MERGERS AND ACQUISITIONS:

The Case of Merck & Co and Schering-Plough Corporation

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Dissertation submitted in partial fulfillment of requirements for the degree of MSc in Business Administration, at the Universidade Católica Portuguesa, September 2012

Abstract

The global pharmaceutical industry is characterized for being highly competitive and for having though market regulations. Therefore, companies whose seek to generate value and continue with a strategic position in the market, look for different and smart ways to achieve the objective. In this industry, Mergers and Acquisitions are very supported by practitioners and managers, since it enhance the productivity of the company and the shareholder value. Merck & Co., Inc and Schering-Plough Corporation are an example of the merger of two companies that brought and incorporated different capabilities in an efficient way, therefore taking advantage of new opportunities in the different segments of the pharmaceutical industry.

The goal of this dissertation is to do the historical financial analyze and estimate the enterprise value of both companies as if they were optimally managed; and assess the value of the merged entity and the synergies created. Last it is proposed an acquisition mode and optimal price for the deal to be accepted.

Through the Literature Review it is presented explained the different valuation methods and M&A concepts and applications.

This work showed that Merck & Co., Inc and Schering-Plough Corporation were undervalued during 2008, and the merger will create value of both companies. The estimated synergies, approximately $ 84 billion, represent 26 percent of the merged entity enterprise value. The company's share price, by the end of 2008 was 30.4 and 17.03, Merck and Schering-Plough, respectively. As a result of all the valuation factors, the premium offered to Schering-Plough was 30 percent over the company's average market capitalization, financed 51% with equity and the remaining with debt and cash.

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List of Abbreviations/Acronyms

APV	Adjusted Present Value
BE	Book Equity
CAPEX	Capital Expenditure
CAPM	Capital Asset Pricing Model
CCC	Cash Conversion Cycle
CF	Cash Flow
CFs	Cash Flows
CFD	Cost of financial distress
DCF	Discounted Cash Flow
EBITDA	Earnings before Interest Taxes Depreciation and Amortizations
FCFE	Free Cash Flow to the Equity
FCFF	Free Cash Flow to the Firm
FDA	Food and Drug Administration Organization
FV	Firm Value
GDP	Gross Domestic Product
GR	Growth Rate
HLT	Highly leverage transactions
M&A	Mergers and Acquisitions
ME	Market Equity
NDA	New Drug Applications
PBV	Price-book Value
PE	Price-earnings ratio
PS	Price-Sales ratio
PwC	PriceWaterHouseCoopers
ROIC	Return on invested Capital
OBS	Organon BioSciences N.V.
T_C	Tax Rate
TIPs	Inflation-indexed Treasury Securities
VAT	Value added tax
V_U	Value of Unlevered Firm
VTS	Value of Tax Shields
WACC	Weighted average cost of capital
WC	Working Capital

Acknowledgments

I would like to express my deep gratitude to my dissertation advisor, Professor Peter Tsvetkov, for the support through this long process, for being always available and giving continuous feedback. I would also like to thank my family, specially my mother and father for giving support during all my life, backing my choices, and most important during this period of work, providing me with words of encouragement whenever it was needed.

Finally, I want to thank my "mentor", my uncle Alexandre Tavares, whose I am very grateful for teaching me about the pharmaceutical industry and for the guidance provided during all the process of writing the dissertation; and specially now for the advices and help making the best decisions in my professional life.

1. Introduction

The emphasis of this master thesis is on Mergers and Acquisitions (M&A). The objective of the thesis is to evaluate the merger of two companies and give reasonable reasons for their consolidation. The thesis focuses on the real case of merger of two biopharmaceutical companies, Merck & Co., Inc and Schering-Plough Corporation in 2008. Since the merger occurred in 2008 it will be analyzed as the present time began in the end of 2008, time when both companies expressed a desire to merge, therefore all financial and market information will be from the same year.

The pharmaceutical industry is characterized for having innumerous opportunities that can be captured when two pharmaceutical companies merge, since the different companies can combine different capabilities that leverage their competitive advantage. Hereby, in this thesis one will demonstrate the opportunities that Merck & Co., Inc and Schering-Plough Corporation will gain with the merger.

The thesis will initiate with the industry and company analysis of Merck & Co., Inc and Schering-Plough Corporation. This framework in the pharmaceutical industry will provide information of how the industry works and their segments. The company analysis section will present Merck & Co., Inc and Schering-Plough Corporation, sales performance and main costs that affect their operations.

The thesis will have a literature review chapter to present the various valuations models and the proper model to value these companies. The literature review will also focus on M&A, crucial notions that are important to understand and proceed with the consolidation of two companies.

Proceeding there will be a chapter dedicated to the performance in the stock market of Merck and Schering-Plough in order to compare both companies share price.

The performance forecast will be separated in different chapters, where there will be the standalone valuation forecast for Merck and Schering-Plough, in this chapter it is applied expectations for both companies. Hereafter, the merger of the companies; the valuation will be done with the same valuation method. In the merger it will be stretched the opportunities that the merged entity will have and applied in the valuation.

At the end, there will be an acquisition offer and the market reaction for this merger.

2. Industry and Company Analysis

2.1. Overview of the Pharmaceutical Industry

The pharmaceutical market is worth 781 US$ billion[1] corresponding to a GDP expenditure[2] global average of 6 percent (Figure 1) and it is represented by two general product segments (Figure 2). The pharmaceutical industry is considered high technology sector with the greatest value added per person employed. It also represents the highest global business R&D investments to net sales and the highest total world manufacturing value added[3]. The average growth rate of the industry in the past 5 years (2003 to 2008) is 6.6 percent, having in 2002 to 2003 the highest growth rate of 9.1 percent[4].

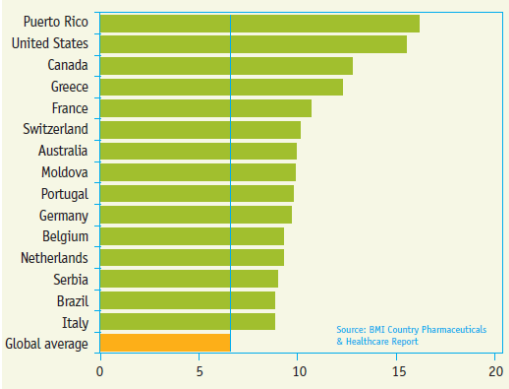


Figure 1: Top 15 countries according to healthcare spending in 2008 as a % of GDP

As mentioned previously the market is divided in two general segments, originally protected and never protected segment. The originally protected segment is formed by pharmaceutical and biotechnological companies. The last segment, never protected, is formed by generic companies and pharmaceutical companies that produce health care products.

Pharmaceutical and Biotechnological companies develop, produce and market medicines; due to the long years (10 to 12 years) it takes to develop and market a new medicines these are legally protected with a patent. The difference between the two types of companies is that biopharmaceutical companies focus their work on finding medicines working with human molecules, instead of chemical molecules. This area of the pharmaceutical industry is considered the new challenge of the business since patients interact in the studies and it will be possible to create personalized medicines. The United States market has approximately 75 percent of the global revenues and R&D expenditure.

[1] "Total Unaudited and audited Global Pharmaceutical market in 2008", IMS Health Market Prognosis, March 2010
[2] Sheppard, A. (2010) "Generic Medicines: Essential contributors to the long-term health of society", Sector Sustainability Challenges in Europe, IMS Health
[3] EPFIA (2008) "The Pharmaceutical Industry in Figures"
[4] "Total Unaudited and audited Global Pharmaceutical market from 2003 to 2008", IMA Health Market Prognosis, March 2010

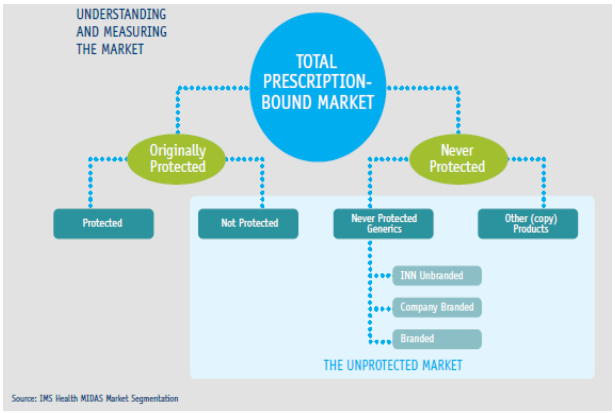


Figure 2: Pharmaceutical Market Segmentation

Generic companies, as the name already says sell generics. Generics is the term used to define the drug segment that is similar to a branded medicines in terms of effectiveness and quality features, dosage to be taken, route of administration and strength, this segment can only be commercialized when the intellectual property protection of originally branded drugs achieves to its end. This segment is the fastest growing segment and it has been gaining strength among the markets, as governments increase their efforts to reduce health expenditure. In volume terms, generics raised 46 percent in the key markets during five years (2002-2007), but in value terms it grew 2 percent, from 12 to 14 percent (during the period of 2002 to 2006), in the global pharmaceutical market (Appendix 2).

By 2007, the greatest market in the world is represented by North American market (USA& Canada) with 45.9 percent market share and it is worth $311.8 billion in sales, followed by Europe and Japan (Figure 3). Although the greatest market, the European market outpaced the US market in terms of growth rate, 7.1 percent and 4.4 percent, respectively, but the fastest growing market is the Asian market with 15 percent growth rate. According to the statistics of IMS Health, it is expected that, between 2008 and 2013, US market might enter in a small recession [(1) to 2 percent], and the remaining markets will continue to grow (Appendix 1).

The pharmaceutical industry is a highly regulated industry and an industry where other players besides the manufacture play a big role.

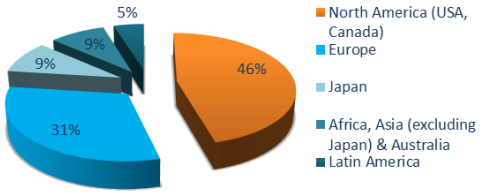


Figure 3: Breakdown of the world – Pharmaceutical Market – 2007 Sales
Source: IMS Health, February 2008 (data relate to the 2007 audited market at ex-factory prices)

Distribution margins, in one of the examples where it is possible to see how many players influence the final price of medicines (Appendix 3). Normally, distribution margins are fixed by governments (mainly in European countries), and approximately 35 percent of retail price reverts to governments and distributors (pharmacists and wholesales). VAT rates are not standardized within countries, according to EU Member States requirement, it must be at least 15 percent, but it varies from country to country.

Pharmaceutical Development Cost are very high due to great length and riskiness that involves the process of research and development of medicines, 10 to 12 years (Appendix 4), approximately, and the improvement of societies and patients that are requiring more complex and suitable medicines (Table 1). In 2007, it was estimated an average cost of spending for a new medicine, biological or chemical, of $1.318 million. The high cost of R&D demonstrates the high necessity for investments in pharmaceutical companies, which tend to be sponsored by their own financial capacities.

Table 1: Ranking of Industry Sectors by aggregate R&D from the world top 1,400 companies in the 2007 EU Scorecard – 2006

Sector (according to the ICB)	R&D investment (€ million)	Share in R&D investment (%)	R&D/Sales ratio (%)
Pharmaceutical & Biotechnology	70.523,5	19.3	15.9
Technology hardware & Equipment	64.351,5	17.6	8.6
Automobiles & parts	60.807,1	16.6	4.2
Electronic & electrical Equipment	27.138,9	7.4	4.4
Software and computer services	26.522,8	4.7	3.1
Chemicals	17.186,0	4.7	3.1
Aerospace & Defence	15.991,3	4.4	4.8
Leisure goods	14.208,6	3.9	6.5
Industrial engineering	9.319,3	2.5	2.7
General industrials	8.867,6	2.4	2.1
Fixed line telecommunications	7.283,1	2.0	1.6
Health care equipment & services	6.446,1	1.8	6.8
Oil & gas producers	4.923,7	.13	0.3
Food producers	3.918,5	1.1	2.2
Household goods	3.911,9	1.1	1.6
Others (22 sectors)	24.243,9	6.6	0.9
Grand Total (37 sectors)*	**365.643,8**	**100,00**	**3.4**

Source: EPFIA; The Pharmaceutical Industry in Figures (2008)

The European pharmaceutical companies have been for a long time the main region where new medicines were invented, reaching during five years (1960 – 1965) a pick of 65% share of the market. But since 2003, United States pharmaceutical companies surpassed EU firms, being the leading market in inventing new molecules (Figure 4).

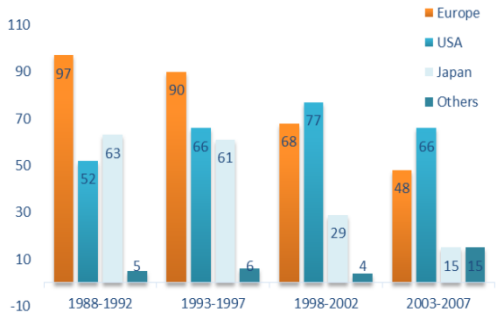


Figure 4: New Chemical or Biological Entities (1988 – 2007)

2.2. Merck & Co

Merck operates in the pharmaceutical industry, focused on research and development of pharmaceutical products. The Merck family entered in the pharmaceutical business in 1668 through a pharmacy and the persistency in discovering and developing medicines has maintained the company operations until the present day[5].

According to IMS Health data in 2008, Merck Corporation ranked in eight in the top 15 Global Pharmaceutical Corporations (Figure 5).

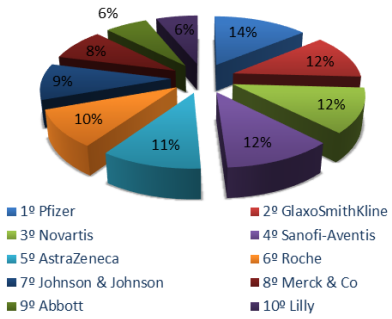


Figure 5: Top 10 Global Corporation

The company separates its business into two product basis operations, *Pharmaceutical* segment and the *Vaccines and Infectious Diseases* segment, reporting results in this matter. Pharmaceutical products are human health pharmaceutical products used in therapeutics and for prevention of human disorders. Vaccines and Infectious Diseases products include products related to both, vaccines for human health, such as preventive pediatric, adolescent and adult vaccines that have to be administrated by medical professionals; and infectious diseases medicines.

Operating results of the Company have been increasing during the years enhancing Merck's' presence in the market (Figure 6 and 7). Although the positive performance in 2008, the company faced a decline of 1% on its revenue compared to 2007 due to sales decline of two of its products, *Fosamax*[6] and *Zocor*[7], which lost exclusivity (patents) in 2008 and 2006, respectively. The decline in the current year was not greater due to increase of sales of three products, *Januvia*, *Janumet* and *Insentress*[8]. Merck performed better in markets outside the United States, having an enlargement of 10 percent in sales, while in the domestic market sales decreased 9 percent, compared to 2007.

[5] Information taken in the Portuguese Merck official website, on November 29th, http://www.msd.pt/content/corporate/about/pt_historia.html

[6] *Fosamax* is used for the treatment and prevention of osteoporosis. *Fosamax and Fosamax Plus D* lost their patent in the United States in February 2008 and April 2008, respectively.

[7] *Zocor*, used to modify cholesterol, lost exclusivity to the United States Market in 2006.

[8] *Januvia* and *Janumet* are medicines used for the treatment of diabetes type 2. *Isentress* is an antiretroviral therapy for the treatment of HIV infection

Figure 6: Merck Performance

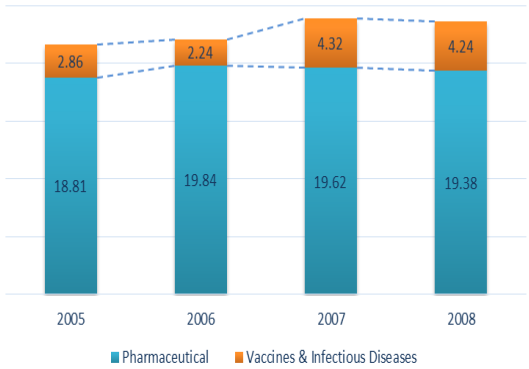


Figure 7: Segments Revenue Performance

The main focus of the company is on innovation and customer value, facing the challenges of the market, in this way the company has the ability to continue to grow and prepare itself for future trends. Merck develops its business with internal and external R&D programs; the objective is to optimize its portfolio by focusing only on the company core competencies, outsourcing its non-core competencies and investing in opportunities such as Merck BioVentures[9], growing emerging markets, like China, and business development.

In the same year, Merck announced a global restructuring program which aimes to the enhance competitiveness, cost reduction and efficiency enlargement. The guidelines of the project go through extensive use of outside technology, in order the company to focus only on its core competencies, as previously mentioned, centralize marketing and sales operations, reinforce and streamline operations. "The company expected to eliminate 6,800 employees and 400 vacancies, 40 percent being in the United States, by the end of 2011. The program would yield a pretax cost of $1.8 to $2.0 billion by 2011, in return from 2008 to 2013 the company expected to have pretax savings of $3.8 to $4.2 billion dollars"[10].

In the beginning of 2008, the company had nine products in Phase III clinical development and it was anticipating to submit three New Drug Applications ("NDA") with the U.S. Food and drug Administration ("FDA") in 2009 (Appendix 5.1).

[9] New division of the company that focused on an unique technology platform for follow-on and novel biologics
[10] Stated in the Annual Report of 2008 about the Restructuring Program.

2.2.1. Prescription Pharmaceutical Segment

Prescription Pharmaceutical products are sold through prescriptions and the company sells them to drug wholesalers and retailers, hospitals, government agencies and managed health care providers (pharmacy benefit managers, health maintenance providers and other institutions).

Sales of this segment had a decline of 1% in 2008 and 2007 due to the end of exclusivity of the products previously mention. Part of the decline felt in the pharmaceutical segment was offset by an increase of sales of *Januvia, Janumet, Singulair*[11] *and Cozaar/Vaseretic. Singulair* was one of the medicines with a higher growth rate of 19% in the segment, in 2007; this rose was due to increase of volume sales in Europe and Japan. *Januvia* was also an important medicine in the company portfolio since it started with sales in 2006 of $42.9 million, $667.5 million in 2007 to $1.4 billion in 2008. (Appendix 5.2)

2.2.2. Vaccines and Infectious Diseases Segments

Vaccines and infectious diseases products cannot be sold directly to the public by retailers due to the fact that they have to be administrated by professionals; therefore this segment has different distribution networks then the Pharmaceutical products. Vaccines distribution network are physicians, wholesalers, physician distributors and government entities. Infectious Diseases products are distributed to wholesalers and retailers, hospitals and governments agencies.

In 2007, sales of this segment grew 48 percent [12] driven by strong performance of four products, *Gardasil, Varivax, Rotateq and Zostax.* Contrary to 2007, a small decline from $4.3 billion to $4.2 billion was experienced in 2008 and the main factor was the *Gardasil and Varivax* reduction of sales.

2.2.3. Costs, Expenses and Others

Merck reduced its cost by 33% in 2008 in comparison with 2007. This reduction was influenced by the 2008 restructuring program implemented in the company and it had different effects in different areas of the company. The higher decrease was seen in Materials and Production costs and Equity Income from affiliates, with (9) and -14 percent, respectively (Table 2).

[11] Medicine for astham and seasonal and perennial allergic rhinitis treatment.
[12] Sales of 2006 were 2.2 billion.

Table 2: Costs, Expenses and Others

($ in millions)	2008	Change	2007	Change	2006
Materials and production	$ 5.582,5	-9%	$ 6.140,7	2%	$ 6.001,1
Marketing and administrative	7.377,0	-2%	7.556,7	-7%	8.165,4
Research and Development	4.805,3	-2%	4.882,8	2%	4.782,9
Restructuring costs	1.032,5	*	327,1	*	142,3
Equity income from affiliates	-2.560,6	-14%	-2.976,5	30%	-2.294,4
U.S *Vioxx* Settlement Agreement charge	-	*	4.850,5	-	-
Other (income) expense, net	-2.194,2	*	46,2	*	-382,7
	14042,5	-33%	20827,5	27%	16414,6
**100% or greater*					

Materials and Production costs were reduced to align with the reduction of costs of the restructuring program. Respectively to the restructuring program $132.2 million were costs related to material and production, where $88.7 million were associated with the closure of facilities and $34.5 million of asset write-offs and others. The Company gross margin was 76.6 percent compared to 74.6 percent in 2008 and 2007, respectively. Changes in the product mix in 2008, decline of *Fosamax* sales, influenced the gross margin.

Marketing and administrative expenses and research and development (R&D) had each a decline in costs of 2 percent in 2008. The cost reduced in marketing and administrative were the reduction of future legal defense costs and reduction of the cost base, like sales force. R&D reduction costs reflect closure of facilities, associated with the restructuring program.

The reduction in Equity Income from Affiliates reflects a decrease in partnerships, more specifically some partnership with Schering-Plough Corporation and reduction in returns of other partnerships.

2.2.4. Capital Structure

From 2004 to 2008, Merck presents a slightly stable capital structure. During the 5 historical years (2004 to 2008) the debt to capital varied from 59 to 62 percent. The company does not provide information about their choices and reasons for the different sources of finance, therefore one cannot provide further comments about the capital structure (Appendix 5.3).

2.3. Schering-Plough Corporation

Schering AG was created in 1851 by Ernst Christian F. Schering in Germany and Plough was a Memphis company formed in 1908 by Abe Plough. In 1971, the companies merged originating Schering-Plough Corporation, becoming a United States based company.

The company is an "innovation-driven science-centered global health care company", which focus its operations in three customer segments, such as prescription, consumer health care and animal health. Although Schering-Plough is presence in all the stages of product development, discovering, developing and manufacturing pharmaceutical products, it also tried to have external programs to enhance innovation through partnering, in-licensing and acquisition. Its main R&D activities were focused in the prescription segment, but it also had crucial applications for the other two segments.

By 2003, with the new management the company strategy was to focus on creating undiscovered therapies and treatments for medical needs and that have commercial value, therefore investing significant funds in scientific research, a six-to-eight year strategic plan denominated by Action Agenda. The goal of this plan was to build strategic and long-term value for shareholders and patients that depend upon the company's medicines. This corresponds to growing sales, control costs and investments in R&D as mention previously.

According to IMS Health data in 2005, the company accounted for 1.4 percent market share of the United States market, being the seventeenth biggest pharmaceutical company in the world.

In 2008, Schering-Plough net sales were $18.billion, having an increase of 46 percent compared to 2007. According to annual report of the company this increase was generated by greater sales of pharmaceutical products such as *Nasonex, Remicade* and *Temodar,* as well as greater sales by the Animal Health segment and the Organon BioSciences N.V.[13] (OBS) products. Some products, such as *Vytorin* and *Zetia*, had a decreased of 11 percent of global net sales. Net sales outside the domestic market accounted for 70 percent of consolidated net sales. (Appendix 6.1)

[13] Organon BioSciences N.V. was purchased from Akzo in 2007. This purchase gave the Schering-Plough

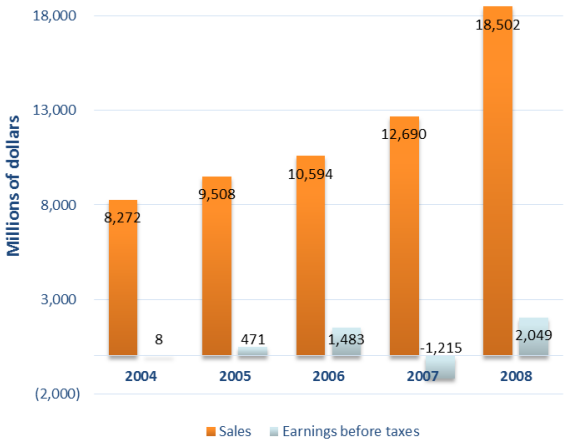


Figure 8: Schering-Plough Performance

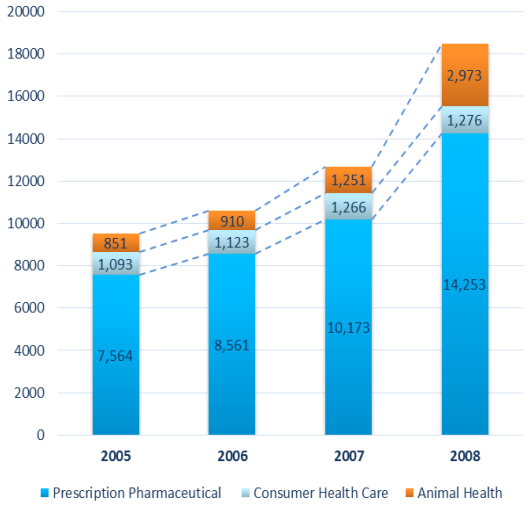


Figure 9: Segments Revenue Forecast

2.3.1. Prescription Pharmaceuticals Segment

Prescription Pharmaceutical products are medicines created for therapeutic treatments that need to be prescribed by a profession to be used. Sales of this segment increased from $10.773 to $14.253 million, corresponding to an enhanced of 40 percent in 2008 compared to 2007. In 2007, the segment had also an increase of 19 percent in sales.

Organon, the human health business of OBS, bought in late 2007, has been one of the main contributors to the sales increase, totalizing in 2008 and 2007 an amount of $3.5 billion and $409 million, respectively. *Remicade*[14] grew 28 and 33 percent in 2008 and 2007, contributed by a favorable impact from foreign exchange, higher market growth and penetration in certain markets.

Greater drop in sales was seen by *Rebetol*[15] with (6) and (11) percent in 2008 and 2007, respectively, due to sales reduction in Japan and the increase of generics competition.

2.3.2. Animal Health Segment

Animal health products are medicines used for animal therapeutic treatments. In terms of percentage it was the segment with higher growth rate from 2007 to 2008, 138 percent, this great increase was driven by the acquisition of OBS, contribution of $1.9 billion in sales, since this company has a high focus on the animal health segment treatments. Global sales grew in a solid way in all geographic areas the company was present but it also enlarged the competition, the later was driven mainly by generics.

[14] Drug administrated for the treatment of immune-mediated inflammatory disorders like rheumatoid.
[15] The combination of Rebetol and Intron A are used for Hepatitis C treatment.

2.3.3. Consumer Health Segment

Having only three product lines in this segment, this also had an increase of 1 percent ($10 million) in 2008, compared to the previous year. *MiraLAX*, launched in 2007, was the main contributor to sales increase in the segment, being offset by a decrease of 12 percent *OTC Claritin*[16] sales. Contrary to 2008, in 2007 the segment had an increase of 13 percent compared to the previous year which the main contribution was given by *OTC Claritin*, with an increase of 18 percent in sales.

The consumer health care segment is a very competitive segment that requires constant introductions of new and innovative products in the market and strong advertisings to costumers.

2.1.1. Costs, Expenses and Others

Schering-Plough gross margin was 65.3 percent in 2007 and 60.5 percent in 2008. The reduction in gross margin in 2008 and 2007 compared to 2006 was due to the impact of $1.4 from purchase accounting adjustments included in costs of sales derived by the amortization of fair values of inventories billion and $326 million from intangible assets acquired with OBS transaction.

R&D and selling, general and administrative expenses (SG&A) suffered an increase of 20.6 percent and 24.8 percent in 2008 and 2007 mainly due to OBS acquisition. Expenses in SG&A rose due to OBS acquisition, ongoing investments in emerging markets, greater promotion spending and unfavorable impact of foreign exchange. R&D expenses were not only influenced by OBS acquisition but also by the increase of clinical trials and related activities and investments in R&D that enhance and expand the company pipeline.

2.1.2. Capital Structure

From 2004 to 2008, Schering-Plough does not present a stable capital structure. From 2004 to 2006 the debt to capital ratio was 52 percent, approximately, but in 2007 and 2008 the ratio increased to 64 and 63, respectively. The company states in its 2008 10-K report that it must maintain a debt to capital ratio of 65 percent in 2009 and 60 percent thereafter (Appendix 6.2).

Having into account the different characteristics of the industry, Merck & Co., Inc and Schering-Plough Corporation, one will chose the most appropriate method to value the two companies.

[16] First RX-to-OTC switch in the laxative category.

3. Literature Review

Through the Literature Review it is going to be explained different valuation methods and the mergers and acquisitions (M&A) concept and methodology.

Regardless of the companies that are going to be valued it is crucial to bear in mind that the value of a project is the sum of future cash flows expected discounted by a proper discount rate.

To valuate these companies we have to evaluate the different methodologies and find the most suitable for the companies that are being valued. The method of *Discounted Cash Flows*, the *Adjusted Present Value* and the method of *Comparables* are going to be the three main methodologies discussed through this Literature Review.

3.1. Valuation

"There are those who are disingenuous enough to argue that value is in the eye of the beholder, and that any price can be justified if there are other investors willing to pay that price. Perceptions need to be backed up by reality, which implies that is the paid for any asset should reflect the cash flows it is expected to generate."[17] (Damodaran, 2002)

This sentence stretches the importance of valuing companies according to cash flows they generate.

3.1.1. Cash Flows

Damodaran (2002) presents the value of an asset as its capacity to generate cash flows. To value cash flows (CFs) it is crucial that CFs is valued prior to taxes, debt payments and reinvestment needs. When valuing equity, Cash flows to equity must be without debt payments.

3.1.1.1. Types of Cash Flows

As it seen so far, there are different cash flows depending on the valuation that is being chosen to estimate the company value, different CFs have to be computed.

- Dividends are the only CFs that is received when an investor buys a stake of a company publically. The model to evaluate equity is named as *dividend discount model*, which the value of the stock is the present value of the dividend payment.

[17] Damodaran, A. (2002), *Investment Valuation, Tool and Techniques for Determining the Value of Any Asset*, University Edition, Second Edition, John Wiley & Sons, Inc., New York

- Free Cash Flow to the Firm (FCFF) is the group of all cash flows that are generated by the firm operations. All claim holders cash flows must be included and those are stockholders, bondholders and preferred stockholders.
- Free Cash Flow to Equity (FCFE) is defined as the remaining cash flow after paying debt obligations, capital expenditure, tax issues and working capital.

3.1.1.2. Terminal Value

According to Damodaran (2002) firms "do not last forever" and it is necessary to establish a moment in the future to estimate its liquidation value. In assessing the terminal value it is imposed a closure in the Discounted Cash Flow Valuation (methodology that will be explained in the next section). Assuming a constant nominal rate in perpetuity, Kaplan et al. (1996) reinforces that depreciation and amortization must be seen as means of comparison with CAPEX, and CAPEX should be as high as those two costs.

3.1.1.3. Growth rate (GR)

According to Damodaran (2002), when estimating growth rate (GR) it is important to have into account, the historical performance of the company, since the past information can be valuable information to the estimation of growth. The growth rate can be calculated simply by doing the product of reinvestment rate (2.1) and the return on capital (2.2).

$$Reinvestment\ rate = \frac{Capital\ Expenditure - Depreciation + \Delta\ working\ capital}{Net\ Income} \quad (2.1)$$

$$ROIC = \frac{EBIT\ (1-T)}{Total\ Capital\ Invested} \quad (2.2)$$

Reinvestment rate accounts for how much a firm is going to generate future growth. Although not the most accurate estimation it is used the most recent financial statements of the company to forecast[18]. Damodaran (2005) states that the higher reinvestment rate will increase the growth rate. The return on invested capital (ROIC) is based upon the firm's operating incomes on existing investments divided by the total capital (Damodaran, 2005). By the formula, it is clear that the growth and reinvestment rate are linked, estimating one will influence the estimation of the other, so in order to grow at greater rate it is necessary to reinvest intensively (Damodaran, 2002). Growth is also directly related with ROIC, the quality of the investment will be reflected in the growth of the company.

[18] http://olesiafx.com/economics/day-200706-15.html

3.1.2. Approaches to Valuation

3.1.2.1. Adjusted Present Value and Discounted Cash Flow Methodologies

Considered for a long time one of the best methods to value assets (for instance a factory, business, product line or market position) was the *Discounted Cash Flow (*DCF*)* methodology (Luehrman, 1997)

The DCF methodology values any asset as the expected future cash flows (CFs) of a project. But to find the present value of the CF, it is necessary to discount them at a proper discount rate. The discount rate will be related with the riskiness of the estimated cash flows, with higher rates for riskier assets and lower rates for safer projects.[19]

The DCF approach with the *Weighted Average Cost of Capital* (WACC) (2.3), it's used to obtain the firm value by discounting the FCFF with the WACC rate, which is the cost of the different components of financing used by the firm, weighted by their market value proportion. (Damodaran, 2002)

$$WACC = \frac{D}{D+E} \times R_e + \frac{E}{D+E} \times R_d \times (1 - T_c) \quad (2.3)$$

The value of the firm can also be derived by valuing the different pieces of the firm separately. This approach is called *Adjusted Present Value* (APV), where the firm value is the sum of two pieces. The first piece is the value of the firm as unlevered firm (2.4), all-equity financed; and the second piece is the value added by a firm's choice of capital structure, in order words the financing side (2.5), which comes in the form of interest tax shield (Kaplan, S et al., 1996). The valuation must contain the tax shields valuation since the company pays taxes and interests, so it is crucial to taken into consideration.

$$Value\ of\ the\ Unlevered\ Firm\ (V_u) = \sum \frac{FCFF_n}{(1+r)^n} + \frac{FCFF \times (1+GR)}{(r-GR)} \quad (2.4)$$

Interest tax shields will reduce taxable income by the amount of the interest and consequently the tax bill by the amount of interest times the tax rate. As with the all-equity financed part the tax shields must be discounted at an "appropriate rate" to reflect its risk (Luehrman, 1997). The common discount rate is the cost of debt since tax shields are as uncertain as principal and interest payments. The author also states that in the terminal horizon, indebtedness will grow as the company grows so the growth rate will be the same as the one applied in the equity side.

$$Value\ of\ Tax\ Shields\ (VTS) = \sum \frac{Interests \times T_c}{(1+r)^n} + \frac{Interest \times T_c \times (1+GR)}{(r+GR)} \quad (2.5)$$

[19] Damodaran, Aswath, Investment Valuation, Tools and Techniques for Determining the Value of Any Asset; University Edition, Second Edition, 2002

The cost of financial distress (CFD) (2.6) is a way to adjust the company's value to the likelihood of the company to enter in hazard, being unable to deliver its terminal value or simply the forecasted cash flows. According to Damodaran (2002) the present value of the distress is multiplied by the probability of distress. In the pharmaceutical industry, it is assumed 27% of losses in case of distress, according to Korteweg (2007) research paper for the health industry.

$$PV\ of\ Expected\ CFD = Probability\ of\ distress\ (default)\ \times CFD\ \times Unlevered\ firm\ value \quad (2.6)$$

According to Copeland et al. (2000) and Damodaran (2002), the value of the company (2.7) is the sum of the different components described previously.

$$Enterprise\ Adjusted\ value = \frac{FCFF\ (1+GR)}{r-GR} + VTS - P(D) \times CFD \quad (2.7)$$

Although a good method when it was discovered, currently the WACC approach is considered obsolete by many researches. To substitute the WACC it is presented the APV, whereas many researches support the usage of the later due to its versatility, reliability and its lower propensities to serious errors (Luehrman, 1997).

Luehrman reinforces the idea by saying that "APV always works when WACC does, and sometimes when it doesn't, because it requires fewer restrictive assumptions. APV's power lies in added managerially relevant information it can provide. APV can help managers analyze not only how much an asset is worth but also where the value comes from."

3.1.2.1.1. Compressed Adjusted Present Value

Kaplan et al. introduced in their study a version of the APV methodology to be applied where it is used the FCFs of an all equity financed firm and the interest tax shields at the same unlevered, all-equity financed firm. This methodology will discount all the capital cash flows to an equity discount rate.

3.1.2.2. The method of Comparables/Multiples

The method of comparables is a methodology based on relative valuations. The value of an asset is based on how similar assets are priced in the marketplace.

According to Steven Kaplan et al. (1996), the value of a company through multiples is obtained by multiplying the ratio or multiple from the comparable companies by the performance measure of the company being valued. Aswath Damodaran (2002) claims the value of the asset through multiples is derived from the pricing of comparable assets, standardized using common variable such as earnings, cash flows, book value, or revenues.

The most widely used multiple analysis are Earnings, Book Value and Revenue Multiples. To determine the Market Value of Equity the multiples analyzed are the Price-earnings ratio (PE), Price-book value (PBV) and Price-Sales ratio and to estimate the Value of the business analysts use FV[20]/EBITDA, Tobin's Q and the Value-sales ratio (FV/Sales). (Damodaran 2002)

Kaplan et al. assert after the analysis of 51 highly leverage transactions (HLT) that although some of the "comparable" or multiple methods performed well on an average basis, the DCF methods were more reliable because they return estimation. Kaplan et al. findings also asserts that most reliable estimates were those obtained by using the DCF and the comparable methods together, being more efficient to perform an analysis with both methods for the sample being studied.[21]

When using Multiples and a methodology based on Cash flows in the same sample it is important to employ Multiples based on EBITDA- Kaplan et al. – in order to obtain a comparability factor.

Kaplan concludes that to employ the multiple method, comparable companies need to have similar trends. These companies need to grow at the same rate and have the same risk profile. It's also expected that these companies vary their value in a direct proportion with changes in performance measures, for instance EBITDA.

3.1.3. Discount Rates

After explaining the three different methodologies that can be applied when valuing a company, cannot be forgotten the different rates that are used by the different methodologies already presented. In this section, it will be stretched these rates and highlight their major differences.

The Adjusted Present Value Methodology employs a discount rate directly to the company cash flows as if the company was entirely equity financed, for this reason the rate employed is an "opportunity cost of capital" (Luehrman, 1997), the unlevered cost of equity, and a Cost of Debt to discount the tax shields.

According to Luehrman (1997) the Discount Cash Flow Model with WACC can be applied to companies where exists constant ratio of debt to total capital. Expected Cash Flows that are already known and those CFs are discounted using a weighted average cost of capital, that has into account debt and equity.

[20] Firm Value
[21] It's important to retain that in the HLT analysis the DCF approached with the WACC couldn't been applied due to one of its assumptions that states that companies must have constant debt ratios, which was not the case.

3.1.3.1. Cost of Equity – CAPM

Aswath Damodaran presents the cost of equity (R_e) as the required rate on equity investments in a firm by the investors. According with the Capital Asset Pricing Model (CAPM) which the R_e formula(2.8) lays on the principle that investors are individuals with diversified portfolios, diversification is a way of reducing the risk, in this sense investors are only exposed to Market Risk. Investors hold a small portfolio of assets, between 10 to 20, reducing their exposure to risk, due to reduction of marginal benefits gained with the increase of portfolio diversification.

The CAPM assumes that investments are "infinitely divisible", being the investors able to purchase an asset by any of its fraction; they are well informed, they have access to all information of the market (no asymmetry) and finally that there is no transaction costs, every asset in the market can be traded.

CAPM incorporates three elements, a Risk-free rate (R_f), a Risk Premium ($R_p = R_m - R_f$) and an unlevered beta (β^u) or systematic risk (Luehrman, 1997) that measure the company's exposure to the market risk.

$$R_e = R_f + \beta * (R_m - R_f) \quad (2.8)$$

As Jason MacQueen[22] stated in his study and as we can see by the equation in the CAPM the "return and the systematic risk go together" and it's not possible to work with one without the other.

3.1.3.2. Risk Free rate

"Academics and practitioners have long used government security rates as risk free rates, though there have been differences on whether to use short term or long-term rates" Aswath Damoradaran (2008) states in his paper.

As Damodaran shows in his findings, the majority of risk and return models takes as a starting point an asset as risk free, and use it to calculate the risk and return of other assets. The importance in this section is to clarify how to choose the appropriate risk free for the valuation of Merck and Schering-Plough.

The expected return of any risky investments is based on the risk free rate of the riskless asset and later added the expected equity premium, which is also based on the risk free rate (in section 2.1.3.4 it's going to be more detailed this relationship). To have a risk free asset means that returns that are expected to be generated by the asset are equal to actual returns. The risk would be the variance between actual returns and the expected return, and in this case the risk would be null.

[22] "Jason MacQueen: *Beta Is Dead! Long Live Beta!*, Quanted, Ltd"

For Aswath Damodaran it's crucial to estimate properly the risk free rate due to great dependency of the cost of equity, as seen in the section 3.1, and cost of debt have on it. In case of the cost of debt, to compose it, it is added the default spread (risk premium), being the latter dependent on the credit risk of the company.

The risk free rate has also influence upon the company's growth, the greater the risk free rate the smaller will growth be, since the value of growth assets will decrease. In this sense, mature companies would have a greater rate than growth companies.

But to use the risk free rate it's imposed some requirements:

- The riskless securities may have no default risk. Being so, only government securities may be chosen, since governments are the only entities that are able to "fulfill promises".
- Securities with risk free rates may not have reinvestment risk. If a security has reinvestment risk it means that in maturity the value of the Treasury bill rate is uncertain.

To have a proper use of risk free rate, valuation should be done with zero-coupon default-free bonds maturing in the same period has the asset of the company. The risk free rate may also vary among countries, since different each country has its own inflation rate, having countries with high inflation rates a higher risk free rate for the same maturity, therefore, securities should be measured in the same currency.

3.1.3.2.1. Real and Nominal Risk Free

What determines whenever it is used the real or the nominal risk free rate is the inflation of a specific country (Damodaran, 2008). In a market where inflation is unstable and high, company valuation should be done with real rates. In this sense, the discount rates should also be real rates.

Government bonds are not based on real rates, instead returns are risk free rate in nominal terms, accounting for inflation. To obtain the value of the real rate it is simply subtracted to the nominal rate the expected inflation.

Another option for obtaining a real risk free rate is through the *inflation-indexed treasuries*. The inflation-indexed treasury (TIPs) presents a guaranteed real return but not a guaranteed nominal return.

3.1.3.3. Beta

According to Rosenberg B. and Rudd, A. (1998) al. beta (β) is the key variable in the CAPM and it has been used as a measure of risk by the investment community. The authors also state that the value of β can be derived by observing relationship between the market trend and the stock price of the company.

The value of β (of a stock) has a direct relationship with the proportion of excess stock return when compared to the excess return on the market, in other words, the higher the excess stock return compared with the excess market return, the higher will be the β estimation of the stock. In this line of thought, β would be an estimation of "historical alignment of stock price with the market" and it can be used to estimate future trends of risk.

Since β is based on historical data is crucial to bear that some levels of risk may have occurred in abnormal situations (chance events) causing the stock price to move with market. In case these events occurred frequently, the stock value will have a β estimation with misleading values, having an unreliable predictor. These estimations problems are named as "*estimation error*" and have to be considered.

Aswath Damodaran (2002) suggests a second method to estimate betas through the fundamentals of the business. The author claims that β is a pure reflection of decisions on which business the company should be in, the level of operating leverage to be applied in the business and the proper financial leverage for the company.

A third way to have the value of beta is estimating the risk parameters from accounting earnings rather from than traded prices. Since variations in earnings in the company reflect the variations in earnings of the market, from the same period, the value of β can be estimated easily to be used in the Capital Asset Pricing Model.

Rosenberg B. and Rudd, A. (1998) concluded in their paper that despite the errors that can appear from the beta estimation, this variable is so far the best risk estimator.

Although, these authors support the use of β, Fama E. and French, K. (FF) (1996) caught the attention of practitioners introducing two arguments against CAPM model, more specifically against the usage of β. The authors argue in their paper that one premises of CAPM (β is the only parameter that explains the expected return and β risk delivers a positive expected premium) does not hold. The authors argue in their findings that expected return is not only explained by β but also by other variables, such as firm's size (market capitalization), book equity (BE) data and the ratio of BE with market equity (ME).

Fama and French (1996) support the usage of *intertemporal CAPM* (ICAPM) or the *arbitrage pricing theory* (APT) is strengthen, since expected market return, common time-series variation in returns and market premium are accounted.

Kaplan, P and Peterson, J (1998) state in their paper that, although FF presented arguments against CAPM, there are no "theoretical justified alternative model" that can be easily applied. Giving reasons to many practitioners to deepen their studies on CAPM.

The authors also present other two different ways to use the β for companies that operate in a single industry or in several. The first concept is the *beta of the pure-play portfolio*. βeta of pure-play portfolios are applied for firms that are specialized in a single industry. To rise to a proper value of β, the authors suggest that calculation should be done to a group of pure-plays that operate in the same industry, division or project that is being done, in this way statistic noise is reduced.

Conglomerates are not included in this group since they operate in different businesses. For this group the authors illustrate that through the usage of *full-information industry beta estimation* it can be reached the value of β. This model is done through the weighted average of company individual businesses betas coefficients, having into account the firm-specific betas and the percentage of sale (of each firm) of each industry the companies operate, in order to get the *observable betas* of the conglomerates.

3.1.3.4. Risk Premium

The equity risk premium (2.9) reflects how much risk analysts attributed to the market and price attached to that risk; the risk premium influences the expected return and the value of any risky investment (Damodaran, 2011). Being the equity risk premium the price for taking risk, the premium only considers the risk that is added to the diversified portfolio (unsystematic/market risk), risk that can be measured and compensated.

The equity risk premium determinants are economic risk, information, liquidity, risk aversion and catastrophic risk, whereas the first three factors play a major role. Information asymmetry is related to the quantity and quality of information available to investors. Yee (2006) states that information asymmetry and incomplete information are two relevant points, in CAPM, and they should not be misunderstood. If all information is public, equity risk may be influenced by the poor-earnings quality which creates incomplete "information environment in the market". Poor-earnings quality by itself may affect the cost of capital.

One of the most used methodology to estimate risk premium is through historical premium approach (Damodaran, 2011). This has into account the estimation of actual returns earned on stocks for a long

period of time and actual returns of a riskless asset, normally a treasury security, the value of actual return of the two assets are compared and computed (differential) on annual basis. To assess to the historical risk premiums one can use the available indexes of rating companies (S&P, Moody's and Fitch) of the market (Damodaran, 2002).

Since some markets are volatile and short (Emerging markets and European Equity markets) the accurate way to measure historical premiums is to find the country risk, having an unreliable parameter. For this reason it's crucial to estimate the country risk premium and add it to the premium of a mature equity market (Damodaran, 2002).

$$Equity\ risk\ premium = Base\ premium\ for\ a\ mature\ equity\ market + Country\ premium \quad (2.9)$$

Important to bear that only the country risk that is not diversifiable by the marginal investor should be accounted (Damodaran, 2011), reflecting an extra risk in a specific market.

3.1.4. Mergers and Acquisitions

"A merger or acquisition happens when two or more companies join, often to share costs, increase efficiency or gain market power", (Ullah et al., 2010), and more precisely to create synergies.

Accordingly, Damodaran (2005) states that the added value that a firm will get after merging or acquiring a new firm is the defined as synergy. This added value wouldn't be reached if both companies continue operating solely.

3.1.4.1. Types of Mergers

There are four types of mergers. The type of mergers is associated to the market that the merged companies are operating. For instance:

Horizontal mergers happen when companies operate in the same market and are direct competitors. These companies tend to sell products that can be substitutes.

Vertical mergers occur between companies that can operate or actually operate in the same value chain, having the potential to have a buyer-seller relationship.

Conglomerate Mergers may occur between companies that might share some parts of the value chain, like marketing and distribution channels and in some cases the production.

Last, Congeneric mergers happen when two companies operate in the same industry but have different clients and suppliers. The companies engage in this type of mergers have no relation with each other.

3.1.4.2. Sources of Synergy

Aswath Damodaran presents two main groups of synergies, where different sources can explain the appearance of synergy within the merged companies.

Operating Synergies, as the name already says, is one of the sources of synergy and it affects the operations of the company. It will cause an increase in growth and/or an increase in operating income from existing assets. Operating Synergies can be seen as:

- Economies of Scale – the combined firm increases cost-efficiency and profitability.
- Increase of Pricing Power - the combined firm reduce competition and increase their market share by forming a single company, this combination will deliver higher operating income and higher margins.
- Different combination of functional strength – when the combined companies can transfer functional strengths between the two businesses. It can be observed in a vast variety of mergers.
- Higher growth increases the capability of the combined firm to generate more sales of products.

The first two Operational Synergies will be achieved only when the two combined companies are from the same business, named as *Horizontal Mergers.*

Financial Synergies are more specific comparing with the previous synergy. This source of synergy can deliver higher cash flows and/or a lower discount rate. The different types of this synergy are:

- Cash Slack or Excess Cash – when one company has excess of cash but poor or limited investment opportunities combine with another that it is in the opposite situation, a company with limited cash and "high-return projects". When combining both companies higher value will be created.
- Debt Capacity – the combined firm will have a higher debt level than if they were operating solely. Earnings and cash flows also become more certain and stable, allowing the new company to borrow higher amounts than they could before as separate entities, having in turn tax benefits.
- Tax Benefits – can be enhanced if companies are acquired or merged to take "advantage of tax laws to write up the target company's asset or from the use of net operating losses to shelter income".
- Diversification- "most controversial source of financial synergy" due the fact that are easier and cheapest ways to do it. But in case of a private or closely held firm, the acquire firm can achieve potential benefits.

Although Damodaran presents different sources of synergies, he concludes that companies enter in mergers to create synergies but only a small part of them can deliver "substantial synergy". These findings suggest that synergies can be achieved but are very arduous to be put into practice.

3.1.4.2.1. Valuing Synergies

Before describing briefly the way mergers should be valued, it is important to distinguish two concepts that may be mistaken. Damodaran (2005), states that the *value of control* is the added value that a company can achieve by running the company in its maximum efficiency. This value is believed to be achieved by the acquired company without the merger, the buyer firm believes that changing management objectives and strategies and applying better investments, the company will increase its value. In the end, companies compare the value achieved in a changed scenario (if it was managed at its maximum efficiency and with the merger) with the status quo.

In the same findings, Damodaran presents how the valuation should be done. The method applied in the findings is:

- Value the firms involved in the merger independent.
- Estimation of company value with a different management, a management that would yield the maximum value of company (value of control).
- Estimate the value of the combine company, without the added value of synergy.
- Estimate the value of the combine company with synergy. The difference with the previous valuation is the value of synergy.

3.1.4.3. M&A does pay?

According to some practitioners and studies M&A on average does pay, but there is some skepticism on the market.

For Mark Sirower and Sumit Shani (2006) companies don't do an average acquisition. They reinforce the idea saying that it is important that executives and boards of the company that make the decisions and monitor investments, have the proper tools to help them distinguish between the good and the bad deals.

Sirower and Shani in their findings also support that initial reactions of the market are a good signal of the acquirer's operating performance in the future. The first year after the deal is established is crucial to deliver promises, it is a signal of the credibility of those promises.

The authors concluded in their paper that:

- On average, acquirers underperform their industry peers – the average return to acquires acquisitions deal around the announcement days were -4.1%, where only 36% of the deals were seen as positive and 64% were perceived as bad deals.
- Initial reactions are persistent and indicative of future returns" – one year later deals that started with a negative and positive reactions maintained their performance (-9.2% to -9% and 5.7% to 4.9%, respectively).
- Delivering results after a good start pays off big – deals that start in a good path and deliver results outperform the ones that started badly.
- Price matters - the average premium paid to companies were around 36%. An average premium of 38.4% was paid by initially negative group and 30.7% paid by the positive group. The same results were intact one year later
- Cash deals outperform stock deals – cash deals on average outperform stock deals by 4%, results from one year later shows a wider gap between the two, 8.3%.
- Sellers are the biggest beneficiaries of M&A transactions – sellers win on average with the deals, 20% of the pre-adjusted return was earned.
- M&A transactions create value at the macroeconomic level – In general there is a value creation of 1% at the announcement, the combination of both seller and buyer market capitalization adds value for the merger.

Robert Bruner (2004) also supports that M&A does pay. According to his findings shareholders of selling firms earn abnormal returns from M&A, and the combination of the returns of the seller and buyers earn significant positive returns. Buyers, on the other side, earn the rate of return on the investments. The author also supports the argument that M&A deals are not homogeneous; each transaction is local, so depending on different circumstances different outcomes will be achieved.

The author concluded in his study (sample of 12.023 deals) that the average adjusted return to buyers was positive in 1.1%, this value is low due to the unprofitability of some big deals. The losses occurred in 87 deals out of the total sample. This cases also happened during 1998 and 2001, a hot M&A market.

Although it was clear for Sirower that mergers do create add value for the companies and for the economy, his paper also presents some skepticism of investors. Many reasons put investors on hold in relation to mergers.

When deciding to enter in this type of deal it's required a full payment upfront and it's crucial to achieve synergies when acquires promised otherwise it will influence negatively the expected net present value of the investment.

Share price of both companies (seller and buyer) reflect the significant performance improvements, named as the *base case*, even without paying an acquisition premium, on which gains will be built. Synergies will only occur if the acquirer can surpass the base case.

Many practitioners and researchers think that mergers come for free but it doesn't. According to Sirower there is always a financial cost associated with achieving synergies (revenue or cost synergies), the *synergy matching principle*.

The authors also states that majority of managers that integrate in a bad mergers they tend to invest more money in the hope of saving the deal, showing investors that it was unnecessary to invest in the business. The major concern is that these businesses usually involve large amounts of money and dissolving them it's extremely expensive, so managers believe they can solve it by investing more.

Stock deals also deliver two significant signals to investor. It shows that it's the best time to issue new shares since they are overvalued. So the buyer should question the sellers' motive to sell the company. Paying with stock shows that sellers are not confident with the deal, otherwise they would pay with cash, paying with debt, requiring confidence and discipline to pay it.

3.1.4.4. Premium Metrics

Premium value is the the added value that is going to be augmented to the base case of the company acquisition value.

Sirower and Sahni present methodologies to be used as tool to compare with the reality. These tools are not replacements to the previous methodologies presented.

Shareholder Value at Risk (SVAR) methodology is a "straightforward starting point for assessing the materiality of a deal whether it is paid for with cash or with stock". In other words, it is a good tool to access which proportion of the value of the company will be at risk if synergies are not achieved after the merger. This methodology (2.10) demonstrates that the higher the value of the seller company comparing to the buyer, and the higher the premium percentage paid to sellers, higher will be the SVAR.

$$SVAR = \frac{Premium\ paid\ for\ the\ acquired\ company}{Market\ Value\ of\ the\ buyers\ company\ before\ the\ announcement} \quad (2.10)$$

The Equity Market Value (2.11) is a tool used to check the integration of the companies after the merger. This value should be a multiple (P/E) of its after-tax earnings (E).

$$MV_T = E_T \times P/E_T \quad (2.11)$$

As reality check the Premium offered to the acquired company should be a percentage of MV.

The authors also stated that synergies must be reached exclusively by cost reductions and revenue increase. For this reason it is possible to compute cost synergies (2.12) required to earn the offer premium for any merger, a measure to support the acquirer premium.

$$\%SynC = \frac{\Pi}{1-\Pi} \times (\%P - \%SynR) \quad (2.12)$$

Where Π is the pre-tax margin, *P* is the premium and %*SynR* is the benefits of the expected percentage of revenue synergies.

The above equation yields the "Meet the Premium (MTP) line", which is the combination of %SynC and %SynR to create pre-tax synergies to equalize the value of premium imposed and pre-tax margin. Deals should occur all above the MTP line. In Sirower et al. paper it was proposed a 35% premium on a target with an 18% pre-tax margin, with this parameters the decrease necessary in costs to achieve enough pre-tax profit improvement, to break even and justify the premium would be 7,7%[23].

3.1.4.5. The Era of Cross- Border on M&A

The breakdown of barriers between countries has made many companies to look for goods, services and products in different countries or regions with better quality and price. Many emerging countries have become "targets" and partners of major companies in developed countries on market integration (Zenner at al., 2008).

According to the study of cross-border era, the current crisis caused markets to accelerate demand for goods more quickly in order to reduce the competitiveness of markets; to survive the fall of the dollar, high valuations for companies in emerging markets and the increase of sovereign wealth funds.

Since 2003 Cross-Border transactions have been exceeding domestic transactions and in 2007 it accounted for 12 out of 15 biggest non-private M&A deals.

Long-term drivers of Cross-border M&A such as globalization, geographic diversification and deregulation are mention as factors to be maintained in the future, this long-term catalysts are stated by the author as a consequence of the current market situation. Due to the free markets, innovation and competition, the long-term drivers were predictable.

[23] The 7,7% is achieved by doing $0{,}35 \times 0{,}18/(1-0{,}18)$

On the other side, the author also presented a group of short-term catalysts that he considers a powerful driver's in today's M&A markets. These drivers may not persist in the future but they do complement the long-term catalysts. The short-term drivers are the major currency shifts/weak U.S dollar, purchasing power of a unit of BRICM (Brazil, Russia, India, China and Mexico), sovereign wealth funds and reduced competition from financial sponsors and strategic domestic buyers.

3.1.4.6. Skepticism of Investors

Although it was clear for Sirower that mergers do create add value for the companies and for the economy, his paper also presents some skepticism. Many reasons put investors on hold in relation to mergers.

When deciding to start an acquisition process, full payment upfront is required and it is crucial to achieve synergies when acquires promised otherwise it will influence negatively the expected net present value of the investment.

Stock prices of both companies (seller and buyer) reflect the significant performance improvements, even without paying an acquisition premium, on which gains will be built. Synergies will only occur if the acquirer can surpass the base case.

Many practitioners and researchers think that mergers come for free but they don't. According to Sirower there is always a financial cost associated with achieving synergies (revenue or cost synergies), the Synergy matching principle.

The authors also states that majority of managers that integrate in a bad mergers they tend to invest more money in hope of saving the deal, showing investors that it was unnecessary to invest in the business. The major concern is that these businesses usually involve large amounts of money and dissolving them it's extremely expensive, so managers believe they can solve it.

Stock deals also deliver two significant signals to investor. It shows that it's the best time to issue new shares since they are overvalued. So the buyer should question the sellers' motive to sell the company. Paying with stock shows that sellers are not confident with the deal, otherwise they would pay with cash, paying with debt, requiring confidence and discipline to pay it.

3.1.4.7. Misleading Arguments

Robert Bruner (2004) presents a group of arguments defended by researches that does not support the occurrence of mergers. According to the author, conventional wisdom supports the idea that M&A is a loser's game; where failure is the most common result of mergers but the evidences about M&A are meanly supported by scientific prove. Another common though is that M&As' are "homogeneous" but

from different authors so far it's was clear that exists different types of deals. Aswath Damodaran (2005) introduces arguments that are presented to overpay the transaction.

- Deal-makers are normally the ones that decide whenever a company should undertake in such deals. Their fees are attached to the occurrence of the agreement and not if it is appropriate to the company. In this sense, Deal-makers tend to undertaken in such agreements no matter the price that would be necessary to pay; these phenomenon is named as *Biased Evaluation Process*.
- *Managerial Hubris* is a another argument designated in Damodaran findings but firstly presented by Roll (1986) where it is characterized as a self-belief that managers do not make mistakes, so they over evaluate companies (and synergies) in the companies they pretend to purchase.
- Lastly, the *Failure to plan for synergy* occurs when companies tend not to map the delivering synergy plan before the acquisition and realize that there is no synergy.

The author also presents other dubious arguments, the *Accretive Acquisition,* where the target company needs to have lower P/E than the purchaser. This line of though supports that after the acquisition the target company will reach an EPS equal to the purchaser. This though makes no sense since the target company had lower ratios for factors (low growth and high risk, for example) and that cannot be excluded with the acquisition.

4. Performance in the Stock Market

Stocks Markets are a good way to evaluate the performance of business and industries. As mention previously, the pharmaceutical industry is a very controlled industry set by high governmental regulations which make it very sensitive to changes in the market and the 2007/08 financial crisis was one of the examples.

Merck and Schering-Plough were no exception following the trends of the market; they have been clearly affected by financial crisis. Merck shares price start declining in the 4th quarter of 2007, dropping from a value of $61.62 to $32.46 in the 4th quarter of 2008; in one year the value of shares dropped by half; this evidence can lead to a conclusion that pharmaceutical industry although important to the society because they create and produce medicines they are influenced by market fluctuations.

Schering-Plough share price had a slight growth in 2007, reaching a price of $33.34 in the 2nd quarter, $13.34 higher than in the following year. In 2008, the shares price dropped to its normal levels, around $20 reflecting the crisis effect.

In the last quarter of 2008, Merck had shares price of $32.46 and Schering-Plough $18.48. Even with the financial crisis the difference between the price of shares of both companies remained equal.

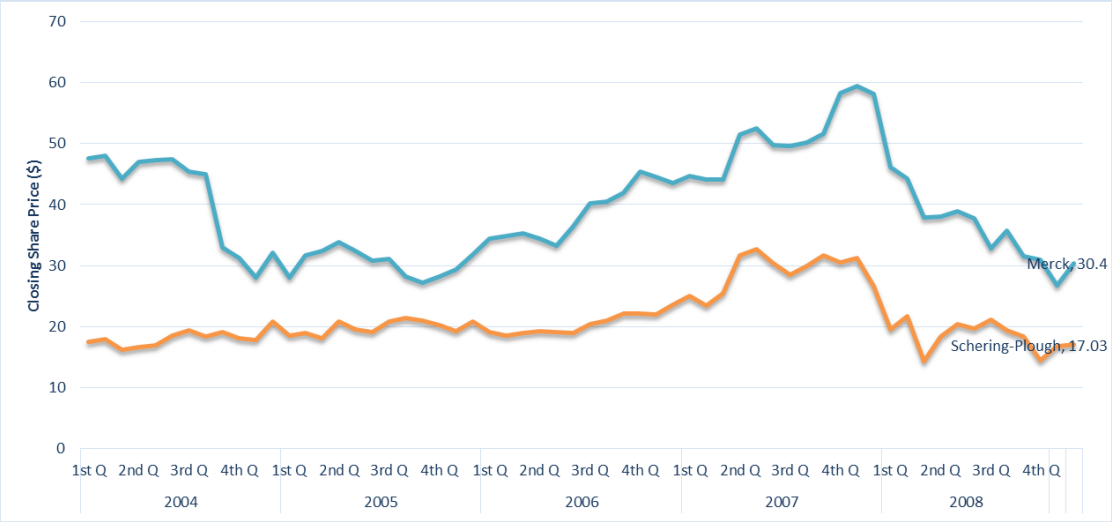


Figure 10: 5-year Historical Stock Price of Merck &Co and Schering-Plough

5. Valuation of Entities Independently

5.1. Performance Forecast

To evaluate the merger and its benefits to the companies it is necessary to perform firstly an individual valuation to merging companies. In this valuation, companies are valued as if they are optimally managed during the forecast years, in order to observe how a company would perform without the merger and the add value they would create when merging with another company.

For individual valuation of both companies, one will take into account analysts' considerations about the industry and the companies, to optimize their performance as if they were operating alone. It is crucial to have consistency in the results presented.

Thus, valuation will be done through two different methodologies: *APV* and *Relative Valuation*. Although the valuations methodologies are different the results should complement each other. APV valuates companies as individuals and relative valuation compares a company with its peer group, in this sense the reader can have a better understanding how the company is doing. The first method to be used will be APV and after relative valuation will be used to complement the first method. The valuation model will consider the historical performance to observe trends and the company strategic objectives in order to forecast the company performance.

Historical information about companies was collected from 2004 to 2008, since the merger happened in 2008. Being the valuation of pharmaceutical companies it is crucial to have a long time period of forecast, since the research, development and production (R&D) of medicines normally last 10 years and majority of the products that go to the approval of Food and Drug Administration Organization (FDA) are rejected or take months to be approved. Another reason that supports the forecast period is the product portfolio, more specifically the stage of life that the medicines may be; some medicines will be losing their patent early and others were introduced recently to the market, so it is important to capture their different trends.

The Free Cash Flows to the Firm will be forecast every year until 2018. The terminal value of the company will be forecasted from 2018.

5.1.1. Merck

The objective of valuation is to find the company expected cash flows and discount them to the present so one can have the value of the company today and the estimation of cash flows will be calculated in nominal values.

To calculate the value of cash flows (4.1) we need to forecast EBIT, CAPEX, Depreciation, Net Working Capital and other assets. During the analysis of historical information, there was a concern to know and have into account which elements of the company are more important to the business, in order to do a better forecast.

$$FCFF = EBIT(1-T) + Depreciation - \Delta Net\ Working\ Capital - Capital\ Expenditure - Other\ assets \quad (4.1)$$

Merck has been trying to establish itself as one of the best pharmaceutical companies in the world, aiming to be in the top 10 in the last years. Until 2008, the growth strategy of Merck was to invest in strategic markets, such as Japan and Latin American countries but continuing to have a great focus on the US market.

5.1.1.1. Revenues

Merck presents its sales information according to two segments, as seen previously: Pharmaceutical Segment and Vaccines and Infectious Diseases segment. The pharmaceutical segment is the one driving the business of the company, being in 2008 5x[24] higher in terms of sales in 2008 than the Diseases and Infectious Segment. According to the European Federation of Pharmaceutical Industries and Associations (EFPIA)[25], the pharmaceutical medicines (segment) will always be the prevailing segment. An estimation of revenues by product segments has to be carefully forecasted and have a clear distinction between the segments.

This estimation of revenues is also crucial since revenues will have a direct and indirect impact on several costs, for instance Material and Production costs which dependent directly on the level of sales and Research and Development that would be reduced in case the level of sales of a company reduce every year.

The revenue forecast can also be presented by geographic segments. Merck presents this alternative way to view/analyze the business and one considered very useful since diverse regions of the globe are in

[24] Revenue of Pharmaceutical Segment (08)/ Revenue of Vaccine and Infectious Disease Segments (08) = 19.382,9 / 4.237 = 4,57
[25] EFPIA (2008) "The Pharmaceutical Industry in Figures"

different phases of growth, even in this business. EPFIA, IMSH Health and other institutions present important data that supports the forecast by geographic segments. The forecast by geographic segments can illustrate to readers how a company can perform in each segment and built an appropriate strategy to the upcoming years. For this reason, Merck's forecast is going to be presented by the segmentation discussed last.

Merck's presents four segments in its reports, North America region, Europe, Middle East and Africa region, Japan region and Other region, the last region includes Latin America and Asia countries.

Revenues Forecast Inputs

According with the references given by Alexandre Tavares[26], the revenue forecast has to take into consideration four factors, the evolution of the pharmaceutical market in terms of the number of patients, the evolution of pharmaceutical price, the market share of the company in terms of global sales and the projections made by the company for the future.

The data collected was from the following segments: Asia/Africa/Australia, Europe, Latin America and North America; segmentation was provided by IMS Health[27]. The institution provides us with growth rates by regions (segments) which will allow a comparison with Merck forecasted growth rates for each segment (Table 3).

Table 3: IMS Health Pharmaceutical Market Growth Prognosis

	North America	Europe	Asia/Africa/Australia	Japan	Latin America
2009	-0,5%	3,5%	11,5%	4,5%	9,5%
2010	4%	4,0%	14,0%	1,0%	11,0%
2011-2015	1,5%	3,5%	12,5%	3,5%	12,5%

Related to the evolution of the market in terms of number of patients, the objective was to relate the number of patients with the spending per patient. Therefore, it was taken into account the pharmaceutical industry spending, the GDP evolution and the population evolution (Appendix 7). According to the IMS Health[28] the pharmaceutical expenditure will increase in the following years between 5 to 8 % due to the increase of world population and the improvement on health care. This information provided by IMS Health leads us to the conclusion that patients market will increase and one will support this information with proper data.

[26] Finance Director of Amgen Portugal
[27] Total Unaudited and Audited Global Pharmaceutical Market by region, IMS Health Market Prognosis, March 2009
[28] Pricing and Contracting in International Markets, Effects of changing stakeholders influences

The evolution of pharmaceutical price is related to the governmental policies and economic conditions of each country, pharmaceutical companies have little maneuver to manage the retail price (Appendix 7). According to the report[29] of World Health Organization the global tendency is towards a reduction of pharmaceutical prices so that all patients can have access to medicines.

The market share during forecast has to be maintained, at maximum (Appendix 8). Regardless of the company's goals for the future, the market share should never be reduced the current level, the objective of the company is not to lose market share. And the current market share will serve as reference to the sales forecast.

Merck contributed in its report with expectation of growth for the upcoming years. Therefore, one had into consideration this expectations, it was seen if those were realistic in relation to past performance and market projections by IMS Health (Appendix 8). This element while taking into consideration the company's data, one revalued in order to project the revenues, in this sense it is considered as an assumption.

United States of America

The first segment has always been the greatest segment in Merck's portfolio (Appendix 9), with the highest sales level. In 2008, this geographic location represented 56[30] percent of the company revenues and one assumed that it will continue to represent a big portion of the company revenues in the future. According to the EFPIA 2008 Study[31], USA is the number one in R&D investment with higher investment in Research and Development (R&D) and greater consumption of medicines being some of the reasons for their number one market position.

The United States segment has presented a grow rate of (5), 8, 7 and (9) percent, in 2005 to 2008, respectively. Although it is the biggest segment, the forecasted growth rate is very small. On average the United States segment will grow at a rate of 1% per year and this low rate is justified by the lower growth forecasted by EPFIA and other institutions and the modest expectations of Merck for the upon coming years. (Appendix 9)

[29] The World Medicines Situation 2011, Medicines Prices, Availability and Affordability, Geneva 2011.
[30] 13370,5/23850,3 = 0,561
[31] EFPIA (2008) "The Pharmaceutical Industry in Figures"

Europe, Middle East and Africa

Europe, Middle East and Africa segment always represented the second biggest market segment. From 2005 to 2008 the sales growth rates were (4), (4), 4 and 12 percent, respectively. From 2007 to 2008 the company had a significant growth comparing to the previous years and according to the company's report this is due to great investment that was made in Africa and Middle East countries.

In 2008, it had 24 percent of the total revenue. According to the EPFIA 2008 study[32], Europe is considered a big threat to U.S. and if applied the right strategies, it can overcome the United States segment. According to the same study, European countries are seen as technologically prepared to receive a great investment in the business as United States but due to different and tougher regulations this market segment has difficulty to be as big as the U.S. market. Africa is integrated in the Asia/Australia/Africa segment of IMS Health that the expects the pharmaceutical market in those regions in those regions to grow on an average rate of 13 percent per year and the United Nations also projects that population Africa and Middle East will continue to grow at an average rate of 12 percent. Although a very optimistic estimations about the market, with the company projections one estimates a growth of 4 percent, on average (Appendix 9).

Japan

According to the company's annual report, this segment is separated from the other two segments since it is a very specific market and the company relies on it to transact certain medicines such as *Cozaar*, with a strong performance in Japan and *Singulair* with a high volume growth. The segment growth rates for 2005 to 2008 were (2), (10), 4 and 19 percent, respectively, and the average growth rate estimated for 2009 to 2018 is 3 percent.

The forecasted growth rate of 2 percent (average) is influenced by the company projection of 0.2 percent to grow each year in the segment, the 2.77 percent of market share in sales and the average growth rate of 0.1 percent on price evolution until 2018 (Appendix 9).

Other

The last segment is represented by the remaining countries that are not included in the first three groups. Such countries are the Australia, Singapore, South Africa, Latin American countries, Brazil, India, China, and others. This segment although with low sales due to the weak presence of the company in such countries, it has high potential to grow, since those countries are becoming more developed.

[32] EFPIA (2008) "The Pharmaceutical Industry in Figures"

The growth rates of this segment were 2, (0.03), 17 and 2 percent, from 2005 to 2008, respectively. Merck's sales market share is 2 percent and the company projects to grow each year 2 percent. These estimations and the price growth rate evolution until 2018 gives a growth rate for 2009 to 2018 of 6 percent, on average (Appendix 9).

5.1.1.2. Costs

From this chapter, the forecast will be presented in a consolidated way; the separation in segments is not necessary since the costs will not be significantly different once the products produced will be the same all over the world and the company business is highly focused on the US market.

Material and Production

This type of costs is highly related with manufacture of products. In this specific case, the manufacture of medicines represented, in the last 4 historical years, 25 percent of sales revenue, on average (Appendix 10). According to the 2008 form 10-K a small percentage of material and production cost (3 percent) is related with the depreciation of planned sale or closure of some of the company's manufacturing facilities and asset write-offs, associated with the 2008 and 2005 Restructuring Program; this percentage of costs will be reflected in the cost of material and production until 2011.

For the forecast one assumes that cost of material and production will be 25 percent of sales revenue since the average rate from 2005 to 2007 was 25 percent.

Marketing and Administrative

Marketing and Administrative expenses represented 34, 31 and 30 percent of the level of revenue, in 2006, 2007 and 2008, respectively (Appendix 10); since the percentage has been around 34 and 30 percent, so I will assume an average between the three years to forecast the Marketing and Administrative costs. Therefore, 32 percent will be proportion spent with this cost. Marketing in this industry can't be compared with the others, since in the Pharmaceutical Industry medicines can't be advertised, regulators control everything that a pharmaceutical company says about their medicines to the public.

According to the 2008 form 10-K, in this cost is also included an average amount of $100 million corresponding to legal defense costs reserves of products. This reserve is for litigations that the company might have. According to the company, Merck has "various claims and legal proceedings" that are considered as normal due to the nature of the industry. Some examples are: product liability, intellectual property and commercial litigation and antitrust actions.

Research and Development

In 2008, Merck reduced its level of costs of R&D by 2 percent (Appendix 10) in comparison to the previous year. This reduction was due to the 2008 restructuring program that had the objective of reducing costs. In 2007, in contrary with 2008, the cost of R&D increased by 2 percent due to the increase of compound entering clinical trials.

According to EPFIA 2008 Study[33] the majority of pharmaceutical companies have a level of R&D correspondent to 15.9 percent of sales revenue. Since there is no information how this cost is projected, one will assume that the R&D would be forecasted based on revenues, like EPFIA presented the level of R&D.

The level of R&D, in the last 3 historical years, was correspondent to 20 percent of revenues and since it has been stable one will assume this level to forecast R&D.

Restructuring Costs

As mentioned previously this cost was created to fulfill the needs of the 2005 and 2008 Restructuring Program. According to 2008 Form 10-K it is expected that in 2011 this cost will no longer be incurred. From 2009 to 2011, the company expects to spend $1.6 billion to $2.0 billion, for the cost forecast one will assume the maximum ($2.0 billion) and distributed equally in the three years.

Equity Income

This cost is associated with the joint ventures and partnerships the company does with other companies. Although this element is addressed in the cost section, Equity Income, like the name already says it is normally a positive income obtained through the partnerships and joint ventures. Due to the 2005 and 2008 Restructuring Program some joint ventures and partnerships are being reevaluated in order to see if it compensates to maintain them in the company portfolio. The respiratory joint-venture of $105 million done with Schering-Plough was terminated in 2008; therefore the company had to pay to the partner in the same year $43 million of charges and the remaining will be amortized until 2016 (patent life of *Zetia*). I will assume that from 2009 to 2016 the value that is going to be amortized will always be equal.

Table 4: Respiratory Joint-venture

Equity Income	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**Total**
Respiratory Joint-venture	-43	7,75	7,75	7,75	7,75	7,75	7,75	7,75	7,75	105

[33] "EPFIA (2008) "The Pharmaceutical Industry in Figures"

Excluding the redemption made with the respiratory partnership with Schering-Plough, one will assume that the level of Equity Income will remain the same, since there is no conclusive information that can lead to a more accurate projection (Appendix 10).

U.S. *Vioxx* Settlement Agreement Charge

This element was only used to enter into an agreement in 2008 with law firms to resolve state and federal myocardial infarction and ischemic stroke claims already filed against the company in the United States.

5.1.1.3. Capital Expenditures

Capital Expenditures (Capexs) are an important element in the pharmaceutical industry. In fact, this element may be considered as one of the barriers to enter and establish in this industry. According to the IMS Health pharmaceutical companies require good and appropriate infrastructures which involve high investments upfront. At the same time companies face a problem of new technology appearing and making the one they have obsolete. Pharmaceuticals are differentiated by investments made on infrastructures, company size are correlated with the investment made in this area, meaning that the highest the company size the higher will be the infrastructure cost.

Pharmaceutical companies tend to invest more in developed countries, where regulations and government policies regarding the pharmaceutical industry are clear and known. United States is nowadays the biggest attraction due to its high development and investment in the pharmaceutical industry.

Merck by no exception follows this investment trend; United States accounted for 73 and 78 percent of the total CAPEX in 2008 and 2007, respectively. However, a new investment trend is rising due to saturation of developed markets which require companies to look for new locations to invest. Countries such as the BRIC countries are showing high growth levels making companies desire for new investment locations.

According to Merck 2008 Form 10-K, the company is engaged in Environmental Matters, in this sense, during the years it has been enrolled in activities that help the environment. In 2008 the company estimated that they spent $89.5 million in environmental matters, since the beginning of this project, and this cost is included in Capital Expenditure. The company stated that in the limit they except to spent in the future $70.0 million with environment actions.

For 2009, the company was expecting to have a capital expenditure of $1.6 Billion; one will assume this estimation for 2009 and assume that environmental matters are already included in this forecast.

Merck does not provide any information about how they project and decide the amount they will invest each year, for that reason one relied on peers' information, more precisely Amgen information about

how they forecast their CAPEX. According the 2009 Form 10-k, Amgen CAPEX is associated with manufacturing capacity and site expansion. Since, Merck does not provide concrete information about their strategies; I cannot estimate the expansion of sites. Therefore, one will forecast CAPEX in relation to manufacturing (Sales – Cost of Sales) (Appendix 11).

From 2004 to 2009, Merck's represented 10, 8, 6, 6, 7 and 8 percent of the company's manufacturing, respectively. One assumed that Capital Expenditure maintained the same percentage over the company's manufacturing, 8 percent, from 2010 to 2018.

5.1.1.4. Depreciation

Merck states that the company uses the straight-line method to depreciate their tangible and intangible assets. Although they provide this information they do not present the description about the assets they have in the company and intentions to purchase more. Therefore, it is quite complicated to forecast depreciation only with outside information.

Therefore, one calculated the percentage that depreciation represented on net assets[34] (table 5). From 2004 to 2008, Merck's' Depreciation and Amortization has been very unstable (Appendix 11). In 2004 the company had a ratio of 7 percent and in the following year the ratio increased to 9 percent then to 13 percent, dropping to 9 percent in 2007 (Table 5).

Table 5: Percentage of Depreciation over net assets from 2004 to 2008

Year	2004	2005	2006	2007	2008	2009-2018
% over net assets	7%	9%	13%	11%	9%	10%

For the forecast, one will assume the percentage of depreciation over net assets from 2008 to estimate depreciation for the upcoming years.

5.1.1.5. Working Capital

Working capital (WC) is a measure of operating requirements of the company; it evaluates the liquidity of the company to fulfill its operating needs. Merck has always displayed liquidity to sustain its operations, the company discloses the values of working capital, been the total current assets minus the total current liabilities. According to Damodaran[35], for valuation purposes the calculation of WC will only have Inventory, Receivables and Payables, following the general composition of WC (formula 4.2).

[34] Net assets
[35] http://pages.stern.nyu.edu/~adamodar/New_Home_Page/valquestions/noncashwc.htm, March 07th, 2012

$$Working\ Capital = Receivables + Inventory - Payables \quad (4.2)$$

Receivable was estimated based on a percentage of revenues, as the formula of the Cash Conversion Cycle[36] (CCC) (4.3) shows. Contrary to Receivables, Inventory and Payable were forecasted having into the Cost of Sales.

$$CCC = DSO + DIO - DPO \quad (4.3)$$

$$DSO = \frac{Receivables}{Revenues} * 365 \quad DIO = \frac{Inventory}{Cost\ of\ Sales} * 365 \quad DPO = \frac{Payable}{Cost\ of\ Sales} * 365$$

From the 2009 Form 10-K it was only possible to withdraw information about Inventory. As the company explains in its report the existing inventory it is related to the revenue obtained together with the probability of the product to have regulatory approval. Since the Cost of sales is also related to revenues, there was no obstruction to forecast inventory based on it. About the two remaining elements, there is no information that can contradict the forecast.

For the forecast of the three elements, one had into account DSO, DIO and DPO, with those it was possible to achieve the number of days the company pays, receives and have products in inventory. With those, one assumed the number of days of 2008 to forecast the element until 2018.

Since 2004, the CCC has been positive but dropping from 166 to 133, but in 2008 it increased to 167. The continuous drop, from 2004 to 2007, shows a concern to reduce the number of days between of Receivables, Payables and Inventory, for this reason one will assume that 2008 was an abnormal year and 2007 values will be the reference for the CCC from 2009 to 2018 (Table 6).

Table 6: Working Capital

	Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Accounts Receivable		3,628	2,927	3,315	3,636	3,779	3,678	3,758	3,864	3,961	4,065	4,175	4,277	4,406	4,541	4,682
Inventories		1,899	1,658	1,769	1,881	2,283	1,708	1,746	1,794	1,890	1,940	1,992	2,041	2,102	2,167	2,234
Accounts Payable		421	471	497	625	618	567	580	596	627	644	661	677	698	719	742
Total working Capital		5,105	4,114	4,588	4,893	5,445	4,819	4,924	5,062	5,223	5,361	5,505	5,640	5,810	5,988	6,174
Δ Working Capital			- 991	473	305	552	- 626	106	138	161	138	144	135	170	178	186
Days Receivables		58	49	53	55	58	55	55	55	55	55	55	55	55	55	55
Days Payables		31	33	30	37	40	37	37	37	37	37	37	37	37	37	37
Inventory Days		140	118	108	112	149	112	112	112	112	112	112	112	112	112	112
Cash Conversion Cycle		**166**	**133**	**131**	**130**	**167**	**130**	**130**	**130**	**130**	**130**	**130**	**130**	**130**	**130**	**130**

[36] Cash Conversion Cycle measures the time period between of time payments the company does to supplies and the time the company will receive from clients.

5.1.1.6. Financial leverage

Following the conclusion taken with the Literature Review, the terminal value of the company will be computed through the APV method, with an unlevered cost of equity. Some assumptions were made through the project so it could be possible to compute the terminal value of the company and the discount rates were driven from CAPM. Since one of the objectives is to find an unlevered cost of equity, the CAPM formula (4.4) will be used with an unlevered beta.

$$R_e = R_f + \beta_u * (R_m - R_f) \quad (4.4)$$

Risk-free (R_f)

According to the company's shareholder structure, Merck had up to 53 percent of the share capital represented by U.S investors, followed by English and German investors, representing 13 and 9 percent of the share capital. Therefore, the risk-free rate was taken from the United States Treasury data of 2008, since the majority of investors are from United States (Appendix 12). The 10-year Treasury bond on December 31st of 2008 was 2.25 percent.

Beta (β)

As explained in the literature review the best method to find the value of a beta (β) is through the estimation using proportion of excess stock return and comparing with the excess return on the market. For the thesis, one used the data from Damodaran website of unlevered βs; the β chosen of 1.03 is from the pharmaceutical industry, in order to achieve a coherent terminal value (Appendix 13).

Risk Premium (R_p)

According, to Damodaran the risk premium (R_p) of U.S. in 2008 was 5 percent (Appendix 14), one important factor about this rate is that it does not include the Moody's default spread and the bond volatility, solely the U.S historical risk-premium. According to Damodaran, U.S. in 2008 had no country risk; therefore the total risk premium is equal to 5 percent.

Having all the elements of the CAPM formula it is possible to compute the value of the cost on equity(R_e). Using the CAPM formula, the required cost on equity is assumed to be 7.4 percent (2.25% + 1.03*5%).

Cost of debt (R_d)

Concluding the equity side elements to estimate the terminal value of Merck cannot be forgotten the valuation of the debt side, as the APV method requires. Therefore it is necessary to have a cost of debt and the appropriate tax rate for the business.

Merck has presented a weighted average interest rate for borrowings of 5.8 and 1.4 percent at 31st of December, 2007 and 2008, respectively (Appendix 15). A high discrepancy between the two years leads to an alternative method to achieve the cost of debt. As it is not possible to obtain a value through the company's data, one has two alternatives: The first would be to collect the cost of debt of the pharmaceutical companies; this element is provided by data's, Bloomberg or Damodaran data base. Hereby, the value found in Damodaran was 6.21 percent. Another alternative would be to adjust the cost of debt with the Moody's rating of probability of default. In the case of Merck it is rated as an A3 (Appendix 16) by Moody's, and the spread associated is 1.65 percent. The interest coverage ratio of the company is 24.8x, having an AAA rating with an adjusted probability of default of 0.65 percent and one assumed Moody's rating to calculate the cost of debt. Hereby, the cost of debt is 3.9 percent (1.65% + 2.25%).

Tax-rate (T_c)

In 2008, the corporate tax rate applied in the company was 20.4 percent. The effective tax rate of Merck has fluctuated year to year, being 28.7 and 2.8 percent, in 2006 and 2007, respectively. The unstable trend of the rates makes the outlook to the future all most impossible to be made. According to Damodaran data in 2009 the marginal tax rate of the drug industry would be 25.8 percent.

Cost of Distress

Finally, having into account the percentage of distress, 27 percent (for pharmaceutical companies that are rated between A+ and B by Moody's), given by Korteweg research paper, the calculation of the cost of financial distress for Merck can be computed. The percentage of distress will be multiplied by the Free Cash Flow to the Firm each year and the terminal value and discount them to the cost of debt. The value found will be multiplied by the probability of default.

APV

In this sense, through the APV method, Enterprise Value of Merck's is $170 billion (formula 2.7 from the literature review), the company average market capitalization[37] is 2x smaller than the estimated EV,

[37] It is used the average market capitalization of companies because in 2008 were affected by the financial crisis and the market capitalization of the same year may not reflect the real value of the company

approximately, which may lead to the conclusion that the company is undervalued (Appendix 17). The Enterprise Value, as the formula represents, it is the sum of value of the unlevered firm plus the tax shields minus the financial distress (Appendix 19).

The estimated value of the unlevered firm is $ 158 billion. The unlevered firm value is calculated by adding the present value FCFF from 2008 to 2018 and the terminal value of FCFF (formula 2.4). The FCFF is the EBIT(1 - T_C) plus depreciation, Capex and variation of other assets, minus the variation of net working capital.

The present value of tax shields, as formula 2.5 shows, it is the sum of the present value of interests multiplied by effective tax rate and the terminal value of tax shields. The value achieved is 13 billion.

The Financial distress for Merck is equal to $1 billion and it was calculated having into account the value of the unlevered firm multiplied by the 1.65 percent of default spread and the 27 percentage of distress for a pharmaceutical company (formula 2.6).

Share Price

To find the share price it is necessary to calculate the value of Equity, where it is equal to present value of FCFE. The Equity value is $ 143 billion, with approximately 9400 million shares, the share price is $15.26 and the share price on 31st December 2008 was $30.4, which is good because the market perceives Merck as a valuable company.

5.2. Schering-Plough

Since 2003, Schering-Plough has established a long-term strategy focused on applying medical science to go towards unmet medical needs and have commercial value with the therapeutics created. In other words, the company's strategy aims at creating therapies and medicines that responds to medical needs that haven't been met yet through the meaningful investment in R&D. The company also sought to build long-term value for shareholders and for patients that rely on the company's medicines.

Although Schering-Plough has built effective strategies that brought great advantage and increased greatly in market, the company faces a high level of competitiveness. The pharmaceutical industry is highly competitive and consists of countless companies trying to discover new drugs and therapies in a very accelerated pace, and according to its 2008 annual report, Schering-Plough tries to be always one step ahead of its competitors.

The valuation that is going to be presented with Schering-Plough will have similar structure than the Merck valuation, in order to compare both companies when necessary and to have an accurate conclusion.

5.2.1.1. Revenues

Schering-Plough, as any pharmaceutical company, operates in the main segment: prescription pharmaceuticals, also known as pharmaceutical segment. This segment represented 77 percent of the company's revenue in 2008, which can lead to the conclusion that the prescription segment is the most invested segment through R&D. The company is also in two other segments: Animal Health and Consumer Health Care, as seen previously. From all the segments, the Animal Health Segment is the one with the highest growth rate.

The analysis and valuation of Schering-Plough will be done by geographic location to be in line with the analysis of the previous company. Therefore revenues, as the last company, will be evaluated in a separate basis but the remaining will be in a consolidated basis.

As with the previous company, one will use the four factors (evolution of the pharmaceutical market in number of patients, evolution of the pharmaceutical price, the market share of the company in sales and objectives made by the company for the future), presented by Alexandre Tavares, that influence the sales of the company.

United States of America

Contrary to what is expected by pharmaceutical companies, the United States segment is not the greatest segment from Schering-Plough (Appendix 20). This geographic segment represents 30% of its revenue, although not the greatest segment it had a significant growth (21 percent) in 2008 comparing to the previous year (Appendix 22). The growth felt was mainly due to the increase in sales of *Nasonex*, one of the prescription drugs with the highest revenue for the company. In the previous years, this segment grew 10, 17 and 12 percent, in 2007, 2006 and 2005, respectively.

Schering-Plough has been growing in a faster way than the market, indicating that the company is increasing its market share in the United States.

Having into consideration the factors influencing the forecast of revenues, one estimate that the United States segment will grow in 2009 and 2010, 15 and 7 percent, respectively. The grow rate will stabilized in 2011, and the segment will grow at a rate of 4 percent.

Although, the growth rate of the segment will have a reduction from 2009, the growth rate will be always higher than the forecasted market growth rate, this shows that the company expects to continue to gain market share of its competitors.

Europe and Canada

Europe and Canada represent the largest segment accounting for 48 percent of the company's sales revenue. Being, such an important segment, it presented one of the fastest and highest growth rates comparing with the other 3 segments. From 2004 to 2008, the Europe and Canada segment grew, 12.4, 9.0, 24.9 and 61.9 percent. And Canada, according to the company's report, had in the last 3 years a growth rate of 5 percent (Appendix 21).

The segment is forecasted to continue to grow at a rate of 27 percent in 2009, but in 2010 the growth rate will decrease to 9 percent and from 2011 to 2018 the growth rate will be 5 percent. This decrease in the growth rate from 2009 is due to population evolution and the market evolution in term of patients.

According to IMS Health the market will grow at approximately 4 percent until 2015, but it is expected that the population will grow at a rate of 1 percent until 2020, showing that the percentage of people with the necessity for drugs will increase comparing with the previous years.

Latin America

Latin America corresponds to the smallest segment of the company, with 10.74 percent of the revenues. This segment although small, it has been growing in a fast way; it grew 46 and 37 percent in the last two years (Appendix 20), 2008 and 2007, respectively. Being a rapidly growing segment one cannot neglect

its future's capacity to generate more value to Schering-Plough. According to the company's' 2008 Form 10-K, the two pharmaceutical drugs that contributed to this growth were *Pegintron Powder*[38], *Claritin*[39] and *Caelyx*[40], the greatest contributor to the growth of the segment was *Caelyx* with a growth rate of 25 percent from 2006 to 2007.

As one already stated previously, the company is implementing growth strategies involving emerging markets being the reason why the Latin American countries by their high levels of expected growth can become a source of growth to the company. The growth employed to forecast the revenues are the following 27 percent for 2009, 15 percent for 2010, 9 percent for 2011 to 2013; and 5 percent for 2014 to 2018.

Asia Pacific

The Asia Pacific segment is composed by countries from the Asian Continent like Singapore and Japan. Japan for instance is in the group of the top 4 foreign countries that generate 5 percent or more of consolidated revenues during the past 3 historical years, 2006 to 2008 (Appendix 21).

Asia Pacific is slightly bigger than the Latin American segment, accounting for 11.11 percent of the total revenues of Schering-Plough in 2008. This segment increased by 67 percent between 2007 and 2008, a significant growth comparing with the previous years. The forecasted growth rates are as stated before by IMS Health. In this segment, one assumed that Japan is equally important as the remaining countries of Asia Pacific segment since it generates significant revenues for the company. Therefore the growth rate estimated for this segment is 34, 30, 12 and 8 percent, from 2009, 2010, 2011 to 2012 and 2013 to 2018, respectively.

5.2.1.2. Costs

From this chapter on the analysis will be done in a consolidated basis, as undertaken previously with Merck. Due to scarcity of information provided by the company it was not possible to analyze and evaluate the cost by segment. Although not optimal this would make the analysis more coherent with the previous one.

[38] Pegintron Powder is an injection to treat hepatitis C
[39] Claritin is a drug used to treat allergies. Schering-Plough only marketed outside of U.S.
[40] Caelyx is medicine for a treatment of ovarian cancer, metastatic breast cancer and Kaposi's sarcoma.

Material and Production

Through the composition of the elements that make part of material and production cost was possible to verify that it is divided in two sub-groups of costs, in other words, this cost come from two sources. Normally, 70 percent of the value of material and production cost is related to the sales of medicines and the remaining 30 percent are related to other costs of production; for example, the amortization of inventory or amortization of acquired intangible assets, elements that one can't predicted in the analysis but it should be noted so that readers can better understand this cost (Appendix 23).

Although, the cost of material and production is sub-divided into parts, since 2005 this cost always followed the same trend, accounting for 35 percent of the revenues. In 2008, it was the only year in which this percentage had a small rise due to the "amortization of fair value of primarily inventories" and "intangible assets acquired as part of the OBS acquisition". For further estimations about this cost, it will be assumed the percentage of 35 percent since during the last three historical years it remained intact.

Marketing and Administrative

This cost, as the previous one, is composed by two sub-groups: the first one is sales related and the second group is related to administrative issues such as "contractually defined costs for physicians and promotion spending" and "ongoing investments in Emerging Markets". These two groups, although not directly related, persist into the future and are somehow dependent on sales; since the company is engaging in expanding its business to other markets it is obvious that sales will rise and the cost on promotion spending and investments will also rise. Therefore, it will be used a percentage of sales as directly or indirectly all sub-groups of this element are dependent on sales. Through the calculations, it was possible to realize that from 2005 to 2007 the average for marketing and administrative costs accounted for 45 percent of sales, and in 2008 this percentage had a reduction of 8 percent due to the acquisition of OBS (Appendix 22 and 23). According to the company's report there was a cost synergy in this element, the reason for the reduction of it. Hereby, one will assume the rate of 37 percent to estimate this cost by 2018.

Research and Development

In different pharmaceutical companies the cost of Research and Development (R&D) can be proportional to different elements of the company, for instance the majority of pharmaceutical companies, as EFPIA Study[41] explained in its research, tends to spend a certain amount (percentage) in relation to sales (15.9 percent) to be its costs with R&D. But this doesn't mean that all companies follow the same trend, one example is Schering-Plough who tries to invest as much as possible in the

[41] EPFIA (2008) "The Pharmaceutical Industry in Figures"

area. A very important quote of the company's report was withdrawn and due to it one will establish the estimation of R&D.

> *"For the full year 2009, Schering-Plough currently expects R&D spending to grow in the mid single-digit range."*

In 2008, R&D accounted for 19 percent of revenues, in the same year this cost had a decrease compared with the previous years. From 2005 to 2007, the proportion of R&D to revenues was around 21 percent, but since the company stated that it expects to have an increase in this value of 5 percent, one will assume this proportion and raise the value to 24 percent. This increase of 5 percent is understandable since the company acquired OBS in 2008, increasing its therapeutic areas to two new therapeutic areas, Women Health and Central Nervous System. Being important to understand these areas very well, this increase in expenditure makes total sense.

Special and Acquisition-related Charges

As the name by itself states this cost is related to charges driven by acquisitions. In the case of Schering-Plough it was charges related to OBS acquisition.

According to the report this charges will continue until 2013 and the forecast will be done until that year. Since there is no information about the future spending with this cost, one will assume the amount of 2008, to be charged until 2013, $329 million.

Equity Income

As with the Merck, this element represents the joint ventures and partnerships of the company, in the case of Schering-Plough as mention in the previous section the partnerships were taken only with Merck.

According to both reports, the respiratory joint-venture between the two companies was terminated, so Schering-Plough equity income dropped 8.7 percent (Appendix 22), reaching a value of $1.879 million. Due to lack of information about the company objectives relative to joint-ventures in the future, one cannot predict future trends of the equity income. For this reason one will assume that Equity Income will remain the same until 2018.

5.2.1.3. Capital Expenditures (Capex)

Capital Expenditures, in the case of Schering-Plough, it has presented an unstable growth during the last 5 historical years; (2), (4), 35 and 21 percent in 2005, 2006, 2007 and 2008, respectively (Appendix 24).

According to the 10-k report, Schering-Plough have two commitments related to capital expenditure that must be fulfill of $106 million and $1 million in 2009 and 2010, respectively, but besides this information there is no further reference on the future.

Therefore, one will forecast Capex having into account how Amgen does it. As seen previously, Amgen relates Capex with the manufacturing production, so the same was done to Schering-Plough to forecast its Capex.

From 2004 to 2006 the ratio of Capex/Manufacturing Production has been dropping 100 basis points, from 9 percent to 7 percent in 2006. From 2006 to the last historical year the company had a stable ratio. Here by, one will assume the percent of the last three years and forecast Capex.

In 2009 and 2010 it was made the proper adjustments to include the commitments that the company had.

5.2.1.4. Depreciation and Amortization

Similarly to the previous company the depreciation of assets will be estimated over net assets. Since there is no inside information about investments on tangible assets made by the company in order to understand how depreciation was calculated it is quite difficult to forecast this element. Contrary to depreciation, Schering-Plough gives estimation for amortization during 2009 to 2013.

> "*Annual amortization expenses related to these intangible assets for the years 2009 to 2013 is expected to be approximately $570 million."*

Due to lack of information about amortization estimation from 2013 to 2018, and once the company estimated for 5 years one will assume the same level ($570 million) until 2018.

However, since there is no information about the value of each element of the cost, amortization and depreciation, it's not possible to forecast each element separately. Therefore, one will use the estimation method used in the previous company, Merck, and still have into account the value of the amortization.

From 2004 to 2008 the Depreciation/Net assets ratio has been increasing (table 7), in the first four years the increase was minor but in 2008 the ratio had a significant growth, an increase of 13 percent. This trend demonstrates an increase in investments (tangible and intangible assets) by the company during these 5 years, mainly in 2008 when the company felt a higher ratio. For forecast purposes, one will

assume a ratio of 21 percent, assuming that an asset was bought in 2008 and it has at least 15 years to depreciate/amortize.

Table 7: Percentage of Depreciation over net assets from 2004 to 2008

Year	2004	2005	2006	2007	2008	2009-2018
% net assets	6%	7%	7%	8%	21%	7%

5.2.1.5. Working Capital

Schering-Plough, does not display in its reports the value of working capital (WC); therefore one had into account the general formula to calculate the WC (4.2) (page 40); thus there is a large coherence with the previous forecast made of Merck working capital. The working capital of the 5 historical years demonstrates that Schering-Plough has always displayed liquidity to sustain its operations (table 8).

Since 2004, the CCC has been positive, dropping from 134 days in 2004 to 104 days in 2006, but in 2007 it bucked the tendency, increasing to 237 days. In 2008, the three elements had a reduction in the time period.

Although the company has always displayed capacity to fulfill its necessities, WC has been presenting very unstable during the years. In 2008 the value of WC dropped again after a huge recovery in 2007.

According to the 2008 Form 10-K, Schering-Plough entered in an agreement to reduce the number of inventory days[42]. Therefore, one assumed the number of days of 2008 to forecast the WC until 2018. Since there is no more information about the other elements, Receivables and Payables, one assumed the days of 2008 to forecast them, in this way those two elements will be in accordance with Inventory.

Table 8: Working Capital

	Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Accounts Receivable		1,407	1,479	1,804	2,841	2,816	3,496	3,903	4,138	4,390	4,634	4,870	5,119	5,381	5,657	5,949
Inventories		1,580	1,605	1,676	4,073	3,114	3,426	3,825	4,055	4,303	4,542	4,773	5,016	5,273	5,544	5,830
Accounts Payable		978	1,078	1,254	1,762	1,677	1,845	2,060	2,184	2,317	2,446	2,570	2,701	2,840	2,986	3,140
Total working Capital		2,009	2,006	2,226	5,152	4,253	5,078	5,668	6,009	6,376	6,730	7,072	7,433	7,814	8,215	8,639
			0%	11%	131%	-17%	19%	12%	6%	6%	6%	5%	5%	5%	5%	5%
Δ Working Capital			- 3	220	2,926	- 899	825	591	341	366	354	342	361	381	402	424
Days Receivables		62	57	62	82	56	56	56	56	56	56	56	56	56	56	56
Days Payables		116	118	124	146	84	84	84	84	84	84	84	84	84	84	84
Inventory Days		188	175	165	337	156	156	156	156	156	156	156	156	156	156	156
Cash Conversion Cycle		**134**	**114**	**104**	**273**	**127**	**127**	**127**	**127**	**127**	**127**	**127**	**127**	**127**	**127**	**127**

[42] "Schering-Plough's agreements with the major U.S. pharmaceutical wholesalers address a number of commercial issues, such as product returns, timing of payment, processing of chargebacks and the quantity of inventory held by these wholesalers. With respect to the quantity of inventory held by these wholesalers, these agreements provide a financial disincentive for these wholesalers to acquire quantities of product in excess of what is necessary to meet current patient demand. Through the use of these agreements, Schering-Plough expects to avoid situations where Schering-Plough's shipments of product are not reflective of current demand." 2008 Form 10-K of Schering-Plough.

5.2.1.6. Financial Leverage

In order to compute the terminal value of Schering-Plough by APV methodology some assumptions need to be taken for the estimation of the company's value. Therefore, the estimation of cash flows was straight forward.

As already explained, the APV has a great benefit compared to other methods of assessment; the valuation is divided into two parts, one that assessed the company as if it were 100% equity financed and the second part refers to the debt of the company, which is not the case when discounting at the WACC with the FCFF method.

Risk-free (R_f), Beta (β) and Risk Premium (R_p)

As it was mentioned before, the value of the risk-free (R_f) was taken the U.S. Treasury data from 2008, since it was the last year one had information about the company. In the case of Schering-Plough, one assumed that the majority of investors were in US. This assumption was made since the company is part of Merck and there is no information about the investors base in 2008.

The value of the risk-free rate (R_f), beta (β) and risk premium (R_p) are 2.25, 1.03 and 5 percent, respectively. With those the elements of the CAPM formula, one could reach a R_e of 7.4[43] percent. (Appendix 25)

Cost of debt

For the debt side valuation it is necessary two main important aspects, the return on debt (R_d) required by the debt holders and the tax rate of the pharmaceutical industry. In 2008, Schering-Plough interest rate varied from 5.3 to 6.5 percent, for borrowings due in 2013 and 2033, respectively, with the specific adjustments necessary according to the additional interest rate set forth by Moody's and S&P. Since the company had in this period of time different borrowings with different interest rates it becomes slightly difficult to compute or even to choose the most appropriate rate through the company information.

Therefore, one could use the rate withdrawn from the Damodaran data base, correspondent to 6.21 percent. Alternately, one could use the data according to the probability of default from Moody's.

In line with the previous company, one will use the data from Moody's rating. According to the company's 2008 Form 10-K, Moody and S&P rating for Schering-Plough is Baa1 and A-, respectively. The spread associated with the rating of Baa1 is 2%. Using the approached described in the literature

[43] R_e = 2.25% + 1.03*5%

review, the cost of debt will be the sum of the risk-free and the default spread, the cost of debt is equal to 4.25 percent (2.25% + 2%)

Another important aspect to retain is that capital structure that is being imposed in the company, the company seeks to have capital structure of 40 percent of debt but from 2004 to 2008 this level has been very unstable. For the forecast, one will use in 2009 a capital structure of 35 percent of debt and from 2010 one will use 40 percent as mentioned in the company reports.

Tax-rate (T_C)

To obtain the value of the tax shields one will multiple the net debt by the cost of debt and by the effective tax rate. According to the Damodaran data base the effective tax rate will be 25.75 percent.

Cost of distress

As with the Merck, the cost of financial distress is 27%, meaning that in case of distress the Schering-Plough would lose 27% of its value. Although this percentage seems high, in reality when accounted in the firm's value one will have to multiply the cost of financial distress with the default spread, which in case of Schering-Plough is 2 percent, reducing the cost drastically.

APV

Having into account all the three components of APV, Schering-Plough enterprise value is $58 billion (formula 2.7). The estimated enterprise value of Schering-Plough is approximately 2x greater than its market capitalization. Likewise Merck, this means that the company is undervalued (Appendix 26).

Having into consideration the APV method to calculate the different parts of the firm's value, one found that the value of the unlevered firm is $36 billion, the value of the tax shields is $13 billion and Schering-Plough value of the financial distress is $ 435 million. (Appendix 28)

Share Price

Schering-Plough share price was computed the same way as Merck. The first objective was to compute the value of equity then the share price. The Equity value found is $36 billion and with approximately 5343 shares; the company's share price is $6.75. Compared with the market price of Schering-Plough shares, $17.03, the company is well perceived by the market.

5.3. Relative Valuation

According to the literature review, one could easily conclude that it is crucial to have a complementary analysis when using WACC or APV methods. APV or even WACC methods are good methodologies but alone they only look for the companies individually. Using the relative valuation, it will be compared Merck and Schering-Plough with their peers and evaluate their performance.

The choice of the peer group had some important criteria in order to have a coherent peer group. The first criterion was to include only pharmaceutical/biotechnology companies, companies that may compete with the Merck and Schering-Plough with "unique pharmaceutical/biotechnology talent". It is important to retain that the companies in the peer group should compete directly with the Merck and Schering-Plough and be exposed to the same environment, research-driven and regulatory. The second criterion is that the companies of the peer group may vary in size, which in normal conditions would be an exclusion factor, but since it is established the first criterion it wouldn't be appropriate to exclude companies by size otherwise the focus would not be on talent basis and the group would be very small and would not have all the competitors. The third and last criterion is considered at least 15 competitors of the both companies.

When choosing the proper peer group it had to be into consideration the peer group presented by the companies, more specifically the peer group presented by Merck in its "Notice of Annual Meetings and Proxy Statements" of 2011.

Table 9: Peer group data

Company	Country	Stock Price	Market Capitalization (million)	Entreprise Value (Million)	P/E	P/Book	P/Sales	EV/EBIT	EV/EBITDA	EV/Sales
Abbott Labs.	United States	53.37	82,853.35	89,219.02	16.08	4.74	2.79	15.67	10.73	3.02
Amgen	United States	57.75	60,464.25	60,264.25	12.89	2.90	4.12	11.56	9.59	4.02
AstraZeneca PLC	UK/Sweden	41.03	59,219.41	66,704.41	9.74	3.72	1.88	8.31	5.72	2.11
Biogen Idec	United States	47.63	14,158.16	13,067.87	13.34	2.44	3.40	10.75	6.05	3.19
Boston Scientific	United States	7.74	11,622.66	16,726.66	9.68	0.88	1.44	10.36	7.95	2.08
Bristol-Myers Squibb	United States	23.25	45,895.50	45,895.50	15.60	3.75	2.59	8.04	10.47	2.59
Lilly (Eli)	United States	40.27	45,784.92	50,323.22	10.02	6.80	2.16	3.86	7.57	2.47
GlaxoSmithKline ADR	United Kingdom	37.27	97,111.16	112,502.00	14.50	8.40	2.74	7.04	6.66	2.49
Johnson & Johnson	United States	59.83	165,680.00	164,719.00	13.15	3.90	2.63	28.07	8.67	2.58
Novartis AG ADR	Switzerland	49.76	112,964.00	114,360.00	13.89	2.25	2.73	12.06	9.55	2.76
Pfizer Inc.	United States	17.71	119,472.00	113,281.00	7.32	2.08	2.47	6.64	5.12	2.35
ROCHE	Switzerland	38.28	132,072.00	125,205.00	15.58	3.15	3.06	9.73	8.17	2.96
Sanofi-Aventis	France	32.16	82,696.72	85,466.29	15.44	1.32	2.16	9.76	5.36	2.11
Takeda	Japan	51.40	42,117.73	25,708.65	11.91	1.84	3.08	5.08	6.44	2.13
Wyeth	United States	37.51	49,946.57	47,140.58	10.63	2.60	2.19	10.67	5.93	2.06
		Average	$ 74,803.90	75,372.23	12.65	3.38	2.63	10.51	7.60	2.59
		Median	$ 60,464.25	66,704.41	13.15	2.90	2.63	9.76	7.57	2.49
		St. Deviation	$ 33,652.74	34,643.34	2.08	1.37	0.44	3.22	1.49	0.37
Merck & Co.	United States	30.4	64,073.79	67,236.59	8.89	3.42	2.72	7.13	6.08	2.82
Schering-Plough	United States	17.03	27,690.78	34,988.78	9.36	3.45	1.50	13.92	7.46	1.89

Since Merck didn't provide enough competitors for the peer group, one had into account other sources to complete the group.

5.3.1. Merck

Although Merck in terms of Market Capitalization is not one of the biggest companies of the group, when looking to the five multiples computed it is clear that the company is in line with the average of its peers. For the average of the ratios, it is considered an upward and downward adjustment for the target price calculation.

The first multiple, *price-earnings ratio*, shows that Merck is transacting at a lower multiple of earnings than its competitors. P/E shows that Merck should invest more to create more growth for the company. Since, the companies of the peer growth may had different expected growth rates it seemed crucial to compute *PEG* ratio, since it takes into account the expected growth of the companies. According to this multiple, Merck is trading at a premium when compared with peers. In relation to the *price-to-book* multiple, Merck reveals that its stock is overvalued, this comes into accordance with the PEG ratio with reveals a higher growth rate for the company. Regarding the *price-to-sales* ratio, the company shows a lower value than its peers. The equity multiples, although good, they may be manipulated by the company, therefore it is important to use the enterprise value multiples.

The two first enterprise multiples are considered better than the EV/Sales, since it takes into consideration not only the sales but also the costs of the company. The *Enterprise Value to EBIT* (EV/EBIT) and the *Enterprise Value to EBITDA* (EV/EBITDA) are below the average of the peers; but the difference between with the averages is much smaller with the first ration than the EV/EBITDA in relation to the average of the peers. Through the results, the average of the peers, one could observe that depreciation and amortization plays an important role for some of the peers, but not as much for Merck. Contradicting the last two multiple, *Enterprise Value to Sales* (EV/Sales) is slightly above the peers average.

For all the above reasons, EV/EBIT seems the most appropriate multiple to find the target price of Merck.

Table 10: Merck relative valuation results

Merck Price per share

	P/E	P/Book	P/Sales	EV/EBIT	EV/EBITDA	EV/Sales	PEG
Mean	46,05	12,32	9,57	38,24	27,66	9,45	5,87
Median	47,86	10,54	9,57	35,53	27,54	9,08	7,87
Min	41,86	11,20	8,70	34,76	25,14	8,59	5,34
Max	50,66	13,55	10,53	42,06	30,42	10,39	6,46

The relative valuation is very useful since it can complement the previous valuation, APV method, or it can be used solely to calculate the target price of a company. Through this valuation, EV/EBIT ratio seemed the best one to calculate the target price since it presents fewer constraints likewise P/E ratio. The target price found with EV/EBIT ratio is $34.76 with a downward adjustment. With the EV/EBITDA ratio, the price found is $25.14, with a downward adjustment, this ratio would be given

more relevance if wanted to have into account the effect of depreciation and amortization in the target price. Comparing with the real share price of $30.4, one can say that Merck is well priced.

Having into account the share price found through APV, the EV/EBIT with a downward adjustment gives a closer approximation to the value that was found.

5.3.2. Schering-Plough

Schering-Plough, comparing with the company from the peer group, has the smallest market capitalization. However, it is well positioned in terms of the relative valuation. The first ratio computed (P/E) reveals that the company is trading below the average of the market, with the growth adjustment

Concerning the P/Book ratio, Schering-Plough is slightly above the average and the median of the group with 3.4x. The same trend can be seen with other ratios; *P/Sales*, *EV/EBITDA* and *EV/Sales* with 1.5x, 7.46x and 1.89x, respectively. The *EV/EBIT* ratio contradicts all the other ratios with a value of 13.94x, a value greater than the average and median of the peer group.

Likewise with Merck, certain ratios, for instance P/E suggest that the Schering-Plough should use more its earnings in investing in the company to generate higher growth.

In computing the share price of Schering –Plough an upward and downward adjustment of 10% were made (Table 11).

Table 11: Schering-Plough relative valuation results

Schering-Plough Price per share

	P/E	P/Book	P/Sales	EV/EBIT	EV/EBITDA	EV/Sales	PEG
Mean	13,66	3,66	2,84	11,35	8,21	2,80	1,74
Median	14,20	3,13	2,84	10,54	8,17	2,69	2,34
Min	12,42	3,32	2,58	10,31	7,46	2,55	1,58
Max	15,03	4,02	3,12	12,48	9,03	3,08	1,92

Looking to the target prices calculated through the multiples, there is no similar value to the real share price of Schering-Plough. The target price calculated with the median of P/E is the one that can be considered closer to the real share price, with a value of $14.20.

Having into account the share price calculated with the APV method, the EV/EBITDA ratio presents a share price very close, $9.58. Having into consideration the adjustments, EV/EBITDA with an upward adjustment and EV/EBIT with downward adjustment present closer values to the price found with APV method, with $10.54 and $10.31, respectively.

6. Valuation of the Merged Entity

As referred in the literature review, according to Ullah et al., (2010), when two companies join, their objective is to gain market power, share costs or increase efficiency, and Damodaran (2005) states that when two companies merge they create an added value for the new entity, also named as synergies. Damodaran (2005), also states that to observe the added value in the merged entity is necessary to evaluate it without the added value (the sum of the values of the two firms evaluated independently) and after the merged entity with synergies.

Hereby, it is fundamental to create a new valuation where Merck and Schering-Plough are jointly estimated and later evaluate the synergy created with the merger. The valuation will be the sum of valuation of Merck and Schering-Plough done in the chapter 6. Although, the objective is to create a new model for the merged entity assumptions made previously will not change, only in the departments or areas where synergies will be created.

The first approach will be to join Merck and Schering-Plough with no value added, the value obtained must be equal to the sum of both firms valuated independently. The second approach will be to reflect in the model the added value achieved with the merger.

6.1. Valuation of the merged entity without Synergies

In order to have a clear notion of the synergies created by a merged entity it is important to have the model of the merged entity without synergies. In this case, the assumptions considered in the standalone performance forecast of Merck and Schering-Plough will be used in to create the valuation of the merged entity. Since no synergies will be accounted, the enterprise value of the new is the sum of all elements of each firm, Merck and Schering-Plough, valued independently.

The income statement, balance sheet and the base-case cash flows are the sum of the respective statements of Merck and Schering-Plough and can be seen in appendix 29, 30 and 31.

The APV model was the only model used to estimate the enterprise value of the merged entity. The relative valuation for this scenario is not an appropriate method since it is not possible to estimate the enterprise value through it.

6.1.1. Revenues and Costs

The merger of Merck and Schering-Plough will enhance the presence of the new entity in the different markets. The new entity will have five geographic segments, United Stated, Europe, Middle East and Africa, Asia, Japan and Other, where Latin American countries are included.

Both firms will enter in new areas of expertise which will leverage their potential in the market. For Merck the new segment areas are the therapeutic area and animal health area. For Schering-Plough the new segment is the vaccines and infectious diseases area.

In appendix 32, the revenue of sales is distributed by product segments, where prescription pharmaceutical segment, still represents the greater segment with 80% of the company sales revenue.

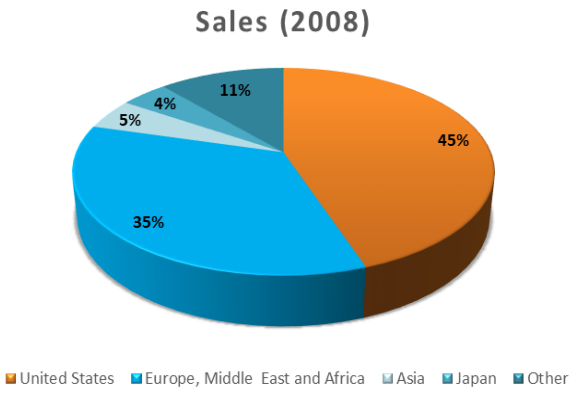


Figure 9: Merged company sales geographic distribution

The cost section was valued the same way as the revenue and all costs from both companies were considered. The same happened in the computation of the balance sheet of the merged entity. In the financial leverage of the merged entity the FCFF, the tax-shields and the financial distress were the sum of the ones of Merck and Schering-Plough since.

Conclusions: Enterprise Value of the company $ 228 billion, exactly the sum of EV of Merck and Schering-Plough. The equity value of the merged entity is $179 billion and the share price would be $12.17 (Appendix 31).

6.2. Valuation of the merged entity with synergies

The merger between Merck and Schering-Plough will provide the new entity opportunities that each company could not achieve individually. One example, one of the segments that Schering-Plough is in, is the animal health segment, where Schering-Plough is performing very well and according to the company it has the best R&D team and pipeline; for Merck to enter into a segment that is already structured and doing very well is a great advantage.

According to the literature review, two companies when enter into merger they can have two types of synergies, *Operating Synergies* and *Financial Synergies*, and the objective in this chapter is to identify the different synergies that will be created with the merger of Merck and Schering-Plough.

The merger between two pharmaceutical companies that operate in the same segments will provide to the new entity a strong and complementary portfolio, opportunity to enhance R&D efforts and pipeline and expand global presence in a faster way. And the new entity will benefit from a strong balance sheet that both companies, Merck and Schering-Plough, will provide.

A stronger and complementary portfolio will be increased by a greater number of products and scope of clients. Enhancing R&D efforts and pipeline will increase the sustainability of the company, the increase of medicines in the pipeline rise the probability of having more medicines passing in the FDA approval; consequently having more medicines in the market. Expanding global presence, as mention previously, will provide the new entity with a broader group of clients.

The market is characterized by many companies which try to deliver the best medicines, for unmet needs trying to spend as low as possible. Bringing companies with different capabilities will reduce the cost and increase the probability of having economies of scale and enhance competition in the market.

Concluding, the merger will create costs synergies and financial synergies, since the new entity can have a greater debt capacity. Important to bear in mind, is that the majority of changes that will be done in this chapter are assumptions. Most of the assumptions will have a support (company or industry), but different assumptions can be withdraw from industry and company insight.

6.2.1. Synergies

6.2.2. Operating Synergies

According to the Merck investor presentation (2009), the merged entity will have reductions in three elements of the company. The company states that it expects to have costs reductions of 15 percent, whereas 40 percent of reductions will happen in the cost of sales and R&D and 60 percent in marketing and administrative elements and research and development. In ones point of view, a reduction of 15 percent is very optimistic since both companies bring different cultures and operate in different segments (animal health, consumer health care and vaccines and infectious diseases) probably the reduction will not be as high. One will consider a more conservative position with a cost reduction of 8 percent, this percentage of reduction will be distributed in the main three costs according to ones expectation of reduction.

Material and Production (Cost of Sales)

The merger between Merck and Schering-Plough will allow the merged entity to have costs reductions, since the production of the majority of the medicines is very similar and each company individually will make the best use of its resources and capacities. According to Danzon et al. (2007) one of the stronger reasons for pharmaceutical companies to enter into a merger is to have economies of scale and scope. This objective is supported since this industry has high levels of expenditure.

One believes that both companies will manage their resources in the best way in order to optimize their capacity. The proportion of cost of sales of Merck working independently is 23 percent, one believes that it will be higher (in comparison with Merck). Once both company will provide with its expertise in production in the different segments, the merged entity will achieve economies of scale but being a

greater company due to the increase of segments (in the point of view of each standalone company) the reduction will greater to achieve the same percentage of costs of the companies working independently.

Concluding, material and production element represents without the synergy 30 percent of sales revenue, since one it is expecting economies of scope in this element, one assumed that the new entity will have this element representing 28 percent of sales revenue.

Marketing and Administrative Costs

Marketing and administrative costs represent in the merged entity without synergies 34 percent of sales revenue. One expects that the greatest decrease in costs will happen in this area since the marketing and administrative do not need to as specialized as in the production of medicines and R&D. The reduction in this area will result in economies of scale since it is expected that this cost for the merged entity will be the same as Merck working independently (in percentage).

Nonetheless, one also had into consideration the level of marketing and administrative costs in relation to sales of Merck and Schering-Plough operating individually when deciding to reduce the level of this element.

For Merck and Schering-Plough, marketing and administrative costs represented 32 and 37 percent, respectively. Marketing, as one mentioned in chapter 5.2.1.2, is not as strong as in other industries due to the specifications of the industry[44].

Administrative costs, one believes that they will not increase with the merger. There will be costs associated with exempting personnel and disposing assets, but those will be treated with higher detail in following section.

Concluding, one assumes there will be an effort to maintain this level as low as possible, therefore, assuming the level of 30 percent, slightly lower than the Merck's level performing individually.

Research and Development Cost

For any pharmaceutical company R&D is very important, in fact, as referred in the chapter 5.2.1.2, the pharmaceutical industry is the one with highest expenditure in this area. Therefore, one assumes that the merged entity will achieve economies of scale, once both companies have an interest in maintaining

[44] For example, in the pharmaceutical industry medicines can't be advertised as it is done in the shoe industry. There are plenty rules that govern the limits of marketing in the pharmaceutical industry. Marketing in this industry is more targeted to doctors, where public relations of the different companies try to promote their medicines.

high levels of investment in R&D; the new entity will not have economies of scope. Merck operating independently had a level of 16 percent (in relation to sales revenue), a percentage that is very close to the industry average, 15.6 percent. In contrary, Schering-Plough operating independently, had a level of 24 percent, this is in accordance with their objective to invest as much as possible in this area.

The merged entity without synergies has 20 percent of R&D expenditure, in relation to sales revenue. One assumed that the level would decrease percent to 18%, since both companies had the objective to invest more than the industry average. The slight decrease is also justified by the fact that Schering-Plough R&D is very developed and it has a strong R&D work force, therefore, the investment in R&D in relation to sales revenue could not be lower.

Concluding, in overall one achieved a reduction of 8 percent in the three areas, whereas the cost of sales and marketing and administrative cost had a higher reduction in relation to R&D.

6.2.3. Financial Synergies

Financial synergies are arduous to find and only companies that have a well structure plan to integrate the companies can achieve. According to Damodaran (2005) companies have to combine their financial capacity optimally in order to find synergies. In this section, one will analyze the four sources of financial synergies, previously referred in the literature review, cash slack or excess cash, debt capacity, tax benefits and diversification.

The first source of financial synergy, cash slack or excess of cash, can be achieved when in the merger one company has limited investment opportunities, but has excess cash, and the other has "high-return projects", but in the other hand it is limited by cash. In the case of Merck and Schering-Plough, this synergy does not apply since as it is seen in their financial statements; both companies have proper conditions to invest in projects. The purchase of Organon BioSciences by Schering-Plough is an example that the company has conditions to invest. The cash levels of both companies are very similar and one will assume that for the merged entity it will be the sum of each entity standalone. Therefore it won't be considered as a cash synergy.

The second source of synergy can be achieved through the Debt Capacity. Damodaran (2005) refers that when two companies merge they can benefit from having higher levels of debt ratio. Since the merged entity will become more stable, debtholders will lend higher amounts of money due to their increase of confidence in the company. This synergy applies to the merger of Merck and Schering-Plough since the merged entity will benefit from slightly higher amount of debt. The merged entity without the financial synergy has a debt to capital ratio of 60 percent. Merck had in 2008 a ratio of 60 percent and Schering-Plough 63 percent. One will assume a conservative position in this synergy since the in one's opinion

the ratio is quite high. Therefore, the increase considered is 3 percent; the merged entity will have a debt ratio equal to Schering-Plough before the merger.

According to the market regulators and debtholders in this industry, pharmaceutical companies can have a debt to capital ratio of 60 percent. Therefore, the merged entity will benefit from this higher level to invest in the entity projects.

The third source of synergy, tax benefits, is a way of the merged entity to take advantage of tax laws in order to reduce the tax payments. Although a good way to have synergies, Merck and Schering-Plough cannot benefit from it, since they don't have operating losses. An alternative way to increase tax benefits is through the increase of the company depreciation, decreasing the taxable income. One considered that depreciation would not be increased. The last source of synergy, diversification, is considered to be the hardest to account and the most "controversial" in a merger. Both companies will have the diversification factor, since both companies will enter in new market segments, but one does not consider this diversification as a synergy.

Concluding, the merged entity will benefit from a slightly greater debt ratio, which corresponds to financial synergy of 2 Billion.

6.2.4. Merger Restructuring Costs

Although, the merged entity realizes cost reductions in different areas, it also has costs related to the merger. The merged entity will be much bigger than each company individually, meaning that it will need higher resources than each company operating individually. In the other hand, it will require fewer resources than the merged entity without synergies. At the same time due to the integration of both companies some required costs will arise for better adaptation and consolidation of Merck and Schering-Plough.

Legal Support

For this type of deals it is crucial legal support by laws companies in order to protect and defend the interests of both parties. Since mergers are normally great transactions, high amount of moneys are involved in the process and are complex process, law firms are very costly since it is not a simple deal.

Integration of Synergies

It is important that companies not only observe where the synergies may happen but also apply them on their strategy and in the company. Beside the reductions mention in the previous chapters, there are three more costs reductions that must be taken into consideration.

Labor cost

Labor cost in a merger is one of the most sensitive elements. After a merger is established it is expected that some employees of both companies will be dismissed. The concern is that the companies need to layoff the proper number of employees and in the right departments.
According to the Richard T. Clark, Merck's chief executive in 2008, Merck expected to reduce the company's work force by 15 percent. Having into account that both companies have approximately 100.000 workers, one assumed that 15.000 will be dismissed. In this process the merged entity will pay compensation to their 15.000 employees for dismissing them.

Property

The merged entity in 2008 will have approximately $19 billion in properties, whereas Merck contributed with 64 percent and Schering with the remaining 34 percent. The majority of Merck's and Schering-Plough's properties are located in the United States of America, the first company has 76 percent and the last has 39 percent. One believes that some of their properties in this region will be sold.

Consulting Support

To best integrate both companies, creating proper strategies to integrate them and create a strategy for the merged entity to enter in the market.

Re-branding

The merged entity has to invest in creating and advertising the re-branded company, the new image of the company, their values and objectives. This advertisement has to be internal and externally, since collaborators can be demotivated or even damaged in the merger process.

In fact, restructuring costs related to a merger are quite difficult to be estimated without both companies inside information about the deal. For a better adaptation of two companies in a merger it is important that both companies have an equal structured plan to have an optimal integration. According to PriceWaterHouseCoopers[45] (PwC) there are seven tenets for a successful integration in a merger. The first tenet is to "Accelerate the transition" since it maximizes shareholder value, longer transitions destroy stakeholders expectation and profit, and slows growth; "Define the integration strategy", must be well defined in order to create value; "Focus on priority initiatives" like limitations that may exist in the merged entity must be a priority; "Prepare for Day One"; "Communicate with all stakeholders" regularly to explain the reasons behind this deal and address all the concerns they may have; "Establish leadership at all levels" it's crucial at the earliest stage of the transition to avoid uncertainty in the roles and define the authority in each department and "Manage the integration as a business process",

[45] PwC created a report where it explains various steps to have a successful integration process – Advisory Services, "How to complete the M&A integration process, minimize disruptions, and achieve desired synergies"

companies must look at mergers as a business deal and threat it as one, in this way they will be creating value to the merged entity.

Although one knows how the integration process should be processed, there is no inside information about how costly it will be. According to Basil Peters (2010), the pharmaceutical industry is the one with the highest restructuring costs in a merger process. The author says in his book that this cost tend to be 15 percent of the merged entity sales. According to the investor presentation of the Merck and Schering-Plough merger, Merck expects to have restructuring costs until 2013. One also agrees with the time length to have restructuring costs, therefore the 15 percent of this cost will be distributed equally during the 5 years (2008-2013) since there is no information to allocate costs differently.

6.2.5. Account Synergies

Once decided the areas that synergies might happen, the following phase is to incorporate and account them in the new structured of the merged entity. The value of synergies created will be the enterprise value of the merged entity with synergies minus the enterprise value of the merged entity without synergies.

Although it is important to account the value of synergies created it is also important to account the value of synergy generated in each area. Therefore, one will present the synergy value created in each area of the merged entity, incorporate them separately into the model of the new entity without synergies and compare with the with the enterprise value of the merged entity with no synergies. Restructuring costs will be the last to be incorporated into the valuation of the merged entity and later, one will present the value that it represents.

6.2.5.1. Value of Synergies

After accounting all operating and financial synergies, one achieved a total synergy value of $ 83 billion. The estimated enterprise value of the merged entity with all synergies is $311 billion; this value considers the restructuring costs. In the table below it is possible to observe where and the synergy value created in each area.

(Millions)	Synergies		Reduction/Increase	EV without Synergy	EV with Synergy
Operating Synergies			8%		
Material and production	4,325		3%		232,762
Marketing and administrative	29,422		3%		257,860
R&D	20,351		1%		248,788
Financial Synergies			3%	**228,437.87**	
Debt	2,317		3%		230,755
Restructuring Costs	7,911	15% *			
Total Synergies	**82,536**		**11%**		**310,974**

* percentage over sales

Table 12: Synergies Value of the merged entity

The restructuring costs are integrated in the merged entity enterprise value, so the total synergy value reflects the impact of this cost. Having into account the Basil Peters input the estimated restructuring cost is equal to $8 billion dollars. As mention previously, the percentage of restructuring costs (15 percent) was equally distributed during the 5 years that it is supposed to last and multiplied by the revenues.

Year	2008	2009	2010	2011	2012	2013
Sales						
Total	42352	47446	50655	52899	55202	57502
Restructuring Costs		1423	1520	1587	1656	1725

Table 13:Merged entity restructuring costs

The estimated enterprise value of the merged entity accounting with the restructuring costs is equal to $311 billion (Appendix 34).

Operating Synergies are the greatest source of costs reductions, since it is the easiest and fastest way to achieve efficiency. The merger of Merck and Schering-Plough was no exception to this rule. According to John L. LaMattina[46] (2001), mergers in the pharmaceutical industry are "attractive" since they reduce costs, remove duplication and produce synergies. Removing duplication happens when companies that are going to merge have similar medicines and when merged they focus on only one that is better for patients. Efficiency is automatically achieved, bringing together the best collaborators and consequently providing a better work and performance. The estimated operating synergies are equal to $60 billion (Table 12).

[46] Online article: **The impact of mergers on pharmaceutical R&D.** John L. LaMattina is the former President of Pfizer Global Research and Development, and is currently Senior Partner at Puretech Ventures, Boston, Massachusetts 02116, USA.

Finally, financial synergies were only on Debt. This synergy is equal to $2 billion and the increase of the debt ratio may create opportunities to invest in new projects.

6.2.5.2. Distribution of Synergy

Frequently in mergers, synergies tend to be generated by one company that brings unique capabilities. In the merger of Merck and Schering-Plough synergies are only created because both companies merge and both bring their unique skills in different areas of expertise, for instance production and material synergy was only achieved because both companies will merge and bringing their expertise in the area it will be possible to reduce this cost.

Research and development is the only area that both companies have very different knowledge since Schering-Plough invest in animal health and consumer health products and Merck doesn't. Unfortunately, due to lack of inside information it is not possible to separate what each company contributes to the R&D synergy, so one will assume that both companies contribute equally.

7. The Acquisition

The form of integration between two companies can be made in various ways. The merger between Merck and Schering-Plough will not be a fusion between the two companies, whereas both parties pay to have a portion of the company of the other party.

Due to the great discrepancy between the enterprise values of the two companies the appropriate way in this merger is for the biggest company to acquire the smallest. Merck estimated enterprise value is approximately 3x greater than the enterprise value of Schering-Plough, which means that Merck should be the one acquiring Schering-Plough. The size of the company it is not the only reason that supports this acquisition; there are several reasons that supports the acquisition of Schering-Plough and one will present some of them.

Firstly, Merck and Schering-Plough have been involved in several partnerships during the years the two companies have been reinforcing their partnerships and positioning in the market. Mergers and acquisitions are a characteristic of this market, since funding is quite difficult it is much easier for small companies to have access to funding through an acquisition.

Secondly, the pharmaceutical market is a very competitive market mainly due to the increase of market share of Generics. Pharmaceutical and biotechnological companies are in a position that they need to produce even better medicines, but they have a disadvantage in comparison to generic companies since they spend high expenditures in R&D. Having the possibility to diversify to a different segment like animal health and human health care is a great opportunity for the companies to maintain competitive in the market.

One will assume that the deal process will begin on 3rd of January, 2009 with the announcement of the deal and it will end 12 months later. Since it is a big deal it is important to account everything and appeal to outside consultants to have the best acquisition and integration of both companies.

7.1. Approaching Shareholders

The way companies decide to approach shareholders of the acquired company is extremely important since different ways to approach them can have different impacts on the shareholders reaction to the acquisition and the market also reacts differently.

For Damodaran (2005) the best way to approach target firms is through a tender offer, a friendly offer, and the acquisition should be cash-based, preferentially, because it shows to the market and to shareholders of the target company that the acquirer company believes in the potential of the company.

The proposal for the acquisition should be done directly to Schering-Plough shareholders with the price they intend to buy the outstanding stocks. By doing the proposal directly to shareholders, Merck will be showing that it is willing to negotiate with the Schering-Plough and find the best way to acquire it. According to Damodaran (2005) tender offers premiums tend to be higher than in hostile acquisitions and on mergers.

About the reaction of Merck and Schering-Plough shareholders[47], one will assume that it is positive and both companies are willing to become part of each other, with at the best deal.

7.1.1. Premium offered to Schering-Plough shareholders

The average market capitalization of Schering-Plough from 2005 to 2008 was $34 billion. Through the valuation done in chapter 5.3 one found an equity value of Schering-Plough is $36 billion, which leads to a positive potential of 8 percent (see appendix 35 for further detail). The company new equity with synergies is $69 billion, comparing with the standalone equity value, it is an upside potential of 92 percent. As previously referred in the literature review, depending on the premium offered to the acquired company can be perceived as a good or bad deal. Bruner (2004) suggest that the deals with premiums around the 30.7 percent are perceived as a good deal. The real premium paid to Schering-Plough shareholders was 34%[48], this value shows that the company and its synergies are overvalued. For this analysis one will take into consideration the literature review, but being more conservative than the suggested premium; therefore the premium chosen for Schering-Plough shareholders is 30 percent.

7.2. Payment Method

As explained in the literature review, the different method the acquirer company choses to finance the acquisition of a company can give different signals to the market. Consequently, the market reaction to the acquisition by the market and the acquired company shareholders will also vary according to the method of payment used. According to the literature review it is crucial that the Merck choses a method, cash-based, that shows to Schering-Plough shareholders that the company believes in the deal and are committed to the Schering-Plough. The decision of the method of payment has also to take into consideration the capability of the Merck to finance the deal.

[47] Since the acquisition happened in 2009, there is no information about the reactions of Merck's and Schering-Plough's shareholders. The information one had is that on August, 2009 99 percent of Merck's shareholders accepted the merger of $41 billion. Reference: http://www.dailyfinance.com/2009/08/07/merck-schering-plough-shareholders-approve-the-merger/

[48] Merck & Schering-Plough Merger: Investor Presentation, March 9

Having into account the market capitalization of Merck ($85 billion) and the equity value of the standalone valuation ($143 billion) it is clear that the company is undervalued by 68 percent (appendix 35), this means that if Merck decided to finance with stocks the company would have an issuing price lower than the fair value so it is possible that Merck will try not to finance entirely with stocks. The choice between cash or stocks has to be considered in attention to the company's capital structure and its credit rating. In one opinion, the acquisition should be financed firstly by cash and debt and lastly by stocks, but maintaining the company rating.

7.3. Financing Sources and the Offer

The acquisition price is the Equity Value of Schering-Plough with synergies, $70 billion. One will assume that the company decided to finance the deal with the three possible sources.

Firstly, financing with cash is extremely important in this deal, so one will assume that Merck will finance $12 billion with cash, taken in the cash equivalents and the investments account of the company.

Secondly, debt will be the second source chosen by Merck. Financing with debt it is also perceived as good indicator of commitment by the acquirer company, but at the same time the acquirer company will want to preserve its credit rating, so it's important to calculate how much it can finance through debt. According to Damodaran interest coverage ratio calculation, a company with an A- rating should have an interest coverage ratio between 3x and 4.25x and having into account that the merged entity with synergies have a Net Debt/Ebitda ratio of 2.22x, Merck can reach this ratio at maximum (see table 14). Merck can finance $22 billion with debt (Appendix 36).

(million dollars)	Merck*	Schering-Plough*	Merged entity (no synergies)*	Merged entity (synergies)*
Cash	4.482	4.188	8.670	8.670
Net Debt	12.017	5.573	28.840	35.687
Ebitda	10.113	3.566	13.680	16.088
Interest Costs	1.135	783	1.918	1.308
Ebit	8.440	2.650	11.100	13.498
Interest coverage	7,43	3,39	5,79	10,32
Net Debt/Ebitda	1,19	1,56	2,11	2,22

*Data are from 2009, since the synergies were calculated from 2009. Merck is rated as A3 (Moody's rating), equivalent to the A- of S&P rating.

Table 14: Merged entity Debt Capacity

After having into account all the restrictions and best practices that Merck should follow, the amount financed by shares is $35 billion, corresponding to 50 percent of the total financing (Appendix 37). Although it was followed requirements to finance the acquisition of Schering-Plough, the fact that half of the acquisition will be financed by shares can raise concerns and mistrust by Schering-Plough shareholders. So it is crucial that Merck present its reasons for the offer structure.

Merck to finance through shares will have to value higher than the market price. One assumed that the premium of 30 percent (the real premium offered) to reach the price offered by the company to Schering-Plough (see table 15 for more information). In this sense, Merck will have to issue 1.576 million shares.

Shares Financing*	Current Share Price (2008)	Offered Price	Issued Shares*
34.891	17,03	22,14	1.576

*million

Table 15: Schering-Plough financing through shares

8. Conclusion

The high level of worldwide competition between pharmaceutical companies increases the pressure for companies to position themselves strategically and be very efficient in researching and developing medicines for unmet necessities. For many pharmaceutical companies a way to strengthen their presence in the market is to enter in new segments through mergers.

The consolidation between Merck and Schering-Plough will leverage the competitive position of new entity, increasing the efficiency of the company due to the complementary factor that will rise with the merger. The new entity will operate in more segments than Merck and Schering-Plough operating independently and the combination of both companies expertise will make this new entity much stronger, taking advantage of new opportunities that shall rise.

The pharmaceutical industry is characterized for having the highest level of R&D of all industries, great pressure to reduce costs and for being a very competitive market. Pharmaceutical companies try to reduce the costs as much as possible but at the same time they aim to create the best medicines in the market. Therefore, the merger of Merck and Schering-Plough is benefiting since Schering-Plough is very R&D oriented and Merck already had a very good pipeline. On the other hand, the high levels of costs in this industry make companies like Merck and Schering-Plough merger in order to reduce them.

The merger of Merck and Schering-Plough is reasonable and it was a natural process since both companies have long cooperated in various projects and their relation has been strengthening during the years. Merck with the merger will benefit from entering in new segments that Schering-Plough has very strong position, animal health and human care segments. Schering-Plough, in the other hand, with be part of the 10th greatest pharmaceutical companies, it will have access to financial resources to invest in projects and be part of a company with a great pipeline.

The two sources of synergies in this merger are cost reductions and financial benefits. Costs are mentioned by practitioners as the most reliable source of synergies and the company will have a reduction of 8 percent. Financial benefit was all on the increase of the debt capacity by 3 percent. Nevertheless, restructuring costs were also included to account the integration process costs.

Merck, being the biggest company will make the offer for the acquisition of Schering-Plough directly to shareholders of the company. The acquisition will be financed by three sources, 17 percent of the acquisition will be with cash, 32 percent with debt and 51 percent with shares.

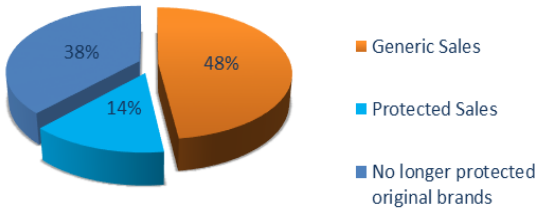
9. Appendixes

Appendix 1: Global Pharmaceutical Market by Region (Total Unaudited and Audited Companies)

	2008		2007	2003-2008	2009	2008-2013
	Mkt Size US$bn	% Growth Const. US$	% Growth Const US$	CAGR % Const US$	Forecast % Growth	CAGR % Const US$
Total unaudited and audited global market						
	$773.1	4.8%	6.6%	6.6%	2.5 - 3.5%	3 - 6%
Total unaudited and audited global market by region						
North America	311.8	1.4%	4.4%	5.7%	-1 - 0%	-1 - 2%
Europe	247.5	5.8%	7.1%	6.4%	3 - 4%	3 - 6%
Asia/Africa/ Australia	90.8	15.3%	15.0%	13.7%	11 - 12%	11 - 14%
Japan	76.6	2.1%	4.2%	2.7%	4 - 5%	1 - 4%
Latin America	46.5	12.6%	12.8%	12.7%	9 - 10%	11 - 14%

Notes on Numbers:
All forecasts are from IMS Market Prognosis International 2009-2013 which provides a view of the audited and unaudited market, using audited sales and adjusting for unaudited sales. The forecasts are based on the March 2009 Market Prognosis release; the next scheduled update is end of October 2009.
Source: IMS Health Market Prognosis, March 2009

Appendix 2: Total Market Composition, June 2007

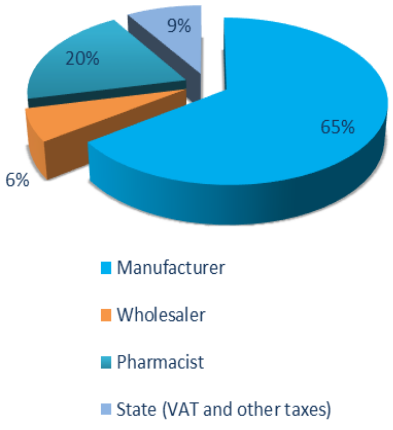


Source:
IMS Health MIDAS Market
Segmentation MAT 6/2007
Ethical Non-Generic Market Only

*Total includes: USA, Canada, South Africa, Top 5 Europe, Scandinacia, Benelex, Austria, Ireland, Portugal, Switzerland

Appendix 3: **Distribution Margins and VAT rates**

Price Structure – Breakdown of the retail Price of a Medicine, 2006(%)



Note: Non-weighted average for Europe (estimate)
Source: EPFIA member associations

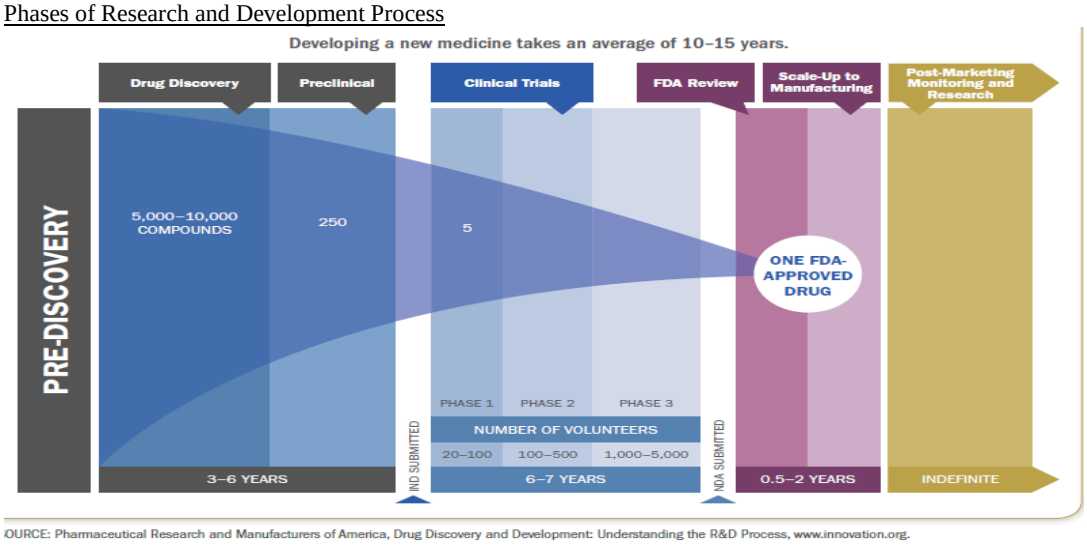
VAT rates applied to medicines in different countries

Country	Standard VAT rate (%)	VAT rates applied to medicines	
		Prescription (%)	OTC (%)
Austria	20.0	20.0	20.0
Belgium	21.0	6.0	6.0
Bulgaria	20.0	20.0	20.0
Cyprus	15.0	0.0	0.0
Czech Republic (1)	19.0	9.0	9.0
Denmark	25.0	25.0	25.0
Estonia	18.0	5.0	5.0
Finland	22.0	8.0	8.0
France (2)	19.6	2.1 - 5.5	2.1 - 5.5
Germany	19.0	19.0	19.0
Greece	19.0	9.0	9.0
Hungary	20.0	5.0	5.0
Ireland (3)	21.0	0.0 - 21.0	0.0 - 21.0
Italy	20.0	10.0	10.0
Latvia	18.0	5.0	5.0
Lithuania	18.0	5.0	5.0
Luxembourg	15.0	3.0	3.0
Malta	18.0	0.0	0.0
Netherlands	19.0	6.0	6.0
Norway	25.0	25.0	25.0
Poland	22.0	7.0	7.0
Portugal	21.0	5.0	5.0
Romania	19.0	9.0	9.0
Slovakia	19.0	10.0	10.0
Slovenia	20.0	8.5	8.5
Spain	16.0	4.0	4.0
Sweden	25.0	0.0	25.0
Switzerland	7.6	2.4	2.4
UK (4)	17.5	0.0	17.5

(1) Czech Republic: VAT increase from 5% to 9% for all medicines on 1/1/2008
(2) France: reimbursable medicines 2.1%; non-reimbursable medicines 5.5%
(3) Ireland: oral medication 0%; other medication 21%
(4) United Kingdom: 17.5% on medicines purchased by hospitals

Appendix 4: R&D

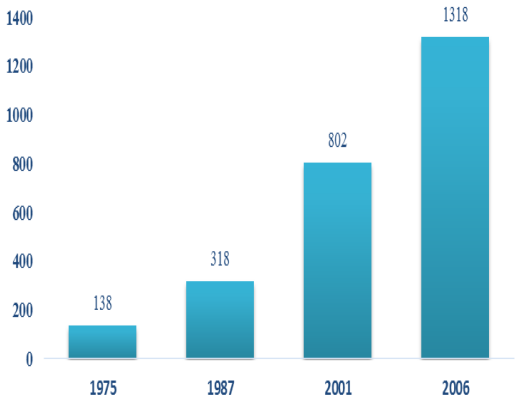
Phases of Research and Development Process



OURCE: Pharmaceutical Research and Manufacturers of America, Drug Discovery and Development: Understanding the R&D Process, www.innovation.org.

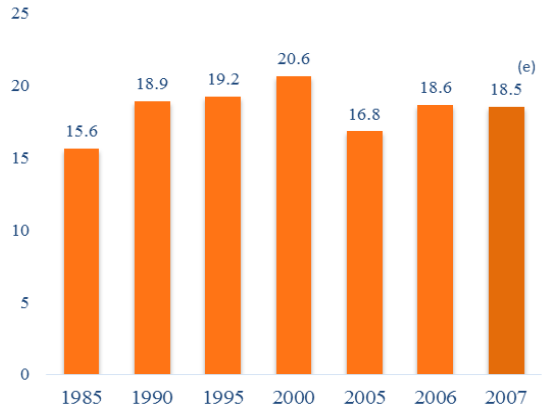
Primary reasons for the high costs with R&D is highly are associated with the great failures rates, costs of clinical trials and the required resources necessary to get approval by regulatory entities. Another reason are seen in promising products that reach advanced stages of clinical trials but have to be abandon because they don't meet all requirements established by regulatory entities. The probability of a new substance to become a market pharmaceutical product is very low, so as soon a company receives approval to market a new product on the market it has to launches to generate cash flows and recover the investment made in R&D.

Estimated Full Cost of Bringing a New Chemical or Biological Entity to Market ($ Million – Year 2005 $)



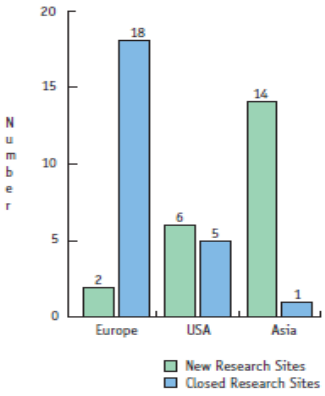
Source: J.A DiMasi and H.G. Grabowski, "The Cost of Biopharmaceutical R&D: Is Biotech Different?". Managerial and Decision Economics 28 (2007): 469-479

R&D as a percentage of sales (1985-2007)



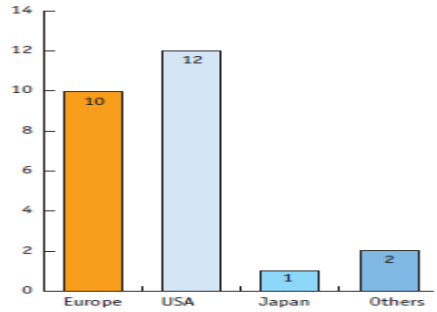
Source: EPFIA Member Associations (official figures) - (e): EPFIA estimate

Changes in Research Site (2001-2008)



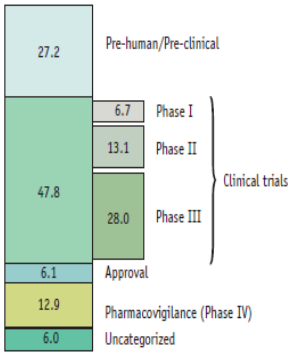
Note: data collected from 22 global companies
Source: IMI (EFPIA Research Directors Group & IFPMA)

Origin of the 25 New Molecular (Chemical and Biological) Entities Launched on the World Market in 2007



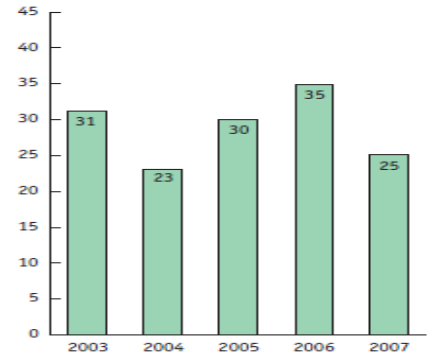
Source: SCRIP - EFPIA calculations (according to nationality of mother company)

Allocation of R&D Investments by Function (%)



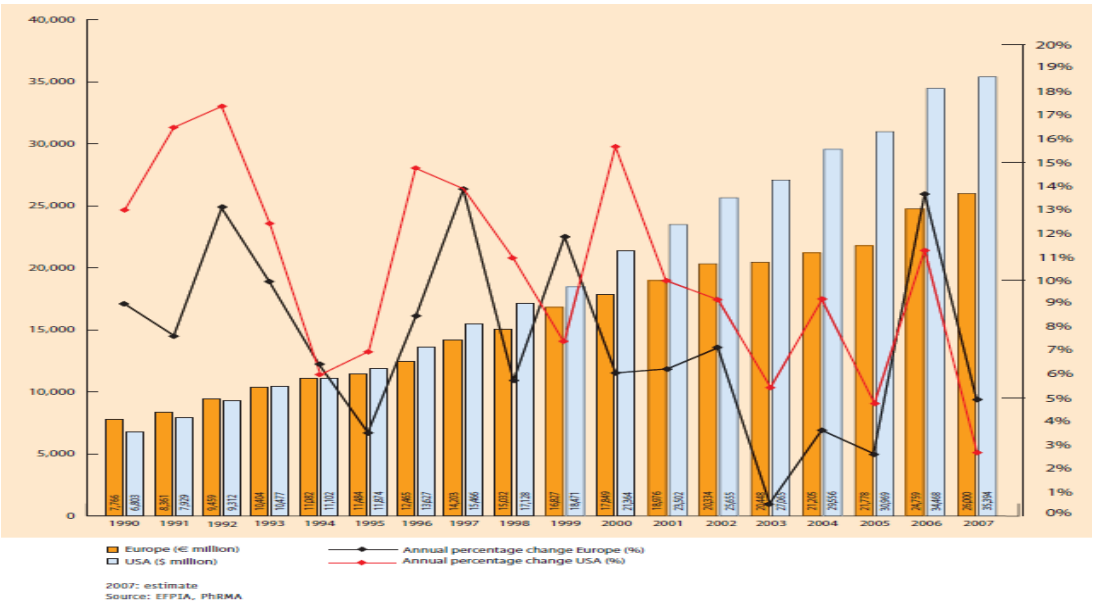
Source: PhRMA, Annual Membership Survey 2008 (percentages calculated from 2006 data)

Number of New Active Substances Launched on the World Market over the Last Five Years



Source: SCRIP

Pharmaceutical R&D Expenditure Value & Annual Growth Rate (%)



2007: estimate
Source: EFPIA, PhRMA

Appendix 5: **Merck Corporation**

Appendix 5.1: Merck Research Pipeline in February 2009

Phase I	Phase I	Phase II	Phase III
Alzheimer's Disease	**Diabetes**	**Atherosclerosis**	**Acute Heart Failure**
V950	MK-4074	MK-1903	MK-7418
Anemia	**Infectious Disease**	MK-6213	(rolofylline)
MK-2578	MK-3281	**Cancer**	**Atherosclerosis**
Cancer	**Neurologic**	MK-0646	MK-0524A
MK-0752	MK-5395	**Diabetes**	(extended-release
MK-1775	**Neutropenia**	MK-0893	niacin/laropiprant)
MK-2206	INS-19	MK-0941	MK-0524B
MK-4101	INS-20	MK-8245	(extended-release
MK-4827	**Psychiatric Disease**	**Infectious Disease**	niacin/laropiprant/
MK-5108	MK-0594	MK-7009	simvastatin)
MK-8033	MK-8368	V419	MK-0859
V934/V935	MK-8998	V710	(anacetrapib)
Cardiovascular	**Respiratory Disease**	**Insomnia**	**Cancer**
MK-1597	MK-5932	MK-4305	MK-8669
MK-3614		**Neurologic**	(deforolimus;
MK-8984		MK-0249	AP23573)
		Osteoporosis	**Diabetes**
		MK-5442 (JTT-305)	MK-0431C
		Psychiatric Disease	**HPV**
		MK-5757	V503
		Respiratory Disease	**Migraine**
		MK-0476C	MK-0974
		MK-0633	(telcagepant)
		Sarcopenia	**Osteoporosis**
		MK-2866	MK-0822
			(odanacatib)

Source: Annual Report Merck 2008

Appendix 5.2: Product Sales Performance

($ in millions)	*2008*	2007	2006
Pharmaceutical:			
Singulair	$ 4,336.9	$ 4,266.3	$ 3,579.0
Cozaar/Hyzaar	3,557.7	3,350.1	3,163.1
Fosamax	1,552.7	3,049.0	3,134.4
Januvia	1,397.1	667.5	42.9
Cosopt/Trusopt	781.2	786.8	697.1
Zocor	660.1	876.5	2,802.7
Maxalt	529.2	467.3	406.4
Propecia	429.1	405.4	351.8
Arcoxia	377.3	329.1	265.4
Vasotec/Vaseretic	356.7	494.6	547.2
Janumet	351.1	86.4	-
Proscar	323.5	411.0	618.5
Emend	263.8	204.2	130.8
Other pharmaceutical[2]	2,278.9	2,422.9	2,780.5
Vaccine and infectious disease product sales included in the Pharmaceutical segment[3]	2,187.6	1,800.5	1,315.8
Pharmaceutical segment revenues	19,382.9	19,617.6	19,835.6
Vaccines[4] and Infectious Diseases:			
Gardasil	1,402.8	1,480.6	234.8
ProQuad/M-M-R II/Varivax	1,268.5	1,347.1	820.1
RotaTeq	664.5	524.7	163.4
Zostavax	312.4	236.0	38.6
Hepatitis vaccines	148.3	279.9	248.5
Other vaccines	354.6	409.9	354.0
Primaxin	760.4	763.5	704.8
Cancidas	596.4	536.9	529.8
Isentress	361.1	41.3	-
Crixivan/Stocrin	275.1	310.2	327.3
Invanz	265.0	190.2	139.2
Other infectious disease	15.5	1.7	-
Vaccine and infectious disease product sales included in the Pharmaceutical segment[3]	(2,187.6)	(1,800.5)	(1,315.8)
Vaccines and Infectious Diseases segment revenues	4,237.0	4,321.5	2,244.7
Other segment revenues[5]	81.8	162.0	162.1
Total segment revenues	23,701.7	24,101.1	22,242.4
Other[6]	148.6	96.6	393.6
	$23,850.3	$24,197.7	$22,636.0

Source: Annual Report Merck 2008

Appendix 5.3: Capital Structure

(million) Year	2004	2005	2006	2007	2008
Current Liabilities:					
Total current liabilities	11.753	13.304	12.723	12.258	14.319
Long-term liabilities					
Total long-term liabilities	13.541	13.626	14.287	17.908	14.119
Shareholder's Equity	17.288	17.917	17.560	18.185	18.758
Total liabilities and equity	42.582	44.846	44.570	48.351	47.196
D/A	59%	60%	61%	62%	60%
E/A	41%	40%	39%	38%	40%

Appendix 6: **Schering-Plough Corporation**

Appendix 6.1: Organon BioSciences N.V.

Organon BioSciences N.V. was purchased from Akzo Nobel in 2007. Organon was a global pharmaceutical company that operated in human and animal therapeutic treatments and it was presence in 120 countries. This purchase enhanced Schering-Plough in several aspects:

- Key new pipepline projects;
- Key products in therapeutic areas – Women's Health and Central Nervous System;
- A proposition as a leader in Animal Health by combining Schering-Plough Animal health with Intervet;
- A leardership position in animal vaccines at Interver and early-stage innovation capabilities in human vaccines at Nobilion;
- Addition state-of-the-art biologics capabilities;
- A substantial expansion to the Company's geographic footprint; and
- Significant Talent, including in key research and development functions

Source: Schering-Plough 2008 Annual Report, on November 29th , 2011

Appendix 6.2: Capital Structure

(million) Year	2004	2005	2006	2007	2008
Current Liabilities:					
Total current liabilities	5.166	4.659	4.162	6.043	5.193
Long-term liabilities					
Total long-term liabilities	3.189	3.423	4.001	12.728	12.395
Shareholder's Equity	7.556	7.387	7.908	10.385	10.529
Total liabilities and equity	**15.911**	**15.469**	**16.071**	**29.156**	**28.117**
D/A	53%	52%	51%	64%	63%
E/A	47%	48%	49%	36%	37%

Appendix 7: Market Indices (Market Evolution)

			Historical information					Forecast									
		Billions	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Price Evolution		Global	0.7%	0.5%	-0.2%	0.0%	-0.2%	0.3%	-0.4%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
Market Evolution (dependent on the evolution of the number of patients)	% Spending (in relation to country GDP)	North America	8.8%	5.6%	9.3%	4.1%	1.8%	5.2%	2.7%	3.6%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
		Europe	6.7%	4.1%	3.9%	3.9%	4.7%	-2.1%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%	3.9%
		Asia/Africa/Australia	8.1%	9.2%	10.0%	10.6%	11.2%	11.5%	12.0%	10.4%	11.3%	11.2%	11.0%	11.2%	11.1%	11.1%	11.1%
		Japan	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
		Latin America	5.0%	5.2%	5.1%	5.1%	4.9%	4.8%	5.2%	5.0%	5.0%	5.1%	5.0%	5.0%	5.1%	5.1%	5.1%
		Global	6.1%	5.6%	6.0%	5.2%	5.0%	4.4%	5.2%	5.0%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%	5.3%
	Spending	North America	1,047,497	701,275	1,245,650	571,539	254,298	731,063	386,088	537,328	624,388	648,855	677,623	711,343	748,201	788,184	830,303
		g		-33%	78%	-54%	-56%	187%	-47%	39%	16%	4%	4%	5%	5%	5%	5%
		Europe	654,782	416,034	419,426	482,707	639,434	-255,363	474,066	511,490	490,857	502,679	515,959	530,166	544,928	559,977	575,441
		g		-36%	1%	15%	32%	-140%	-286%	8%	-4%	2%	3%	3%	3%	3%	3%
		Asia/Africa/Australia	844,355	962,147	1,042,413	1,104,958	1,167,503	1,198,775	1,250,896	1,081,578	1,177,083	1,169,852	1,142,838	1,163,258	1,158,649	1,154,915	1,158,941
		g		14%	8%	6%	6%	3%	4%	-14%	9%	-1%	-2%	2%	0%	0%	0%
		Japan	95,161	167,610	77,722	104,562	113,265	120,260	124,871	136,113	145,563	148,329	150,309	153,950	158,031	161,971	166,053
		g		76%	-54%	35%	8%	6%	4%	9%	7%	2%	1%	2%	3%	2%	3%
		Latin America	109,555	138,163	159,341	189,165	210,639	193,543	254,814	283,161	290,480	307,830	323,655	342,041	362,931	384,393	407,921
		g		26%	15%	19%	11%	-8%	32%	11%	3%	6%	5%	6%	6%	6%	6%
	GDP Source: IMF	North America	11,853,250	12,622,950	13,377,200	14,028,675	14,291,550	13,938,925	14,526,550	15,094,025	15,609,697	16,221,378	16,940,567	17,783,568	18,705,028	19,704,590	20757566.74
		g		6%	6%	5%	2%	-2%	4%	4%	3%	4%	4%	5%	5%	5%	5%
		Europe	9,772,868	10,147,173	10,754,503	12,377,114	13,604,971	12,437,820	12,155,543	13,115,131	12,586,076	12,889,212	13,229,718	13,593,991	13,972,509	14,358,376	14754899.16
		g		4%	6%	15%	10%	-9%	-2%	8%	-4%	2%	3%	3%	3%	3%	3%
		Asia/Africa/Australia	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132	10,424,132
		g		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		Japan	4,655,823	4,571,867	4,356,750	4,356,347	4,849,185	5,035,141	5,488,424	5,869,471	5,980,997	6,060,834	6,207,665	6,372,229	6,531,077	6,695,692	6,864,456
		g		-2%	-5%	0%	11%	4%	9%	7%	2%	1%	2%	3%	2%	3%	3%
		Latin America	2,191,101	2,656,990	3,124,341	3,701,854	4,298,752	4,032,149	4,900,267	5,613,501	5,792,499	6,052,087	6,410,966	6,773,269	7,170,343	7,606,790	8,069,803
		g		21%	18%	18%	16%	-6%	22%	15%	3%	4%	6%	6%	6%	6%	6%
		Global	42,136,202	45,571,189	49,342,423	55,677,539	61,166,629	57,760,763	63,074,924	69,659,626	71,896,504	75,522,071	79,504,622	83,940,909	88,743,877	94,028,240	99,627,267
	GDP Source: IMF	North America	3.5%	6.5%	6.0%	4.9%	1.9%	-2.5%	4.2%	3.9%	3.4%	3.9%	4.4%	5.0%	5.2%	5.3%	5.3%
		Europe	4.7%	3.8%	6.0%	15.1%	9.9%	-8.6%	-2.3%	7.9%	-4.0%	2.4%	2.6%	2.8%	2.8%	2.8%	2.8%
		Asia/Africa/Australia	9.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
		Japan	2.7%	-1.8%	-4.7%	0.0%	11.3%	3.8%	9.0%	6.9%	1.9%	1.3%	2.4%	2.7%	2.5%	2.5%	2.5%
		Latin America	6.0%	21.3%	17.6%	18.5%	16.1%	-6.2%	21.5%	14.6%	3.2%	4.5%	5.9%	5.7%	5.9%	6.1%	6.1%
		Global	6.0%	8.2%	8.3%	12.8%	9.9%	-5.6%	9.2%	10.4%	3.2%	5.0%	5.3%	5.6%	5.7%	6.0%	6.0%

Market Evolution (dependent on the evolution of the number of patients)	Total	North America	9.1%	5.9%	9.9%	4.3%	1.8%	5.1%	2.8%	3.7%	4.1%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
		Europe (epfia 2010)	7.0%	4.3%	4.1%	4.5%	5.2%	-1.9%	3.8%	4.2%	3.7%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
		Asia/Africa/Australia	8.8%	9.2%	10.0%	10.6%	11.2%	11.5%	12.0%	10.4%	11.3%	11.2%	11.0%	11.2%	11.1%	11.1%	11.1%
		Japan (Total)	2%	4%	2%	2%	3%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
		Latin America	5.3%	6.3%	6.0%	6.1%	5.7%	4.5%	6.3%	5.8%	5.2%	5.3%	5.3%	5.3%	5.4%	5.4%	5.4%
		Global	6%	6%	6%	6%	5%	4%	5%	5%	5%	5%	5%	5%	5%	5%	5%

			1990	1995	2000	2005	2010	2015	2020	2025	2030
Market Evolution	Population	North America	281,162.0	295,749.0	313,289.0	329,231.0	344,529.0	359,639.0	374,394.0	388,472.0	401,657.0
		g		5%	6%	5%	5%	4%	4%	4%	3%
		Europe	720,497.0	727,422.0	726,777.0	730,736.0	738,199.0	742,067.0	744,177.0	743,890.0	741,233.0
		g		1%	0%	1%	1%	1%	0%	0%	0%
		Asia/Africa/Australia	3,855,262.0	4,213,170.0	4,553,167.0	4,880,650.0	5,213,123.0	5,549,192.0	5,873,784.0	6,178,254.0	6,462,770.0
		g		9%	8%	7%	7%	6%	6%	5%	5%
		Japan	122,251.0	124,487.0	125,720.0	126,393.0	126,536.0	126,072.0	124,804.0	122,771.0	120,218.0
		g		2%	1%	1%	0%	0%	-1%	-2%	-2%
		Latin America	443,032.0	482,647.0	521,429.0	557,038.0	590,082.0	622,437.0	652,182.0	678,778.0	701,606.0
		g		9%	8%	7%	6%	5%	5%	4%	3%
		Global	5,306,425.0	5,726,239.0	6,122,770.0	6,506,649.0	6,895,889.0	7,284,296.0	7,656,528.0	8,002,978.0	8,321,380.0
		g		8%	7%	6%	6%	6%	5%	5%	4%

Appendix 8: Company Evolution – Company's Market Share

			Historical information					Forecast									
			2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Company Evolution (dependent on the competitors evolution vs company)	Global Sales	North America	262.33	277.29	293.09	305.99	311.80	323.8	335.1	343.5	348.6	353.9	359.2	364.6	370.0	375.6	381.2
		g		6%	6%	4%	2%	6%	3%	3%	2%	2%	2%	2%	2%	2%	2%
		Europe	190.77	202.98	215.97	231.31	247.50	263.9	253.2	259.5	268.6	278.0	287.7	297.8	308.2	319.0	330.2
		g		6%	6%	7%	7%	5%	-4%	3%	4%	4%	4%	4%	4%	4%	4%
		Asia/Africa/Australia	85.77	86.94	88.14	89.46	90.80	106.6	129.7	145.9	164.2	184.7	207.8	233.7	262.9	295.8	332.8
		g		1%	1%	2%	2%	2%	22%	13%	13%	13%	13%	13%	13%	13%	13%
		Japan	68.26	70.11	72.00	75.02	76.60	95.0	102.3	107.9	111.7	115.6	119.7	123.8	128.2	132.7	137.3
		g		3%	3%	4%	2%	8%	8%	6%	4%	4%	4%	4%	4%	4%	4%
		Latin America	28.80	32.46	36.58	41.26	46.50	47.9	54.3	60.5	68.1	76.6	86.2	97.0	109.1	122.7	138.1
				13%	13%	13%	13%	11%	13%	12%	13%	13%	13%	13%	13%	13%	13%
		Global	605	650	694	742	782	837	875	917	961	1009	1061	1117	1178	1246	1320
		g		7.4%	6.8%	6.9%	5.4%	7.0%	4.5%	4.9%	4.8%	4.9%	5.1%	5.3%	5.5%	5.7%	5.9%
	Merck Market Share	United States	5%	5%	5%	5%	4%					5%					
		Europe, Middle East and A	2%	2%	2%	2%	2%					2%					
		Japan	2%	2%	2%	2%	2%					2%					
		Other	8%	7%	7%	7%	6%					6%					
		Global	4%	3%	3%	3%	3%					3%					
	Schering-Plough Market Share	United States	1%	1%	1%	2%	2%					2%					
		Europe and Canada	2%	2%	2%	2%	4%					4%					
		Asia Pacific	0%	1%	1%	1%	1%					1%					
		Latin America	3%	3%	3%	3%	4%					5%					
		Global															

Appendix 9: Merck Income Statement

Income Statements																
	Historical Information					Forecasting										
Year	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Sales																
United States	13,472	12,767	13,777	14,691	13,371	13,504	13,545	13,667	13,790	13,941	14,095	14,250	14,406	14,565	14,725
Europe, Middle East and A	5,441	5,204	4,977	5,159	5,774	6,022	6,299	6,620	6,892	7,174	7,468	7,700	8,093	8,505	8,939
Japan	1,668	1,638	1,479	1,533	1,824	1,883	1,932	1,991	2,032	2,074	2,117	2,161	2,206	2,251	2,298
Other	2,358	2,404	2,403	2,815	2,883	3,064	3,236	3,433	3,642	3,865	4,100	4,351	4,616	4,897	5,196
Total	22,939	22,012	22,636	24,198	23,850	24,474	25,011	25,711	26,356	27,054	27,781	28,461	29,321	30,219	31,158
Costs																
Material and production	4,960	5,150	6,001	6,141	5,583	5,577	5,699	5,857	6,169	6,332	6,502	6,662	6,863	7,073	7,293
Marketing and administrative	7,239	7,156	8,165	7,557	7,377	7,932	8,104	8,327	8,534	8,757	8,990	9,208	9,483	9,770	10,071
R&D	4,010	3,848	4,783	4,883	4,805	4,405	5,002	5,142	5,271	5,411	5,556	5,692	5,864	6,044	6,232
Restructuring Costs	107	322	142	327	1,033	667	667	667	-	-	-	-	-	-	-
Equity Income	(1,008)	(1,717)	(2,294)	(2,977)	(2,561)	(2,561)	(2,553)	(2,545)	(2,537)	(2,530)	(2,522)	(2,514)	(2,506)	(2,499)	(2,394)
U.S. *Vioxx* Settlement Agreement Charge	-	-	-	4,850	-	-	-	-	-	-	-	-	-	-	-
Oher (Income) Expense, net	(338)	(15)	7	403	(1,814)	15	15	15	16	16	17	17	18	18	19
Total	14,970	14,743	16,804	21,184	14,423	16,034	16,933	17,464	17,452	17,987	18,543	19,064	19,721	20,407	21,221
EBIT	7,969	7,269	5,832	3,014	9,428	8,440	8,078	8,247	8,903	9,067	9,237	9,397	9,600	9,812	9,938
Interest/ Expense	6	95	389	357	380	1,135	1,160	1,193	1,223	1,256	1,290	1,321	1,361	1,403	1,446
EBT	7,975	7,364	6,221	3,371	9,808	9,575	9,238	9,440	10,127	10,323	10,527	10,718	10,961	11,215	11,384
Taxes @ 20,38%	2,161	2,733	1,788	95	1,999	2,467	2,380	2,432	2,609	2,659	2,712	2,761	2,824	2,889	2,933
Net income	5,814	4,631	4,434	3,275	7,809	7,108	6,859	7,008	7,518	7,664	7,815	7,957	8,137	8,326	8,452
EBITDA	7,969	7,269	5,832	7,606	11,059	10,113	9,789	10,005	10,706	10,917	11,137	11,343	11,605	11,879	12,069

Appendix 10: Merck costs disaggregated (Historical information)

	2005	2006	2007	2008
Cost of Sales	**5149.6**	**6001.1**	**6140.7**	**5582.5**
- Restructuring costs (2008 &2005)		736.4	483.1	123.3
- Amortization of inventory adjusted to fair value				
Total		736.4	483.1	123.3
- Manufacturing related	5149.6	5264.7	5657.6	5459.2
% over sales	23%	23%	23%	23%
% all cost sales over sales	**23%**	**27%**	**25%**	**23%**
% manufacturing related over cost of sales		88%	92%	98%
Marketing and Administrative		**8165.4**	**7556.7**	**7377**
- Reserves for future Vioxx legal defense		673	280	62
- Reserves for Fosamax Litigation		48	0	40
- Insuranc e arbitration - Vioxx			455	0
Total		721	735	102
- Manufacturing related	0	7444.4	6821.7	7275
% over sales	0%	31%	28%	31%
% all cost sales over sales	**0%**	**34%**	**31%**	**30%**
% manufacturing related over cost mark & adm		91%	90%	99%
Research and Development		**4782.9**	**4882.8**	**4805.3**
- Closure or sale of facilities (Rest Program)		56.5	0	128.4
- Research Expense		762.5	325.1	0
Total		819	325.1	128.4
- Manufacturing related		3963.9	4557.7	4676.9
% over sales		16%	19%	19%
% all cost sales over sales		**20%**	**20%**	**20%**
% manufacturing related over cost of sales		83%	93%	97%
Restructuring Program			**327.1**	**1032.5**
2008 Rest Program				735.5
- Separation Costs				684.9
2005 Rest Program				297

Appendix 11: Supplemental data

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Supplemental data															
Depreciation and Amortization	1,259	1,554	2,268	1,988	1,631	1,674	1,711	1,758	1,803	1,850	1,900	1,947	2,005	2,067	2,131
% of growth		23.5%	46.0%	-12.4%	-18.0%										
% over net assets	7%	9%	13%	11%	9%										
Capital expenditures	1,726	1,403	980	1,011	1,298	**1,600**	1,635	1,681	1,709	1,755	1,802	1,846	1,901	1,960	2,021
% Capex/ (Sales - Cost of sales)	10%	8%	6%	6%	7%	8%									
Δ Net working capital	3,178	(991)	473	305	552	(626)	106	138	161	138	144	135	170	178	186
Δ Other assets	1,400	794	(704)	5,650	(4,196)	962	185	240	188	239	248	233	294	307	321

Appendix 12: Treasury Yield Curve Rates

Date	1 mo	3 mo	6 mo	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	20 yr	30 yr
01-02-2008	3.09	3.26	3.32	3.17	2.88	2.89	3.28	3.54	3.91	4.39	4.35
01/31/08	1.64	1.96	2.07	2.11	2.17	2.27	2.82	3.19	3.67	4.35	4.35
02/29/08	2.07	1.85	1.83	1.77	1.65	1.87	2.50	2.96	3.53	4.37	4.41
03/31/08	1.22	1.38	1.51	1.55	1.62	1.79	2.46	2.88	3.45	4.30	4.30
04/30/08	1.17	1.43	1.64	1.85	2.29	2.49	3.03	3.34	3.77	4.49	4.49
05/30/08	1.98	1.89	2.01	2.22	2.66	2.93	3.41	3.68	4.06	4.74	4.72
06/30/08	1.60	1.90	2.17	2.36	2.63	2.91	3.34	3.61	3.99	4.59	4.53
07/31/08	1.55	1.68	1.89	2.27	2.52	2.81	3.25	3.56	3.99	4.63	4.59
08/29/08	1.63	1.72	1.97	2.17	2.36	2.60	3.10	3.45	3.83	4.47	4.43
09/30/08	1.02	0.92	1.60	1.78	2.00	2.28	2.98	3.38	3.85	4.43	4.31
10/31/08	0.12	0.46	0.94	1.34	1.56	1.80	2.80	3.29	4.01	4.74	4.35
11/28/08	0.02	0.01	0.44	0.90	1.00	1.27	1.93	2.35	2.93	3.71	3.45
12/31/08	0.11	0.11	0.27	0.37	0.76	1.00	1.55	1.87	**2.25**	3.05	2.69

Source: US Treasury

Appendix 13: Levered and Unlevered Betas by Industry

Industry Name	*Number of Firms*	*Average Beta*	*Market D/E Ratio*	*Tax Rate*	*Unlevered Beta*	*Cash/Firm Value*	*Unlevered Beta corrected for cash*
Bank	476	0,71	183,05%	25,97%	0,30	12,61%	0,35
Beverage	40	0,96	19,03%	16,21%	0,83	3,25%	0,86
Biotechnology	107	1,26	9,98%	3,25%	1,15	10,63%	1,29
Chemical (Basic)	18	1,26	28,67%	19,25%	1,02	8,21%	1,12
Chemical (Diversified)	32	1,23	27,63%	25,35%	1,02	7,92%	1,10
Chemical (Specialty)	87	1,19	35,48%	18,85%	0,92	5,79%	0,98
Drug	341	1,17	14,52%	5,90%	1,03	10,70%	1,15
E-Commerce	53	1,50	11,29%	12,60%	1,36	23,33%	1,78
Educational Services	33	0,84	2,27%	20,44%	0,82	7,99%	0,89
Electrical Equipment	82	1,38	23,79%	14,06%	1,14	9,38%	1,26
Electronics	172	1,31	45,68%	11,78%	0,93	24,77%	1,24
Entertainment	83	1,67	79,88%	16,90%	1,01	7,21%	1,08
Environmental	78	1,12	49,93%	15,13%	0,78	2,27%	0,80
Financial Svcs. (Div.)	295	1,27	522,77%	17,99%	0,24	11,57%	0,27
Food Processing	108	0,80	35,37%	21,62%	0,63	3,14%	0,65
Food Wholesalers	17	0,73	59,86%	27,00%	0,51	5,93%	0,54
Healthcare Information	28	1,05	19,92%	16,00%	0,90	13,72%	1,04
Insurance (Life)	34	1,17	43,42%	26,62%	0,89	34,66%	1,36
Insurance (Prop/Cas.)	77	0,91	3,78%	20,53%	0,89	4,36%	0,93
Manuf. Housing/RV	17	1,31	51,79%	13,67%	0,90	27,78%	1,25
Maritime	55	1,30	186,85%	7,14%	0,48	7,95%	0,52
Medical Services	159	1,10	54,69%	18,25%	0,76	15,06%	0,90
Medical Supplies	251	1,17	13,46%	12,45%	1,05	7,66%	1,13
Natural Gas (Div.)	33	1,22	58,59%	23,99%	0,84	2,26%	0,86
Natural Gas Utility	24	0,69	90,76%	24,32%	0,41	2,82%	0,42
Pharmacy Services	18	0,94	23,50%	20,26%	0,79	2,38%	0,81
Reinsurance	10	0,91	21,12%	8,19%	0,76	32,39%	1,12
Restaurant	67	1,27	25,59%	20,11%	1,05	3,25%	1,09
Securities Brokerage	31	1,36	924,55%	22,87%	0,17	21,13%	0,21
Telecom. Services	139	1,43	51,38%	15,80%	1,00	5,70%	1,06
Thrift	233	0,66	19,42%	17,12%	0,57	21,11%	0,72
Tobacco	11	0,71	17,69%	22,09%	0,63	5,73%	0,66
Toiletries/Cosmetics	22	0,95	38,64%	22,76%	0,73	7,45%	0,79
Public/Private Equity	9	2,08	389,77%	6,90%	0,45	7,51%	0,49
Funeral Services	5	1,41	67,74%	32,54%	0,97	4,83%	1,01
Total Market	**6753**	**1,19**	**65,71%**	**16,57%**	**0,77**	**10,43%**	**0,86**

Source: Damodaran website

Appendix 14: Country Risk Premium

Country	*Region*	*Long-Term Rating*	*Adj. Default Spread*	*Total Risk Premium*	*Country Risk Premium*
Albania	Eastern Europe & Russia	B1	650	14,75%	9,75%
Belarus	Eastern Europe & Russia	B1	650	14,75%	9,75%
Belgium [1]	Western Europe	Aa1	70	6,05%	1,05%
Brazil	Central and South America	Ba1	300	9,50%	4,50%
China	Asia	A1	140	7,10%	2,10%
Denmark	Western Europe	Aaa	0	5,00%	0,00%
Dominican Republic	Caribbean	B2	750	16,25%	11,25%
Ecuador	Central and South America	Ca	260	8,90%	3,90%
France [1]	Western Europe	Aaa	0	5,00%	0,00%
Germany [1]	Western Europe	Aaa	0	5,00%	0,00%
Greece [1]	Western Europe	A1	140	7,10%	2,10%
Ireland [1]	Western Europe	Aaa	0	5,00%	0,00%
Isle of Man	Financial Center	Aaa	0	5,00%	0,00%
Israel	Middle East	A1	140	7,10%	2,10%
Italy [1]	Western Europe	Aa2	100	6,50%	1,50%
Japan	Asia	Aa3	120	6,80%	1,80%
Luxembourg [1]	Financial Center	Aaa	0	5,00%	0,00%
Netherlands [1]	Western Europe	Aaa	0	5,00%	0,00%
New Zealand	Australia & New Zealand	Aaa	0	5,00%	0,00%
Portugal [1]	Western Europe	Aa2	100	6,50%	1,50%
Russia	Eastern Europe & Russia	Baa1	200	8,00%	3,00%
Saudi Arabia	Middle East	A1	140	7,10%	2,10%
Singapore	Asia	Aaa	0	5,00%	0,00%
Slovakia	Eastern Europe & Russia	A1	140	7,10%	2,10%
South Africa	Africa	A2	160	7,40%	2,40%
Spain [1]	Western Europe	Aaa	0	5,00%	0,00%
St. Vincent & the Grenadines	Caribbean	B1	650	14,75%	9,75%
Suriname	Caribbean	Ba3	525	12,88%	7,88%
Sweden	Western Europe	Aaa	0	5,00%	0,00%
Switzerland	Western Europe	Aaa	0	5,00%	0,00%
United Arab Emirates	Middle East	Aa2	100	6,50%	1,50%
United Kingdom	Western Europe	Aaa	0	5,00%	0,00%
United States of America	North America	Aaa	0	5,00%	0,00%

Source: Damodaran website

Appendix 15: Long-term debt of Merck ar December 31

	2008	2007
4.75% notes due 2015	$ 1.078,3	$ 1.068,1
4.375% notes due 2013	530,0	524,4
6.4% debentures due 2028	499,3	499,3
5.75% notes due 2036	497,8	497,7
5.95% debentures due 2028	497,2	497,1
5.125% notes due 2011	273,7	258,8
6.3% debentures due 2026	248,0	247,9
other	319,0	322,5
	$ 3.943,3	$ 3.915,8

Source: Merck 2008 Form 10-K

Appendix 16: Cost of debt, Interest Coverage ratio and Default spread

Re = Rf + β (Rm - Rf)	7.40%
Rf	2.25%
β	1.03
Rp = Rm - Rf	5.00%
growth 2018 - ∞	0.12%
Reinvestment rate	1.001%
ROIC	11.9%

default spread	1.65%
Rd total	3.90%
D/V (2008)	60.3%

Interest Coverage ratio	24.79
probabilty of default	0.65%
% CFD for Health Industry	27%

Appendix 17: Merck Market Value from 2005 to 2008

Market Value	**2004**	**2005**	**2006**	**2007**	**2008**	**average**
Merck	70.985,65	69.407,00	94.515,45	126.244,14	64.073,79	85.045,21

source: Bloomberg

Appendix 18: Merck Balance Sheet

ASSETS															
Year	**2.004**	**2.005**	**2.006**	**2.007**	**2.008**	**2.009**	**2.010**	**2.011**	**2.012**	**2.013**	**2.014**	**2.015**	**2.016**	**2.017**	**2.018**
Current Assets															
Cash and Equivalents	2.879	9.585	5.915	5.336	4.368	4.482	4.581	4.709	4.827	4.955	5.088	5.213	5.370	5.535	5.707
Short-term investments	4.211	6.052	2.798	2.895	1.118	1.147	1.173	1.205	1.236	1.268	1.302	1.334	1.375	1.417	1.461
Accounts Receivable	3.628	2.927	3.315	3.636	3.779	3.678	3.758	3.864	3.961	4.065	4.175	4.277	4.406	4.541	4.682
Inventories	1.899	1.658	1.769	1.881	2.283	1.708	1.746	1.794	1.890	1.940	1.992	2.041	2.102	2.167	2.234
Deferred Income taxes	859	826	1.433	1.297	7.756	7.959	8.134	8.361	8.571	8.798	9.034	9.256	9.535	9.827	10.133
Total Current Assets	13.475	21.049	15.230	15.045	19.305	18.975	19.391	19.934	20.484	21.027	21.591	22.120	22.788	23.487	24.217
Investments	6.727	1.108	7.788	7.159	6.491	6.661	6.807	6.998	7.173	7.363	7.561	7.746	7.980	8.225	8.480
Property, at cost															
Land	367	433	409	406	386	396	405	416	427	438	450	461	475	489	504
Buildings and improvements	8.874	9.480	9.746	10.048	9.767	10.023	10.243	10.529	10.794	11.080	11.377	11.656	12.008	12.376	12.760
Equipment	11.926	12.785	13.172	13.554	13.104	13.446	13.741	14.126	14.480	14.864	15.263	15.637	16.109	16.603	17.119
Construction in progress	1.642	1.016	882	796	871	894	913	939	963	988	1.015	1.039	1.071	1.104	1.138
Total	22.809	23.714	24.210	24.803	24.128	24.759	25.302	26.010	26.663	27.370	28.104	28.793	29.662	30.571	31.522
Less accumulated depreciation	8.095	9.315	11.015	12.457	12.129	12.446	12.719	13.075	13.403	13.758	14.127	14.473	14.910	15.367	15.845
Property, net	14.714	14.399	13.194	12.346	11.999	12.313	12.584	12.936	13.260	13.612	13.977	14.319	14.752	15.204	15.676
Goodwill	1.086	1.086	1.432	1.455	1.439	1.476	1.509	1.551	1.590	1.632	1.676	1.717	1.769	1.823	1.880
Other intangible assets, net	679	519	944	713	525	539	551	566	581	596	612	627	646	666	686
Other assets	5.892	6.686	5.982	11.632	7.436	8.398	8.583	8.823	9.011	9.250	9.498	9.731	10.024	10.332	10.653
Total assets	42.573	44.846	44.570	48.351	47.196	48.362	49.424	50.807	52.099	53.480	54.915	56.260	57.959	59.735	61.592

Liabilities and Shareholders Equity															
(million) **Year**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Current Liabilities:															
Loans Payable and current portion of long-term debt	2.181	2.972	1.285	1.824	2.297	2.357	2.409	2.476	2.538	2.606	2.676	2.741	2.824	2.911	3.001
Accounts Payable	421	471	497	625	618	567	580	596	627	644	661	677	698	719	742
Accrued compensation other accrued liabilities	5.288	5.381	6.653	8.535	9.174	9.414	9.621	9.890	10.138	10.407	10.686	10.948	11.278	11.624	11.985
Income taxes	3.021	3.649	3.461	444	1.426	1.464	1.496	1.538	1.576	1.618	1.661	1.702	1.754	1.807	1.863
Dividends Payable	841	830	827	831	804	824	843	866	888	911	936	959	988	1.018	1.050
Total current liabilities	11.753	13.304	12.723	12.258	14.319	14.626	14.947	15.366	15.768	16.186	16.620	17.027	17.542	18.079	18.641
Long-term liabilities															
Long-term debt, net current portion	4.692	5.126	5.551	3.916	3.943	4.046	4.135	4.251	4.358	4.473	4.593	4.706	4.848	4.996	5.152
Deferred income taxes	6.442	6.093	6.330	11.585	7.767	7.970	8.145	8.372	8.583	8.810	9.046	9.268	9.548	9.841	10.146
Minority Interests	2.407	2.407	2.406	2.407	2.409	2.472	2.526	2.597	2.662	2.732	2.806	2.874	2.961	3.052	3.147
Total long-term liabilities	13.541	13.626	14.287	17.908	14.119	14.488	14.806	15.220	15.602	16.015	16.445	16.848	17.357	17.889	18.445
Total	25.294	26.929	27.010	30.166	28.437	29.114	29.753	30.586	31.370	32.201	33.066	33.876	34.899	35.968	37.086
Shareholder's Equity	17.288	17.917	17.560	18.185	18.758	19.248	19.671	20.222	20.729	21.278	21.849	22.385	23.061	23.767	24.506
Total liabilities and equity	42.582	44.846	44.570	48.351	47.196	48.362	49.424	50.807	52.099	53.480	54.915	56.260	57.959	59.735	61.592
D/A	59%	60%	61%	62%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
E/A	41%	40%	39%	38%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%

Appendix 19: Base- Case Value

Base-Case Cash Flows															
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EBIT	7.968,7	7.268,5	5.832,2	3.013,9	9.427,7	8.439,5	8.077,9	8.246,8	8.903,4	9.067,1	9.237,5	9.396,7	9.599,8	9.812,5	9.937,9
Taxes	2.159,5	2.696,6	1.673,8	84,4	1.923,3	2.174,0	2.080,9	2.124,4	2.293,5	2.335,7	2.379,6	2.420,6	2.472,9	2.527,7	2.560,0
EBIT (1-t)	5.809,2	4.571,9	4.158,4	2.929,5	7.504,4	6.265,5	5.997,1	6.122,4	6.609,9	6.731,4	6.857,9	6.976,1	7.126,9	7.284,8	7.377,9
Depreciation	1.258,7	1.554,2	2.268,4	1.988,2	1.631,2	1.673,8	1.758,5	1.802,6	1.900,0	1.946,6	2.005,3	2.066,8	2.131,0	1.946,6	2.005,3
Operating Cash Flow	7.067,9	6.126,1	6.426,8	4.917,7	9.135,6	7.939,3	7.755,5	7.925,0	8.509,9	8.677,9	8.863,2	9.042,9	9.257,9	9.231,3	9.383,3
Δ Net working capital	3.178,1	-990,7	473,3	305,1	551,9	-625,9	137,7	160,7	138,4	143,9	134,9	170,3	178,0	143,9	134,9
Capital Expenditures	1.726,1	1.402,7	980,2	1.011,0	1.298,3	1.600,0	1.681,0	1.709,2	1.754,5	1.801,6	1.845,7	1.901,5	1.959,8	1.801,6	1.845,7
Δ Other assets	-18.599,7	794,1	-704,2	5.650,3	-4.196,3	962,5	240,3	187,7	238,8	248,3	232,7	293,9	307,2	248,3	232,7
Free Cash flow of assets	20.763,4	4.920,0	5.677,5	-2.048,7	11.481,7	6.002,8	5.696,6	5.867,4	6.378,2	6.484,2	6.650,0	6.677,2	6.813,0	7.037,6	7.170,0

Base-Case Value

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCFF	11.481,7	6.002,8	5.696,6	5.867,4	6.378,2	6.484,2	6.650,0	6.677,2	6.813,0	7.037,6	7.170,0
Terminal Value											98.587,88
PV CF		5.589,17	4.938,64	5.867,42	6.378,19	6.484,16	6.649,99	6.677,19	6.812,99	7.037,55	102.099,25
Base-case value (total)	$ 158.534,55										

Interest Tax Shields

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Interest tax shield	77,6	292,5	298,9	307,3	315,2	323,5	332,2	340,3	350,6	361,3	372,6
Terminal Value of tax shields											9.864,82
PV tx shields		281,51	276,89	273,96	270,43	267,18	290,67	260,37	293,43	256,09	10.118,96
Total PV, tx shields	$ 12.589,50										

Cost of Financial Distress

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
CFD	51,2	26,7	25,4	26,1	28,4	28,9	29,6	29,7	30,4	31,4	31,9
Terminal Value											845,74
PV CF		25,74	23,51	23,30	24,38	23,86	23,55	22,76	22,35	22,22	876,48
Total PV, CF	$ 1.088,15										

Adjusted Present Value	$ 170.035,90

Value of Equity

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCFE	9.318,2	7.131,7	6.188,8	6.115,3	6.666,8	6.789,8	6.905,4	7.112,9	7.047,8	7.185,8	7.257,9
Terminal Value											99.796,08
PV CF		6.640,34	5.365,36	4.936,36	5.010,69	4.751,52	4.499,51	4.315,36	3.981,24	4.059,23	99.677,80

Value of Equity	$ 143.237,42
# of shares	9386,3
Share Price	$ 15,26

Appendix 20: Schering – Plough segments weight

Year	2004		2005			2006			2007			2008		
Sales		% Total Sales		growth	% Total Sales		growth	% Total Sales		growth	% Total Sales		growth	% Total Sales
United States	3,219	39%	3,589	11%	38%	4,192	17%	40%	4,597	10%	43%	5,556	21%	52%
Europe and Canada	3,595	43%	4,040	12%	42%	4,403	9%	42%	5,500	25%	52%	8,903	62%	84%
Asia Pacific	676	8%	995	47%	10%	1,009	1%	10%	1,234	22%	12%	2,056	67%	19%
Latin America	782	9%	884	13%	9%	990	12%	9%	1,359	37%	13%	1,987	46%	19%
Total	8,272	100%	9,508	15%	100%	10,594	11%	100%	12,690	20%	120%	18,502	46%	175%

Appendix 21: Sales of foreign countries with ≥ 5% consolidated net sales

Foreign Countries accounted for ≥ 5 % of consolitated net sales

	2006		2007		2008	
	Net Sales	% of Consolitaded Net Sales	Net Sales	% of Consolitaded Net Sales	Net Sales	% of Consolitaded Net Sales
Total International net sales	$ 6.402,00	60%	$ 8.093,00	64%	$ 12.946,00	70%
France	809	8%	965	8%	1369	7%
Japan	669	6%	70	6%	1008	5%
Germany	408	4%	473	4%	835	5%
Canada	478	5%	578	5%	774	4%

Source: Schering-Plough 2008 Form 10-K

Appendix 22: Schering-Plough Income Statement

Pro Forma Income Statements															
	Historical Infomation								Forecasting						
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sales															
United States	3,219	3,589	4,192	4,597	5,556	6,373	6,819	7,092	7,376	7,671	7,977	8,296	8,628	8,973	9,332
Europe and Canada	3,595	4,040	4,403	5,500	8,903	11,310	12,328	12,908	13,514	14,149	14,814	15,511	16,240	17,003	17,802
Asia Pacific	676	995	1,009	1,234	2,056	2,763	3,592	4,023	4,505	4,866	5,255	5,675	6,129	6,620	7,149
Latin America	782	884	990	1,359	1,987	2,526	2,905	3,166	3,451	3,762	3,950	4,148	4,355	4,573	4,801
Total	8,272	9,508	10,594	12,690	18,502	22,972	25,644	27,188	28,846	30,448	31,997	33,630	35,352	37,169	39,085
Costs															
Material and production (cost of s	3,070	3,346	3,697	4,405	7,307	8,040	8,975	9,516	10,096	10,657	11,199	11,771	12,373	13,009	13,680
Marketing and administrative	3,811	4,374	4,718	5,468	6,823	8,471	9,457	10,026	10,638	11,228	11,800	12,402	13,037	13,707	14,413
R&D	1,607	1,865	2,188	2,926	3,529	5,513	6,155	6,525	6,923	7,307	7,679	8,071	8,485	8,921	9,380
Acquired in-process R&D	0	0	0	3,754	0	0	0	0	0	0	0	0	0	0	0
Special and acquisition-related cha	153	294	102	84	329	329	329	329	329	329	0	0	0	0	0
Equity Income	-347	-873	-1,459	-2,049	-1,870	-1,870	-1,870	-1,870	-1,870	-1,870	-1,870	-1,870	-1,870	-1,870	-1,870
Oher (Income) Expense, net	58	18	-10	-533	-130	-161	-180	-191	-203	-214	-225	-236	-248	-261	-275
Total	8,352	9,024	9,236	14,055	15,988	20,322	22,865	24,335	25,913	27,437	28,583	30,137	31,776	33,505	35,329
EBIT	-80	484	1,358	-1,365	2,514	2,650	2,778	2,853	2,933	3,010	3,414	3,493	3,576	3,664	3,756
Interest	88	-13	125	150	-465	783	885	938	995	1,050	1,104	1,160	1,219	1,282	1,348
EBT	8	471	1,483	-1,215	2,049	3,432	3,663	3,791	3,928	4,061	4,518	4,653	4,795	4,946	5,104
Taxes @	779	228	340	258	146	884	944	977	1,012	1,046	1,164	1,199	1,235	1,274	1,315
Net income	-771	243	1,143	-1,473	1,903	2,548	2,719	2,814	2,916	3,015	3,354	3,454	3,560	3,672	3,789
Ebitda	373	970	1,926	-504	4,689	3,566	3,802	3,938	4,084	4,225	4,691	4,835	4,987	5,147	5,316

Appendix 23: Schering-Plough Costs disaggregated (Historical information)

Costs	2005	2006	2007	2008
Cost of Sales	**3,346**	**3,697**	**4,405**	**7,307**
- Manufacturing streamlining actions		146		
- Amortization of inventory adjusted to fair value			258	889
- Amostization of acquired intangible assets			65	527
- Incremental depreciation on property			3	33
- Purchasing account adjustments			1,400	326
- Cost Saving from manufacturing streamlining			-100	
- Amortization related to other intangible		47	107	570
Total	0	193	1,733	2,345
- Manufacturing related	3,346	3,504	2,672	4,962
% over sales	35%	33%	21%	39%
% all cost sales over sales	**35%**	**35%**	**35%**	**39%**
% manufacturing related over cost of sales		95%	61%	**68%**
Marketing and Administrative	**4374**	**4718**	**5468**	**6823**
- Contractually definied costs for physician		204	242	223
- OBS acquisition related				1,706
- addition in 2004 fourth quarter of Bayer sales representat	656			
- Promotion spending, ongoing investments in EMA		377	875	
Total	656	581	1,117	1,929
- Manufacturing related	3,718	4,137	4,351	4,894
% over sales	39%	39%	34%	26%
% all mkt and administrative ove	**46%**	**45%**	**43%**	**37%**
% manufacturing related over mk	85%	88%	80%	72%
Research and Development	**1865**	**2188**	**2926**	**3529**
- Upfront payments related to licensing transactions			197	
- Clinical trials, building greater breath and capacity to suppor pipeline (increase the value cost)	0	0	995	741
Total	0	0	1,192	741
- Manufacturing related	1,865	2,188	1,734	2,788
% over sales	20%	21%	14%	15%
% all R&D over sales	**20%**	**21%**	**23%**	**19%**
% manufacturing related overR&I	100%	100%	59%	79%
Special and acquisition-related charges	**294**	**102**	**84**	**329**
- Integration-related			61	54
- termination costs (productivity Transformation Program)			23	275
- Changes in Manufacturing operations (U.S. and Puerto Rico)		102		
Total	0	102	84	329
- Manufacturing related	294	0	0	0
% over sales	3%	0%	0%	0%
% all SARC over sales	**3%**	**1%**	**1%**	**2%**
% manufacturing related over SA	0%	100%	100%	100%

Appendix 24: Supplement data

Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Supplemental data															
Depreciation and Amortization	453	486	568	861	2,175	917	1,023	1,085	1,151	1,215	1,277	1,342	1,411	1,483	1,560
% of growth		7%	17%	52%	153%										
% net assets	6%	7%	7%	8%	21%										
Capital expenditures (sales growth)	489	478	458	618	747	1,140	1,155	1,224	1,298	1,370	1,440	1,514	1,591	1,673	1,759
CAPEX/(Sales - Cost of sales)	9%	8%	7%	7%	7%										
Δ Net working capital		-3	220	2,926	-899	825	591	341	366	354	342	361	381	402	424
Δ Other assets		-54	110	562	28	-385	244	75	80	77	75	79	83	88	93

Appendix 25: Estimated Parameters

Re = Rf + β (Rm - Rf)	7.40%
Rf	2.25%
β	1.03
Rp = Rm - Rf	5.00%
growth 2018 - ∞	0.94%
Reinvestment rate	19.44%
ROIC	4.82%

default spread	2%
Rd (total)	4.25%
D/V (2008)	62.55%

Interest Coverage ratio	-5.406
probability of default	1.40%
% CFD for Health Industry	27%

Appendix 26: Schering-Plough Market Value from 2005 to 2008

Market Value	**2004**	**2005**	**2006**	**2007**	**2008**	**average**
Schering-Plough	30,789.00	30,858.00	35,152.68	43,183.44	27,690.78	33,534.78

source: Bloomberg (millions)

Appendix 27: Schering-Plough Balance Sheet

ASSETS															
Year	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Current Assets															
Cash and Equivalents	4,984	4,767	2,666	2,279	3,373	4,188	4,675	4,957	5,259	5,551	5,833	6,131	6,445	6,776	7,125
Short-term investments	851	818	3,267	32	5	6	7	7	8	8	9	9	10	10	11
Accounts Receivable	1,407	1,479	1,804	2,841	2,816	3,496	3,903	4,138	4,390	4,634	4,870	5,119	5,381	5,657	5,949
Inventories	1,580	1,605	1,676	4,073	3,114	3,426	3,825	4,055	4,303	4,542	4,773	5,016	5,273	5,544	5,830
Deferred Income taxes	309	294	266	349	435	540	603	639	678	716	752	791	831	874	919
Prepaid expenses and other current asset	872	769	744	1,272	1,228	1,525	1,702	1,805	1,915	2,021	2,124	2,232	2,346	2,467	2,594
Total Current Assets	10,003	9,732	10,423	10,846	10,971	13,182	14,715	15,601	16,553	17,471	18,360	19,297	20,286	21,328	22,428
Property, at cost															
Land	79	67	67	326	377	468	523	554	588	620	652	685	720	757	796
Buildings and improvements	3,198	3,238	3,387	4,634	4,551	5,651	6,308	6,688	7,095	7,489	7,870	8,272	8,696	9,143	9,614
Equipment	2,999	3,131	3,240	4,503	4,504	5,592	6,243	6,619	7,022	7,412	7,789	8,187	8,606	9,048	9,515
Construction in progress	809	761	627	891	1,008	919	1,026	1,088	1,154	1,218	1,280	1,345	1,414	1,487	1,563
Total	7,085	7,197	7,321	10,354	10,440	12,630	14,099	14,948	15,859	16,740	17,591	18,489	19,436	20,435	21,488
Less accumulated depreciation	2,492	2,710	2,956	3,338	3,607	4,478	4,999	5,300	5,624	5,936	6,238	6,556	6,892	7,246	7,620
Property, net	4,593	4,487	4,365	7,016	6,833	8,151	9,099	9,647	10,236	10,804	11,353	11,933	12,544	13,189	13,869
Goodwill	209	204	206	2,937	2,778	2,268	2,660	2,820	2,992	3,158	3,318	3,488	3,666	3,855	4,054
Other intangible assets, net	371	365	286	7,004	6,154	6,892	7,693	8,157	8,654	9,134	9,599	10,089	10,606	11,151	11,726
Other assets	735	681	791	1,353	1,381	996	1,240	1,315	1,395	1,472	1,547	1,626	1,709	1,797	1,890
Total assets	15,911	15,469	16,071	29,156	28,117	31,488	35,407	37,539	39,828	42,039	44,178	46,433	48,811	51,319	53,965

Liabilities and Shareholders Equity															
(million) **Year**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Current Liabilities:															
Accounts Payable	978	1,078	1,254	1,762	1,677	1,845	2,060	2,184	2,317	2,446	2,570	2,701	2,840	2,986	3,140
Short-term borrowings and current portion of long-term debt	1,569	1,278	242	461	245	304	340	360	382	403	424	445	468	492	518
Income taxes	896	213	323	617	183	227	254	269	285	301	316	333	350	368	387
Accruded compensation	443	632	794	995	1,010	1,254	1,400	1,484	1,575	1,662	1,747	1,836	1,930	2,029	2,134
other accruded liabilities	1,280	1,458	1,549	2,208	2,078	2,580	2,880	3,054	3,240	3,420	3,594	3,777	3,971	4,175	4,390
Total current liabilities	5,166	4,659	4,162	6,043	5,193	6,211	6,933	7,351	7,799	8,232	8,651	9,092	9,558	10,049	10,567
Long-term liabilities															
Long-term debt, net current portion	2,392	2,399	2,414	9,019	7,931	6,662	7,693	8,157	8,654	9,134	9,599	10,089	10,606	11,151	11,726
Deferred income taxes	111	117	122	1,701	1,551	1,926	2,150	2,279	2,418	2,552	2,682	2,819	2,964	3,116	3,276
Other long-term liabilities	686	907	1,465	2,008	2,913	3,617	4,037	4,281	4,542	4,794	5,038	5,295	5,566	5,852	6,154
Total long-term liabilities	3,189	3,423	4,001	12,728	12,395	12,204	13,880	14,716	15,614	16,480	17,319	18,203	19,135	20,118	21,156
Shareholder's Equity	7,556	7,387	7,908	10,385	10,529	13,073	14,593	15,472	16,416	17,327	18,209	19,138	20,118	21,152	22,242
Total liabilities and equity	**15,911**	**15,469**	**16,071**	**29,156**	**28,117**	**31,488**	**35,407**	**37,539**	**39,828**	**42,039**	**44,178**	**46,433**	**48,811**	**51,319**	**53,965**
D/A	53%	52%	51%	64%	63%	58%	59%	59%	59%	59%	59%	59%	59%	59%	59%
E/A	47%	48%	49%	36%	37%	42%	41%	41%	41%	41%	41%	41%	41%	41%	41%

Appendix 28: Base-Case Value of Schering-Plough

Base-Case Cash Flows																
Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EBIT	(80)	484	1,358	(1,365)	2,514	2,650	2,778	2,853	2,933	3,010	3,414	3,493	3,576	3,664	3,756
Taxes	(7,790)	234	311	290	179	683	716	735	756	775	879	900	921	944	968
EBIT (1-t)	7,710	250	1,047	(1,655)	2,335	1,967	2,063	2,118	2,177	2,235	2,535	2,593	2,655	2,720	2,789
Depreciation	453	486	568	861	2,175	917	1,085	1,151	1,215	1,277	1,342	1,411	1,483	1,277	1,342
Operating Cash Flow	8,163	736	1,615	(794)	4,510	2,884	3,148	3,269	3,392	3,512	3,877	4,004	4,138	3,997	4,130
Δ Net working capital	-	(3)	220	2,926	(899)	825	341	366	354	342	361	381	402	342	361
Capital Expenditures	489	478	458	618	747	1,140	1,224	1,298	1,370	1,440	1,514	1,591	1,673	1,440	1,514
Δ Other assets	-	(54)	110	562	28	(385)	75	80	77	75	79	83	88	75	79
Free Cash flow of assets	7,674	315	827	(4,900)	4,634	1,304	1,508	1,524	1,591	1,654	1,923	1,949	1,976	2,139	2,177

Base-Case Value

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCF	4,634	1,304	1,508	1,524	1,591	1,654	1,923	1,949	1,976	2,139	2,177
Terminal Value											33,998
PV CF		1,215	1,307	1,230	1,196	1,158	1,253	1,182	1,116	1,125	35,064
Base-case value (total)	45,846										

Interest Tax Shields

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Interest tax shield	-33	202	228	242	256	271	284	299	314	330	347
Terminal Value											10,581
PV tx shields		193	219	228	237	245	252	260	268	276	10,810
Total PV, tx shields	12,989										

Cost of Financial Distress

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCF	25.02	7.04	8.14	8.23	8.59	8.93	10.38	10.52	10.67	11.55	11.76
Terminal Value											358.15
PV CF		6.76	7.49	7.26	7.27	7.25	8.09	7.86	7.65	7.94	365.90
CFD (total)	433										

Adjusted Present Value	58,402

Value of Equity

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCFE	5,413	673	-401	1,080	1,057	1,206	1,591	1,596	1,601	1,606	1,611
Terminal Value											25,161
PV CF		627	-374	1,006	984	1,123	1,481	1,486	1,491	1,495	26,772

Value of Equity	$ 36,091	(million)
#shares	5343	
Price per share	$ 6.75	

Merged Entity

Without Synergy

Appendix 29: Income Statement of the merged entity without synergies

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Tax (10-K Info)	20.4%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%
growth											
Pro Forma Income Statements											
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sales											
United States	18,927	19,877	20,364	20,758	21,165	21,612	22,072	22,546	23,035	23,538	24,058
Europe, Middle East and Africa	14,677	17,332	18,627	19,528	20,406	21,324	22,283	23,211	24,332	25,508	26,741
Asia	2,056	2,763	3,592	4,023	4,505	4,866	5,255	5,675	6,129	6,620	7,149
Japan	1,824	1,883	1,932	1,991	2,032	2,074	2,117	2,161	2,206	2,251	2,298
Other (Latin America)	4,870	5,590	6,141	6,599	7,094	7,627	8,051	8,498	8,971	9,470	9,998
Total	42,352	47,446	50,655	52,899	55,202	57,502	59,777	62,091	64,673	67,388	70,244
Costs											
Merger Costs											
Material and production	12,890	13,617	14,674	15,373	16,265	16,989	17,701	18,432	19,236	20,082	20,973
Marketing and administrative	14,200	16,403	17,560	18,354	19,172	19,986	20,789	21,609	22,520	23,477	24,484
R&D	8,334	9,919	11,157	11,667	12,194	12,718	13,235	13,763	14,349	14,964	15,612
Equity Income	-4,431	-4,431	-4,423	-4,415	-4,407	-4,400	-4,392	-4,384	-4,376	-4,369	-4,264
Oher (Income) Expense	-1,944	-147	-165	-176	-187	-198	-208	-219	-231	-243	-256
Others	1,362	996	996	996	329	329	0	0	0	0	0
Total	30,411	36,356	39,798	41,799	43,366	45,425	47,126	49,202	51,497	53,912	56,550
EBIT	11,942	11,089	10,856	11,100	11,836	12,077	12,651	12,890	13,176	13,476	13,694
Interest	-85	1,918	2,045	2,131	2,218	2,306	2,393	2,481	2,581	2,685	2,795
EBT	11,857	13,007	12,901	13,230	14,055	14,383	15,045	15,371	15,756	16,161	16,489
Taxes @ 20,38%	2,145	3,351	3,323	3,408	3,621	3,705	3,876	3,959	4,059	4,163	4,247
Net income	9,712	9,656	9,578	9,822	10,434	10,678	11,169	11,411	11,697	11,998	12,241
Ebitda	15,748	13,680	13,590	13,943	14,790	15,143	15,828	16,178	16,592	17,026	17,385
Supplemental data											
Depreciation	3,806	2,590	2,734	2,843	2,954	3,065	3,177	3,289	3,416	3,550	3,691
Capital expenditures	2,045	2,740	2,790	2,905	3,008	3,125	3,242	3,359	3,493	3,633	3,780
Δ Net working capital	-347	199	696	479	527	492	486	496	551	580	610
Δ Other assets	-4,168	577	429	315	268	316	323	312	377	395	414

Appendix 30: Balance Sheet of the merged entity without synergies

ASSETS											
Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Current Assets											
Cash and Equivalents	7,741	8,670	9,256	9,666	10,086	10,506	10,921	11,344	11,815	12,311	12,832
Short-term investments	1,123	1,154	1,179	1,213	1,243	1,277	1,311	1,343	1,384	1,427	1,471
Accounts Receivable	6,595	7,174	7,661	8,002	8,351	8,700	9,045	9,395	9,787	10,198	10,631
Inventories	5,397	5,135	5,571	5,850	6,192	6,481	6,764	7,057	7,375	7,711	8,064
Deferred Income taxes	8,191	8,499	8,737	9,001	9,249	9,514	9,787	10,046	10,366	10,701	11,052
Prepaid expenses and other current assets	1,228	1,525	1,702	1,805	1,915	2,021	2,124	2,232	2,346	2,467	2,594
Total Current Assets	30,276	32,156	34,106	35,535	37,037	38,498	39,952	41,418	43,074	44,815	46,644
Investments	6,491	6,661	6,807	6,998	7,173	7,363	7,561	7,746	7,980	8,225	8,480
Property, at cost											
Land	763	864	927	970	1,014	1,058	1,102	1,146	1,195	1,247	1,301
Buildings and improvements	14,318	15,673	16,550	17,217	17,889	18,569	19,247	19,928	20,703	21,518	22,374
Equipment	17,608	19,038	19,984	20,744	21,503	22,276	23,052	23,824	24,715	25,651	26,634
Construction in progress	1,879	1,813	1,939	2,026	2,116	2,206	2,294	2,385	2,485	2,590	2,701
Total	34,568	37,388	39,401	40,958	42,522	44,109	45,696	47,282	49,098	51,006	53,010
Less accumulated depreciation	15,736	16,924	17,718	18,375	19,026	19,694	20,365	21,030	21,802	22,613	23,465
Property, net	18,833	20,464	21,683	22,583	23,496	24,415	25,331	26,252	27,296	28,393	29,545
Goodwill	4,217	3,744	4,168	4,371	4,581	4,790	4,994	5,205	5,435	5,678	5,933
Other intangible assets, net	6,679	7,431	8,244	8,723	9,235	9,730	10,211	10,716	11,252	11,816	12,412
Other assets	8,817	9,394	9,823	10,138	10,405	10,722	11,045	11,357	11,734	12,129	12,542
Total assets	75,313	79,850	84,831	88,347	91,927	95,519	99,093	102,694	106,771	111,055	115,557

Liabilities and Shareholders Equity											
Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Current Liabilities:											
Loans Payable and current portion of long-term debt	2,297	2,357	2,409	2,476	2,538	2,606	2,676	2,741	2,824	2,911	3,001
Accounts Payable	2,295	2,412	2,639	2,780	2,945	3,090	3,232	3,379	3,538	3,705	3,881
Short-term borrowings and current portion of long-term debt	245	304	340	360	382	403	424	445	468	492	518
Income taxes	1,609	1,691	1,749	1,807	1,862	1,919	1,978	2,035	2,103	2,175	2,250
Accrued compensation other accrued liabilities	12,262	13,248	13,901	14,428	14,952	15,488	16,026	16,561	17,179	17,827	18,509
Dividends payable	804	824	843	866	888	911	936	959	988	1,018	1,050
Total current liabilities	19,512	20,837	21,880	22,716	23,567	24,418	25,271	26,120	27,099	28,128	29,208
Long-term liabilities											
Long-term debt, net current portion	**11,874**	**10,708**	**11,828**	**12,407**	**13,011**	**13,607**	**14,192**	**14,795**	**15,453**	**16,147**	**16,877**
Deferred income taxes	9,318	9,895	10,294	10,652	11,001	11,362	11,729	12,087	12,512	12,956	13,423
Other long-term liabilities	2,913	3,617	4,037	4,281	4,542	4,794	5,038	5,295	5,566	5,852	6,154
Minority interests	2,409	2,472	2,526	2,597	2,662	2,732	2,806	2,874	2,961	3,052	3,147
Total long-term liabilities	26,514	26,692	28,686	29,936	31,216	32,496	33,764	35,051	36,492	38,007	39,601
Shareholder's Equity	29,287	32,321	34,264	35,694	37,145	38,605	40,058	41,523	43,179	44,919	46,749
Total liabilities and equity	75,313	79,850	84,831	88,347	91,927	95,519	99,093	102,694	106,771	111,055	115,557

Appendix 31: Base-Case of the merged entity without synergies

Base-Case Cash Flows											
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EBIT	11,942	11,089	10,856	11,100	11,836	12,077	12,651	12,890	13,176	13,476	13,694
Taxes	2,102	2,857	2,797	2,859	3,049	3,111	3,259	3,320	3,394	3,471	3,528
EBIT (1-t)	9,839	8,233	8,060	8,240	8,787	8,966	9,392	9,569	9,782	10,005	10,166
Depreciation	3,806	2,590	2,734	2,843	2,954	3,065	3,177	3,289	3,416	3,550	3,691
Operating Cash Flow	13,646	10,823	10,794	11,084	11,741	12,032	12,569	12,858	13,198	13,555	13,857
Δ Net working capital	-347	199	696	479	527	492	486	496	551	580	610
Capital Expenditures	2,045	2,740	2,790	2,905	3,008	3,125	3,242	3,359	3,493	3,633	3,780
Δ Other assets	-4,168	577	429	315	268	316	323	312	377	395	414
Free Cash flow of assets	16,116	7,307	6,878	7,385	7,938	8,098	8,518	8,691	8,777	8,947	9,054

Base-Case Value

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCF	16,115.62	7,307.16	6,878.45	7,385.16	7,938.49	8,098.06	8,518.06	8,690.86	8,776.95	8,947.45	9,053.80
Terminal Value											132,586.08
PV CF		6,803.69	6,245.87	7,097.76	7,573.75	7,641.77	7,902.96	7,859.46	7,929.07	8,162.72	137,163.54
Base-case value (total)	204,380.60										

Interest Tax Shields

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Interest tax shield	44.45	494.10	526.78	548.87	571.48	594.06	616.51	639.16	664.74	691.62	719.88
Terminal Value											20,446.20
PV tx shields		474.90	495.91	501.61	507.24	512.23	543.14	520.52	561.54	532.44	20,929.39
Total PV, tx shields	25,578.92										

Cost of Financial Distress

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCF	76.17	33.79	33.52	34.37	37.00	37.82	40.01	40.27	41.02	42.90	43.70
Terminal Value											$ 1,203.89
PV CF		32.50	31.00	30.57	31.66	31.11	31.64	30.62	30.00	30.16	$ 1,242.39
CFD (total)	$ 1,521.64										

Adjusted Present Value	228,437.87

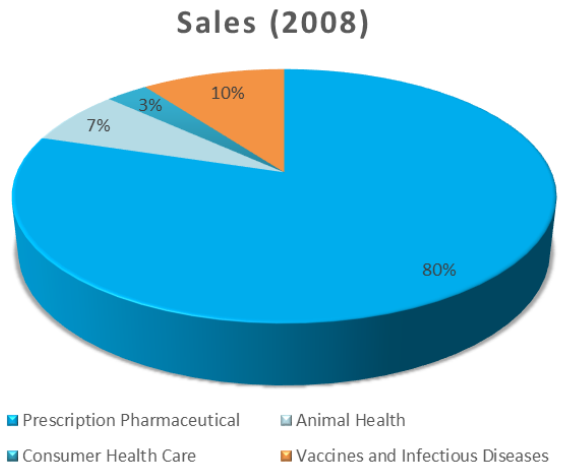
Value of Equity

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCFE	14,731.2	7,804.9	5,787.6	7,195.8	7,723.5	7,995.4	8,496.3	8,708.9	8,648.9	8,792.0	8,868.9
Terminal Value											124,957.1
PV CF		7,267.13	4,991.78	5,942.38	5,994.65	5,874.05	5,980.75	5,801.42	5,472.06	5,554.72	126,449.89

Value of Equity	$ 179,328.84	million
#shares	14729.3	
Price per share	$ 12.17	

With Synergy

Appendix 32: Merged company sales by areas



Appendix 31: Long-term debt increase

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Long-term Debt	Without synergy	11.874	10.708	11.828	12.407	13.011	13.607	14.192	14.795	15.453	16.147	16.877
	With synergy	11.874	17.080	18.236	19.044	19.873	20.701	21.520	22.353	23.282	24.260	25.288
	Benefit	-	6.372	6.407	6.636	6.861	7.093	7.328	7.558	7.829	8.113	8.411

(millions)

Appendix 32: Synergies Value and Restructuring Cost of the merged entity

(Millions)	Synergies	% over sales	Reduction/Increase	EV without Synergy	EV with Synergy
Operating Synergies	**60.489**		-8%		
Material and production	8.738	24%	-2%		205.254
Marketing and administrative	27.990	31%	-4%		191.968
R&D	23.761	19%	-2%		231.010
Financial Synergies	**72.609**		3%	**228.437,87**	
Debt	72.609	35%	3%		181.514
Restructuring Costs	structuring	15%			313.934
Total Synergies	**133.098**		**-5%**		**313.934**

Appendix 35: Upside Potential of Schering-Plough

Upside Potential	**Schering-Plough**	**Merck**
Equity of standalone/market cap	8%	68%
Equity w Synergy/ Standalone equity val	93%	42%

Appendix 36: Merck debt financing to purchase Schering-Plough

Debt financing	
Extra Net Debt/Ebitda ratio	0,99
Correspondent debt	10.060
Total debt	22.077

million dollars

Appendix 37: The three sources of finance

	Financing	
Total	$ 69.767,42	
Cash	12.000	17%
Debt	22.077	32%
Shares	35.691	51%

Appendix 38: Income Statement of the merged entity with synergies

	Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Tax (10-K Info)	20.4%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%
	growth											
		Pro Forma Income Statements										
	Year	2,008	2,009	2,010	2,011	2,012	2,013	2,014	2,015	2,016	2,017	2,018
Sales												
United States		18,927	19,877	20,364	20,758	21,165	21,612	22,072	22,546	23,035	23,538	24,058
Europe, Middle East and Africa		14,677	17,332	18,627	19,528	20,406	21,324	22,283	23,211	24,332	25,508	26,741
Asia		2,056	2,763	3,592	4,023	4,505	4,866	5,255	5,675	6,129	6,620	7,149
Japan		1,824	1,883	1,932	1,991	2,032	2,074	2,117	2,161	2,206	2,251	2,298
Other (Latin America)		4,870	5,590	6,141	6,599	7,094	7,627	8,051	8,498	8,971	9,470	9,998
Total		42,352	47,446	50,655	52,899	55,202	57,502	59,777	62,091	64,673	67,388	70,244
	growth											
Costs												
Merger Costs												
Material and production		12,890	13,048	13,930	14,547	15,181	15,813	16,439	17,075	17,785	18,532	19,317
Marketing and administrative		14,200	14,329	15,298	15,976	16,671	17,366	18,053	18,752	19,531	20,351	21,214
R&D		8,334	8,730	9,320	9,733	10,157	10,580	10,999	11,425	11,900	12,399	12,925
Equity Income		-4,431	-4,431	-4,423	-4,415	-4,407	-4,400	-4,392	-4,384	-4,376	-4,369	-4,264
Oher (Income) Expense		-1,944	-147	-165	-176	-187	-198	-208	-219	-231	-243	-256
Others		1,362	996	996	996	329	329	0	0	0	0	0
Restructuring Costs			1,423	1,520	1,587	1,656	1,725	0	0	0	0	0
Total		30,411	33,948	36,476	38,248	39,400	41,216	40,891	42,648	44,609	46,671	48,936
EBIT		11,942	13,498	14,179	14,651	15,803	16,286	18,887	19,443	20,064	20,717	21,308
Interest		-85	1,308	2,045	2,131	2,218	2,306	2,393	2,481	2,581	2,685	2,795
EBT		11,857	14,806	16,224	16,782	18,021	18,592	21,280	21,924	22,645	23,402	24,102
Taxes @ 20,38%		2,145	3,814	4,179	4,323	4,642	4,789	5,482	5,648	5,833	6,028	6,209
Net income		9,712	10,992	12,045	12,459	13,379	13,803	15,798	16,277	16,811	17,374	17,894
Ebitda		15,748	16,088	16,913	17,494	18,756	19,352	22,064	22,732	23,480	24,267	24,998
Supplemental data												
Depreciation		3,806	2,590	2,734	2,843	2,954	3,065	3,177	3,289	3,416	3,550	3,691
Capital expenditures		2,045	2,740	2,790	2,905	3,008	3,125	3,242	3,359	3,493	3,633	3,780
Δ Net working capital		-347	199	696	479	527	492	486	496	551	580	610
Δ Other assets		-4,168	577	429	315	268	316	323	312	377	395	414

Appendix 39: Balance Sheet of the merged entity with synergies

ASSETS											
Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Current Assets											
Cash and Equivalents	7,741	8,670	9,256	9,666	10,086	10,506	10,921	11,344	11,815	12,311	12,832
Short-term investments	1,123	1,154	1,179	1,213	1,243	1,277	1,311	1,343	1,384	1,427	1,471
Accounts Receivable	6,595	7,174	7,661	8,002	8,351	8,700	9,045	9,395	9,787	10,198	10,631
Inventories	5,397	5,135	5,571	5,850	6,192	6,481	6,764	7,057	7,375	7,711	8,064
Deferred Income taxes	8,191	8,499	8,737	9,001	9,249	9,514	9,787	10,046	10,366	10,701	11,052
Prepaid expenses and other current a	1,228	1,525	1,702	1,805	1,915	2,021	2,124	2,232	2,346	2,467	2,594
Total Current Assets	30,276	32,156	34,106	35,535	37,037	38,498	39,952	41,418	43,074	44,815	46,644
Investments	6,491	13,508	13,721	14,163	14,587	15,032	15,486	15,925	16,456	17,011	17,593
Property, at cost											
Land	763	864	927	970	1,014	1,058	1,102	1,146	1,195	1,247	1,301
Buildings and improvements	14,318	15,673	16,550	17,217	17,889	18,569	19,247	19,928	20,703	21,518	22,374
Equipment	17,608	19,038	19,984	20,744	21,503	22,276	23,052	23,824	24,715	25,651	26,634
Construction in progress	1,879	1,813	1,939	2,026	2,116	2,206	2,294	2,385	2,485	2,590	2,701
Total	34,568	37,388	39,401	40,958	42,522	44,109	45,696	47,282	49,098	51,006	53,010
Less accumulated depreciation	15,736	16,924	17,718	18,375	19,026	19,694	20,365	21,030	21,802	22,613	23,465
Property, net	18,833	20,464	21,683	22,583	23,496	24,415	25,331	26,252	27,296	28,393	29,545
Goodwill	4,217	3,744	4,168	4,371	4,581	4,790	4,994	5,205	5,435	5,678	5,933
Other intangible assets, net	6,679	7,431	8,244	8,723	9,235	9,730	10,211	10,716	11,252	11,816	12,412
Other assets	8,817	9,394	9,823	10,138	10,405	10,722	11,045	11,357	11,734	12,129	12,542
Total assets	75,313	86,697	91,745	95,512	99,341	103,187	107,019	110,873	115,246	119,841	124,670

Liabilities and Shareholders Equity											
Year	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Current Liabilities:											
Loans Payable and current portion of	2,297	2,357	2,409	2,476	2,538	2,606	2,676	2,741	2,824	2,911	3,001
Accounts Payable	2,295	2,412	2,639	2,780	2,945	3,090	3,232	3,379	3,538	3,705	3,881
Short-term borrowings and current portion of long-term debt	245	304	340	360	382	403	424	445	468	492	518
Income taxes	1,609	1,691	1,749	1,807	1,862	1,919	1,978	2,035	2,103	2,175	2,250
Accruded compensation other accru	12,262	13,248	13,901	14,428	14,952	15,488	16,026	16,561	17,179	17,827	18,509
Dividends payable	804	824	843	866	888	911	936	959	988	1,018	1,050
Total current liabilities	19,512	20,837	21,880	22,716	23,567	24,418	25,271	26,120	27,099	28,128	29,208
Long-term liabilities											
Long-term debt, net current portion	11,874	17,555	18,742	19,573	20,425	21,276	22,118	22,974	23,929	24,934	25,990
Deferred income taxes	9,318	9,895	10,294	10,652	11,001	11,362	11,729	12,087	12,512	12,956	13,423
Other long-term liabilities	2,913	3,617	4,037	4,281	4,542	4,794	5,038	5,295	5,566	5,852	6,154
g	0	0	0	0	0	0	0	0	0	0	0
Minority interests	2,409	2,472	2,526	2,597	2,662	2,732	2,806	2,874	2,961	3,052	3,147
Total long-term liabilities	26,514	33,539	35,600	37,102	38,629	40,164	41,690	43,230	44,968	46,794	48,714
Total debt	46,025	54,376	57,480	59,818	62,196	64,582	66,961	69,350	72,067	74,922	77,922
Shareholder's Equity	29,287	32,321	34,264	35,694	37,145	38,605	40,058	41,523	43,179	44,919	46,749
Total liabilities and equity	75,313	86,697	91,745	95,512	99,341	103,187	107,019	110,873	115,246	119,841	124,670

Appendix 40: Base-Case of the merged entity with synergies

Base-Case Cash Flows

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
EBIT	11,942	13,498	14,179	14,651	15,803	16,286	18,887	19,443	20,064	20,717	21,308
Taxes	2,436	3,477	3,653	3,774	4,071	4,195	4,865	5,009	5,169	5,337	5,489
EBIT (1-t)	9,506	10,021	10,527	10,877	11,732	12,091	14,022	14,435	14,896	15,381	15,819
Depreciation	3,806	2,590	2,734	2,843	2,954	3,065	3,177	3,289	3,416	3,550	3,691
Operating Cash Flow	13,312	12,611	13,261	13,720	14,685	15,156	17,198	17,723	18,312	18,931	19,510
Δ Net working capital	-347	199	696	479	527	492	486	496	551	580	610
Capital Expenditures	2,045	2,740	2,790	2,905	3,008	3,125	3,242	3,359	3,493	3,633	3,780
Δ Other assets	-4,168	577	429	315	268	316	323	312	377	395	414
Free Cash flow of assets	15,782	9,095	9,345	10,022	10,883	11,223	13,147	13,556	13,891	14,323	14,706

Base-Case Value

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCF	15,781.89	9,095.43	9,345.34	10,021.59	10,882.94	11,222.79	13,147.20	13,556.30	13,890.84	14,323.42	14,706.30
Terminal Value											$ 207,665.97
PV CF		8,468.74	8,101.89	8,089.54	8,179.54	7,853.79	8,566.58	8,224.53	7,846.83	7,533.70	$ 214,868.09
Base-case value (total)	287,733.24										

Interest Tax Shields

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Interest tax shield	- 17.28	336.94	526.78	548.87	571.48	594.06	616.51	639.16	664.74	691.62	719.88
Terminal Value of tax shields											$ 20,760.69
PV tx shields		324.29	487.97	489.35	490.38	490.63	490.05	488.99	489.47	490.15	$ 21,251.71
Total PV, tx shields	25,493.00										

Cost of Financial Distress

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCF	70.31	40.52	41.63	44.65	48.48	50.00	58.57	60.39	61.88	63.81	65.52
Terminal Value											$ 1,823.92
PV CF		39.00	38.57	39.81	41.60	41.29	46.56	46.20	45.57	45.22	$ 1,868.61
CFD (total)	**$ 2,252.42**										

Adjusted Present Value	310,973.82

Value of Equity

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
FCFE	14,731	2,294	8,187	9,581	10,420	10,865	12,868	13,321	13,466	13,857	14,195
Terminal Value											$ 200,446
PV CF		2,136	7,098	7,734	7,832	7,603	8,385	8,082	7,607	7,288	$ 207,398

Value of Equity	$ 271,162.25
#shares	14729.3
Price per share	$ 18.41

Merck	Scherin-Plough
$ 201,837.44	$ 69,324.81
9386.3	5343

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