Equity Valuation

A valuation of the pharmaceutical company Novartis AG

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Abstract

Equity Valuation: A valuation of the pharmaceutical company Novartis AG

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This dissertation valuates Novartis AG, a Swiss pharmaceutical company operating globally, listed both in SIX and NYSE.
The purpose of this valuation is to provide readers a recent considerate investment recommendation based on the forecasted market share price of Novartis. Examining and understanding the pharmaceutical sector and Novartis's financial information led to conducting a valuation using the DCF and reaching a target share price of USD 99.75, indicating Novartis's worth at 31st December of 2019. To complement this decision, this dissertation included the Relative approach using the ratios EV/EBITDA and EV/Revenues. Due to the inconsistency of results found, the DCF was the chosen model to value the company.
Regarding these inferences, the conducted sensitivity analysis and both approaches, it decided a BUY recommendation is the right choice.

Keywords: Equity Valuation, Discounted Cash Flows, Novartis, Pharmaceutical Industry

Abstrato

Equity Valuation: A valuation of the pharmaceutical company Novartis AG

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Esta dissertação avalia a Novartis AG, uma empresa farmacêutica suíça que opera globalmente e quotada em bolsa, tanto no SIX como no NYSE.
O objectivo desta avaliação é providenciar aos leitores uma recente e pensada recomendação de investimento, baseada na estimação do preço de mercado da acção da Novartis. Ao examinar, compreendendo o sector farmaceutico e a informação financeira da Novartis, foi tomada a decisão de conduzir a avaliação através do DCF, chegando então a um preço de mercado de USD 99.75, indicando então o valor da Novartis no dia 31 de Dezembro de 2019.
De maneira, a complementar esta decisão, nesta dissertação está também incluida a realização da avaliação através de rácios, utilizando o EV/EBITDA e o EV/Revenues. Pela inconclusão dos dados a que se chegou com esta abordagem, o DCF foi o modelo escolhido para avaliar a empresa.
Tendo em conta estas condições, uma análise de sensibilidade e ambas as abordagens, foi dada como a escolha certa, uma recomendação de compra da acção.

Palavras-Chave: Avaliação do Capital Próprio, Fluxo de Caixa Descontados, Novartis, Indústria Farmacêutica

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Alone, we go faster. Together, we go further

Index

1. Literature Review

How to value a firm is at the heart of most financing and investment decisions. The estimate of a firm's value is frequently a task for investment analysts when deciding on different aspects of the firm like capital budgeting, mergers and acquisition or for example, going public. (Bancel and Mittoo, 2014)

Hence why the Equity Valuation subject is based on questioning the worth and value of a company. At the fast pace of today's world, valuation is a financial and analytical tool that managers should master more than ever (Luehrman, 2016) and as this dissertation's goal is to value the company Novartis, even though it should reach a target price and a market recommendation, it should be more than just a number reached, according to Oscar Wilde most know "the price of everything, but the value of nothing".

Valuation has a key role in many financial areas like corporate finance, mergers & acquisitions and portfolio management but it is important to say that it does not work as a linear exercise. The preconceptions and biases that an analyst brings to the process will find its way into the value and in various cases it will make the process more realistic and suited to each situation. (Damodaran, 2002)

There are different approaches when doing valuation, that make very different assumptions about the fundamentals that determine the value of a company, but they do share some common characteristics, advantages and disadvantages. We can classify the methods in 3 broad ones. The first, discounted cashflow valuation, relates the value of an asset to the present value of expected future cashflows on that asset. The second, relative valuation, estimates the value of an asset by looking at the pricing of 'comparable' assets relative to a common variable like earnings, cashflows, book value or sales. The final approach, contingent claim valuation, uses option pricing models to measure the value of assets that share option characteristics. (Damodaran, 2006)

1.1. Discounted Cashflow Valuation

It is considered that the discounted cash flow valuation is the foundation on which all other valuation approaches are built, as it is needed to understand the fundamentals of this approach to do the relative valuation correctly as well as it is needed to begin first the discounted cash flows analysis (DCF) to be able to apply the option pricing models that fulfil the contingent approach.(Damodaran, 2002)

In equity valuation, the analyst should define which specific cash flow stream will be valued and afterwards forecast those. There is two kinds of cash flows streams - free cash flow and dividends which both are associated to different discounted cash flow valuation models and discount rates .(Jerald E. Pinto *et al.*, 2010)

To start the discounted cash flow analysis there are four general stages:

1) Selecting the DFC model: it requires to be chosen a specific cash flow stream
2) Forecast the cash flows
3) Choose a discounted rate methodology
4) Estimate the discounted rate

When having a perception that dividends are an appropriate definition of cash flows, the model used is called the Dividend Discount Model (DDMs).

1.1.1. Dividend Discount Model (DDMs)

This model defines cash flows as the distribution to shareholders that is authorized by a company's board of directors, meaning, dividends. The basic argument for using this definition of cash flow is that an investor when buying stocks, usually expects to get two types of cashflows - dividends during the period she holds the stock and an expected price at the end of the holding period. Subsequently, since this expected price is drew by future dividends, the value of a stock is the present value of dividends through infinity. (Damodaran, 2002)

However, there are disadvantages when using the DDMs as dividend policy practices are different in different points worldwide and change throughout time. In this model, dividends are the only access to the company's true value and will be taken as truthful information. In addition to these facts, if dividends are not one of the sources of value creation, this model will not reach its objective. (Jerald E. Pinto *et al.*, 2010)

This model works best for companies that appear to have history in maintaining a policy of paying out most of the cash flows left over after debt payments and reinvestment needs – as dividends.(Damodaran, 2002)

1.1.2. Free Cash Flow to the Firm (FCFF) and Free Cash Flow to the Equity (FCFE)

In another perspective, the returns are defined as free cash flow. According to (Jerald E. Pinto *et al.*, 2010), *the concept of free cash flow responds to the reality that, for a going*

concern, some of the cash flow from operations is not " free " but rather needs to be committed to reinvestment and new investment in assets.

Cash flows are categorized as Free Cash Flow to the Firm (FCFF) and Free Cash Flow to the Equity (FCFE) and depending on whether the analyst is using the FCFF or the FCFE in the DCF valuation, it shall be used respectively, the cost of capital or the cost of equity of a valued company, as discount rate. Moreover, with the FCFF approach it will be reached the enterprise value, on contrary, when using FCFE it will be equity value of the company.(Janiszewski, 2011)

Free cash flows to firm are the cash flows that are available to all providers of the company's capital, both creditors and shareholders, after covering capital expenditures and working capital needs. Therefore, FCFF are projected on an unlevered basis, before subtracting interest expenses. It reflects the cash generated by company's all assets, independently of how the assets are financed (capital structure of the company).(Janiszewski, 2011)

FCFF= EBIT (1-Tax rate) + Depreciation - CAPEX - Changes in Working Capital

Free cash flows to equity are the cash flows leftover after meeting all financial obligations, including debt payments and after covering capital expenditures and working capital needs(Janiszewski, 2011)

FCFE = Net Income + Depreciation – CAPEX - Changes in Working Capital - (Debt Repayments - New Debt Issued)

The two approaches (FCFF and FCFE), however, should theoretically yield the same estimates if all inputs reflect identical assumptions when valuing the equity of the company.

An analyst may prefer to use one approach rather than the other concerning the characteristics of the company being valued as for a company's with high leverage or with a historical background of leverage changes it is preferable to use the FCFF as its growth rate will be more stable than the FCFE growth rate and therefore not be prone to error.

1.1.3. APV

Still in terms of discounted cash flow models, there are alternatives to models who use the WACC as a discount rate: the adjusted present value (APV). APV discounts the same cashflows as the enterprise DCF model but uses the unlevered cost of equity as the discount rate (without the tax benefit of debt). It then separately values the cash flow tax benefits of debt and adds them to determine the total enterprise value.

APV will not be used to value Novartis because this company's debt-to equity ratio is not expected to change significantly. In companies where this scenario is expected or verified, this discounted cash flow method is suited as WACC-based models can yield true results but appears to be more difficult to apply in these situations. (Koller, Goedhart and Wessels, 2000)

1.2. Relative Valuation

This kind of valuation represents also a very known approach when it comes to valuing companies. The underlying concept of this kind of valuation is that similar assets or services should sell at similar prices and therefore relative valuation involves a group of comparison like an industry group.

This method it is typically implemented using price multiples or enterprise value multiples and these will be used for complementary information and under the assumption that the comparison asset or company is fairly value as this method does not specify intrinsic value. Price multiples are ratios that combine the stock' s market price to some measure of value per share. Enterprise value multiples, by contrast, relate the total market value of all sources of a company' s capital to a measure of fundamental value for the entire company

Having the advantage of being simply applicable, related to market prices, grounded in a sound economic principle (that similar assets should sell at similar prices) and widely recognized by investors (Jerald E. Pinto *et al.*, 2010), this approach also has its drawbacks. When taking the Relative Approach, the value of an asset is derived from the pricing of 'comparable' assets, standardized using a common variable such as earnings, cashflows, book value or revenues (Damodaran, 2002) considering that the market is reliable in terms of comparison. Another factor that might disrupt the truthfulness of the results comes from the fact that the peers selected are not suited or that the prices paid for these companies on their shares of stock were not representative.

Since Novartis AG is a pharmaceutical company, to do its valuation it should be taken into consideration the industry and models most suited for. So, to choose multiples to evaluate the company, it was considered the ones that are related to R&D costs and the company's ability to manage high levels of debt and profitability as the pharmaceutical industry demands.

Novartis will be examined using the Return on Research Capital Ratio (RRCR), Return on Invested Capital (ROIC) and valued using the Enterprise Multiples, EV/EBITDA and EV/Revenues.

1.3. Contingent Claim Valuation

An analysis of projects in a dynamic environment is often more complex than the standard DCF approaches may suggest, since they implicitly assume a static view of investment decisions and projected cash flow scenarios. The Contingent Claim Valuation or also known as The Real Options approach is more dynamic than the traditional approaches since it is capable of incorporating not only the value of flexibility and growth opportunities but also of competitive strategies in an uncertain environment.(Smit and Trigeorgis, 2003)

Some experts believe that there are two main methods when valuing pharmaceutical projects – discounted cash flow (DCF) analysis and real options valuation (ROV). For projects with strong market potential and therefore little risk of being terminated for economic reasons, the DCF will be understated because published success rates are too low for these projects, so this kind of valuation would need adjustments that tend to rely heavily on management intuition. ROV provides a more reliable method, being better suited to project valuation both in the pharmaceutical industry and in other R&D driven industries with staged investments that depend on periodic reevaluation of the project. (Pyles, 2014) as the value of many strategic investments does not derive so much from direct cash inflows, as it does from the options to invest in future growth. Strategic plans often encompass projects which, if measured by cash flows alone, typically would appear to have a negative net present value (NPV), when in fact they may have a positive total strategic value.(Smit and Trigeorgis, 2003)

This opportunity to invest can be seen as a call option, involving the right to acquire an asset for a specified price (investment expenditure) at some future time, the underlying asset may be a package consisting of the project plus the value of other embedded

corporate real options and the techniques derived from option pricing can help quantify management's ability to adapt its future plans to capitalize on favorable investment opportunities or to respond to undesirable developments in a dynamic environment by cutting losses.(Smit and Trigeorgis, 2003)

1.4. Valuation Model's Choice

However, how does one select a valuation model? According to (Jerald E. Pinto *et al.*, 2010), when selecting this, there are three broad criteria required:

- To be consistent with the characteristics of the company being valued.
- To be appropriate given the availability and quality of data.
- To be consistent with the purpose of valuation, including the analyst's perspective.

The Real Options Valuation might be potentially good in the pharmaceutical industry however is challenged by the complex implementation and trouble to correctly realize it when the access to information on the projects and drugs in development are not obtainable, which was the case.

R&D expenses have the struggle that although they are expensed in the period in which they occur, the value of the assets does not show up immediately as part of the total assets. This makes it hard and uncertain to measure the capital and profitability ratios of companies in the biotechnology and pharmaceutical industry that spend millions of dollars on research and investigation and need to wait long periods of time of FDA approval, while reporting large losses when the product isn't ready to sell. However, this can be opposed – there is not one "right" method as it should be a combination of factors. In the end of my research, I decided the best way to evaluate to Novartis would be to use the Discounted Cash Flow Model completed by my industry and company's assumptions and the multiples EV/EBITDA and EV/Revenues.

2. Industry Overview: The Pharmaceutical Industry

Before analyzing this industry, it should be given a definition of what it consists of: the pharmaceutical industry comprises all the companies that manufacture, discover, develop and market medicaments and treatments.

Pharma companies are valued and examined in a different way than most. Their big capital expenditures on Research and Development shouldn't be treated like a regular

company, since this department is the heart of these companies. Additionally, nowadays, there are many trends to reflect when investing and evaluating companies in this industry. These companies, as stated before, invest heavily in R&D to develop new treatments in different medicine specialties since new drugs are generally more effective than older ones and as the industry continues to be hurt by the perception that rising product prices hurt costumers, this is the pattern to survive the competitive industry they're in. (Argus Research, 2018)

As in any other competitive industry, there are leading companies and projections on whether these companies have what it takes to stay in the lead. In the pharmaceutical industry, at the moment and since 2017, Novartis, Pfizer, Roche, Johnson & Johnson and Sanofi are considered the Top 5 and are estimated to stay this way.

According to (Evaluate Pharma, 2018), this is the Worldwide Market Share of the most important competitors in this business, in 2017 and the estimations for 2024.

Company	WW Market Share		Rank
	2017	2024	Change (+/-)
1. Novartis	5.3%	4.4%	+1
2. Pfizer	5.8%	4.3%	-1
3. Roche	5.3%	4.2%	+0
4. Johnson & Johnson	4.4%	3.9%	+1
5. Sanofi	4.3%	3.7%	+1
6. GlaxoSmithKline	3.6%	3.2%	+1
7. Merck & Co	4.5%	3.2%	-3
8. Abbvie	3.5%	3.1%	+0
9. AstraZeneca	2.5%	2.6%	+2
10. Bristol-Myers Squibb	2.4%	2.4%	+2
11. Amgen	2.8%	2.1%	-1
12. Novo Nordisk	2.2%	2.0%	+4
13. Celgene	1.6%	2.0%	+8
14. Eli Lilly	2.3%	1.8%	-1
15. Bayer	2.2%	1.6%	+0

Table 1: Worldwide Prescription Drug Sales in 2024: Top 15 Companies

It can be observed that Novartis, Pfizer and Roche are the all very similar, but Pfizer is leading at the moment. Something that is projected to change in 2024, with Novartis evolving to nº1 in terms of market share.

On the other hand, it can be seen a decline in all the companies' market share, in 2024. According to (Evaluate Pharma, 2018), this is caused by the expectation that

biotechnology products will represent 31 % of the market in 2024, an significant increase since its 25% in 2017. Likewise, within the world's top 100 products, these will represent 52% of sales, versus 49% in 2017.

The increase and decrease of pharmaceutical prices are also a polemic discussion now more than ever as Mr. Trump released his Drug Pricing Blueprint. President Trump's blueprint will seek to encourage innovation, while also promoting price competition and addressing foreign freeloading. As its stated that "excessively high drug prices, foreign freeloading, and a system rigged to reward list price increases, are burdening the American people" (Services, 2018)

Novartis, like all branded pharmaceutical companies, European or US based, face various threats including drug trial failures, big periods of approval by FDA, pricing pressure from the industry and political pressure in the costs of drugs (Novartis AG and Xnys, 2019) so Mr. Trump's decisions is definitely an effect factor.

Mr. Trump's speech on lowering drug prices didn't specify many topics other than confirming that he was making an announcement about reducing the middleman profits and that prices of drugs should be much higher outside the US. Nevertheless, these statements aren't found applicable as we see Big Pharma/Biotech companies' competitive advantage supported by strong pricing power given by their patent protected drugs and also based on the 2019 U.S. government budget proposal and the Council of Economic Advisors we expect only minor negative distress to branded drug prices(Novartis AG and Xnys, 2019)

So far since the drug pricing blueprint announcement, FDA has approved more generic drugs in July of 2018 than any month in history and big pharmaceutical companies such as Novartis, Merck and Pfizer have announced that they aren't increasing drug prices for the rest of 2018. However, these are major companies that already have instituted their annual prices increases so many specialists defend that patients will not sense savings from these prices restrictions and these deviations will account for a minimal portion of the company's revenues. (Samantha DiGrande, 2018)

Furthermore, there is a new trend in the pharmaceutical industry that is the technological sector entrance in this industry.

The world has understood the benefits and quickness that comes with med-tech devices being used for medical proposes. (Argus Research, 2018) then soon the big pharma companies will want to adapt to these projects and changes to yield better health results for patients, from their drug R&D to how doctors diagnose and treat diseases. According

to (Deloitte, 2017), artificial intelligence, real-world evidence, robotic and cognitive automation will have the potential to improve study design, physician and patient recruitment and in-trial decision making, which will increase the efficiency of repetitive tasks.

Patent protection is also a common aspect in this industry as without them, innovative products will not generate high returns due to "copy-cats" or generics. These are protected for up to 20 years as according to (Koller, Goedhart and Wessels, 2000) the business can charge a price premium during this period and even afterwards as the holder still may enjoy some price "stickiness".

According to global news and consulting firms as PwC and Arthur D Little, there are specify key drivers to consider in the evolution towards the pharma industry in 2020. (Jan, 2016) (Jan, 2016)(PwC, 2020). This analysis can be read on Appendix 3.

3. Company Overview: Novartis AG

Novartis AG is a publicly traded Swiss holding pharmaceutical company with a goal to reach global scale, discover and develop innovative products along with answering to all new opportunities and risks that the pharma industry has to offer. Novartis's strategy is very focused in the benefits that Research and Development brings. Showing a solid record of innovation developments, having 16 major approvals as well as six FDA breakthrough therapy designations and 16 major submissions in 2017 alone (Novartis AG, 2018d)

The Company's range of products includes innovative pharmaceuticals and oncology medicines, generic and biosimilar medicines, and eye care devices. The company has three business segments focused on areas of healthcare, those being the Innovative Medicines Division, Sandoz and Alcon.

- The Innovative Medicines Division that is divided in two business units: Novartis Pharmaceuticals and Novartis Oncology
- The Sandoz Division that manufactures generic pharmaceuticals and biosimilars
- The Alcon Division that is involved in surgical and vision care products and Corporate activities. (Reuters, 2018) (Information, National and Scotland, 2017)

Novartis stands out for its portfolio of blockbusters in the Innovative Medicines Division, which include *Gilenya* used in multiple sclerosis, the drug *Entresto* for heart failure, the immunology drug *Cosentyx* and *Afinitor,* and *Tasigna* for cancer in the Oncology Unit of this division.

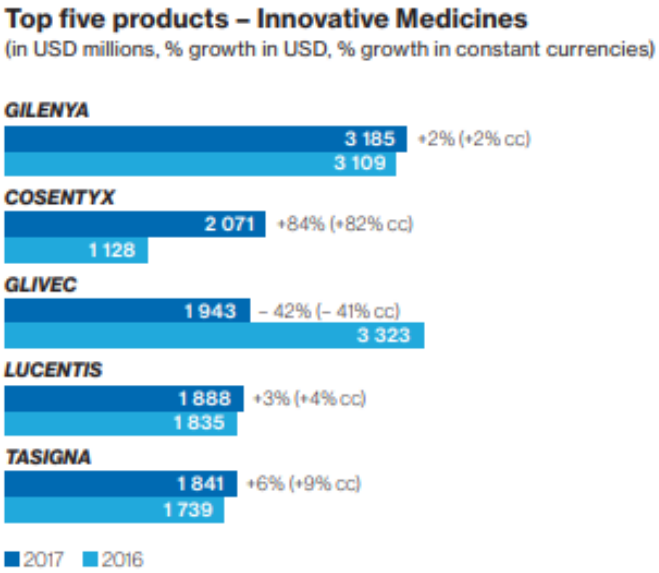


Figure 1: Top 5 Products from the Innovative Medicines Division.
Source: Novartis 2017 Annual Report

The Innovative Medicines Division is the largest contributor among the divisions of Novartis representing 67% of Group Net Sales and reported consolidated net sales of USD 34.9 billion. This division's portfolio includes more than 60 key marketed products, many of which are leaders in their respective therapeutic areas.(Novartis AG, 2018c)

Sandoz comes right after accounting for 19% of Group Net Sales, reporting for USD 9.9 billion in 2018 and Alcon represents 14% of the company's Net Sales, accounting for USD 7.1 billion.

At the moment, Novartis appears to be taking a strategic step to transform the Sandoz Division towards more differentiated products and agreeing to sell selected fractions of the division, namely the Sandoz US dermatology business and generic US oral portfolio, reshaping the portfolio in order to compete in a more challenging environment.

Novartis's decision to spin off its eye-care division, Alcon, is expected to bring changes but not negative ones as the spin-off is in line with the company' strategy to focus more on human prescription drugs. This has been shown over the years, with the divestitures of the vaccine, animal health, and consumer healthcare businesses, being in the best interest of shareholders.

Alcon, however, continues to show solid sales growth as a result of improved operations and costumers' relationships, both in the Surgical division and Vision Care division, both sales' increasing around 7% and 3%, respectively.

Vision Care will be the one division maintained in the company as the Alcon Ophthalmology Pharmaceuticals portfolio will remain with Novartis, strengthening its leading ophthalmology pharmaceuticals business. In addition, Alcon's results reflect the second consecutive years of net sales growth.

Regardless of this decision or the recent patent loss on *Gleevec/Glivec*, a product used in the Oncology Unit, Novartis is considered and well-positioned operating company that should translate its strong pipeline of new products and clear innovative mindset into steady growth. (Novartis AG and Xnys, 2019).

Novartis is pursuing new indications and building out the data profile for *Cosentyx, Entresto* and *Gilenya*. It is expected that *Cosentyx* will be Novartis' largest drug next year, the confidence invested has been from 100 studies and an extensive phase III clinical trial program, including three approved indications and a potential fourth.(Communications, 2019). These products growth can be checked in Appendix 4.

Diversity is also present in Novartis, its products are sold in about 155 countries, the company reached nearly 1 billion people globally in 2017 and there are about 126 000 employees of 145 different nationalities. Its products are sold globally, in Europe where its headcounters are based, the United States, Asia, Australia, Africa, Canada and Latin America.(Information, National and Scotland, 2017). (Appendix 5)

Complementing the overlook of the industry that Novartis is inserted, it was conducted a SWOT Analysis for future assistance in the forecasts computed for the company's valuation, inserted in Appendix 6. This analysis was based on the information from Morgan Stanley Wealth Management (Novartis AG and Xnys, 2019), the 2017 and 2018's Annual Reports and information contained in the Industry Overview.

4. Novartis's Historical Performance

To reach the target price that will represent Novartis's valuation in the market, the historical performance of the company was analyzed considering the pharmaceutical industry and the market today as a way to predict Novartis's future performance and results.

To do so, it was used the latest annual report from 2017 and 2018 and the previous 6 year's financial statements. To evaluate its historical performance, it was computed the company's Net Debt and consequently the Debt/Equity ratio, the evolution from 2013 to 2018 in the its Revenues, EBITDA and EBITDA's Margin (inserted in Appendix 9), EBIT (Appendix 7), Net Income and Share Price (Appendix 19)
Following this, it was computed the company's NOPLAT (in Appendix 10) and ROIC.

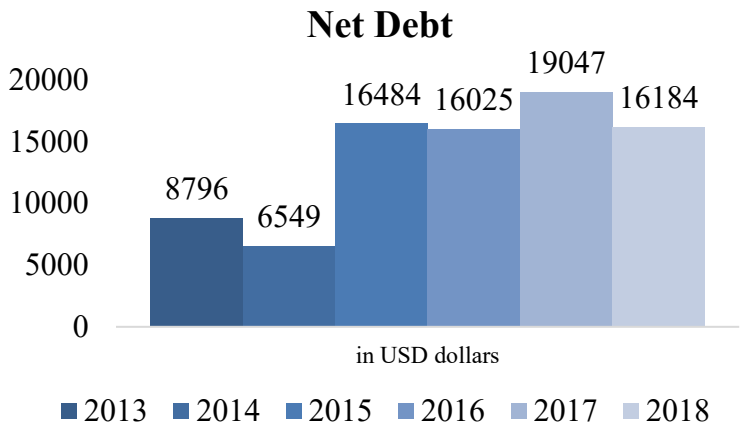
4.1.Debt/Equity Ratio (D/E) and Net Debt

The D/E ratio quantifies a company's financial leverage and is calculated by dividing a company's total liabilities by its shareholders' equity. This ratio was computed both in book value and market values.
Concerning the market value of debt and market value of equity, explained in later chapters of this dissertation, Novartis's D/E rounds precisely 11%. This market approach, which it will be the one considered in the valuation, reflects that the company maintains a relative stable target level in their capital structure considering the industry which is in. This ratio, however, appears higher when computed with the accounting numbers provided by the company. The historical book value D/E ratio has ranged between 24% and 41% in 2013-2018 increasing every year, however, has stabilized in the last couple years between 39% / 41%, allowing an average of 32%.

2013	2014	2015	2016	2017	2018	Average	Median
24.2%	28.8%	28.5%	31.8%	38.5%	40.9%	32.1%	30.3%

Figure 2: Historical Book Value D/E
Source: Dissertation computations

As for the book value computation of the company's Net Debt it was summed the non-current debt and subtracted the Cash and Equivalents and the Current Investments and Financial instruments from the Current Debt. Net Debt has been increasing since 2013 until 2017. However, 2018 has seen changes, net debt decreased to USD 16.2 billion compared to USD 19.0 billion at December 31 of 2017, due to an increase in cash and cash equivalents.



Graph 1: Net Debt from 2013 to 2018

4.2. Revenues

Novartis made substantial progress in 2017 and 2018. Alcon returned to growth, launched important new products, and benefited from efficiency gains delivered by Novartis Business Services and the recently established global drug development and production organizations. Despite navigating the final year of the *Gleevec/Glivec* patent expiration, the Group net sales grew by 2% in constant currencies (cc) and 5% in 2017 and 2018, respectively, presenting growth increase.

This performance is being driven by recently launched products such as *Cosentyx* and *Entresto. Cosentyx,* on their treatment for psoriasis and other autoimmune diseases, reached multi-blockbuster status and grew strongly across all indications, with sales rising 37% to USD 2.8 billion and expecting to maintain strong access in US. As for *Entresto*, the product for heart failure, was able to double its sales from USD 507 million to 1 billion. In addition to this, Novartis has 10 potential blockbuster launches planned in the next 2 years, 4 being in 2019 and being in 2020.

Sandoz is expanding access to biosimilars, and Novartis has currently a leading portfolio with five biosimilars now on the market. However, Sandoz net sales were down 2% due to fierce price competition in the US and generic competition.

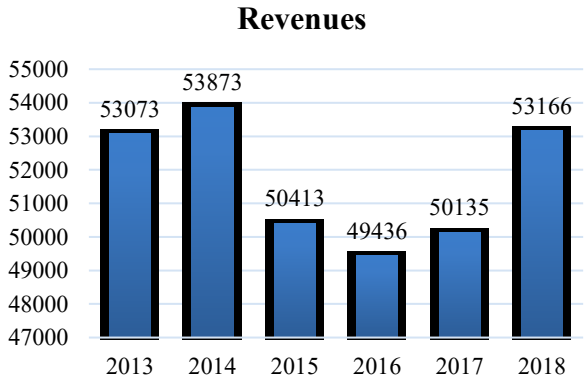
Alcon made significant progress on its turnaround, returning to growth and building momentum toward the end of the year, supported by the launch of innovative new products and continued double-digit growth in sales of their *Dailies Total* contact lenses.

Table 2: Historical Revenues by Business Division

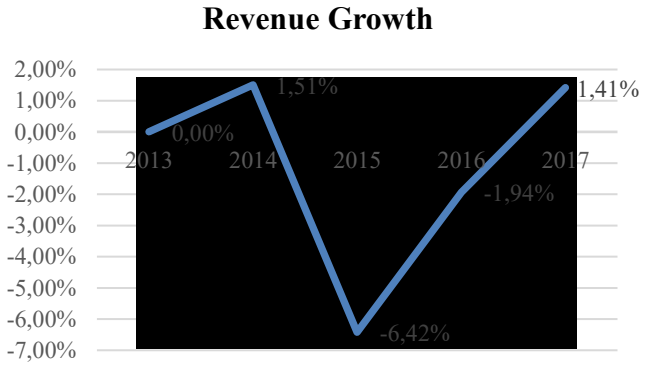
In USD billions	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Innovative Medicines	32 416	32 053	30 582	33 186	32 946	35 633
Sandoz	9 453	9 848	9 285	10 248	10 178	10 036
Alcon	10 546	10 876	9 857	5 812	6 774	7 153
Corporate	-325	-358	-284	-728	-789	-922
Other revenue	911	1 215	947	918	1 026	1 266
Sales to discontinued segments	72	239	26			
Total Revenues	53073	53873	50413	49436	50135	53166

Novartis was recognized in sustainability rankings, including Fortune magazine's "Change the World" list (at Nº 4) and "World's Most Admired Companies" list for the pharmaceutical industry (at Nº. 2). Fourth in the 2017 Dow Jones Sustainability Index (DJSI) World, and we re-entered the DJSI Europe Index for the first time in four years. It was again recognized as one of the world's most sustainable companies by Corporate Knights, and one of 73 companies worldwide to make Carbon Disclosure Project (CDP)'s Water A List. (Novartis AG, 2018b).

It's important to state that 2015 was a year of big changes for Novartis, in which they discontinued a lot of operations, in terms of Vaccines, Consumer Health and Animal Health, which account for the sudden decrease on Revenues that can be observed.



Graph 3: Historical Total Revenues



Graph 2: Historical Total Revenues Growth

4.3. Operating Income (EBIT)

Operating income in 2017 was USD 8.6 billion (+4% from 2016), largely driven by sales' increase, productivity improvements and lower amortization, which were partly offset by generic competition and higher marketing investments. However, this variable in 2018 shown a decrease of 5%, accounting for USD 8.2 billion, mainly due to the impacts from M&A transactions, higher restructuring and net impairment charges, and growth investments, partly offset by higher sales. (in Appendix 7)

4.4. Net Income

Net Income is the company's earnings, the Revenues adjusted for all the expenses incurred while doing business.(Bollinger, no date).

2017, at USD 7.7 billion and a 15% increase, was benefiting from growth in operating income and income from associated companies (higher income from the stake in GSK Consumer Healthcare Holdings Ltd).

However, 2018 brings even better results, and Novartis this year reached about USD 12.6 million, still mainly because of the benefits that come from the divestment of the stake in GSK Consumer.

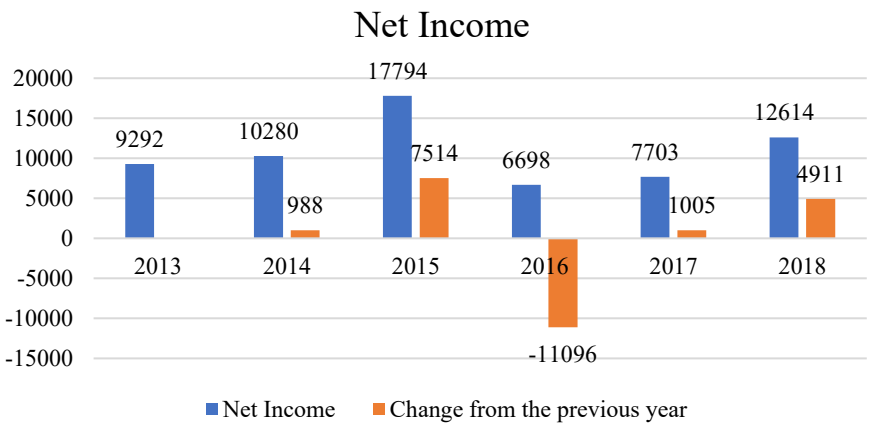


Table 3: Historical Net Income

2015 accounts for the year with the highest net income for Novartis for the fact the year benefitted from the USD 10.8 billion net income from discontinued operations, which included USD 12.7 billion of exceptional pre-tax divestment gains and the operational results of the divested businesses. 2016, however, accounts for the lowest net income values mainly due to the exceptional divestment gains included in the net income from

the discontinued operations of the prior year. Since 2016 that the company has seen a growth in this matter every year afterwards.

4.5. ROIC and Return on Research Capital Ratio (RRCR)

One of the key ingredients of corporate value is the company's **return on invested capital**. It measures how profitable is a company with the amount that has been invested. This ratio analyses the performance better than ROE or ROA because it focuses solely on a company's operations, in addition to this ROIC also differs by industry. The pharmaceutical industry relies on sustainable competitive advantages such as patents and brands and therefore tend to have high median ROIC.(Koller, Goedhart and Wessels, 2000).

This measure was taken from Thomson Reuters Eikon, which is calculated as income after tax for the fiscal year divided by the same period average total long-term capital and is expressed as a percentage. Total long-term capital was represented by the sum of total equity, total long term debt, deferred income tax and total other liabilities.

From the table below, it can be seen that the company's ROIC has decrease from 2014 to 2016 However, since 2016 that the company has seen this measure increase, being 2018 the year that accounts for the highest ratio yet.

	2013	2014	2015	2016	2017	2018
Novartis AG	9.3%	10.8%	6.8%	6.2%	7.0%	11.20%
Roche AG	26.2%	20.1%	18.1%	19.2%	17.0%	20.80%
Pfizer Inc	7.5%	6.2%	4.9%	5.2%	8.5%	7.7%
Merck & Co	5.3%	14.5%	5.5%	4.9%	6.8%	9.6%
Bayer AG	-	7.3%	7.3%	6.4%	5.3%	2.1%

Table 4: Novartis and Peers' ROIC.
Source: Thomson Reuters Eikon

Although it looks to be a low ROIC for a pharmaceutical company, Novartis appears in line with its closer peers with exception to Roche Holding AG which accounts for 2x its ROIC.

According to (Koller, Goedhart and Wessels, 2000), the combination of growth and return on invested capital (ROIC), relative to its cost, is what drives value. Which means that, a company will create value only if its ROIC is greater than its cost of capital (the

opportunity cost for its investors) which it did happen, as Novartis's cost of capital accounted for 5.03% and in 2017 and 2018, ROIC was 7% and 11,30%, correspondingly.

In addition to this, given that there are industries known for higher expenditure on R&D, like tech or pharmaceutical, it was considered important to see R&D's evolution in Novartis.

Using the R&D/Revenues, which provides knowledge on what % of Revenues are allocated to R&D expenditures, it was achievable to see that Novartis has 16.3% of their Revenues allocated to R&D expenditures. Taking the Thomson Reuters Eikon data, it was possible to observe that this percentage is slightly below the industry average and median, 18.6% and 18%, respectively. (in Appendix 8). This measure presents normal values within its peers, being Pfizer the most similar company.

As it can be seen, R&D expenditure is important to pharmaceuticals in the competition for innovative products and their expensive development. Therefore, it was considered Return on Research Capital (RRCR) would be a relevant metric to take in consideration. As R&D involves a lot of spending and payoff that are hard to measure, this ratio measure how much of the Revenues are a result of the expenditure made on R&D. RRCR is computed as it follows:

Return on Research Capital = Current year's Gross Profit / Previous year's R&D Expenditure

in USD millions	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**	**2024E**
Gross Profit	36494	36528	33009	31916	32960	**34759**	36268	37371	38316	39215	39882	40532
Research &Development	9071	9086	8935	9039	8972	9074	9255	9441	9629	9822	10018	10219
RRCR		**4.03**	**3.63**	**3.57**	**3.65**	**3.87**	**4.00**	**4.04**	**4.06**	**4.07**	**4.06**	**4.05**

in USD millions	**2025E**	**2026E**	**2027E**	**2028E**
Gross Profit	40907	41255	41461	41667
Research & Development	10423	10632	10844	11061
RRCR	**4.00**	**3.96**	**3.90**	**3.84**

Table 5: Historical and Forecasted RRCR
Source: Dissertation estimates

With the estimates of R&D and Gross Profit for 2019-2028, it was computed the RRCR ratio. Which according to historical and estimated values, for every USD 1 Novartis spent

on R&D, they achieved a return of USD 4 in gross profit, thought out all years. However, this computation assumes a one-year average investment cycle for R&D and since it was not possible to have access to the % of R&D made into profit, this ratio only gives the investors a view of what R&D might bring to the table.

However, the fact that Novartis's ROIC appears to be twice as high as the estimated WACC proves that the company is value generating. In addition to this, according to (Damodaran, 2009), the value of the research assets augments the value of the assets and consequently the book value of equity. Here is where Novartis significantly makes a difference in comparison to its peers, presenting a value of shareholder's equity quite above the average and median of industry and for this reason reflecting its competitive advantage.

In USD millions	Novartis Ag	Roche Ag	Pfizer Inc	Merck & Co Inc	Bayer Ag
Shareholders Equity	78 614 000000	27 788 732 394	27 788 732 394	26 701 000 000	52 271 538 689

In USD Millions	Average	Median
Shareholders Equity	32 223 774 514	26 701 000 000

Table 6: Novartis and Peers' Shareholders Equity
Source: Thomson Reuters Eikon

5. Company Valuation

5.1. Chosen Model

Now that are known the industry and the company's conditions as well as the methods available to do a valuation, it was chosen to firstly start by using the **Discounted Cash Flow Model** as the company is considered to have a stable capital structure, avoiding the errors that can happen when companies are expecting to change in the future.

This model will aim to predict the future performance of Novartis for the next 9 years and will have into account quantitative and qualitative assumptions.

5.2. Assumptions

Currency and Inflation: Novartis is a Swiss multinational pharmaceutical company and although it would be expected the company to report in Swiss Franc (CHF), the financial

statements and annual reports are reported in dollars (USD). Minding this, all computations and values thought out this dissertation are in USD or converted to USD and in constant currencies just like the company reported in their annual reports.

Growth rates: When treating capital expenses such as R&D as operating expenses, it's lost the most potent tool for not only estimating growth but also for checking for internal consistency. When confronted with this situation according to (Damodaran, 2009) its best for analysts to not rely so much on the fundamentals and base their decisions on the type of company. This will be taken into account when making decisions about growth. To do so, own judgments on future growth based on history, investor's presentations, trustworthy reports about the company itself, its peers and the industry nowadays and in the future will be used to make decisions.

Taxes: An 14% effective cash tax rate was used, in-line with the average of the historical rates applied from 2013 to 2018. Novartis's majority of sales are both in Switzerland, the company's headcounters, and in its subsidiary in the US. Seeing that the swiss corporate effective tax rate of 2018 is 17,77% and the taxes on income earned in the US subsidiary is 10,33%, it was also acceptable to consider 14% as an effective tax rate as the average of rates of both places amounts for 14,05%.

The tax rate in 2018 was 8.8% compared to the prior 14,4%, due to the impact on taxes of the divestment of the 36.5% stake in the GSK consumer healthcare joint venture. However, according to (Novartis AG, 2018a), when excluding this impact, the tax rate in 2018 would've been 14,4% in line with the prior year, as the benefit from satisfactory profits mixed was offset by the effect from the discontinuation of the recognition of the income from associated companies related to the GSK joint venture. This tax rate will remain constant during the forecast period since there are no events expected to change this assumption.

Innovative Medicines Division: This division in Novartis will continue to increase meaningfully in line with 2018 in revenues due to all the conditions mention above. *Entresto* is now a blockbuster, *Cosentyx* and *Gleevec/Glivec* are expected to increase in sales and so is the oncology unit with *Promacta/Revolade* and *Tafinlar + Mekinist.*

Generics: It will be followed the company's Investors Relation report that it will be assumed no *Gilenya* generics will enter in 2019. (Novartis AG, 2019).

R&D Benefits

The Revenues forecast section will consider the R&D benefits as accounting numbers presented on publicly traded companies do not typically represent the fair value of R&D investments (Deloitte and Thomson Reuters, 2010). A pharmaceutical company can have loads of drugs in its development pipeline but that does not mean it should be included in the valuation. For this reason, I assumed that any investment on a drug that it's still in discover/pre-clinical stage is assigned to be a zero-market value. So, to every product that today is believed to grow because of the R&D effort put in before and is today a blockbuster will have a rate that will benefit in terms of sales and should show its market potential, this will be followed by the information available by the company, market research reports and my own best judgment on the industry. This goes especially to specific drugs in the Innovative Medicines Division stated before.

EBITDA

Given the stable values from 2013 to 2018, it is assumed that from 2019 to 2024, this measure will grow at the average growth rate of the 4 last years (2.42%) and afterwards will slow down its pace and grow at 1.40% until 2028.

5.3. Novartis's 2019-2028 Forecast

In order to ultimately reach the value of the company and fill the company's business plan, it was begun the forecast of financial statements to deliver the information compulsory to compute the DCF and the selected multiples.

Forecasting Revenues

Since the information for revenues on the pharma industry and Novartis are accounted annually, this will be the way it will be forecasted in this dissertation.

According to the Media Presentation of Q4 and FY 2017 Results and Q4 and FY 2018 Results on Novartis it was possible to assume prospective for the 2019 and subsequently. The Global Head Drug Development & CMO of Novartis, Vas Narasimhan, presented the future direction of Novartis and these guidelines will be in mind for the forecasts as

Novartis has a good history of accomplishment and over perform their operational and financial targets.

Barring unforeseen events and the industry overview stated before, group sales are expected to grow low to mid-single digit which I preview to be about 4% in 2019. Given the large increase in 2018 (6%) and the changes in the industry, I decided to take a conservative approach and follow the company's guidelines but apply my judgement on the fact technology will have positive and negative impacts on total revenues. However, forecasting the company as a whole and not take into account each of the division's growth rate would not lead to a credible valuation so this dissertation considers the general information given from Van Narasimhan.

The expectations on Novartis becoming the top pharmaceutical company in the world is in line with the news and ideas that the company's management is planning, as its focus in expanding its innovative medicines business solely.

The company announced the agreement to acquire *Endocyre*, a company specializing in prostate cancer therapies, valued at approximately USD 2.1 bn, expanding their nuclear medicines platform. This news revised upwards its guidance for full-year sales, expected to contribute to groups sales in 2021 (Novartis AG, 2018e) and Novartis's management said *Endocyte* acquisition would strengthen its capabilities in radiopharmaceuticals, which it expected to be a "key growth driver" for its business.(Financial Times, 2018)

Similar to the outlook for 2018, Novartis expects group core operating income to grow by a mid to high-single digit rate, which my prediction would be about 6.94%.

As previously mentioned, Novartis AG is divided in 4 segments that have different importance in the company's results and revenues as well as different growth prospective and target markets. (Miller, 2018) (forecasts in Appendix 11)

- Innovative Medicines Division is expected to grow mid-single digit, about 6% in 2018. Taken that the majority of revenues come from this division throughout all historical years and that there are products in this division expected to outperform[1], this is a very positive factor for Novartis.
- Sandoz generics business is expected to slightly decline due to US pricing pressure, just in line with the prior year which it will account for a decrease of 1%.

  This division is expected to continue to invest in development of biotechnology-based medicines intended to sales as "biosimilar versions" and also as other

[1] Products and Outlook explained in Company's Overview

differentiated and "harder to make" generic products, which I believe will increase the division's growth in the consecutive years.

- Alcon's eye care business is predicted to grow low at a mid-single digit pace which I predicted to be similar to last year, about 5%.

Novartis's Total Revenues (in Appendix 12) also include a % of "Corporate Activities" and a % of "Other Revenues". Corporate Activities comprises other items of income and expense that are not attributable to specific segments, as for example, some revenues from intellectual property rights and some expenses associated to post-employment benefits, environmental remediation liabilities, charitable activities, donations and sponsorships. These were forecasted as an average of the last 3 years, since these have been increasing since 2016.

As for the Other Revenues, these incorporate an early release of deferred income associated with collaboration agreements. Novartis maintains stable values ranging from USD 911 M to USD 1226 M, therefore this section was estimated computing the average of the last 3 years, every year, using the same reasoning from above.

All of the growth rates applied and mentioned above are in line with the Worldwide Prescription Drug Sales rate for 2018-2024, that being 6,4%.

According to Evaluate Pharma's World Preview 2017, Outlook to 2022, Novartis is predicted to return to the top spot with expected sales of $49.8bn in 2022, compared with $49.7bn for Pfizer and $49.6bn for Roche. This prediction is only considered to change if it happened a big profile failure change in their rankings.(Lervolino and Urquhart, 2017).

In this year's Evaluate Pharma's World Preview 2018, Outlook to 2024, Novartis is forecasted to be nº 1 in 2024 with $53.2 bn total worldwide prescription sales and in terms of Innovation, it's expected to reach the highest value pipeline (NPV) at $22.9 bn in that same year. (Lervolino & Urquhart, 2017) However, given the conditions in the industry and the outlook for the company, I expect Novartis to exceed these projected numbers, reaching USD 61 996.30 bn in total sales for 2024 and NPV at $23.5bn in that same year, given the company's wide-ranging portfolio of innovative medicines, therapeutic areas and additionally the fact that not only Novartis has at the moment 3 drugs among the world's top 50 selling drugs but in 2024 is forecasted to have around 10 products with sales over $1bn and an extra 12 products with sales over $0.5bn by 2024. (Evaluate Pharma, 2018)

As discussed in the Company and Pharmaceutical Industry Overview, I expect that the viewpoint for this industry in the near and long-term future to be positive even being a highly competitive sector. Due to my optimistic perspective and to Novartis's increasing sales and lead trends, for 2019 and the during the next 9 years I believe it will show its improved results. I expect the company's total revenues growth to increase 3.67% in 2019, 3.05% in 2020, 2.53% in 2021, 2.36% in 2022, 1,71% in 2023, 1.64% in 2024, 0.93% in 2025, 0.85% in 2026, 0.50% in 2027 and 0.50% in 2028 reaching for its best results yet.

Forecasting Operating Expenses and Operating Income (EBIT)

According to Novartis, Operating expenses includes Cost of goods sold, Research & Development, Selling General & Administration, Other income and Other expense. (in Appendix 13)

Other income and Other expense include reversals and charges related to the impairment of property, plant and equipment and as it was chosen that property, plant and equipment is driven by revenues, this dissertation will consider the forecast of other income and other expense as well driven by revenues.

In addition to this, Cost of goods sold and the Selling General & Administration section, that includes Marketing and Sales, were assumed to be driven by revenues as well.

Forecasting R&D

Forecasting R&D and adding its profits correctly to be valuation it was tricky as in pharmaceutical companies, this concept is the heart of the business.

R&D is essentially an investment and it should not be seen only as an expense. It was used a rate of 2% throughout time, based on the historical fraction of investment in R&D that the company appears to have. I estimate that the company will then reach its highest spending in R&D at USD 11 061 M in 2028, as it can be observed in Appendix 13.

My estimates appear to be in line with (Evaluate Pharma, 2018) as Evaluate Pharma predicts Novartis will spend about 2% per year until 2024, being one of the Top 10 Companies investing in R&D as nº 3 on the list, being overtaken by Roche (nº1) and Johnson &Johnson (nº2)

Forecasting Depreciation and CAPEX

Depreciation occurs when the value of the asset has been used up, usually this includes the property, plant and equipment (PP&E).

CAPEX combines all the capital expenditures of the company and it was assumed that the true proxy for this would be the sum of Novartis's purchase of PP&E and intangible assets.

As the company moves towards steady state, CAPEX will gradually meet Depreciation because in this condition the company is not expected to grow significantly and begins to invest less to support growth and more to replace its assets.

Since 2015 that depreciation has been increasing, so for this section's forecast it was decided that from 2018 onwards it would grow at the average of last 4 years' growth rates, at a reasonable growth rate of 7%. As for the CAPEX, a similar approach was given, as the purchase of PP&E and intangible assets were stable at a recurring amount, it was forecasted as the average of the last 3 years for the next periods. As a consequence, the CAPEX/ Depreciation ratio is 1.17. (in Appendix 14)

Forecasting Net Working Capital

Net Working Capital is defined as the difference between Current Assets and Currents Liabilities of the current period, less the different between these two sections at the previous period.

Novartis's Current Assets were defined as the sum of the Inventory, Trade Receivables, Income Tax Receivables, and Other Currents Assets.

Novartis's Current Liabilities were defined as the sum of the Trade payables, Current income tax liabilities and Provisions and other current liabilities

Each component was forecasted accordingly (in Appendix 15), "Trade Payables" was estimated according to the Inventory. "Current income tax liabilities" estimates were the average of the last 3 years, every year as this section was mainly constant thought out time.

"Provisions and other current liabilities" were assumed to maintained constant for the next 6 years, in which was applied the average of the last 5 years, every year.

In terms of Current Assets, "Inventory" was forecasted in function of their Cost of Sales. "Trades Receivables" and "Income Tax Receivables" were estimated based on Revenues.

Since "Other current assets" is a section that remains constant during the historical years, it was projected an average of the last 5 years.

Cash and Equivalents were backed out of the formula, as this section was assumed to be an investment for treasury bills, short term government securities or commercial paper. According to Damodaran, this section earns a fair return and for valuation purposes it should not be included in measures of working capital (Damodaran, no date)

Net Working Capital, according to this dissertation's assumptions, is expected to decrease and maintain constant values after 2019. Working Capital changes from 2023 onwards are smaller, consistent with the assumption that current assets are balanced by current liabilities which a steady-state scenario implies.(Mario Massari, Gianfranco Gianfrate, 2016)

Forecasting Deferred Taxes, Inventories and Accounts payable

For Deferred Taxes Assets, since its tied with operations so it will grow with Revenues. Deferred Taxes Liabilities. Inventories and Accounts payable were driven by the Cost of Goods Sold

Forecasting Interest Expense and Interest Income

These sections were forecasted according to (Koller, Goedhart and Wessels, 2000) as interest expense (or income) is tied directly to the liability (or asset) that generates the expense (or income). Hence, the appropriate driver for interest expense is total debt. Total debt, however, is a function of interest expense, and this circularity leads to implementation problems. To avoid the complexity of this feedback effect, interest expense is forecasted as function of the prior year's total debt which it was done to simplify the model and minimize implementation error.

Forecasting interest income was computed with the same reasoning, forecasted based on the asset generating the income.

Interest Expense's forecasting were then based on the company's Prior Year Total Debt balances, as it was used the forecast ratio: interest expense t / total debt t-1. Novartis has presented thought out the period considered (2013-2018) constant levels of debt, which I considered to continue in my forecasted period. From 2019 to 2028, I considered it the average of the last 6 years, every year.

Interest Income of the company were based on the company's Prior Year Cash Excess, as it was used the forecast ratio: interest income t / excess cash t-1. Minding this, excess

cash was computed as Current Assets minus Current Liabilities, plus Cash and Cash Equivalents.

5.4. WACC

With regard to reach the present value of operations, one would discount each period's forecast of free cash flow and when doing so, make sure to discount taking into account the risk faced by all investors of the company. That's where the Weighted Average of Cost of Capital (WACC) sets in, WACC is the rate of return required by the company's debt and equity investors from investing and therefore the appropriate discount rate for the free cash flow.(Koller, Goedhart and Wessels, 2000)

WACC based models as the enterprise DCF and profitability/excess returns models, work its best when it is expected that the company's capital structure is not changing significantly, as it is the case for Novartis based on its historical values and prospective.

The WACC formula uses market values of debt (D) and equity (E), multiplied by each of their costs (k). The cost of debt is lowered by the marginal tax rate, it appears defined as it follows:

$$\text{WACC} = \frac{D}{D+E}k_d(1-T_m) + \frac{E}{D+E}k_e$$

5.4.1. Cost of debt

According to (Damodaran, 2015)**,** *the cost of debt is the rate at which you can borrow at currently, as it will reflect not only your default risk but also the level of interest rates in the market.* We can reach this cost through two approaches: the yield to maturity on the outstanding long-term bonds from the company and use it as the interest rate or based on the rating of the company, estimating a default spread based upon the rating. Both of these will be computed, compared and taken into account.

To compute the cost of debt through the 1st stated approach, it was calculated the weighted average yield of Novartis's 23 bonds presented on Thomson Reuters Eikon.

As the company reports in USD but appears to have the YTM of the bonds outstanding in the headcounters' currency (CHF), in order to compute the credit spread that characterizes the company's risk it will be subtracted to this weighted average, the risk free rate on the currency of the company's bonds (CHF). It was then used the 10 years

Switzerland Government Bond (-0.312%) as the rate's maturity was chosen accordingly to the average maturity of Novartis's bonds.

Next, to arrive at the cost of debt, it was summed the risk-free rate of the currency on the company's reports (USD) and the credit spread. With the same reasoning, it was used the 10 years US Government Bond (2.64%)

$$\text{Cost of Debt} = \text{Risk Free Rate} + \text{Credit Spread}$$
$$= 2.64\% + 0.47\% = 3.11\%$$

Although this dissertation will use the cost of debt computed using the company's bonds yields, it was compared how much the 2nd approach yield similar values.

According to Aswath Damodaran (Damodaran, 2019c), when the data to fulfill the computations in the 1st approach isn't available, one should look up the rating of the company and estimate the default spread upon the rating. Thereupon, it was used the author's file on Ratings and Coverage Ratios.(Damodaran, 2019c)(Damodaran, 2019b)

As for the end of 2018, Moody's Investor Service rated Novartis as AA. This fact would add up to a spread of 1%, which summed to the US Risk Free Rate (2.64%) would yield a cost of debt of 3.64%, considered very similar to the dissertation's cost of debt.

After deducting the taxes afterwards at a tax rate of 14%, it was given a cost of debt of 2.67%.

When examining the cost of debt of pharmaceuticals, according to Damodaran's study of 237 companies in this sector it should be around 5,43% and about 4,07% after taxes, which Novartis appears to be lower. This study analyzes US companies and consequently can be unrelated to be considered, however, due to the fact that Novartis has 34% of revenues from the US it was taken into account the difference from its American competitors.

5.4.2. Market Value of Debt and Market Value of Equity

In order to estimate the market value of equity, one should multiply the number of shares outstanding for the current stock price of Novartis, which is fairly easy to obtain and reflects the market-wide and firm specific changes. (Damodaran, 2002)

To compute this value, it was used the access to Thomson Reuters, and it was reached a **market value of equity** of **2 311 171 429** shares outstanding x 87.38 CHF[2] = **USD 208 826 208 324.**

Likewise, according to (Damodaran, 2002), the challenging part is obtaining the market value of debt as usually companies do not have all their debt in the form of bonds outstanding trading in the market.

Novartis appears to have most of their debt publicly traded with exception to one bank loan that will be evaluated and then added to the market value of the bonds outstanding. To get this, one multiplied the amount issued of each bond by its last price.

Market Value of Bonds = CHF 21 311 057 867.47

As for the loan, it was computed the net present value of the loan and its YTM was assumed to be equal to YTM of a bond with the same currency and maturity.

Market Value of Bank Loan = CHF 1 601 923 076.92

The company's debt added up to USD 23 162 961 567 when converted to US dollars

Total Market Debt= USD 23 162 961 567

5.4.3. Cost of equity

To reach the cost of equity, it will be used the Capital Asset Pricing Model (CAPM), in which needs to be considered the risk-free rate, the beta of the company and the market risk premium as the formulas is given by:

Cost of Equity = Risk Free Rate + Beta (Market's Rate of Return – Risk Free Rate)

5.4.3.1. Risk Free Rate

The risk free rate is the starting point for both your cost of equity and cost of debt. If you define it, as I do, as the rate of return you would expect to make on an investment with guaranteed returns, an investment can be risk free only if the entity making the guarantee is default free and if you are not exposed to reinvestment risk.(Damodaran, 2016)

It was considered the US Government Bond of 10 years (2.64%) as the risk-free rate as it was taken into account the fact that all computations and values in this dissertation were in US dollars.

- [2] Share price found at 16/Jan/2019, which exchanged to USD 90.36

5.4.3.2. Beta and Market Risk Premium

For the Market Risk Premium, the New York Stock Exchange (NYSE) was the chosen index to proxy the market that Novartis is inserted. This decision was tricky as Novartis is both quoted in SIX index and in the NYSE, however, considering that Novartis is a European company exposed to US market risk given the similar % of sales both in Europe (36%) and the US (34%) and since this dissertation is reported in US dollars , these facts weighted more than the circumstance that the company has its headcounters in Switzerland. This index's rate of return is 10.43%

The company's beta measures its market or systematic risk, which in theory is the sensitivity of its returns to the returns on the market portfolio of risky assets (Jerald E. Pinto *et al.*, 2010). So, to arrive at the beta that measure Novartis exposure, it was ran a linear regression with the company's stocks monthly prices (31/01/2013 to 31/01/2019) as the dependent variable (y) and the NYSE prices as the dependent variable (x) resulting in a 0.0031 beta. This, however, according to (Jerald E. Pinto *et al.*, 2010), is the raw beta that in order to predict the future should be adjusted using the formula introduced by Blume (1971):

$$\text{Adjusted beta} = (2/3) * \text{Unadjusted beta} + (1/3)$$

The adjustment results in a 0.34 beta which was used in the valuation.

5.5. Enterprise Value of Novartis

When all the above parameters are estimated, it is possible to compute the weighted average cost of capital which reached **5.03%.**

Next, with this rate and using the FCFF approach, it is found an Enterprise Value of USD 247 518.06 bn. (in Appendix 16).

The enterprise value reflects the cash generated by company's all assets, independently of how these assets are financed (capital structure of the company). (Janiszewski, 2011) However, this does not reflect the company's true value for shareholders after all debts have been paid off, that is Equity Value.

In order to obtain Equity Value, one should sum two main components: Enterprise Value and the Terminal Value which is the sum of the cash flows multiplied by the cumulative discount factor for each year of the financial projections plus lastly detract the company's non-operating assets/liabilities. (Janiszewski, 2011)

Eventually as Novartis grows, there will come a period that it will grow at a rate less than or equal to the growth rate of the economy it operates in. This stable growth can be

sustained in perpetuity, assuming that the cash flows after projections will grow at a constant rate in perpetuity, reflecting the company's terminal value. (Damodaran, 2002).Given the positive outlook of the company in the industry and their operations at global scale, i.e. Europe, United States, Asia, Africa, Canada, Latin America and "Australasia" which refers to Australia, New Zealand, Melanesia, Micronesia and Polynesia, it was considered the global Real GDP growth for 2021-2025 of 3.4% and an Inflation for the same period of 3%. With this in mind and taking a conservative approach, this dissertation assumes a perpetuity of 2.5%. (PwC, 2019)

For Novartis, it will be deducted the unfunded pension liabilities, the company's net debt in market values and minority interests, reaching and Equity Value of USD 99.75 per share. In order to reach, the value for Novartis's Market Net Debt it was subtracted from the Market Value of Debt the Cash and Cash Equivalents of the period. Cash and Cash Equivalents were forecast based on the growth rate of the cash flows. (in Appendix 17)

5.6. Sensitivity Analysis

The forecasting process works around uncertainty and the assumptions that the analyst thinks it suits best. Converting forecasts to a valuation implicates more than inputting values to a model to obtain an estimate of the value of a company and since forecasts over long periods of time are imprecise, sensitivity analysis and situational adjustments play a key role to a complete valuation.(Jerald E. Pinto *et al.*, 2010)

Two very important assumptions were considered firstly, the WACC and the perpetuity rate, separately and combined.

This sensitivity analysis reveals the effect of decreasing or increasing 0.25BPS to 1BSP on the base case. The price per share can be described to increase as the WACC decreases and when perpetuity increases, decreasing when the opposite case happens. One specificity is presented, as the WACC decreases changes in the base case are bigger than when the parameter is increasing. When perpetuity is increasing, changes are also more intensified.

	Decrease			Base Case	Increase		
G	**1.75%**	**2.00%**	**2.25%**	**2.50%**	**2.75%**	**3.00%**	**3.25%**
EV (USD bn)	202 446	214 991	229 792	247 518	269 132	296 069	330 573
Equity Value (USD bn)	185 442	197 987	212 788	230 514	252 128	279 065	313 569
Price per share (USD)	80.24	85.67	92.08	99.75	109.10	120.75	135.69
Price per share (CHF)	79.38	84.75	91.08	98.67	107.92	119.45	134.22
change from base case	*-20%*	*-14%*	*-8%*		*9%*	*21%*	*36%*

	Decrease			Base Case	Increase		
WACC	**4.28%**	**4.53%**	**4.78%**	**5.03%**	**5.28%**	**5.53%**	5.78%
EV (USD bn)	351 076	308 064	274 476	247 518	225 402	206 930	191 269
Equity Value (USD bn)	334 072	291 060	257 472	230 514	208 398	189 926	174 265
Price per share (USD)	144.56	125.95	111.41	99.75	90.18	82.18	75.41
Price per share (CHF)	143.00	124.59	110.21	98.67	89.20	81.30	74.59
change from base case	*45%*	*26%*	*12%*		*-10%*	*-18%*	*-24%*

Table 7: Valuation with different g and WACC

		Perpetuity						
	Price per Share (USD)	**1.75%**	**2.00%**	**2.25%**	**2.50%**	**2.75%**	**3.00%**	**3.25%**
WACC	4.28%	106.22	116.20	128.63	144.56	165.69	195.07	238.72
	4.53%	96.01	104.01	125.95	125.95	141.53	162.21	190.97
	4.78%	87.48	94.02	101.86	111.41	123.32	138.57	158.81
	5.03%	80.24	85.67	92.08	99.75	109.10	120.75	135.69
	5.28%	74.03	78.59	83.91	90.18	97.68	106.84	118.25
	5.53%	68.64	72.52	76.98	82.18	88.32	95.67	104.63
	5.78%	63.92	67.24	71.04	75.41	80.50	86.51	93.70

Table 8: Valuation using different g and WACC simultaneously

As the current market price of Novartis's shares is USD, 90.36, the light grey shade represents the dissertation's DCF estimates. However, changes in parameters WACC or Perpetuity could possibly change the recommendation given. The scenarios given a perpetuity above 3%, one would be believed should not be valid as the worldwide inflation is expected to stay at 3%.

All the values shaded green suggest maintaining a BUY recommendation as well as a SELL recommendation is given to all the values shaded red. The best scenarios are found if Novartis's perpetuity would grow at 2.75% or at the worldwide perpetuity of or 3%.

Values with perpetuity below 3.25% and that appear not shaded are considered a HOLD recommendation as the share price is considered to perform with market at the moment. The variance of 0.25 BPS in the WACC or Perpetuity, nevertheless, results in a BUY or HOLD recommendation for the investor. With the only exception, to the scenario of a 5.28% WACC and a 2.55% perpetuity.

6. Relative Valuation

In pursuance of complementing and comparing the DCF approach, the Relative Valuation was chosen. This approach does not show the long-term progression of the company however reflects shot-term reality that the company lives in. Consequently, to start, it was analyzed the group of peers for Novartis.

When selecting this group, it was considered several parameters like industry, market capitalization, capital structure, size, revenues, ROA and ROE.

From the standard group from Thomson Reuters (Appendix 18), that included companies I too added up, it was cut down to 4 pharmaceutical companies with those similar variables stated and that were considered Novartis's Peer Group.

Those being Roche Holdings AG, Pfizer Inc., Merck & Co Inc and Bayer AG. These first 3 companies are as well as Novartis part of the Top 10 Worldwide Prescription Sales' companies, according to Evaluate Pharma. (Evaluate Pharma, 2018)

Firstly, these companies were active in the pharmaceutical industry and appeared to have similar size, with a market capitalization ranging from 195 bn to 250bn, being Novartis AG and Pfizer very alike. Only Bayer AG did not fill this parameter, having a much lower market capitalization rounding 75 bn, however, delivered similar values in rest of the stated variables.

In terms of Revenues, it also ranged from USD 40 to USD 55 bn, being Merck &Co the lowest provider in that section.

For Capital Structure I decided to analyze it in function of their D/E ratio and found that Novartis takes the lowest ratio in significant comparation to its peers, being under the industry's median. Bayer AG was especially chosen as a close competitor for being the company with the most similar capital structure.

Although Novartis presents positive aspects in terms of peers and industry, the company's 5-year Historical Growth Rate appears negative and lower than its peers (with minimal difference from Bayer AG), reflecting that in the last 5 years the

company could've grown more or more consistently than it presents. Suggesting that the strategy of focusing more in being solely a Medicines' Company is a good turn around. Its, however, safe to say that none of its peers are above the industry average and median.

As only one peer, Bayer AG, presented a similar capital structure to Novartis, it was decided that **enterprise value multiples** would be more appropriate considering these are not affected by capital structure.

Summing up, it was taken into account the four basic principles that help companies apply multiples accurately according to the article by (Liu, Nissim and Thomas, 2002) which should be:

- Comparing peers with similar prospects for ROIC and growth
- The use of forward-looking multiples
- The use of enterprise-value multiples
- Adjusting the EV/EBITDA multiple for nonoperating items[3]

6.1. EV/EBITDA and EV/Revenues

Company Name	EV / EBITDA (Daily Time Series Ratio)	EV/Revenues (Daily Time Series Ratio)
Novartis AG (Thesis Estimates)	**16.43**	**4.66**
Novartis AG (From Thomson Reuters**)**	**13.72**	**4.57**
Roche Holding AG	10.82	4.25
Pfizer Inc	11.76	4.96
Merck & Co Inc	14.55	5.04
Bayer AG	10.43	2.69
Average	**12.86**	**4.34**
Median	**12.25**	**4.56**

Table 9: Novartis and Peers' Trailing EV/EBITDA and EV/Revenues
Source: Dissertation's computations for Novartis and Thomson Reuters Eikon Ratios for the Peers

[3] For Novartis, non-operating items included Minority Interest and Unfunded Pensions.

EV/EBITDA is the ratio that answers in investor's question "How much is each dollar of company's EBITDA worth to me?", used to determine the value of the company by any buyer considering the company's debt. This ratio was also introduced in this analysis as it is often stated that multiples based on EBITDA provide better estimates than based on EBIT because depreciation expenses distort the information about the value of earnings as well as depreciation schedules do not accurately reflect the actual deterioration of asset value. (Lie and Lie, 2002)

Novartis appears to have the highest EV/EBITDA (16.43) in comparison to their closest peers chosen, being Merck & Co Inc (14.55) the closest to it. These two companies are as well the only ones from the selected group with values above the median[4] of the industry (12.25).

In general guidelines, an EV/EBITDA value below 10, a considered low ratio would be measured as a healthier ratio and it would mean investors are spending less money for a $1 of earnings, however in this industry most companies appear to have a high EV/EBITDA to practice the business. According to (Damodaran, 2019a), his pharmaceutical sector sample of 237 companies as of January 2019, presents an EV/EBITDA average of 16.09 when considering all the companies and a ratio of 13.46 when considering just the companies with a positive EBITDA. It is important to mention, that even thought this information gives us a picture of what is usual, this sample includes only US companies.

Alongside with EV/EBITDA, it was decided to analyze the EV/Revenues as this ratio. Similarly to the previous, it's a valuation measure that links the enterprise value of a company to the company's sales, quantifying how much it costs to purchase the company's sales. EV/Revenues answers the investor's question "How much is each dollar of Revenues worth to me?".

This multiple reflects very similar values all peers, again with exception to Bayer. Being Novartis, according to this dissertation estimates slightly above the average and median.

[4] This dissertation will be using the Median of the industry, rather than the Mean, to avoid distortion by outliers in the value of the list of the peer groups' multiple.

6.2. Forward Multiples

To complement this, it was also analyzed forward multiples as according to (Liu, Nissim and Thomas, 2002), multiples derived from forward earnings explain stock prices remarkably well and should be used as long as earnings forecasts are available, since these contain significantly more value-relevant information than historical data.

The forward multiple refers to the multiple applied to the company's next year's expected earning, EBITDA or Revenues. As Valuation is a forward - looking process, analysts should focus on these forecasts when available. (Jerald E. Pinto *et al.*, 2010)

	Forward EV/EBITDA	**Forward EV / Revenue**
	(Daily Time Series Ratio)	(SmartEstimate ®) (FY1)
Novartis AG (Thesis Estimates)	**16.05**	**4.16**
Novartis AG	**13.78**	**4.07**
Roche Holding AG	10.33	4.00
Pfizer Inc	12.12	5.09
Merck & Co Inc	5.55	3.33
Bayer AG	7.98	2.58
Average	**10.36**	**4.34**
Median	**10.18**	**4.45**

Table 10: Table 14: Novartis and Peers' Forward EV/EBITDA and EV/Revenues
Source: Dissertation's computations for Novartis and Thomson Reuters Eikon Ratios for the Peers

The ratios above, besides the thesis estimates, were extracted from Thomson Reuters Eikon, which predict parallel conclusions to the trailed ratios analyzed above.

	EV / REVENUE	**EV/EBITDA**
Average	4.34	10.36
Driver	55 474	15 425
EV	207 758	159 809
- Net Debt	14 907	
- Minority Interest	3	
- Unfunded Pensions	2 094	
Equity Value	223 754	147 805
#Shares	2 311	
SHARE PRICE	**96.82**	**61.79**

Table 11: Novartis's Price per Share (USD) according to multiples

With the peers' median and the ratio's driver, that being EBITDA and Revenues, it was possible to reach a target price of USD 61.79 and USD 96.82, respectively. According to the EV/EBITDA and EV/Revenues, Novartis shares are **undervalued** and **overvalued**, respectively.

7. Investment Banking Report's Comparison

To ensure the accuracy relevance of the estimates in this dissertation, these were compared with the financial institution ODDO BHF's Equity Research Report for Novartis AG's 2019.

	Dissertation	**OOCD BHF**
Share Price during valuation period (CHF)	89.38	79.48
Share Price in valuation (CHF)	98.67	97.00
Recommendation	BUY	BUY

ODDO BHF's Valuation presented a shorter length period of only 2 years (2020) and this dissertation accounts for 9 years of projections (2028) using the same method of valuation, the WACC-based DCF. Although, this institution valued Novartis when the 2018's Annual Report was not reported yet, their expectations went in line with the actual figures.

	Dissertation		**ODDO BHF**	
in USD millions	2019E	2020E	2019E	2020E
Profit and Loss Statement				
Revenues	55 474	57 162	54 726	57 517
Current EBIT	8 736	9 098	15 580	17 190
EBITDA	15 426	15 799	16 051	17 688
Cash Flow Statement				
CAPEX	2992	3931	2 417	2 534
Balance Sheet				
Net Debt	14 907	10 934	16 052	11 473
WACC	5.03%	5.03%	6.50%	6.50%
Risk-Free Rate	2.64%	2.64%	0.78%	0.78%
Beta	0.34	0.34	0.85	0.85
Market Risk Premium	10.43%	10.43%	7.23%	7.23%
Cost of Debt	2.67%	2.67%	2.6%	2.6%
Cost of Equity	5.29%	5.29%	6.9%	6.9%
Tax Rate	14.00%	14.00%	15%	15%
EBIT Margin	16.7%		31%	
Perpetuity	2.5%		2%	
EV	247 907	247 907	202 522	197 016
Share Price (USD)	**99.75**		**98.06**	

Table 12: Comparation to the Investment Bank

Regarding, Revenues, it's presented that both the dissertation and the financial institution believe in the growth of this section. ODDO BHF's forecast is slightly more optimistic than the dissertation, however, very similar.
In consequence to this, both their Current EBIT and EBITDA are higher, especially in terms of EBIT which I reckon it should be a consequence of the assumptions made on the matters that EBIT include, as for example, Revenues, R&D growth, Cost of Sales, Selling, General &Administration growth as well as Other Income and Other expense.
As for EBITDA, the change is again like the Revenues section, very small.
As for CAPEX, the dissertation's forecasts are a touch higher than ODDO BHF's, especially for 2020.
In relation to Novartis's Net Debt, the dissertation accounts for a low value than ODDO BHF which I believe it can be caused by the set of assumptions made when computing the market value of debt.
An important issue to consider when analyzing both valuations is the fact that different forecast periods affect the estimated share price in the DCF approach as the assumptions of risk-free rates will demand different criteria.
Given this, it was observed that ODDO BHF had some DCF long term assumptions that I did not consider because I forecasted for a longer period and in a different currency. Some of which, affect the variable that could bring great differences, the WACC.
The financial institution considered a risk free of 0.78% which it was not described from where it was taken from or how it was computed but on the opposite side, the dissertation's valuation used the 10y US Government Bond (2.64%). As for the value of beta, this dissertation assumed a lower beta (0.34) instead of the 0.85 that they used.
In terms of perpetuity, ODDO BHF took a more conservative approach than my estimation, using a 2% perpetuity versus the 2.5% used.
The tax rate found on the report was of 15%, slightly higher than the 14% on my forecast as well as their market risk premium of 7.23% opposed to my 5.46%.
This group of assumptions led to a 1.5 BPS difference on the WACC.
As for another long term assumption, it is reported that the institution is assuming a EBIT Margin of 31% which I disagree as this dissertation assumed that the average EBIT Margin for Novartis is about 16.7%, a much lower measure. Additionally, to this, ODDO BHF, also assumed that growth will likely accelerate and Novartis will be in position to increase its core operating margin to 35%.

The USD 1.69 difference between the share prices reached, as well as the similarities are subject to the assumptions of both valuations. It was not possible to further in more detail to compare this dissertation's assumptions explained throughout with theirs as it was not described all of the assumptions or reasons that the analysts used. This report only accounted for their valuation model and the outlook they expected, which was very useful, nevertheless. One could say this dissertation took to some extent a more optimist approach, reaching a higher share price, finishing that both valuations are a BUY recommendation.

8. Final Conclusions

This dissertation's intention consisted in reaching the value of the price share of Novartis and to increase awareness to the conditions in the pharmaceutical industry that affect valuations in this sector.

Valuing a company is a highly subjective exercise as it depends on the perspective and assumptions of each analyst. Therefore, to start this valuation in the right path it was examined and written the state of art of the Equity Valuation's subject. Afterwards, it was concluded that given the information available, the conditions of the company and the practices used by most market analysts, a WACC based model like the Discounted Cash Flow (DCF) Model was the right choice.

With the DCF approach, this dissertation reached a share price of USD 99.75. This value was then compared with the valuation of the financial institution ODDO BHF, that valued Novartis's shares at USD 98.06.

Using the Relative's approach, it arrived at a range of values from USD 61.79 to USD 96.82. The inconsistency of these results with the latter, I believe come from the dissimilarity in companies even in the same sector and especially the bias and assumptions from the multiples valuation, which leads to a misleading conclusion.

My beliefs are optimist and in line with ODDO BHF and the Evaluate Pharma reports, that provides trusted information on the pharmaceutical industry, on the evolution of Novartis in the sector. Concluding that the shares are undervalued, and a BUY recommendation is the right choice.

9. Appendices

Appendix 1. Historical Financial Statements

Income Statement						
in USD millions	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Revenue	53073	53873	50413	49436	50135	53166
Cost of Goods Sold	-16579	-17345	-17404	-17520	-17175	-18407
Gross Profit	36494	36528	33009	31916	32960	34759
Research&Development	-9071	-9086	-8935	-9039	-8972	-9074
Selling, General & Administration	-15241	-14993	-14247	-14192	-14997	-16471
Other income	1205	1391	2049	1927	1969	1690
Other expense	-2047	-2512	-2873	-2344	-2331	-2735
Operating income (EBIT)	11340	11328	9003	8268	8629	8169
Interest income (from associated companies)	599	1918	266	703	1108	6438
Interest expense	-683	-704	-655	-707	-777	-957
Other financial income and expense	-92	-31	-454	-447	39	185
Income before taxes	11164	12511	8160	7817	8999	13835
Taxes	-1498	-1545	-1106	-1119	-1296	-1221
Net Income	9649	10519	17820	6698	7703	12614

Table 13: Novartis Income Statement 2013-2018

Balance Sheet						
in USD millions	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Assets						
Property, plant & equipment	18197	15983	15982	15641	16464	15696
Goodwill	31026	29311	31174	30980	31750	35294
Intangible assets other than goodwill	27841	23832	34217	31340	29997	38719
Investments in associated companies	9225	8432	15314	14304	15370	8352
Deferred tax assets	7375	7994	8957	10034	8229	8699
Financial Assets	1523	1720	2466	2196	2243	2345
Other non current assets	525	554	601	698	818	895
Total non-current assets	95712	87826	108711	105193	104871	110000
Inventories	7267	6093	6226	6255	6867	6956
Trade Receivables	9902	8275	8180	8202	8600	8727
Income tax receivables	0	0	0	156	202	248
Other current assets	3392	2530	2992	2541	3054	2861
Cash and cash equivalents	6687	13023	4674	7007	8860	13271
Cash,marketable securities,commodities,time deposits and derivative financial instruments	2535	839	773	770	625	2693
Total current assets	29783	30760	22845	24931	28208	35563
Assets of disposal group held for sale	0	0	0	0	0	807
Assets related to discontinued operations	759	6801	0	0	0	0
Total Assets	126254	125387	131556	130124	133079	145563
Equity and liabilities						

Issued share capital and reserves attributable to Novartis AG shareholders	74343	70766	77046	74832	74168	78614
Share Capital	1001	1001	991	972	969	944
Treasury Shares	-89	-103	-101	-76	-100	-69
Reserves	73431	69868	76156	73936	73299	77739
Non controlling interests	129	78	76	59	59	78
Total Equity	74472	70844	77122	74891	74227	78692
Liabilities						
Deferred tax liabilities	6904	6099	6355	6657	5168	7475
Provisions and other non current liabilities	7268	7672	8044	8470	7057	7319
Total non-current liabilities	25414	27570	30726	33024	35449	37264
Trade payables	6148	5419	5668	4873	5169	5556
Financial debts and derivatives	6776	6612	5604	5905	5308	9678
Current income tax liabilities	2459	2076	1717	1603	1723	2038
Provisions and other current liabilities	10935	10448	10719	9828	11203	12284
Total current liabilities	26318	24555	23708	22209	23403	29607
Liabilities of disposal group held for sale	0	0	0	0	0	51
Liabilities related to discontinued operations	50	2418	0	0	0	0
Total Liabilities	51782	54543	54434	55233	58852	66871
Total Equity and Liabilities	126254	125387	131556	130124	133079	145563

Table 14: Novartis's Balance Sheet 2013-2018

Free Cash Flow Statement (in USD millions)	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Net Income	9649	10519	17820	6698	7703	12614
Reversal of non-cash items and other adjustments	7179	6725	9070	6698	7703	12614
Dividends received from associated companies and others	444	479	432	899	987	719
Interest Received	40	35	34	43	97	243
Interest paid	-609	-668	-646	-723	-708	-826
Other financial receipts	55	553	714			218
Other financial payments	-22	-24	-23	-155	-272	-32
Taxes paid	-2054	-2179	-2454	-2111	-1611	-1670
Net cash flows from operating activities before WC and provision changes	14342	15648	14155	13088	13254	14437
Payments out of provisions and other net cash movements in non current liabilities	-947	-1125	-1207	-1536	-877	-664
Changes in net current assets and other operating cash flow items	-778	-625	-863	-77	244	499
Net cash flow from operating activities	13174	13897	12085	11475	12621	14272
Purchase of property, plant & equipment	-2903	-2624	-2367	-1862	-1696	-1773
Proceeds from sales of property, plant & equipment	48	60	237	161	92	
Purchase of intangible assets	-475	-780	-1138	-1017	-1050	-1582
Proceeds from sales of intangible assets	96	246	621	847	640	823
Purchase of financial assets	-152	-239	-264	-247	-468	-262
Proceeds from sales of financial assets	313	431	166	247	330	167
Purchase of other non current assets	-38	-60	-82	-149	-42	-39
Proceeds from sales of other non current assets	15	2	1		1	9
Divestments of interest in associated companies	-52	1370			29	12854

Acquisitions of interests in associated companies						
Acquisitions and divestments of businesses,net	-42	-331	-16507	-765	-784	-13854
Purchase of marketable securities and commodities	-278	-169	-595	-530	-580	-2440
Proceeds from sales of marketable securities and commodities	249	2086	262	622	549	472
Cash flows used in investing activities from continuing operations	-3219	-8	-19666	-2693	-2979	-5591
Cash flows used in/from investing activities from discontinued operations	-133	889	8882	-748	-140	
Total cash flows used in investing activities	-3352	881	-10784	-3441	-3119	-5591
Dividends paid to shareholders of Novartis AG	-6100	-6810	-6643	-6475	-6495	-6966
Acquisition of treasury shares	-2930	-6915	-6071	-1109	-5490	-2036
Proceeds from exercise options and other treasury share transactions	1693	2400	1581	214	252	700
Increase in non-current financial debts	93	6024	4596	1935	4933	2856
Repayment of non-current financial debts	-2022	-2599	-3086	-1696	-188	-366
Change in current financial debts	596	-107	451	1816	-755	1681
Impact of change in ownership of consolidated entities	4			-6		-19
Dividends paid to non-controlling interests and other financing cash flows	-103	-140	-4	7	10	-37
Cash flows used in financing activities	-8769	-8147	-9176	-5314	-7733	-4244
Effect of exchange rate changes on cash and cash equivalents	82	-295	-286	-387	84	-26
Net change in cash and cash equivalents	1135	6336	-8349	2333	1853	4411
Cash and Cash Equivalents at Jan 1	5552	6687	13023	4674	7007	8860
Cash and Cash Equivalents at Dec 31	6687	13023	4674	7007	8860	13271

Table 15: Novartis's Free Cash Flow Statement 2013-2018

Appendix 2. Forecasted Financial Statements

Income Statement Forecasted										
in USD millions	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
Revenue	55 474	57 162	58 607	59 982	61 003	61 996	62 570	63 102	63 416	63 732
Cost of Goods Sold	- 19 206	- 19 790	- 20 291	- 20 767	- 21 120	- 21 464	- 21 663	- 21 847	- 21 956	- 22 065
Gross Profit	36 268	37 371	38 316	39 215	39 882	40 532	40 907	41 255	41 461	41 667
Research& Development	- 9 255	- 9 441	- 9 629	- 9 822	- 10 018	- 10 219	- 10 423	- 10 632	- 10 844	- 11 061
Selling, General & Administration	- 17 186	- 17 709	- 18 157	- 18 583	- 18 899	- 19 207	- 19 384	- 19 549	- 19 647	- 19 744
Other income	1 763	1 817	1 863	1 907	1 939	1 971	1 989	2 006	2 016	2 026
Other expense	- 2 854	- 2 941	- 3 015	- 3 086	- 3 138	- 3 189	- 3 219	- 3 246	- 3 262	- 3 279
Operating income (EBIT)	8 736	9 098	9 378	9 632	9 766	9 888	9 870	9 834	9 723	9 609
Interest income (from associated companies)	6 472	6 319	9 270	9 626	10 087	11 104	11 352	11 482	11 617	11 579

Interest Expense	- 1 191	- 1 060	- 1 055	- 1 048	- 1 052	- 1 061	- 1 078	- 1 059	- 1 059	- 1 059
Other financial income and expense	193	199	204	209	212	216	218	220	221	222
Income before taxes	14 210	14 557	17 797	18 419	19 014	20 147	20 362	20 477	20 502	20 350
Taxes	1 223	1 274	1 313	1 348	1 367	1 384	1 382	1 377	1 361	1 345
Net Income	**12 987**	**13 283**	**16 484**	**17 070**	**17 646**	**18 763**	**18 980**	**19 100**	**19 141**	**19 005**

Table 16: Novartis's Forecasted Income Statement

Appendix 3. Economic, Technological and Social Analysis

Economic Analysis

It is essential to know that the pharmaceutical's market growth is being persistent and at an accelerated pace, as the global pharmaceuticals markets was worth $934.8 billion in 2017 and it is expected to reach $1170 billion in 2021, growing at 5.8% according a recent pharma market research report by The Business Research Company.(The Business Research Company, 2018)

In addition to this, according to (Evaluate Pharma, 2018) the worldwide total prescription drug sales is forecasted to grow at an annual CAGR of 6.4% for 2018 through 2024 so the expectations stated before will continue to increase until 2024.

Companies will have to adapt to these new priorities to be able to maintain their profitability as margins decrease and as the traditional blockbuster sales model comes to an end, niche marketing becomes important (trend towards personalized medicine)(Jan, 2016)

Brexit is also making an impact in the pharma world and Novartis is not an exception to it. Following the Brexit vote in the UK, EU decided to move the headquarters of the EU's health authority, the EMA, from the UK to the Netherlands by March 2019. However, it is expected that a significant percentage of EMA's employees will not move to the Netherlands which will or could delay new drug approvals in the EU.

Technological Analysis

As a continuation of what has been stated before, innovation is becoming more complex as people no longer want to wait in lines to take care of their finances or their health. The public is ready to do whatever it takes to live healthier and longer lives, and wearable devices and mobile application with the aid of Blockchain connecting the patient to all their historical health records is something in the picture now. This kind of data would

make the diagnostic easier for paramedics and it would be able to prepare for treatment whilst travelling to the patient.(PwC, 2018)

Social Analysis

The provision of healthcare is moving closer to the patient: this trend has been seen in the UK and US, but it is taking place in other countries as well. Some large discount stores and pharmacy chains have available retail medicine outlets which some of the staff are nurse practitioners who provide basic medical care like writing prescriptions, making changes in the healthcare system. This will benefit healthcare payers as it will be cheaper and closer delivered to the patient's home and would eliminate a significant number of consultations.

Appendix 4. Novartis's blockbusters *Cosentyx* and *Entresto* growth

According to Novartis's Q3 2018 Results, *Cosentyx* has shown strong growth momentum across all indications and geographies and its sales have increased about 37% from Q3 2017 to 2018 while *Entresto*'s sales have also been driven by strong uptake in all launched markets appearing to have increased about 113% from Q3 2017 to 2018.

	Q3			9M	
	Sales USD million	Growth vs. PY USD million	cc	Sales USD million	Growth vs. PY cc
Cosentyx	750	194	37%	2,031	37%
Entresto	271	143	113%	710	117%

Figure 3: Novartis's blockbusters Cosentyx and Entresto growth

Appendix 5. Novartis Net Sales by Region and Shareholders

It can be found that most net sales are in Europe and the United States, at an even stake of 36% and 34% respectively, being the Innovative Medicines the division that produces most the sales at 67%, both 2017 and 2018.

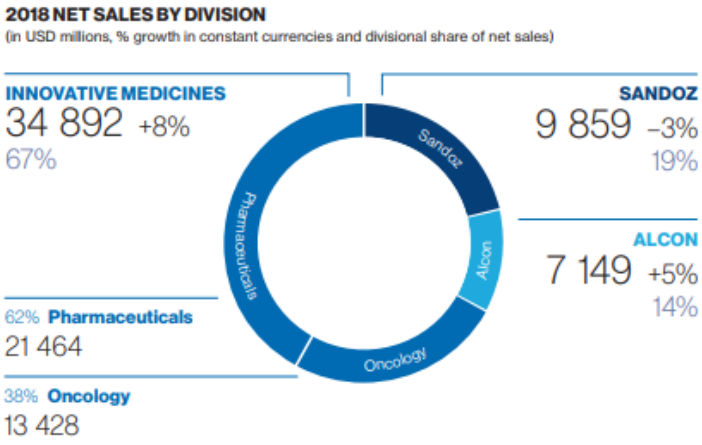


Figure 4: 2018 Net Sales by Division
Source: Novartis's 2018 Annual Report

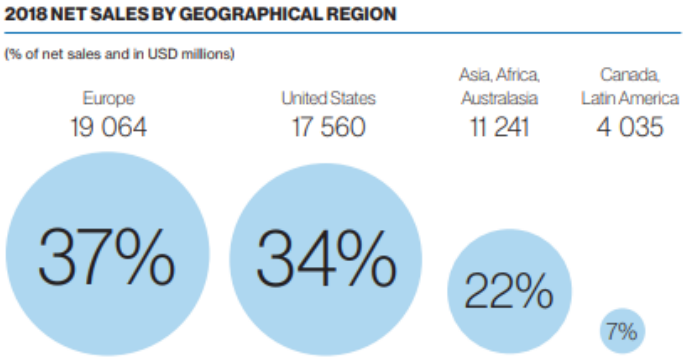


Figure 5: 2018 Net Sales by Region
Source: Novartis 2018 Annual Report

In 2018, 25% of Novartis's Net Sales of USD 51.9 billion came from Emerging Growth Markets and the remaining 75% accounted from Established Markets that comprise all of US, Canada, Western Europe, Japan, Australia and New Zealand.

Novartis has about 167 000 registered shareholders being 51,39% of them, nominees, fiduciaries and ADS depositary, 35,25% are legal entities and the remain 13,26% are individual shareholders. This information doesn't account for the whole Novartis AG investor base since nominees and JPMorgan Chase Bank, as ADS depositary, are registered as shareholders for many beneficial owners. The majority of registered shareholders are found in Switzerland (42,56%), United States (25,82%) and United Kingdom (22,22%)

Appendix 6. Strategic Business Analysis: SWOT Analysis

Strengths:

- **Strong product portfolio**: abundance of thriving products at the moment, showing strong growth in different geographies
- **Strong intellectual property** supporting the multi-billion-dollar products. Vasant Narasimhan brings a strong background that fits the Novartis operations as he worked at McKinsey before joining Novartis in 2005. His experience in leading the drug development division and the Sandoz biopharmaceutical unit as well as leadership in an important drug development group should help him effectively lead the company.(Novartis AG and Xnys, 2019)
- **Strategic thought**: they made strategic acquisitions over the recent past (dermatology firm Fougera and rare disease company) as the company lacked the needed scale in these areas.
- **Growing therapy areas and disinvested in businesses** that did not align with their focused strategy as way to improve margins, supply chain management, marketing and innovation
- **Higher Profit Margins:** According to Thomson Reuters Eikon, Novartis presents the highest Net Margin percentage in comparison to their peers.

- **Colaborations**:2018 has been a year of partnerships and agreements as so that in October, Novartis announced the clinical development with Pfizer, a good competitor in the business, for the treatment of nonalcoholic steatohepatitis.

  The company has as well entered into a licensing and equity agreement with Boston Pharmaceuticals for the development of three novel anti-infective drug candidates that are part of the Novartis Infectious Diseases portfolio. This portfolio will have the potential to address the need for new agents to treat antibiotic-resistant Gram-negative infections
- **Technology improvements:** As biomedical innovation will continue to accelerate**,** Novartis has embarked upon a digital transformation strategy, with the goal of becoming a leader in leveraging advanced analytics and other new technologies. Taking action, Novartis created a new role of Chief Digital Officer, invested substantial resources into efforts to improve the way data is used in drug discovery and development, enhanced the ways of engagement with patients, doctors and other

stakeholders to automate business processes. It is expected that these commitments using innovative science will transform their business model using digital technologies.(Novartis AG, 2018a)

Weaknesses

- **Integration risks** from bringing together all of the business lines while staying focused on key strategies
- **Low Historical Growth Rate:** The last 5 years' growth rate appeared lower than the industry's average and most of their closest peers. 2017 and 2018 have been a turning point, however, Novartis's past marked by downward pressure on the profitability by its competitors.
- **Their business model can be** overcomed as digital technologies are entering the healthcare field. Novartis has embarked in this new digital transformation strategy, however, this is expected to have high expenditures in improving data in drug discovery and development and at the same time there's fear that other companies with different business models might disrupt relationships with stakeholders.

Opportunities

- **Growth in emerging markets:** continuing to invest in this path is a source of profit and an alternative to more competitive markets like the United States or Europe.

- **Aging populations:** Aging populations continue to put pressure on health systems around the world. People are living longer, the worldwide elderly population continues to grow at a rapid pace and according to projections by the United Nations, the number of people in the world aged 60 or over will reach nearly 2.1 billion by 2050. (United Nations, 2015)

- **Inflation Rate**: The US and Europe are the regions where Novartis has most of its sales. At the moment, the US presents the lowest rate since Jun of 2017 and the Euro Area inflation rate appears unchanged and low since the latest 9 months. Given that a low inflation rate brings more stability, this is an opportunity for customers to consume more.

- **Technology innovation** might be a challenge and delicate subject, nevertheless, it can be an opportunity for Novartis to differentiate itself from competitors, allowing for efficiency.

Threats

- Pharmaceutical threats like **drug trial failures**, **extended new drug approval times** and the **pricing pressure** from the managed care industry. (Novartis AG and Xnys, 2019)
- **Generic drug companies**, attacking patents on branded drugs several years before key expiration dates

The introduction of generic competition for a patented branded medicine typically results in a significant and rapid reduction in net sales and operating income for the branded product because generic manufacturers typically offer their unpatented versions at lower prices. Such competition can occur after successful challenges to intellectual property rights or the regular expiration of the term of the patent or other intellectual property rights

Some of Novartis's best-selling products have begun or are about to face significant competition due to the end of market exclusivity resulting from the expiry of patent or other intellectual property protection. As for example, some of former top-selling products *Gleevec/Glivec*, *Diovan* and *Exforge* all face continued and increasing generic competition in major markets.

- **Uncertainty**: It's not possible to predict accurately the timing of the introduction of competitive or products with the same functions as the Novartis's ones, or their possible effect on the revenues. In addition to this, Novartis is obligated to comply with the laws of all of countries it operates in, therefore new laws or regulation highly interfere with the pharmaceutical processes.
- **Instability in the political environment** caused by the Brexit affecting the European Union, US's war with China or the Mr. Trumps Blueprint decisions might distress Novartis both in local and international markets

Appendix 7. Historical EBIT and EBIT Margin

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
EBIT	11340	11328	9 003	8 268	8 629	8 169	8 736	9 098	9 378	9 632	9 766	9 888	9 870	9 834	9 723	9 609
EBIT Margin	***21.4%***	***21.0%***	***17.9%***	***16.7%***	***17.2%***	***15.4%***	***15.7%***	***15.9%***	***16.0%***	***16.1%***	***16.0%***	***15.9%***	***15.8%***	***15.6%***	***15.3%***	***15.1%***

Table 17: EBIT Margin 2013-2028

In USD millions	2013	2014	2015	2016	2017	2018
Revenue	53 073	53 873	50 413	49 436	50 135	53 166
Cost of Sales	-16 579	-17 345	-17 404	-17 520	-17 175	-18 407
Gross Profit	36 494	36 528	33 009.	31 916	32 960	34 759
Research&Development	-9 071	-9 086	-8 935.	-9 039	-8 972	-9 074
Selling, General & Administration	-15 241	-14 993	-14 247	-14 192	-14 997	-16 471
Other income	1 205	1 391	2 049	1 927	1 969	1 690
Other expense	-2 047	-2 512	-2 873	-2 344	-2 331	-2 735
Operating income (EBIT)	11 340	11 328	9 003	8 268	8 629	8 169

Table 18: Historical Operating Income

Appendix 8. R&D/Total Revenues of Novartis and Peers

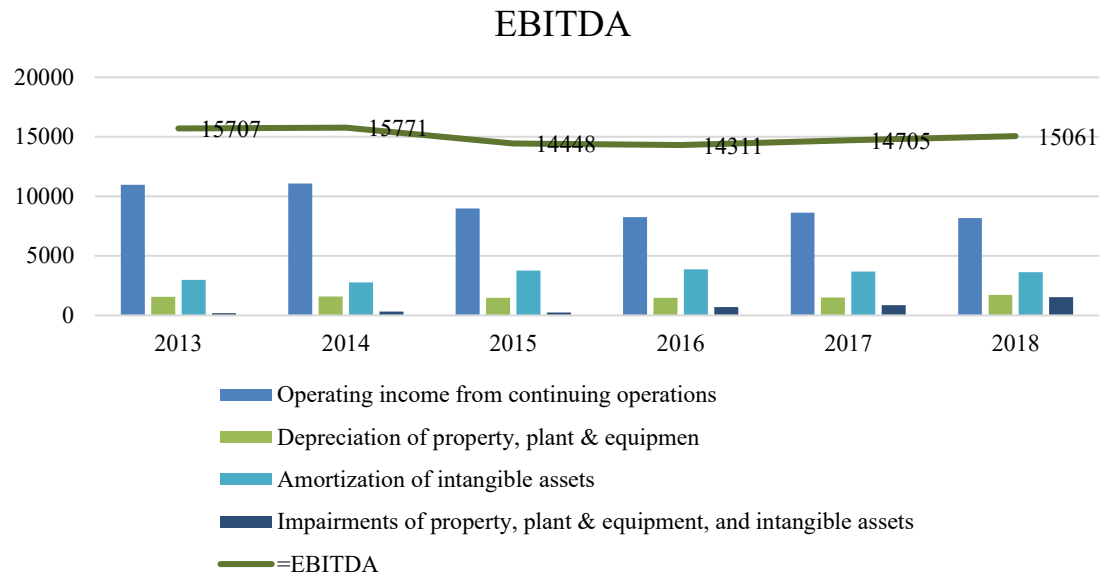
	NOVARTIS AG	ROCHE AG	PFIZER INC	MERCK & CO INC	BAYER AG	AVERAGE	MEDIAN
R&D To Total Revenues	16.3%	19.4%	14.9%	22.7%	13.3%	18.6%	18.0%

Graph 4: R&D/Total Revenues of Novartis and Peers
Source: Thomson Reuters Eikon

Appendix 9. EBITDA and EBITDA's Margin

Novartis defines earnings before interest tax, depreciation and amortizations (**EBITDA**) as it follows:

Operating income from operations - Depreciation of property, plant &equipment - Amortization of intangible assets – Impairments of property, plant & equipment and intangible assets



Graph 5: Historical EBITDA in USD millions
Source: Novartis 2018's Annual Report

EBITDA Margin measures the company's EBITDA as a percentage of the company's total revenue, giving a good measure of the company's operating profitability and changing depending on the industry examined.

	2013	2014	2015	2016	2017	2018	Average
EBITDA Margin	29.6%	29.3%	28.7%	28.9%	29.3%	28.3%	**29.0%**

Table 19: Historical EBITDA's Margin and last 6 years' Average

Novartis's EBITDA Margin has been stable for all 6 historical years rounding an average of 29%. In order to examine the industry, it was realized the average EBITDA Margin of the listed group of peers on Thomson Reuters Eikon (32.9%) and of the selected peer group (28%) which demonstrated conclusive that the financial health of the company is in line with the sector.

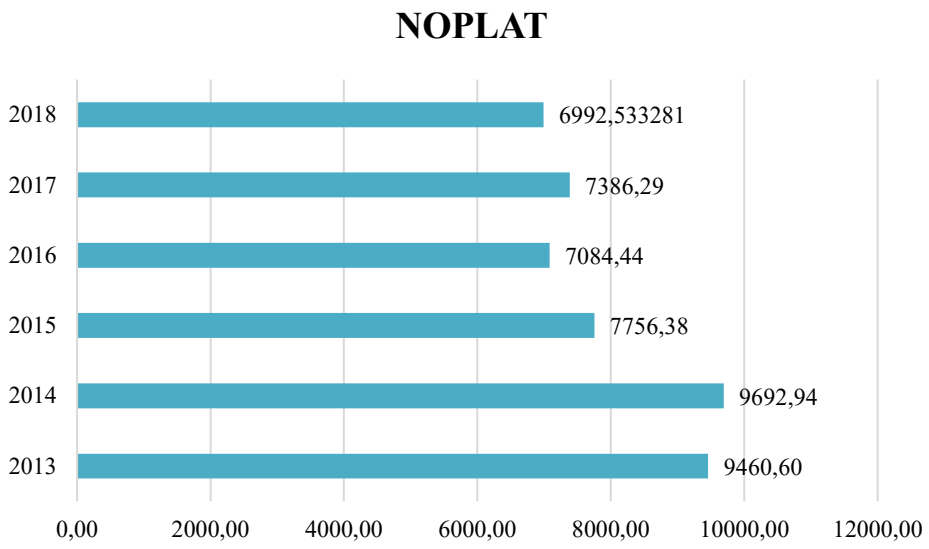
Appendix 10. NOPLAT

According to (Koller, Goedhart and Wessels, 2000), NOPLAT represents the total after-tax operating income generated by the company's invested capital, available to all investors.

Since 2014 that this section has seen a decline, however 2017 increased lightly. This decline can be explained through the seen increase in operating costs like R&D,

Marketing and Sales and General and Administration, which lead to operating profits and consequently NOPLAT.

A company that functions efficiently presents, usually, a positive NOPLAT which is the case in Novartis.



Graph 6: Historical NOPLAT

Appendix 11. Novartis' Historical Revenues and Forecasts by Division

	2018	2019	2020	2021	2022	2023	2024
Innovative Medicines	35 633	37 771	39 281	40 460	41 674	42 507	43 358
expected annual growth rate	*8%*	*6%*	*4%*	*3%*	*3%*	*2%*	*2%*

	2025	2026	2027	2028
Innovative Medicines	43 791	44 229	44 450	44 673
expected annual growth rate	*1%*	*1%*	*1%*	*1%*

Table 20: Innovative Medicines Division's Forecast for 2019-2028

	2018	2019	2020	2021	2022	2023	2024
Sandoz	10 036.00	9 935.64	9 939.61	10 039.01	10 139.40	10 240.79	10 343.20
expected annual growth rate	-1.40%	-1.00%	0.04%	1.00%	1.00%	1.00%	1.00%

	2025	2026	2027	2028
Sandoz	10 447	10 499	10 551	10 604
expected annual growth rate	1.00%	0.50%	0.50%	0.50%

Table 21: Sandoz Division's Forecast for 2019-2028

	2018	2019	2020	2021	2022	2023	2024
Alcon	7 153.00	7 510.65	7660.86	7 814.08	7 892.22	7 971.14	8 011.00
expected annual growth rate	5.6%	5.0%	2.0%	2.0%	1.0%	1.0%	0.5%

	2025	2026	2027	2028
Alcon	8 051	8 091	8 132	8 172
expected annual growth rate	0.5%	0.5%	0.5%	0.5%

Table 22: Alcon Division's Forecast for 2019-2028

Appendix 12: Novartis Total Revenues from 2013 to 2028

Table 23: Novartis Historical and Forecasted Revenue

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Divisions												
Innovative Medicines	32 416	32 053	30 582	33 186	32 946	35 633	37 771	39 282	40 460	41 674	42 508	43 358
Sandoz	9 453	9 848	9 285	10 248	10 178	10 036	9 936	9 940	10 039	10 139	10 241	10 343
Alcon	10 546	10 876	9 857	5 812	6 774	7 153	7 511	7 661	7 814	7 892	7 971	8 011
Corporate	- 325	- 358	-284	-728	-789	-922	- 813	-841	-859	-838	-846	-847
Other revenue	911	1 215	947	918	1 026	1 266	1 070	1 121	1 152	1 114	1 129	1 132
Total Revenue	**53 073**	**53 873**	**50 413**	**49 436**	**50 135**	**53 166**	**55 474**	**57 162**	**58 607**	**59 982**	**61 003**	**61 996**
Revenue Growth		*1.51%*	*-6.42%*	*-1.94%*	*1.41%*	*6.05%*	*4.34%*	*3.04%*	*2.53%*	*2.35%*	*1.70%*	*1.63%*

	2025	2026	2027	2028
Innovative Medicines	43 791	44 229	44 450	44 673
Sandoz	10 447	10 499	10 551	10 604
Alcon	8 051	8 091	8 132	8 172
Corporate	- 844	- 846	- 846	- 845
Other revenue	1 125	1 129	1 129	1 127
Total Revenue	**62 570**	**63 102**	**63 416**	**63 732**
Revenue Growth	*0.93%*	*0.85%*	*0.50%*	*0.50%*

Appendix 13. Forecasted Operational Income (EBIT)

	2019E	2020E	2021E	2022E	2023E	2024E	2025E	2026E	2027E	2028E
Revenues	**55 474**	**57 162**	**58 607**	**59 982**	**61 003**	**61 996**	62570	63102	63416	63732
% of Cost of sales	*-35%*	*-35%*	*-35%*	*-35%*	*-35%*	*-35%*	*-35%*	*-35%*	*-35%*	*35%*
Cost of Sales	-19 206	-19 790	-20 291	-20 767	-21 120	-21 464	-21663	-21847	-21956	-22065
Research&Development	- 9 255	- 9 441	- 9 629	- 9 822	-10 018	-10 219	-10423	-10632	-10844	-11061
%Selling, General &Administration	*-31%*	*-31%*	*-31%*	*-31%*	*-31%*	*-31%*	*-31%*	*-31%*	*-31%*	*-31%*
Selling, General & Administration	-17186	-17709	-18157	-18583	-18899	-19207	-19384	-19549	-19647	-19744
% other income	*3%*	*3%*	*3%*	*3%*	*3%*	*3%*	*3%*	*3%*	*3%*	*3%*
Other income	1 763	1 817	1 863	1 907	1 939	1 971	1989	2006	2016	2026
% other expense	*-5%*	*-5%*	*-5%*	*-5%*	*-5%*	*-5%*	*-5%*	*-5%*	*-5%*	*-5%*
Other expense	- 2 854	- 2 941	-3 015	- 3 086	- 3 138	- 3 189	-3219	-3246	-3262	-3279
Operating Income (EBIT)	**8 736**	**9 098**	**9 378**	**9 632**	**9 766**	**9 888**	**9 870**	**9 834**	**9 723**	**9 609**

Table 24: Forecasted Operational Income from 2019-2028

Appendix 14. CAPEX and Depreciations: Historical and Forecasts

	2013	2014	2015	2016	2017	2018
CAPEX	2903	3404	3505	2879	2746	3355
Depreciations	1601	1630	1150	1591	1677	2021
CAPEX/Depreciations	1.81	2.09	3.05	1.81	1.64	1.66

Table 25: Historical CAPEX and Depreciations

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
CAPEX	2993	3031	3127	3050	3069	3082	3067	3073	3074	3072
Depreciations	2223	2320	2390	2451	2508	2551	2592	2616	2639	2652
CAPEX/Depreciations	1.35	1.31	1.31	1.24	1.22	1.21	1.18	1.17	1.17	**1.16**

Table 26: Forecasted CAPEX and Depreciations

Appendix 15. Net Working Capital: Historical and Forecasted

	2013	2014	2015	2016	2017	2018
Current Assets	20561	16898	17398	17154	18723	18792
Current Liabilities	19542	17943	18104	16304	18095	19878
Working Capital	1019	-1045	-706	850	628	-1086
Net Working Capital		-2064	339	1556	-222	-1714

Table 27: Historical Net Working Capital

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Current Assets	19518	20023	20456	20868	21174	21472	21644	21803	21897	21992
Current Liabilities	18488	18726	18919	19014	19139	19247	19298	19359	19391	19423
Working Capital	1030	1297	1537	1854	2035	2225	2346	2445	2506	2569
Net Working Capital	2116	268	240	317	181	190	121	99	61	63

Table 28: Forecasted Net Working Capital

Appendix 16. Valuation using DCF

FCFF		**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**
EBIT (1-Tax rate)		7 513	7 824	8 065	8 283	8 399	8 504	8 488	8 457	8 362	8 263
+D&A		2 203	2 299	2 368	2 428	2 485	2 526	2 569	2 593	2 615	2 628
-CAPEX		2 993	3 031	3 127	3 050	3 070	3 082	3 067	3 073	3 074	3 072
-Variation in Net WC		2 116	268	240	317	181	190	121	99	61	63
FCFF		4 607	6 824	7 067	7 344	7 634	7 759	7 869	7 877	7 841	7 756
PV FCFF		4 386	6 186	6 100	6 035	5 973	5 780	5 581	5 320	5 041	4 748
Terminal Value	314 243										
Enterprise Value	**247 518**										
- Net Debt	14 907										
- Minority Interest	3.00										
- Unfunded Pensions	2 094										
Equity Value	**230 514**										
#shares outstanding	2 311										
Share Price	**99.75**										
WACC											5.03%
Perpetuity	2.5%										

Table 29: Novartis's Share Price using DCF

Appendix 17. Cash and Cash Equivalents: Historical and Forecasted

In USD millions	2013	2014	2015	2016	2017	2018
Cash and cash equivalents	6 687	13 023	4 674	7 007	8 860	13 271

Table 30: Historical Cash and Equivalents

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
% Cash and Cash Equivalents	*- 37.8%*	*48.1%*	*3.6%*	*3.9%*	*3.9%*	*1.6%*	*1.4%*	*0.1%*	*-0.5%*	*-1.1%*
Cash and cash equivalents	8 256	12 229	12 665	13 161	13 681	13 905	14 101	14 117	14 052	13 900

Table 31: Cash and Equivalents Forecast

Appendix 18. Novartis's Peer Group

COMPANY NAME	MARKET CAPITALIZATION	PRICE CLOSE (USD)	5Y HIST. GROWTH RATE	REVENUES (USD)	BETA	ROA (FY0)	ROE (FY0)	D/E
NOVARTIS AG	**227 499 809 971.57**	**89.25**	**-0.2%**	**50 135 000 000.00**	**1.14**	**8.7%**	**15.3%**	**38.3%**
ROCHE HOLDING AG	**215 533 475 204.56**	**250.02**	**5.2%**	**54 704 916 350.20**	**0.99**	**17.2%**	**52.4%**	**71.7%**
PFIZER INC	**256 824 000 000.00**	**44.28**	**6.4%**	**52 546 000 000.00**	**0.86**	**9.4%**	**24.5%**	**61.0%**
MERCK & CO INC	**194 664 184 790.00**	**74.86**	**5.2%**	**40 122 000 000.00**	**0.71**	**11.9%**	**29.4%**	**76.5%**
BAYER AG	**75 228 874 648.06**	**80.47**	**-0.1%%**	**42 004 054 653.85**	**1.10**	**7.5%**	**17.5%**	**36.7%**
JOHNSON & JOHNSON	389 798 678 014.46	145.34	8.2%	76 450 000 000.00	0.57	13.4%	30.7%	0.0%
GILEAD SCIENCES INC	92 079 843 982.16	71.18	1%	26 107 000 000.00	1.03	18.3%	58.5%	164.1%
ABBVIE INC	133 559 367 674.33	88.79	21.4%	28 216 000 000.00	1.70	13.2%	185.2%	733.1%
SANOFI SA	113 783 290 052.14	90.90	0.4%	43 450 774 342.92	0.84	6.8%	12.0%	26.8%
GLAXOSMITHKLINE PLC	101 068 654 647.46	20.37	8.2%	40 787 482 434.33	1.08	9.5%	1034.9%	0.0%
ASTRAZENECA PLC	101 439 833 651.54	80.08	-4.9%	22 465 000 000.00	1.02	8.6%	36.4%	119.0%
NOVO NORDISK A/S	86 113 463 659.91	44.91	10.8%	18 003 578 278.88	1.43	38.2%	80.2%	3.4%
ELI LILLY AND CO	118 866 550 233.55	112.21	15.9%	22 871 300 000.00	0.29	10.8%	35.4%	117.7%
AVERAGE	**156 580 018 046.51**	**91.95**	**6.5%**	**38 977 342 171.68**	**0.97**	**13.7%**	**133.1%**	**141.0%**
MEDIAN	**116 324 920 142.84**	**80.27**	**5.8%**	**40 454 741 217.17**	**1.00**	**11.4%**	**35.9%**	**74.1%**

Table 32: Novartis's Peer Group

Source: Thomson Reuters Eikon

Appendix 19. Share Price Evolution

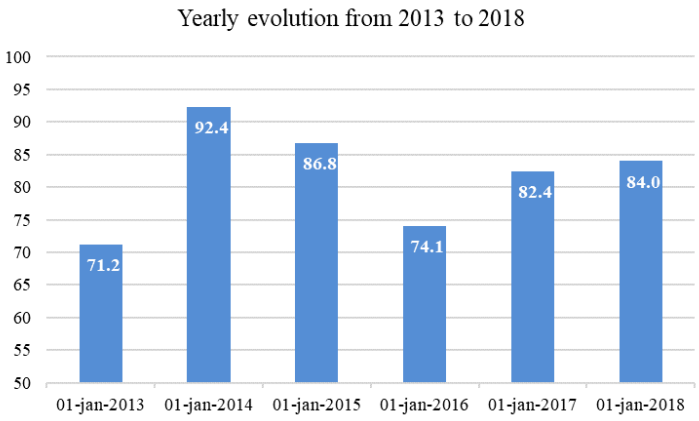


Figure 7: Share Price yearly 2013-2018

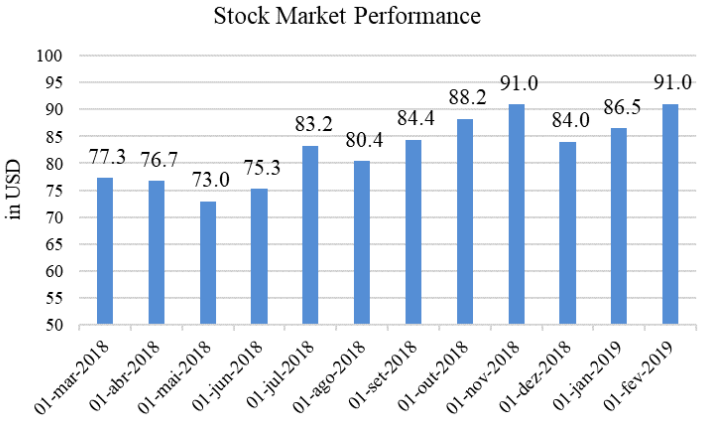


Figure 6: Share price performance 2018-2019

In terms of stock market performance, Novartis has been increasing its share price since 2016, from USD 74 to USD 84. Still this increase has been continuous in 2019, reaching USD 91 which is in line with the estimations on this dissertation.

10. Bibliography

Articles and Books

Bancel, F. and Mittoo, U. R. (2014) 'The Gap between the Theory and Practice of Corporate Valuation: Survey of European Experts', *Ssrn*, (48), pp. 80–83. doi: 10.1111/jacf.12095.

Damodaran, A. (2002) 'Investment Valuation: Second Edition', *Finance*, pp. 1–1372. doi: 10.1016/B978-0-7020-2797-0.00001-1.

Damodaran, A. (2006) 'Valuation Approaches and Metrics: A Survey of the Theory and Evidence', *Foundations and Trends® in Finance*, 1(8), pp. 693–784. doi: 10.1561/0500000013.

Damodaran, A. (2009) 'Valuing Companies with intangible assets Aswath Damodaran Stern School of Business', (September), pp. 1–36.

Jan, U. L. B. (2016) 'Trends in the pharmaceutical industry'. Available at: http://i3health.eu/wp-content/uploads/2016/01/Presentation-E.Croufer-.pdf.

Janiszewski, S. (2011) 'How to Perform Discounted Cash Flow Valuation?', *Foundations of Management*, 3(1), pp. 81–96. doi: 10.2478/v10238-012-0037-4.

Jerald E. Pinto, C. *et al.* (2010) *Equity Asset Valuation*. 2nd edn.

Koller, T., Goedhart, M. & and Wessels, D. (2000) *Valuation: Measuring and Managing the value of companies*, *Journal of Visual Languages & Computing*.

Lie, E. and Lie, H. J. (2002) 'Multiples Used to Estimate Corporate Value', (April), pp. 1–11.

Liu, J., Nissim, D. and Thomas, J. (2002) 'Equity Valuation Using Multiples', *Journal of Accounting Research*, 40(1).

Mario Massari, Gianfranco Gianfrate, L. Z. (2016) *Corporate Valuation: Measuring the Value of Companies in Turbulent Times*. Edited by Wiley.

Smit, H. T. J. and Trigeorgis, L. (2003) 'Real Options: Examples and Principles of Valuation and Strategy', pp. 1–36.

Reports

Argus Research (2018) 'NOVARTIS AG-SPONSORED ADR', pp. 2017–2019.

Deloitte (2017) *A new future for R&D? Measuring the return from pharmaceutical innovation 2017*. Available at: https://search.proquest.com/docview/220023058/fulltextPDF/D705F16039764077PQ/63?accountid=31562.

Evaluate Pharma (2018) 'World Preview 2018 , Outlook to 2024', *World Preview 2018 , Outlook to 2024. (2018), (June). Retrieved from www.evaluate.com/PharmaWorldPreview2018*, 11th Editi(June). Available at: www.evaluate.com/PharmaWorldPreview2018.

Information, N. S. S., National, I. and Scotland, S. (2017) 'Annual Report 2017 .' doi: 10.1158/1078-0432.CCR-09-2824.

Lervolino, A. and Urquhart, L. (2017) 'World preview 2017, outlook to 2022', *EvaluatePharma*, (June), pp. 1–48. Available at: http://info.evaluategroup.com/rs/607-YGS-364/images/wp16.pdf.

Novartis AG (2018d) 'Q3 2018 Results'.

Novartis AG (2019) 'Q4 and FY 2018 Results'.

Novartis AG and Xnys, N. V. S. (2019) 'Buoyed by Recently Launched Branded Drugs , Novartis Posts Steady 2Q Novartis AG NVS (XNYS) Drug Manufacturers'.

PwC (2018) *Revolutionising health: predicting patient health using blockchain and*

wearable technology.

PwC (2019) *Global Economy Watch - Projections*. Available at: https://www.pwc.com/gx/en/issues/economy/global-economy-watch/projections.html.

PwC (2020) 'Pharma 2020 : The vision Which path will you take ?*'.

Services, T. U. S. D. of H. & H. (2018) 'American Patients First - The Trump Administration Blueprint to Lower Drug Prices and Reduce Out-of-Pocket Costs', (May). doi: americanpatientsfirst.

United Nations (2015) 'World Population Ageing'.

Websites

Bollinger, M. (no date) *Understanding Pharmacy Financials V: Net Income*. Available at: https://www.liveoakbank.com/pharmacy-resources/understanding-pharmacy-financials-v-net-income/.

Communications, N. G. (2019) 'Novartis R & D update highlights industry leading development pipeline including potential blockbusters and advanced therapy platforms', pp. 4–6.

Damodaran, A. (2015) *Session 6: Estimating cost of debt, debt ratios and cost of capital*. Available at: www.stern.nyu.edu/~adamodar/podcasts/BVR/BVR7ppt.ppt (Accessed: 25 November 2018).

Damodaran, A. (2016) 'The Cost of Capital', (April). Available at: http://people.stern.nyu.edu/adamodar/pdfiles/papers/costofcapital.pdf.

Damodaran, A. (2019a) *Enterprise Value Multiples by Sector (US)*. Available at: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/vebitda.html.

Damodaran, A. (2019b) *Ratings, Interest Coverage Ratios and Default Spread*.

Damodaran, A. (2019c) 'Session 6: Estimating Cost Of Debt, Debt Ratios And Cost Of Capital'. Available at: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ratings.htm.

Damodaran, A. (no date) *Working capital in valuation*. Available at: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/valquestions/noncashwc.htm.

Financial Times (2018) *Novartis to acquire Endocyte in $2.1bn deal*. Available at: https://www.ft.com/content/2ea3135c-d298-11e8-a9f2-7574db66bcd5.

Miller, J. (2018) *UPDATE 1-Novartis raises 2018 sales outlook as Entresto, Cosentyx accelerate*. Available at: https://www.cnbc.com/2018/10/18/reuters-america-update-1-novartis-raises-2018-sales-outlook-as-entresto-cosentyx-accelerate.html.

Novartis AG (2018a) *Awards & Recognition*. Available at: https://www.novartis.com/our-company/awards-recognition.

Novartis AG (2018b) *Innovative Medicines*.

Novartis AG (2018c) *Our Business*. Available at: https://www.novartis.com/our-company.

Samantha DiGrande (2018) *5 Actions Taken Since the Release of Trump's Drug Pricing Blueprint*. Available at: https://www.ajmc.com/newsroom/5-actions-taken-since-the-release-of-trumps-drug-pricing-blueprint (Accessed: 12 November 2018).

The Business Research Company (2018) *The Growing Pharmaceuticals Market: Expert Forecasts and Analysis*. Available at: https://blog.marketresearch.com/the-growing-pharmaceuticals-market-expert-forecasts-and-analysis.

Complementary Sources

Thomson Reuters Eikon