary supplements, hemorrhoid care, and personal care items. Consumer Healthcare is the fifth largest over the counter health care company globally. This unit was a legacy Wyeth business and was acquired in merger with Wyeth. The unit’s mayor market is U.S. The portfolio includes 2 out of 10 largest selling over the counter brands in the world.

Nutrition Products:

The unit was added in acquisition of Wyeth. The business segment is a global leader in infant nutritionals. The main markets are Asia, Europe, Latin America and Middle East. It is expected that sales of this business unit will grow significantly in next year due to the synergies created in merger with Wyeth. The main drivers for growth in sales will come from potential growth in new and existing markets, through distribution channels owned by Pfizer, as well as leveraging of strength of combined company in development of new products.

The Boston Consulting Groups matrix model is used to describe the current market position of products produced and characterize them; it will help as strategic tool in understanding the product life cycle and determines what priorities should be given to each of the products. The products will be classified in four groups. Cash cows: relatively high market share, low or no growth rate usually generates the highest proportion of revenues for company, investments needed are low, stars: high growth rate as well as high market share, use large amounts of cash and are leaders in the market segment if market share is sustained or reached the result will lead to cash cow,
Dogs: low growth, low market share, if no profit is generated the product should be eliminated. Question marks, have the worst cash flow characteristics of all. High demand for the product, but still a low market share if investments lead to increase in market share the question marks turn into stars, if the investments made don’t lead to questions. Also the description of the most revenue generating or potentially valuable new products already in production will be performed. This will include all major 9 drugs which generate more than 1 billion in sales.

Lipitor: the best selling prescription drug in the world is used in treatment from elevated LDL – cholesterol levels in blood. Total sales of Lipitor counted for 22.8% of all Pfizer’s revenues in 2009. Still sales of Lipitor are falling for several years and in BCG matrix Lipitor could be characterized as cash cow with slowly decreasing market share and sales growth. Mayor threat of future sales volumes and revenues generated from this product as well as its market share in cholesterol treatment drug sector is ending patent rights in 2012 on this particular product. This will lead to immediate competition from generic drug producers which should dramatically impact Revenues generated from this particular drug as well as its operational productivity.

Lyrica: used in treatment of post herpetic neuralgia, diabetic peripheral neuropathy, fibromyalgia, adjunctive therapy for adult patients with partial onset seizures. The patent rights expire in 2018 meaning that drug will have strong potions in future. Currently in BCG matrix the product could be characterized as star with continuously increasing market share and revenue growth. Increasing sales volumes require investments in production and supportive marketing activity.

Celebrex: A treatment from osteoarthritis, rheumatoid arthritis and acute pain. Patent rights expire in 2014. The current sales have been generally flat and the product could be characterized as cash cow for Pfizer generating stable revenues and being in patent protected position for next for years. Still company believes in potential of this drug and considers it a star with potential growth ability and is supported by continued educational and promotional efforts.

Norvasc: is a drug for treating hypertension. The drug has lost its patents in all major markets and significantly loses its market share in past years which correspond to decrease in revenues from sales of this particular drug. Currently the drug could be
described as cash cow with sales volume at 2 billion, but future decrease in sales volumes is expected, thus company should not make additional investments in this product.

**Viagra:** The most recognized pharmaceutical brand in the world (high brand value) is used in treatment from erectile dysfunction. Currently the drug is generating approximately 1.9 billion in revenues with little increase in its sales volumes in U.S. market. The product is definitely a cash cow generating solid profits for company, still the patent rights on this pharmaceutical ends in 2012 and company has to take into account competition from manufacturers of generics which will impact the market share. Still as the brand value and recognition of the product is extremely high this should not lead to immediate decrease in sales amounts.

**Xalatan:** world’s leading branded agent is to reduce elevated eye pressure. Still increases its market share and sales volumes

**Detrol:** The world’s most prescribed branded medicine for overactive bladder. Currently a cash cow which faces competition from other branded medicines, but still generates solid revenues. The expiration date for patent rights is close.

**Zyvox:** 2015 best-selling branded agent for the treatment of certain serious Gram-positive pathogens. The pharmaceutical can be characterized as cash cow with characteristics of star in emerging markets (the main driver in revenue increase has been revenue growth in emerging markets). Patent expiration date is 2015 which will allow generating solid revenues and sustaining the market share in close periods.

**Geodon/ Zeldox:** a dopamine and serotonin receptor antagonist for the treatment of schizophrenia. The sales of this drug generated 1 billion in companies’ revenues in 2009. Currently a strong cash cow with stable sales volumes. The closeness of patent expiration in 2012 can change the strong market position.

**Sutent:** the drug is used in treatment of advanced renal cell carcinoma. In 2009 it was the most sold medicine in the world for the treatment of first line renal cell carcinoma. This product is the biggest star among all drugs and products in Pfizer’s biopharmaceutical product portfolio. The revenues from product sales have grown rapidly: in year 2008 the revenues increased by 48%, while in 2009 the increase was
more modest resulting in 12%. Still as the product is relatively new the future increase in revenues is expected and will be protected by patent rights till year 2021.

4.4. Analysis of competitors:

Pfizer’s industry competitors or companies which could be included in the same peer group as Pfizer are: Abbot Laboratories, Amgen, Astra Zeneca, Bristol – Myers Squibb Company, Eli Lilly and Company, GlaxoSmithKline, Johnson & Johnson, Merck & Co, Schering-Plough Corporation, and previously before the 2009 also Wyeth. The mayor 3 competitors regarding market size and product diversification are Novartis AG, Sanofi Aventis SA, and Glaxo Smith Kline.

In the below pie the market share of mayor competitors as well of Pfizer can be seen with regard to companies’ revenues in global context. The total Pharmaceutical revenues in 2009 were 837 billion USD dollars. (Phrma, 2010)

![Global Pharmaceutical Revenues in 2009](image)

Figure 15. Global Pharmaceutical revenues in 2009 by percentage proportions. Source: The Pharmaceutical Manufacturers Association

As can be seen Pfizer is the world’s leader in Revenues. Its closest industry competitors and companies in pharmaceutical industry with similar total revenues are Novartis, Sanofi Aventis, and Glaxo Smith Kline.
Figure 16. Revenues of five largest industry rivals for years 2005-2009 in billions USD. Source: own plotted.

If taking a closer look on changes in companies Revenues during the last 5 years the solid growth can be seen for two major competitors Novartis AG and Sanofi Aventis AS. The Revenues of Novartis have grown by 31% for the last 4 years resulting in compounded annual growth rate at 7%. At the same time the revenues of Sanofi Aventis SA have grown by 40% with Compounded annual growth rate being nearly 9%. Still the revenues of Pfizer have been flat for the last four years (with a slight decrease). If those two competitors continue the expansion of their market share and continuous growth in the same rate they will overtake the Pfizer’s position in total revenues in next two years.

Another characteristic of competitors must be compared and this is related to research and development expenses. It is a major driver to strengthening of new product pipelines and believably will lead to development of new products which eventually result in higher possible revenues from newly developed products. The table below shows the research and development expenses for major players in pharmaceutical industry from years 2005–2009.

![Research & development expenses 2005-2009](image)

Figure 17. Research and development expenses for years 2005-2009 for five largest industry rivals in billions USD. Source: Own plotted.

As can be seen from the graph Pfizer is devoting the largest amount to research and development of new products annually. Still the high increase in research and development expenses from Novartis in past years will strengthen the development of new products for this company and believably will lead to higher revenues in next decade. Additional significant fact what should be mentioned here is significant increase in research and development expenses by Merck & Co. It has the highest R&D ratio to
revenues among mayor industry players (21%) and significant increase has been viewed for the last four years. Still till this moment it has not lead to mayor increase in revenues, but believably in next decade it could be expected that company will come closer to 40 billion revenue threshold.

4.5. Analysis of Industry, market scale and potential market growth.

Asserting that Pfizer is well diversified company in pharmaceutical industry leads to analysis of whole pharmaceutical industry in general to understand the scope of the market in which it operates.

The global Pharmaceutical market in which Pfizer operates in is growing in size by 4-6% annually. The expected market growth in 2010 is similar to previous years and according to IMS health (a leading provider of data on pharmaceutical industry) will total 825 billion USD in total sales.

The main market for Pfizer and the world’s largest pharmaceutical market is U.S. where growth is projected to be 3-5% in 2010. The total sales for this market are projected at USD 310 billion. The second largest market is Europe where top 5 largest countries create a market with sales totaling 150 billion USD in 2010. The growth there is projected to be more modest and is limited to 1-3% due to economic situation which leads to lowering of costs and expenses in government healthcare system. The reduction in pharmaceutical sales is expected in Japan (caused by biennial price reduction) and will total 90 billion USD by year 2010. The mayor driver of total market sales growth is related to emerging markets where growth in the past years has been in levels of 12-14%, and is expected to be the same in 2010 totaling the sales to reach 105 billion. The rest of the world’s markets (skipped in upper description) will grow approximately 5 - 8 % in next year’s.

The total industry sales can be seen in later shown pie charts, from them it can be derived that mayor increase in market share counts for Emerging markets. The growth in emerging markets will significantly impact the total market growth and challenge among the mayor industry rivals in those markets will significantly impact the global revenue increase. Total compounded annual market growth rate for years 2009 – 2013 is expected to be 4 - 7% (Novartis, 2010).
4.6. SWOT analysis.

**Strength**: Economies of scale allowing for lower costs of performing activities. Also the market capitalization of the company and highest revenues generated in the industry allow borrowing of debt at lower interest expense. Well diversified outbound and inbound logistics processes, strong existing product line: 9 products generate more than 1 billion in revenues allowing concentration of resources at lower costs per unit on production of those specific products. The recognition of the companies brand as well as rights on the world’s best recognized medicine Viagra which allows strengthening of the company’s brand in general. Also the scale at what company operates allows to significantly negotiating its terms with wholesalers and gives an advantage on over the counter product market. Strong investments in research and development provide excellent bridgeheads in creation of new blockbuster drugs. Pfizer also has strong product pipeline which is one of the largest by number of products in development. Mayor Products responsible for high proportion of revenues are patent protected pharmaceuticals, which don’t face direct competition in markets were legislative protections of patent rights is well developed. The acquisition of Wyeth strengthened merged companies position in emerging markets and developed more diversified
product portfolio. The stronger position in developing countries which will be responsible for higher industry sales proportion in future years as derived from external industry analyses will definitely create good bases for company’s revenue growth in future.

**Weaknesses:**

Company faces patent expiration on some of its mayor products which generate large proportion of all revenues. Large proportion of revenues (23%) is dependent on sales of one drug Lipitor. After the expiration of patent rights on this particular product company thus loses technological advances and will face direct competition from generic drug producers, and predictably the sales of this product will lower significantly. Pfizer also does not have a strong business unit in generic drug production. This market segment not only allows company to be more diversified but also allows being less dependent on economic downturns in global economy when decrease in economic downturn takes place leading to higher demand of low cost pharmaceuticals. This market segment is also responsible for mayor market share in emerging markets meaning that Pfizer will not be able to follow increase in sales volumes in global pharmaceutical industry because the mayor future sales growth are largely dependent on sales growth in emerging and developing markets where generic products are responsible for largest market share of all pharmaceutical products. Also 38% of all revenues are generated through distribution of pharmaceutical products through three mayor wholesalers.

**Threats:**

The changes in healthcare industry which will take place in 2011 will make large sales amounts dependent on government purchases. Also, healthcare reform in the U.S., if enacted, could increase pricing and access restrictions on Pfizer’s products and could have a significant impact on its business. There have also been a number of legislative proposals seeking to allow importation of medicines into the U.S. from countries whose governments control the price of medicines, despite the increased risk of counterfeit products entering the supply chain. If importation of medicines is allowed, an increase in cross-border trade in medicine subject to foreign price controls in other countries could occur and negatively impact Pfizer’s revenues.
Company also faces legislative and regulatory action in several states of U.S. (its largest market by revenues 47%) could adversely affect companies business. Those actions could include changes in patent laws, the importation of prescription drugs from outside the U.S. at prices that are regulated by foreign governments, as well as restrictions to innovative products in form of abandoning direct to customer advertising or limitations on interactions with health care professionals.

**Opportunities:**

From demographic viewpoint it can be stated that in U.S. the aging baby boomer population in past 5 years and in next 15 years will have a significant impact on demand of pharmaceutical products, thus the whole pharmaceutical industry in U.S. has and will enjoy the economic increase in form of increasing scale of the market. The fast growing emerging markets will be responsible for increasing sales of pharmaceutical products in global context. Presence and ability to gain market share in those markets will lead to significant increase in revenues for successful industry rivals.
5. Forecasting performance:

Although the future is unknowable, the predictions of how company may develop will be based on careful analysis on past performance of the company, future projected changes in global world’s economy and pharmaceutical industry as well as internal and external analysis previously performed in these theses will settle the foundation for companies’ performance forecasts. The total projection period will be limited to 7 years based on the fact that Pfizer is a steady state company is not cyclical and based on the previous analysis does not show the possibility for rapid growth in revenues in future years (otherwise a longer period of 15 years would be used). Afterword’s the valuation of remaining years will be based using a growth perpetuity formula in order to determine continuous value of the company. This valuation mainly basis on information gathered from SWOT analysis, external and internal analysis of the company, derivation of results from porters five force model, the historical performance of the company observable in companies financial statements and product analysis using Boston Matrix model. Also the impact of acquisition of Wyeth has a major impact on future expected revenue growth as well as gross and operating margins. The acquisition is determined to create synergies mainly driven by cost reduction initiatives, higher revenue volumes and stronger market position in developing markets. The impact of patent expiration on its mayor blockbuster drugs and particularly Lipitor will downsize the revenues in future period. From externally available information to the general public and thus used in these thesis the impact on new successful drug entry in the market (which are now in the late phase of the development) and consecutive earnings generated from them could not be predicted, for the forecasted seven year period. Lipitor which is responsible for 25% of all sales will face a generic competition due to the expiration of patent rights and company’s revenue reliance on it (counted for 25%) will drive the Revenue forecasts to decline for all the projection period. Also the patent expiration on all mayor products (Aricept, Lipitor, BeneFix, Xalatan, Geodon, Viagra and Detrol by year 2012 will lower the sales revenue by 10 percent points till year 2014. Also expectations that the legislation changes which would allow U.S. government to directly negotiate prices with pharmaceutical manufacturers on behalf of Medicare beneficiaries, will expectedly restrict access to and reimbursement of Pfizer’s products will result in lower EBITDA margin. The decrease in even larger extend is offset by predicted revenue increase in worlds developing markets and can be related to one of the positive synergies gained
from the acquisition of Wyeth which had a strong positions in developing countries. The other impact which will positively increase the sales volumes and lower the expected decrease is enhanced from the global economic situation which after the downturn in years 2008 – 2009 is predicted to rebound and thus would allow potential customers to afford branded drugs (mayor portfolio of biopharmaceutical products produced by Pfizer) and restart the treatments as those products again become affordable for part of the lower income population. The projections in revenues thus state that in year 2010 the revenues will increase due to the acquisition of legacy Wyeth and their recognition for full financial year and will be flat for the year 2011. Further as Pfizer faces patent expiration on all mayor products (Aricept, Lipitor, BeneFix, Xalatan, Geodon, Viagra and Detrol) by year 2012 will lower the sales revenue for projected decrease in 10 % percent points in years 2011 – 2014 and decline in revenues of 2% for each of the remaining years in the seven year projection period. Regarding projections of other lines in balance sheet, income statement and calculations of invested capital, and NOPLAT as well as reconciliation of them is done using suggestions of Koller, Goedhart and Wessels book Valuation chapter 9 Forecasting performance. The mayor line items on company’s income statement are estimated using the previous year’s ratio related to the driver of the line. In most cases most of the lines are tied to revenues and thus cost of goods sold, selling administrative and informational expenses, R&D expenses are tied to changes in revenues. The data available on companies’ quarterly financial performance in year 2010 was used as base for projection of 2010 years performance on each of the line items where available. Still as acquisition of Wyeth made changes and created accretion or dilution in profit or gross margins the historic ratios could not be used for prediction of future line items. The ratios for the main line items are used from year 2010 for the following years of projection as the reflection of acquisition must be stated in them. The property plant and equipment has been tight to revenues as well, while depreciation has been forecasted as percentage of net PP&E. Interest expense or income is tight directly to the assets or liabilities that generate them. Regarding other operating items as accounts receivable, payable and inventories are tight to changes in cost of goods sold. The goodwill and acquired intangibles are set constant as future acquisitions cant bee predicted. Also the change in deferred tax assets and liabilities can’t be predicted because they have historically fluctuated and are set constant. At the levels of year 2009. No changes are predicted in long term debt, short term borrowings, pension and postretirement obligations, short and long term
investments and those lines are left constant. Taxes grow in line with income and the marginal tax rate is left at the same levels as in year 2009. The decrease in preferred stock outstanding has been predicted at the same rate as from historical data. Other line items which could have been tight to its forecast drivers are left unchanged if huge fluctuations in them and no dependency on forecast driver are observed.

As the value from the forecast years thus discounted by WACC gives a Net present value of 98.258 Billion USD. Still the most weights in discounted cash flow analysis are based on continuous value. The formula used to calculate the value of operations of Pfizer using the Discounted Free cash flow analysis is stated below,

$$V = \sum_{t=1}^{T} \frac{FCF_t}{(1+WACC)^t} + \frac{FCF_T}{(WACC-g)(1+WACC)^T}$$  \[7\]

FCF = Free cash flow in period t
WACC = Weighted average cost of capital
g = expected growth rate in perpetuity

The most important factor for calculating the terminal value thus is the growth rate. The growth rate is assumed to be 3 percent’s. The 1.5 percent increase is related to sales volume growth as still it is expected that companies previous and continuous expenditures in research and development will lead to development of new commercially successful drugs which will replace the current products at the end of the patent protection period. Also the scale of the Pfizer and past evidence suggests that company could acquire small drug research companies and purchase the patent rights on highly successful products at the beginning of their commercialization. The other part of 3 percent growth is expected price increase due to the inflation in global economy in the longer run. The current value of continuous value after discounting is equal to 160.630 billion USD. Summing up the operating value is equal to 258.897 billion USD. As the cash flows are generated throughout the year and not as a lump sum, discounting in full year increments understates the appropriate discount factor. (Koller, 2010). Thus the operating value is adjusted for a half year using a discount factor of 1.041. The upward adjusted operating value gives a result of 269.899 billion USD.
6. Moving from enterprise value to value per share

6.1. Determining the enterprise value:

In order to determine the enterprise value the value of nonoperation assets in form of excess cash and short term investments must be added to the operating value of the firm. The excess cash and marketable securities are nonoperation assets that can be converted to into cash on short notice and at a low cost. The value of them at the end of year 2009 was 24.969 billion USD. Additionally the value of discontinued operations must be added due to the fact that discontinued operations represent businesses being sold or closed down and no longer represents the part of the company’s operations and thus is not included in the free cash flow of the operations. The value of discontinued operations equals 14 million USD. After the addition of those items the enterprise value of Pfizer results in 294.882 Billion USD.

6.2. Determining the equity value:

As previously calculated the enterprise value of Pfizer equals 294.882 billion USD. In order to determine the equity value of the company the deduction of no equity claims must be performed. No Equity claims represent the financial claims which are not included in EBITDA and thus excluded from free cash flow. The no equity claims will be divided into three parts: interest bearing debt, debt equivalents, and hybrid claims. Interest bearing debt represents long and short term loans (indifferent forms and with different maturities). Fair value of long term debt is obtained from TRACE database as of December 30th 2009. The book value of long term debt disclosed in companies’ financial statements was 43,193 million USD at the end of fiscal year 2009 and is a mix of debt with different maturities. The fair value stated in companies financial statements and after recalculation leads to valuation of current market value of debt to be equal 40.62 billion USD (a difference in approximately 3 billion USD from its par value). Short term as stated on companies’ balance sheet equals 5.46 billion USD.

6.3. Debt and debt equivalents:

Includes capitalized operating leases, pension benefit obligations, and postretirement benefit obligations. As the projected and historical cash flow was adjusted for operating leases the deduction of them must be performed. The value of capitalized leases is
calculated in appendix A. The unfunded pension and postretirement liabilities are also equal to debt equivalents and must be deducted from Enterprise value. As the disclosed in Pfizer's financial statements footnotes the value of them equals 9.635 billion of dollars. Summing up the total debt and debt equivalents including interest bearing debt equals 64.302 billion of USD at the end of financial year 2009.

6.4. Hybrid claims:

Represent preferred stock, employee stock options and minority interest. The value of preferred stocks can be calculated using market value, Black–Scholes value or conversion value. The market value approach is used in these theses to determine the appropriate value of the outstanding preferred stock. The number of outstanding preferred shares by year 2009 in December 31 was 1511. Holders of the preferred shares have an option to convert each share into 2,547.87 shares of common stock. As the market value of Pfizer's common stock equaled 18.19 USD at the end of year 2009 the total value of the preferred stock is assumed to be equal 70.770 million USD.

In order to value employee stock options the Black, Scholes and Merton, option pricing model is used. As company undisclosed the full information of stock options their values and maturity in its annual report of year 2009 the calculations to determine the current value of employee stock options won’t be performed due to lack of data. As stated in companies financial statement company uses the upper mentioned model to determine the aggregate intrinsic value of the stock options number of which totaled 447.693 million with weighted average exercise price per share being equal 30.11 USD and weighted average remaining contractual term 4.6 years. Pfizer uses the following assumptions in weighted average values in its Black Scholes Merton option pricing formula. Expected dividend yield is assumed to be 4.9% and is determined using a constant dividend yield during the expected term of the option. Risk free rate is stated at 2.69 % and is determined using the interpolated yield on U.S. Treasury zero-coupon issues. Expected stock price volatility is assumed to be 41, 36%. Aggregate intrinsic value of stock options outstanding at the end of year 2009 which was calculated by subtracting exercise price from market Price of underlying Pfizer's common stock equals 250 million USD.

In the situation when company has a control but not ownership rights over the subsidiary the company’s financial statements are still consolidated in Pfizer's accounts.
As the full value of the subsidiary included in company’s accounts leads to improper valuation of the company the minority interest must be deducted from enterprise value. As stated in companies financial statements the minority interest of Pfizer equaled 432 million USD at the end of the financial year 2009. And as Pfizer's subsidiaries are not bibliically listed the market value of them could not be obtained to derive more proper value and thus the net book value is used in this situation. As all the items related to Interest bearing debt, other debt equivalents and hybrid claims are calculated the subtraction of them from Pfizer's enterprise value leads to Equity value of 152.194 Billion USD.

Further using the information available from Wharton Research data services the amount of common shares outstanding as of 31 of December 2009 was 8.070 billion. Dividing the obtained equity value with number of common shares outstanding results in share price to be equal 18.86 USD at the valuation date 31.12.2009.

6.5. Sensitivity Analysis.

In order to see how changes in main variables used in valuation could impact the current share price the sensitivity analysis will be performed. The key parameters change in which will result in different current share price are weighted average cost of capital and terminal growth rate. The sensitivity analysis thus will show the minimum and maximum share price regarding the change in parameters within plus, minus 20 percent points of original assumptions and calculated results.

<table>
<thead>
<tr>
<th>Terminal growth rate / WACC</th>
<th>20%</th>
<th>15%</th>
<th>10%</th>
<th>5%</th>
<th>no changes</th>
<th>-5%</th>
<th>-10%</th>
<th>-15%</th>
<th>-20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>12.92</td>
<td>14.60</td>
<td>16.54</td>
<td>18.77</td>
<td>21.40</td>
<td>24.53</td>
<td>28.31</td>
<td>32.97</td>
<td>38.88</td>
</tr>
<tr>
<td>15%</td>
<td>12.58</td>
<td>14.20</td>
<td>16.06</td>
<td>18.20</td>
<td>20.71</td>
<td>23.67</td>
<td>27.24</td>
<td>31.61</td>
<td>37.08</td>
</tr>
<tr>
<td>10%</td>
<td>12.25</td>
<td>13.82</td>
<td>15.61</td>
<td>17.66</td>
<td>20.06</td>
<td>22.88</td>
<td>26.25</td>
<td>30.34</td>
<td>35.44</td>
</tr>
<tr>
<td>5%</td>
<td>11.94</td>
<td>13.45</td>
<td>15.18</td>
<td>17.15</td>
<td>19.44</td>
<td>22.13</td>
<td>25.32</td>
<td>29.18</td>
<td>33.93</td>
</tr>
<tr>
<td>no changes</td>
<td>11.64</td>
<td>13.10</td>
<td>14.77</td>
<td>16.67</td>
<td>18.86</td>
<td>21.42</td>
<td>24.45</td>
<td>28.09</td>
<td>32.54</td>
</tr>
<tr>
<td>-5%</td>
<td>11.35</td>
<td>12.77</td>
<td>14.37</td>
<td>16.20</td>
<td>18.31</td>
<td>20.76</td>
<td>23.64</td>
<td>27.08</td>
<td>31.26</td>
</tr>
<tr>
<td>-10%</td>
<td>11.07</td>
<td>12.45</td>
<td>14.00</td>
<td>15.76</td>
<td>17.79</td>
<td>20.73</td>
<td>23.64</td>
<td>26.13</td>
<td>30.07</td>
</tr>
<tr>
<td>-15%</td>
<td>10.81</td>
<td>12.14</td>
<td>13.64</td>
<td>15.34</td>
<td>17.29</td>
<td>19.53</td>
<td>22.15</td>
<td>25.25</td>
<td>28.96</td>
</tr>
</tbody>
</table>

Figure 19. Table on changes in share price as of December 31. 2009 due to changes in in parameters of weighted average cost of capital and terminal growth rate. Source: own design.

As can be seen from upper table the small change in WACC has a higher impact on share price than change in terminal growth rate. If presumably the patent expiration on mayor drugs has higher impact on revenues generated and company does not meet the settled goals in enlarging its market share in developing markets and continuous to carry
the initial leverage ratio the weighted average cost of capital is expected to increase due
to lowering in operating cash flow company will generate and thus lower its interest
coverage ratio. It could be expected that in case the weighted average cost of capital
increase by 10 percent points due to upper stated reasons it could be stated that
companies share price will lower to 14.77 dollars per share. Additional driver for
increase in weighted average cost of capital is risk free rate which due to recovery in
U.S. economy is expected to increase in future years again strengthening the assumption
that share price of Pfizer could lower due to the upper streamed increase in weighted
average cost of capital.
7. Valuing flexibility in research and development using real options.

The studies have found that the traditional DCF method could hardly explain around 39 per cent of market capitalization of the company. This is because, for pharmaceutical companies, much of the market value is driven by milestones achieved in research which is not captured in DCF. The real option model to value pipeline products has improved the valuation (Banerjee, 2003).

The Pfizer's research and development expenses equaled 15.7 percent points of consolidated revenues totaling 14.875 billion USD. As the valuation of all companies research and development projects is out of the scope of these theses due to the page limit and fully unavailable information on the development projects to the external public, the valuation is performed by valuing the true net present value of new drug development project. As suggested in Koller, Goedhart and Wessel’s, the valuation will be performed in a way that first the drug approval and research and development processes of Pfizer are explained. Afterword’s the market and technical risks will be explained as well as their impact on value. Finally the value of new drug development project is determined using a real option valuation approach.

7.1. The drug approval and research and development process.

The development process sustains a series of controlled trials in order to assess the safety and efficacy of new drugs in appliance to high scientific standards. There are several steps for a new experimental drug to reach the approval phase. The first step is preclinical trials where new drug is tested in the laboratories and in animal studies in case of positive outcome the medicine can advance to clinical testing and possibly successfully pass the registration phase.

**Discovery/ Preclinical trials:**

Through preclinical trials experimental medicine is tested in the laboratories and in animal studies, the targeted research is focused on safety as well as on effectiveness of the new experimental medicine. Regarding the success rate for the new drug to be
advanced to clinical trials is 90 percent in industry (the percentage on success rates for all development phases are taken from Kellogg, 2000)

**Clinical test phase 1**

During this phase an experimental medicine is for the first time tested on humans with the main aspect of research on safety and tolerability. The length of all clinical trials is usually from five to seven years and the first stage usually lasts for one to two years with a success rate of 75 percent’s.

**Clinical test phase 2**

This stage of development primarily focuses on the effectiveness of new medicine with substantiation focus on side effects and risks. The second clinical phase could last up to 2 years and the possibility of successful outcome, is 75 %.

**Clinical test phase 3**

The last phase of clinical trials usually is the longest and the most complex majorly due to the large number of participants involved and data which have to be processed. The success for a new medicine to reach the approval stage is 50 percent.

**Approval by government**

This step involves filling the application of registration in various health regulatory institutions worldwide. The duration of this process varies from half to two years. Usually 85 percent of all fillings are approved and the new medicine can be commercialized.

**Post marketing Studies**

Also this phase does not have an impact on new development process in valuation; it is part of it. The post marketing studies take place after the approval by regulatory institutions. Through them additional information is obtained concerning mainly long term risks, benefits and optimal usage.

It is worth mentioning the fact that as experimental medicine has its patent registration process before the start of the clinical trials and as duration of the patent is 20 years the
patent rights have usually half expired at the moment when new drug has received the government approval and can be commercialized.

7.2. **Underlying risks: Market and technical:**

In valuing new drug development process the two sources of risk must be counted. Market risk could be related to demand risk for new medicine which could impact the Product price and consequently affect the revenues generated by new drug. Also the political risks, interest and currency risks impact the cash flows generated by the sales of medicine and thus the value of new drug development. The future cash flows that the new medicine will generate is hard to be estimated because the determination of number of people that will be suffering from the particular disease and are related to the particular market segment is hard. Also the economic situation globally could impact the buyer power of the patients and in line with potential changes in populations growth rate affects the future revenue amounts.

Technological risk in general is more important than the market risk. The main example is success or fails on trial outcomes in new drug development process which are of higher value than the possible changes in cash flows the medicine could generate. Other factor related to the technical risk is the ability of new drug in development process to meet the desired effects and characteristics of the targeted patient segment.

7.3. **Estimating the net present value of new drug without flexibility:**

As the information on new drugs in early stage of development is not disclosed to the general public the assumptions will be used regarding the numbers in valuation process. The new experimental medicine (molecule) will be named ZX 375. The calculation of net present value will have following characteristics: from the description of the development process in the previous section the information stated will assume that new drug development process will take 10 years. Assuming that the development process will be successful leads to a projected sales revenue for the next ten years during which the medicine is patent protected plus continuous value for the upward years of the drug when patent rights have expired and medicine faces competition from generic manufacturers. Based on typical stages in the sales and profit cycles the revenues are projected to grow for the first five years with a mature state lasting for the rest of period
of patent protection. (Lilien, 2007) followed by a decline period due to expiration of patent rights in the terminal value of the company.

<table>
<thead>
<tr>
<th>Development process</th>
<th>Preclinical trials</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Approval</th>
<th>Commercialization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Probability of success</td>
<td>90%</td>
<td>75%</td>
<td>75%</td>
<td>50%</td>
<td>85%</td>
<td></td>
</tr>
<tr>
<td>Expenses</td>
<td>5</td>
<td>15</td>
<td>23,5</td>
<td>86,3</td>
<td>1,3</td>
<td>200</td>
</tr>
<tr>
<td>Probability of expenditure</td>
<td>100%</td>
<td>90%</td>
<td>68%</td>
<td>51%</td>
<td>25%</td>
<td>21,52%</td>
</tr>
<tr>
<td>Calculated costs</td>
<td>5</td>
<td>13,5</td>
<td>15,9</td>
<td>43,7</td>
<td>0,3</td>
<td>43,0</td>
</tr>
<tr>
<td>Discounted expense</td>
<td>4,7</td>
<td>11,9</td>
<td>13,2</td>
<td>49,3</td>
<td>0,2</td>
<td>28,6</td>
</tr>
</tbody>
</table>

Figure 21. Calculation and determination of present value of new drug development project. Source own plotted.

In the upper table the net present value of the costs for the development process and commercial launch is calculated. The probabilities of positive outcome are taken from development process described before. The expenses related to each stage of development were used as stated in research papers of J.A. Dimasi (2001) and Kola Landis (2004). The predictions on the time steps calculated on each node of the development process and their duration are estimated based on information available to external public by Pfizer Inc. the probability of expenditure is calculated in order to Estimate the proper development costs which are then discounted to the present value as of January 1st 2010.

As the costs for new drug development have been estimated the following table will show the calculations of the value of the cash flows of new drug once it has received the government approval and has been launched in market (commercialized)

In the appendix IX, the projected revenue volumes for the period of 10 years which is the patent protected period of new medicine. The peak sales and projected proportions for the each year of the period have been estimated from article of Ralph Villiger and Boris Bogdan (2005). The peak sales are reached in year 7 and will decline by 25 percent’s annually after the expiration of patent rights. The marginal tax rate is assumed to be the same as stated in Pfizer's annual report 2009 and equals 20,3 %. The cost of goods sold ratio to revenues is equal to the same as of for year 2009 and is approximately 15 percent. The hurdle rate which is 15% is obtained from Shockley
(2007) and is the minimum required return for the investment. The terminal value is estimated using the decreasing free cash flow perpetuity formula and assumes sharp (25 percent) decline in revenues in perpetuity after year 2011 the expiration of patent rights and following competition from generic drug producers which causes sales volumes and unit price to decrease leading to lowering of projected revenues.

Previously calculated probability of success of launching the new medicine was 11.93 percent thus the expected cash flows which were generated from the launch of new product and totaled 448.9 million USD only amount to 96.59 million. Subtracting the expected costs from the expected cash flow leads to a negative net present value which is equal 11.37 million. As the rule of NPV states the project should not be proceed with and the development project must be abandoned in order not to destroy the value. To sum up if the static net present value approach is used in valuing the new drug development project and following cash flows it can generate the result can be negative leading to an outcome not to proceed with the development of it.
8. Real Option Valuation

The real option valuation approach will be performed in order to determine the outstanding value of the new drug development project. The value determined through this valuation approach will be compared with the previously obtained value using a static net present value approach. Furthermore the valuation outcome will determine if the Pfizer should forego the development of the new medicine or not.

8.1. The structure of the valuation.

In this section the flexibility of the development process of the new medicine will be described and the process of the real option valuation will be structured. Assuming that Pfizer has discovered a new molecule which was previously named ZX 375 it can now develop it into a new medicine which can be commercialized. In order to reach the commercialization process the experimental medicine must go through five stages of the development process. After each stage company has to make a decision either to move to the next phase of the development or to stop the development project.

As Pfizer follows to develop the new molecule and the new molecule enters the preclinical trials resulting in costs of 5 million. After the period of two years which is the duration of the particular research phase Pfizer based on the outcome of the preclinical trials has to make a decision to go on to clinical trials or to abandon the project. If the outcome is positive and the gains from the commercialization process still seem profitable company will proceed with moving to next phase of the development project. The length of the first phase of the clinical trials is one year with related expenses amounting 15 million, if the phase is successfully completed and experimental medicine looks profitable regarding the commercialization process company may follow up with entering Phase 2 clinical trials. If the outcome of the tests is negative or the commercialization of the project does not seem to be profitable Pfizer will abandon the project. The period of the second phase of the clinical trials is two years with outstanding costs 23, 5 million and if successfully completed will lead to phase 3 clinical trials. The Phase 3 of the development process will take 3 years with expenses totaling 86, 3 million USD. If the experimental medicine passes all the tests in this phase and the new drug development projects is profitable company can follow with the filling for approval for the new drug with FDA or other institution depending on the region. Approval period which lasts for one year is successful and new drug receives an
authority approval the company can then follow with the commercialization process of the new drug which will cost 200 million.

From the description above it can be stated that the decision at each phase to follow or abandon the development process can be named as call option. As there are several steps in this particular development process the option to start the preclinical trials after the discovery of new molecule is the follow on option or could also be called compound option or technically speaking option on option. For example before starting the preclinical trials Pfizer has an option whether to invest 5 million or to cancel the development project. If the investment is made the company purchases a call option with maturity of the option being two years and the strike price outstanding being equal to investment necessary in Phase 1 one of the clinical trials thus 15 million. Pfizer will undertake the option if its value is more than 15 million. Before entering the Phase 1 of clinical trials Pfizer can again purchase a one year call option to enter the Phase 2 clinical trials, with value of 15 million and strike price of 23, 5 million. Pfizer has five options in the development process of new medicine and thus the initial option is a compound option. The company will only undertake the option if its value is higher than the costs to initiate the preclinical trials. To value such compound option the binominal tree valuation method will be used.

8.2. Building the binominal tree.

The real option valuation method with straight forward binominal lattice for valuing flexibility will be used to determine the value of the compound option. The results of this valuation method according to Koller (2010) are similar to results derived from more complicated mathematics such as stochastic calculus or Monte Carlo simulation. In order to perform the binominal tree analysis the five input parameters must be used. Those five parameters are: risk free rate, which according to obtained data in previous chapters equaled 10 year U.S. government zero coupon bonds yield at the end of year 2009 and was 4.1676 percent; The present value of the cash flows what the new medicine will generate after the launch were previously determined using the static NPV approach and equaled 448,9 million USD and is the current value of the underlying assets; The time till maturity equals the development process and is 10 years; The time steps will equal 0,5 years, thus the binominal lattice will have 20 steps. The length of the time step was chosen as suggested by Shockley (2005) and will allow model to be more precise (in general it was stated that log normal distribution
increasingly approximates if the number of time steps is larger than 5); the last input parameter the volatility can’t be observed and is taken from Shockley (2007) where the suggested volatility rate was stated at 50%.

Now when the five input parameters are obtained and explained the next step is to value the up and down movements can be valued (the valuation process is performed using the step method suggested by Koller (2010). The following formulas are

\[
\begin{align*}
\text{Up movement} &= \text{u} = e^{\sigma \sqrt{T}} = e^{0.5 \sqrt{0.5}} = 1.424 \quad [8] \\
\text{Down movement} &= \text{d} = \frac{1}{\text{u}} = \frac{1}{1.424} = 0.7022 \quad [9]
\end{align*}
\]

The values obtained in for the up and down movements and the previously stated value of the underlying asset allows deriving a binominal lattice which can be seen in appendix X.

8.3. Valuation of the option.

After the binominal lattice excluding flexibility to abandon or precede the investment in different phases has been built, the value of the compound option at early stage can be calculated. As stated in Koller (2010) the previously build binominal lattice must be adjusted for risk neutral valuation and risk free time factor.

The risk free factor for time step is calculated below and the risk free rate is taken the same as in the previous paragraph and equals 10 year US government bond yield as of end of year 2009. The time step as mentioned earlier is 0.5 years.

\[
\text{Risk free factor} = e^{r \times \text{length of time step}} = e^{0.0576 \times 0.5} = 0.0208 \quad [10]
\]

As the value of risk factor is calculated the risk neutral valuation must be performed to calculate the probability for up and down states.

\[
\text{Probability} = \frac{1 + \text{risk free factor} \times \text{down movement}}{\text{up movement} \times \text{down movement}} = \frac{1 + 0.0208 \times 0.7022}{1.424 \times 0.7022} = \frac{0.3258}{0.7218} = 0.5024 \quad [11]
\]

As the probability for the up state has been calculated and the sum of both up state and down state equals 1 the value of the down state probability equals 0.4976. These risk neutral probabilities will be used to calculate down and up states in the binominal tree.
Now when the risk neutral probabilities have been obtained the risk neutral pricing formula may be constructed and implemented. As stated in Brealy (2003), the calculation of the present value of the option is started from the right side in the binominal tree and worked back to the present. The formula for calculating each step is as follows:

The upside payoff and the down side payoff are multiplied by risk neutral probabilities for up and down states and the sum of them is divided by 1 plus the risk free factor.

\[ PV = \frac{\text{probability of the up state} \times \text{up side payoff} + \text{probability of down state} \times \text{downside payoff}}{1 + \text{risk free factor}} \]  

[12]

This process is repeated 18 times starting from the left side of the binominal lattice. The binominal tree must also be adjusted for technological risk (as drug trial outcome affects the value of the option). Also the costs in entering the next stage of the drug development project must be included.

As stated by Shockley (2007) the technical risk and related expenses when entering the new phase of development of the new drug must be calculated by multiplying the previously obtained values from the binominal tree which were already adjusted by risk neutral probabilities at each step when the decision must be made to enter the new phase of the development process. This is done using the following formula.

\[ \text{Probability of success}^N \times \text{MAX} (\text{the value of the underlying asset}^N - \text{Expenses}^N; 0) \]  

[13]

Where the probability of success is the positive outcomes in each stage of the development and expenses refer to the necessary investment’s to proceed with the next stage of the development process.

Now using this formula the example for adjustments to technical risk and related expenses will be drawn. Before entering the third phase of the development process the probability of success for the drugs currently in phase 2 developments to successfully enter the third phase of the development process is 67%. Meanwhile the costs of pursuing with phase 3 clinical trials amount to 86, 3 million USD. Working back the binominal lattice the results derived from the risk neutral formula are multiplied by upper stated formula which adjusts for technical risk and expenses related to entering the third Phase of the development process. The calculation is as follows:

\[ 67\% \times \text{MAX} \left( \frac{0.50424 + 1385.814 + 0.49576 \times 6790}{1 + 0.0208} \right) - 86, 3; 0 \right) = 7542 \]  

[14]
Performing all the valuation steps from left to right in binominal tree the value of the compound option as of January the first 2010 is determined. The present value of the compound option thus is 144 million USD. Clearly using the real option valuation the new drug development project must be undertaken.

**Conclusion**

The aim of these theses was to estimate the fair market value of the Pfizer as at the end of year 2009. Additionally the net present value of drug development project was calculated using a real option valuation approach.

In order to estimate the fair value of the company the historical analysis of companies’ financial statements was performed and revealed that Pfizer's net operating profit less adjusted taxes had a compounded annual growth rate equal to 6,02 percent’s for the last 5 years and is a good performance for a company of such scale. The cumulative annual growth rate for revenue growth has been small resulting in 0,4 % , for the years 2004 – 2009 and has increased in year 2009 due to merger with Wyeth. Analysis of historical returns on invested capital showed that Pfizer's main operations and acquired businesses through past decade had mainly the same characteristics. The return after the reformulation of financial statements showed to be about 25% which is good performance of the company. Forecasting of companies future performance through analysis of company, industry and global economic situation in the world revealed, that the acquisition of Wyeth will create synergies mainly driven by cost reduction initiatives, higher revenue volumes and stronger market position in developing markets. The impact of patent expiration on its mayor blockbuster drugs and particularly Lipitor will downsize the revenues in future period. Also expectations that the legislation changes which would allow U.S. government to directly negotiate prices with pharmaceutical manufacturers on behalf of Medicare beneficiaries, will expectedly restrict access to and reimbursement of Pfizer’s products will result in lower EBITDA margin. The patent expiration for mayor products, Aricept, Lipitor, BeneFix, Xalatan, Geodon, Viagra and Detrol will significantly decrease revenues. Lipitor alone is responsible for 25% of all revenues generated. Meanwhile no alternatives or products which would replace the existing products can be seen in the product development pipeline. The decrease in even larger extent will be offset by rebound in world global economy and sharp market growth in developing markets.
The determination of weighted average cost of capital revealed it to be 8.5 percent’s. After performing the sensitivity analysis the changes in beta had the most impact in changes in weighted average cost of capital. It could be explained due to situation that Pfizer’s leverage ratio is under 50 percent’s and thus the increase in cost of debt is less significant. Still the ending patent rights and expected lowering on net earnings could significantly increase the weighted average cost of capital in next year’s thus lowering the company’s overall value.

The valuation of the new drug development project was performed. Furthermore the valuation outcome determined if the Pfizer should forego the development of the new medicine or not. Using a DCF valuation method the project appeared to be value destroying while in the meanwhile the real option valuation method showed the value of flexibility and the net present value of the project was 36.05 million USD. In general this value has to be added to the equity value as well as values of all current projects in development phases. But due to small amount and inability to value all projects it was not done in this thesis.

The overall valuation of the Pfizer showed the current intrinsic value per share to be 18.86 USD which as assumed by the author should be the fair value of the Pfizer's Inc. share price. The total equity value thus at the 31 of December 2009 was 152,194 millions USD.

Still the sensitivity analysis of WACC and growth rate suggested that due to ending patent expiration on mayor products and possible increase in risk free rate (the 10 year U.S. government bonds) the increase by 10 percent’s in WACC could be expected. This would lead to decrease in share price to 14,77 USD.
List of Literature.

Books

Brealey, Meyers, 2003, Principles of Corporate Finance, Seventh Edition,


Journal Articles


**Papers:**


**URL:**


**Reports:**

United States Securities and Exchange Commission, *Form 10-K*, 2009 Pfizer Inc, New York, United States
United States Securities and Exchange Commission, *Form 10-K*, 2008 Pfizer Inc, New York, United States
United States Securities and Exchange Commission, *Form 10-K*, 2007 Pfizer Inc, New York, United States
United States Securities and Exchange Commission, *Form 10-K*, 2006 Pfizer Inc, New York, United States
United States Securities and Exchange Commission, *Form 10-K*, 2005 Pfizer Inc, New York, United States
United States Securities and Exchange Commission, *Form 20-F*, 2010 Novartis AG, Basel, Switzerland
United States Securities and Exchange Commission, *Form 20-F*, 2010, Sanofi-Aventis, Paris, France