CATÓLICA LISBON
BUSINESS & ECONOMICS

Equity Valuation of Gerresheimer AG

Martin Kreuzer

Dissertation written under the supervision of
José Carlos Tudela Martins

Dissertation submitted in partial fulfilment of requirements for the MSc in International Management, at the Universidade Católica Portuguesa, June 4th, 2019.

Recommendation: Buy
Current price as of May 8th, 2019: 69€
Price Target: 78€

Gerresheimer AG
Healthcare / Pharma
Reuters: GXIG.DE

Investment Summary

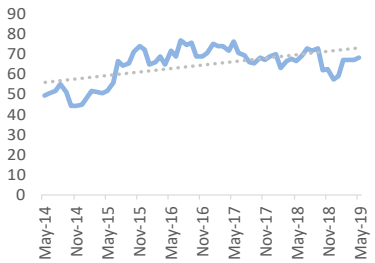
Growing…. slowly, but surely

Profile	
closing price	69 €
Market Cap (€m)	2.434
EV (€m)	3.617
Shares outstanding (m)	31,4
Free float	100%
P/E	28x
EV/EBITDA	13x
Net Debt/EBITDA	47%
Dividend Yield (2019)	1,4%
Beta	1,1

Fianancials: PPG & P&D			
€m	*2018*	*2019*	*2020*
Revenue	1.355	1.397	1.435
EBITDA	274	269	279
Net Income	139	81	83
ROIC	10,5%	5,9%	5,9%
FCF	126	63	68

Sum of the parts Valuation	
Business Unit	*EV (€m)*
EV Advanced Technologies	335
EV PPG & P&D	3.282
2y EV/EBITDA	13,5x

Share price development		
52-week high	79,9	*14.09.2018*
52-week low	51,3	*04.01.2019*
1-year change	1,13%	*March 18-19*
5-year change	43,48%	*March 14-19*



After rough years, the new CEO puts Gerresheimer back on "growth-path" and presents a promising mid-term outlook. I therefore issue a buy recommendation targeting a price of 78€, which represents an upside potential of 15% compared to a current share price of 69€ as of May 8th, 2019. When comparing it to the price as of valuation date (63€) the upside potential amounts to 24%. Gerresheimer gets tailwind from stable industry and macroeconomic outlooks and will particularly profit from arising megatrends.

Strong year 2018 and even stronger mid-term guidance

2018 was strong with an adjusted EBITDA of 294 EURm and sales of 1.433 EURm on a group basis. The valuation based on its individual parts, PPG and P&G, and its newly acquired Advanced Technologies division, result in an EV of 3.617 EURm. EBTIDA-margins average at 20% and sales forecast of its core-business is projected at 2-3%, leaving space for positive surprises.

Trust in the new Management

The new CEO radiates confidence as well as optimism and has structured ideas on how to improve Gerresheimer´s operational performance, productivity and geographical footprint. Dietmar Siemssen, seems capable of transforming the Advanced Technology unit into a strong part of Gerresheimer and of escaping the pressure on margins arising from the competitiveness of the contract manufacturer business. Gerresheimer presents an attractive investment in the light of pharma growth, megatrends and promising projects arising from 2019 onwards.

Abstract

This master thesis performs an equity valuation of Gerresheimer AG, a global manufacturer for the pharma and healthcare industry, and determines its ordinary share price as of 30.11.2018.

The state-of-the-art valuation approaches are presented and the industry- and macroeconomic environment of Gerresheimer is analyzed. Afterwards, the equity value of Gerresheimer is determined using the sum of the parts DCF approach, combined with a relative valuation consisting of trading multiples. The Advanced Technologies division of Gerresheimer is valued based on the fair market value of the purchase price.

The author issued a buy recommendation with a target price of 78€ as of Nov 30, 2018, with an upside potential of 24% compared to a share price of 63€ as of Nov 30, 2019. The results are subject to a sensitivity analysis, consisting of different scenarios and variations of Gerresheimer´s expected operating performance, completed with a Monte Carlo analysis.

Finally, the methodologies and results are compared to the equity report provided by Credit Suisse, a leading multinational investment bank.

Author: Martin Kreuzer
Title: Equity Valuation of Gerresheimer AG
Keywords: Equity Valuation, share price, Enterprise Value, Corporate Finance, Gerresheimer, Healthcare, Pharma, Pharmaceutical Packaging

Résumo

A problemática da presente Tese de Mestrado consiste na avaliação do capital próprio da empresa Gerresheimer AG que, sendo um produtor a nível global, atua nas indústrias Farmacêutica e de Saúde. O preço das ações ordinárias da referida empresa é infra determinado à data de 30.11.2018.

Distintas metodologias de avaliação são apresentadas, bem como uma análise da indústria e do ambiente macroeconómico em que se insere a Gerresheimer. Seguidamente, o valor do capital próprio da empresa é calculado através da combinação de duas abordagens: *DCF* (soma das partes) e avaliação relativa recorrendo a múltiplos de transação. O valor da divisão de Tecnologias Avançadas da Gerresheimer é determinado com base no justo valor de mercado do preço de aquisição.

O autor apresenta uma recomendação de compra a um preço-alvo de 78€ à data de 30.11.2018, com um potencial de retorno de 24% comparativamente com o preço por ação de 63€ a 30 de novembro de 2018. Os resultados obtidos foram sujeitos a uma análise de sensibilidade relativa a diferentes cenários expectáveis da performance operacional da Gerresheimer, análise essa que é complementada com uma análise Monte Carlo.

Finalmente, as metodologias e resultados são comparados ao relatório de capital próprio da Gerresheimer AG emitido pela Credit Suisse, um banco de investimentos líder multinacional.

Autor: Martin Kreuzer
Título: Equity Valuation of Gerresheimer AG
Palavras-chave: Avaliação de Ações, Cotação, Valor da Empresa, Finanças Corporativas, Gerresheimer, Saúde, Farmacêutica, Embalagem Farmacêutica

Acknowledgements

Firstly, I would like to thank my supervisor Tudela Martins, who was always available for guidance, support and valuable feedback.

Furthermore, a special thanks goes to my family in Austria, who supported me during the journey; not only throughout my studies, but also in every part of my life.

Lastly, I would like to thank my friends and thesis-colleagues, Denis Zimmerer, Marcin Rękawiczny and Fabian Arndt for the support and the great time at university. Also, a special thanks goes to my other colleagues for all the fun we had throughout this master's program.

List of Tables

List of Figures

List of Formulas

List of Abbreviations

AG	Aktiengesellschaft (German for „joint-stock company“)
APT	Arbitrage Pricing Theory
APV	Adjusted present value
Atech	Advanced Technologies division
BV	Book Value
CAGR	Compounded annual growth rate
Capex	Capital expenditures
CAPM	Capital Asset Pricing Model
COGS	Cost of Goods Sold
CS	Credit Suisse
D	Debt
D&A	Depreciation and Amortization
DAX	Deutscher Aktienindex (German stock Index)
DCF	Discounted Cash Flow
DIH	days inventory held
DPO	days payable outstanding
DSO	days sales outstanding
E	Equity
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes and depreciation and amortization
ECB	European Central Bank
EM	Emerging Markets
EMM	Exit Multiple Method
EU	European Union
EUR	Euro
EV	Enterprise Value
FCF	Free Cash Flow
FCFE	Free Cash Flow to Equity
FCFF	Free Cash Flow to the Firm
FDA	Food and Drug Administration
GDP	Gross domestic product
GGM	Gordon Growth Model
IMF	International Monetary Fund
ke	Cost of Equity
LTM	Last Twelve Months
M&A	Mergers and Acquisitions
MDAX	Mid-Cap-DAX
MRP	Market risk premium
MSCI	Morgan Stanley Capital International
MV	Market Value
NI	Net Income
NWC	Net working Capital
P&D	Plastic and Devices Division
PE	price-to-earnings multiple
PEG	price/earnings-to-growth multiple
PM	Pharmerging Markets
PPE	Property, Plant and Equipment
PPG	Pharmaceutical Packaging Glass Division
R&D	Research and Development
rf	Risk free rate
rm	Expected rate of return on Equity
ROIC	Return on Invested Capital
S&P	Standard & Poor´s
SG&A	Selling, General and Administration expenses

Sotp	Sum of the parts
SWOT	Strength, Weaknesses, Opportunities and Threats
TV	Terminal Value
UN	United Nations
US	United States
USD	US Dollar
WACC	Weighted average cost of capital
WHO	World Health Organization

Table of Content

1 Introduction

The aim of this Master Thesis is to assess the Equity Value of Gerresheimer AG as of 30.11.2018.

Gerresheimer has a long history in providing specialty glass and pharmaceutical plastic products for global healthcare companies and in improving health and well-being of society. Gerresheimer and its industry are struggling to manage financial, societal and organizational challenges and face an environment that is currently shaped by digital technologies, aging and growing population and increases in chronic diseases. Changes bring opportunities that will help companies to deliver new healthcare models and to find the balance between financial stability and providing affordable as well as accessible products to society.

Gerresheimer missed the growth expectations of investors in the past and time will show whether the company can tackle the opportunities and become an attractive investment opportunity or whether it falls behind. This thesis will elaborate the impacts of its environment and will provide a unbiased perspective of Gerresheimer´s equity value.

1.1 Research questions and structure

The report answers the following research questions:

What are the most accurate valuation-approaches to determine Gerresheimer´s equity value?

How will the industry and macro-environment influence Gerresheimer´s fair value?

What is the fair value of one common share of Gerresheimer as of 30.11.2018?

What is the expected upside/downside potential?

To answer the research questions, first a presentation of the state-of-the-art valuation methodologies is provided in the literature review. Secondly, Gerresheimer´s industry and macroeconomic environment are analyzed and evaluated. Thirdly, the financial performance is projected based on Gerresheimer´s past performance and on the adjustments made to the consolidated statements. Adjustments are necessary given Gerresheimer´s previous acquisition of Sensile-Medical. Finally, the fair value will be determined, using the most accurate valuation approaches, and compared to the equity report provided by Credit Suisse.

2 Literature Review

The following chapter provides an overview of the three most common valuation techniques used to value publicly listed company. Firstly, the relative valuation approach, that values the asset based on prior transactions or comparable company multiples. Secondly, the Discounted Cash Flow Valuation ("DCF"), that is valuing a company based on its expected future cash flows. Lastly, the contingent claim valuation, that uses option pricing models to analyze the value of an asset. (Damodaran, 2010)

2.1 Relative Valuation Techniques

In a multiple valuation, the target company is valued using **precedent transaction multiples** ("transaction comps") or **comparable company multiples (**"trading comps"). The former is mainly applied in M&A-transactions or restructuring deals and is based on the acquisition price paid by the buyer for similar companies in prior transactions. As this valuation technique contains a premium paid, which is described as a reflection of the value investors pay to fully control a business, a more common approach used by equity analysts are trading multiples. This methodology assumes that companies in the same sector and with comparable financial ratios, provide a relatively similar equity value of the target company. (Rosenbaum et al., 2009)

For the purpose of this thesis, a trading comps analysis will be conducted. In order to do so, a peer group has to be selected together with its financials, which is, in a next step, applied to the target financials to drive a valuation range. (Lie & Lie, 2002)

Multiples are an easy and widely recognized way of estimating a current and market-based enterprise/equity value of the target company and particularly useful when combining it with a DCF analysis (Kaplan & Ruback, 2007). However, they also come with drawbacks, as they are subjective in terms of market conditions and might lead to skewed valuation results (e.g. in bearish or bullish markets). Furthermore, there might be no relevant comparable companies that accurately reflect the target´s strengths, weaknesses, opportunities and threats. (Foushee et al., 2012)

2.1.1 Peer Group

The basis of the multiple analysis is the selection of the right portfolio of comparable companies (i.e. peer group). Valuation practice recommends selecting the peers based on business and financial related criteria. Particularly, Kaplan & Ruback (2007) describe that *"*comparables*"* should bear a resemblance to the target in terms of cash flow growth projections, risk structures and performance indicators. Appropriate measures that will be used in this thesis include "ROIC" (Return on Investment), "EBITDA margin" (Profitability) "Net Debt/EBITDA" (Leverage ratio), "Sales CAGR (5y)" or "EBIT/Interest expenses" (coverage ratio).

2.1.2 Most commonly used Multiples

Selecting the right multiples is a broadly discussed topic in finance literature. Kim & Ritter (1999) argued that, "there is no clear answer for which multiples should be used". According to a research of Morgan Stanley (1999) the most common multiples are Price-to-Earnings (PE) and EV/EBITDA. In general, multiples can be based on Equity Value①, Enterprise value② and on growth measurements③: (Fernández, 2001)

①	PE = Market Cap/Total Net Income
②	EV/EBITDA = Enterprise Value/EBTIDA EV/EBIT = Enterprise Value/EBIT EV/Sales = Enterprise Value/Sales
③	PEG = PE/growth of Earnings per Share (5y)

Table-1: Most commonly used multiples

Multiples based on **Equity Value** reflect the price equity investors are willing to pay for each euro of earnings. It represents one of the most popular multiples but comes with some limitations; net income includes interest expense and is, therefore, dependent on the capital structure of a company. Furthermore, it is subjective to accounting regulations (e.g. for D&A and taxes) which might lead to misleading results when comparing with its peers. (Damodaran, 2010)

By contrast, **Enterprise value** refers to the claims of both, equity and debt holders and is used in line with unlevered financial metrics (e.g. EBITDA, EBIT, Sales). Although widely used, EBITDA multiples do not take into consideration capital expenditures, that are linked to D&A, or working capital requirements and potentially lead to misleading valuations. (Fernández, 2001)

Lastly, **growth Multiples** are similar to the enterprise- and equity multiples, but additionally take the growth rates of certain parameters into consideration. They usually find their application in rapidly growing industries. (Fernández, 2001)

Studies based on companies listed on US-stock exchanges, showed that multiple valuations perform best when using forward multiples (e.g. 2 years horizon) derived from analyst's expectations. Compared to historical data, they are more accurate and relevant when computing the company´s value. (Liu, 2002)

2.2 Intrinsic Valuation – Discounted Cash Flow

The most fundamental valuation methodology is the Discounted Cash Flow Analysis, which is built on the assumption that the "value of a company today equals the value of its projected Free Cash Flows, discounted at an appropriate rate". (Kaplan et al., 1995) The approach is based on several mainstays and assumptions:

2.2.1 Framework of Free Cash Flow Models

The main Free Cash Flow Methods are **Free Cash Flow to the Firm** ("FCFF") and **Free Cash Flow to Equity** ("FCFE"). The former represents the Cash Flow available to all funding providers (equity and debt investors) after accounting for all cash operating expenses, taxes, capex and working capital. (Mielcarz & Mlinarič, 2014)

Earnings Before Interest and Taxes (EBIT)
(-) Taxes on EBIT
(=) Net Operating Profit Less Adjusted Taxes (NOPLAT)
(+) Depreciation & Amortization (D&A)
(-) Capital Expenditures (Capex)
(+/-) Changes in Net Working Capital (NWC)
(=) Free Cash Flow to the Firm (FCFF)

Table 1: FCFF Derivation; (Berk & DeMarzo, 2014)

The **FCFE** is a metric measuring the amount of cash available to equity holders only:

Net Income (NI)
(+) Depreciation & Amortization (D&A)
(-) Capital Expenditures (Capex)
(+/-) Changes in Net Working Capital (NWC)
(+) Net Borrowings
(=) Free Cash Flow to Equity (FCFE)

Table 2: FCFE Derivation; (Berk & DeMarzo, 2014)

2.2.2 Weighted average cost of capital

The standard approach to continue the intrinsic valuation of the target is to discount the projected Free Cash Flows using the weighted average cost of capital ("WACC"). The WACC is based on the company´s current capital structure and represents the weighted average of the cost of capital of the target. Particularly, it is a measure of how much return investors are expecting on debt and equity, depending on the current market situation. (Arditti, 1973; Bruner et al., 1998).

$$WACC = \big(kd * (1 - t)\big) * \frac{D}{V} + ke * \frac{E}{V}$$

kd	Cost of Debt	ke	Cost of Equity
t	Tax rate	E	Market Value of Equity
D	Market Value of Debt	V	D+E

Equation-1: WACC-computation

2.2.2.1 Cost of Equity

The Cost of Equity describes the return that investors are expecting to receive to compensate for the risks of owing an asset. The most common methods for valuing those risk are the Capital Asset Pricing Model ("CAPM"), the Arbitrage Pricing Theory ("APT") and the Fama-French three-factor model. (Damodaran, 2012) For the purposes of this thesis, the CAPM will be used for the valuation of Gerresheimer and will therefore be explained in more detail:

In general, an investment bears two risks: the “systematic” and the “unsystematic” risk. The former refers to potential market risks (e.g. war or recessions) and cannot be diversified away. There will always be the presence of those risks and thus the investors should receive compensation. On the contrary, the unsystematic risk refers to a specific asset and will not be compensated in the CAPM as it can be diversified away. (Black et al., 1972)

$$ke = rf + ßL * (rm - rf)$$

ke	Cost of Equity	rm	Expected rate of return on Equity
rf	Risk Free Rate	(rm-rf)	Market Risk Premium
$ß_L$	Levered Beta		

Equation-2: CAPM computation

The risk-free rate reflects the return investors would expect from an investment with zero risk. Therefore, the entity issuing the risk-free security should not have a default- or a reinvestment risk. German or US Government Bonds are generally recognized as being riskless. The risk-free should be in line with the currency of the free cash flows as well as the time horizon assuming a going concern of the target. For practical reasons, usually a risk-free rate with a maturity of 10 years is used. (Bruner et al., 1998)

The Market Risk Premium (“MRP”) represents the return investors demand over the risk-free to compensate for the volatility in the total equity market. It is seen as the delta between the expected return on equities and the risk-free rate. The CAPM suggests, that the premium should reimburses the investors for the systematic risk that any investments bears. (Fama, 1968) Given the lack of clear consensus on how to compute the MRP, a rate of 5,5-7,0% should currently be applied in Germany according to the institute of auditors (Zwirner, 2018). According to Damodaran (2019), the MRP in Germany is 6%.

Beta (Levered and unlevered) is a measurement of the systematic risk of a company and indicates whether the asset is more/less volatile than the whole market. It states how sensitive the asset´s return is compared to the market and can be expressed as “the covariance between the rate of return on the company´s stock and the market return”. A beta greater than 1.0 means that the asset is more volatile and has a higher systematic risk (and v.v.). (Rosenbaum et al., 2009) As the beta is reversing around the mean (“1” for the market) the raw betas should be adjusted using the “Blume-method”. (Blume, 1971)

$$adjusted\ ß = raw\ ß * \frac{2}{3} + \frac{1}{3}$$

Equation-3: Blume adjustment

The unlevered Beta ($ß_u$) refers to a company without taking the effects of financial leverage into consideration. On the other hand, the levered beta ($ß_L$) considers the impact of the company´s capital structure. Damodaran (2012) assumes the relationship to be:

$$ßu = \frac{ßL}{(1 + \frac{D}{E} * (1 - t))} \qquad ßL = ßu * (1 + \frac{D}{E} * (1 - t))$$

$ß_L$	Levered Beta	t	Tax Rate (effective)
$ß_u$	Unlevered Beta	D/E	Debt-to-Equity ratio

Equation-4: Beta levered/unlevered

The unlevered Beta is "relevered" using the target´s capital structure and effective tax rate. The levered Beta is then used in the CAPM to compute the cost of equity. (Damodaran, 2012)

Country risk premium: Adding a country risk premium to the cost of equity is a concept developed by (Damodaran, 2012) to adjust for additional risks of equity markets. In Gerresheimer´s case, no additional risk premium will be added as the company is considered as well diversified given that it generates most of its sales in Europe. Furthermore, its production facilities (assets) are mainly in "low-risk" countries.

2.2.2.2 Cost of Debt

The second main input for the WACC is the cost of debt, which reflects the costs at which a company can borrow on the capital market given the company´s credit profile and D/E ratio. The cost of debt can be derived by the yield of the outstanding debt instruments of the target. (Rosenbaum et al., 2009)

In the case the company has no regularly traded bonds outstanding, the cost of debt can be calculated using the targets credit rating (e.g. derived from Moody´s, S&P or Fitch-Ratings) and the associated credit spread. (Rosenbaum et al., 2009)

However, some companies are not rated by rating agencies. (Moody´s, 2018) In this case, a synthetic rating can be applied using interest coverage ratios (EBIT[DA]/interest expenses) and compare it to the rating classes developed by investment banks or Damodaran. To finally derive the cost of debt, the risk-free is usually added to the credit spread. The credit spread itself is difference between two bonds with similar maturity but different credit quality. (Damodaran,

2012) As Gerresheimer has neither traded bonds outstanding nor is rated by agencies, the above-mentioned approach will be applied.

As debt is tax-deductible, the WACC captures the after-tax cost of debt by applying a tax-shield using the following formula:

$$after\ tax\ kd = pre\ tax\ kd * (1 - t)$$

Equation-5: Tax-shield

Therefore, the after-tax costs are lower than the pre-tax costs and this benefit increases as the tax rate increases. (Damodaran, 2012) Some countries, however, may limit the deduction of net interest expenses on taxable income up to a certain level, which should be taken into consideration when computing the WACC. (Schmidt & Moesle, 2018)

2.2.3 Terminal Value

The terminal value (TV) is a metric used to capture the value of the target beyond the explicit period and is based on last year´s FCF. In general, one can differentiate between the Exit Multiple Method ("EMM") and the Gordon Growth Model ("GGM"). (Rosenbaum et al., 2009)

Gordon Growth:

$$\frac{FCFn * \ (1 + g)}{(WACC - g)}$$

g	Growth Rate (e.g. nominal GDP growth rate)
FCFn	Last year of the projection period

Equation-6: Perpetuity growth model

The GGM was originally developed by Myron Gordon and Eli Shapiro in 1956 and is best used for mature companies that reached the steady state. (Gordon & Shapiro, 1956)

For the purposes of this thesis, the last year of the explicit period will be extended for the Terminal Value year in order to make necessary adjustments. Thus, the perpetuity formula will be applied on the FCF of the "TV-year".

Exit Multiple Method:

$$EBITDAn * Exit\ Multiple$$

EBITDAn	EBITDA of the last projection period

Equation-7: Exit Multiple Method

Although appreciated by bankers, the mix of intrinsic (DCF) and relative approach (EMM) does lead to inconsistency in the valuation. To avoid potential irregularity, it is suggested to project the TV using the GGM. (Damodaran, 2012)

2.2.4 Present Value Calculations

The calculation of the Present Value of the FCF lies on the principle of the Time Value of the Money. This concept goes back to the Jewish theology and to Babylonian Talmud (ca. 500 CE) who first argued that the benefit of receiving money *today* is higher than receiving it *tomorrow*. Based on this reasoning, the projected FCFs and the TV are discounted to their present values using an appropriate discount rate. (Fernández, 2007b; Peterson & Fabozzi, 2009) The discount rates differ dependent on the Framework of the FCF:

Methodology	**Discounting Method**
FCFF	Weighted Average Cost of Capital
FCFE	Levered Cost of Equity (ßl)
APV	Unlevered Cost of Equity (ßu)

Table-2: Discounting methods of Intrinsic-valuation-methodologies (Koller et al., 2015)

2.2.4.1 Enterprise- and Equity-Discounting Models

The most common way to compute the DCF Model is to discount the projected Free Cash Flows to the Firm ("FCFF") and the terminal value with the WACC:

$$Enterprise\ Value = \frac{FCFFy1}{(1+WACC)\text{^}1} + \frac{FCFFy2}{(1+WACC)\text{^}2} + \cdots + \frac{TV}{(1+WACC)\text{^}n}$$

Equation-8: Enterprise Value computation

Alternatively, one can discount the FCFE with the levered cost of equity which derives the equity value of a target. The relationship between the enterprise value and the equity value can therefore be described as the following equation: (Rosenbaum et al., 2009)

$$Equity\ Value = EV - Debt - Preferred\ Stocks - Minority\ Interests + Cash$$

Equation-9: Equity-bridge

2.2.4.2 Sum-of-the-parts

A company that operates in different segments might be valued based on the sum of the values of its divisions. (Fernández, 2007a) This approach allows to take different risks, capital structures and economic profiles into consideration. (Pinto et al., 2010) For the purpose of this thesis, this method will be applied to account for the impact of the newly acquired Sensile-Medical division.

2.2.4.3 APV

An alternative to the above-described approaches is the Adjusted Present Value Model ("APV"). It separates all elements of the company's value and analyses each one of them in a separate step. Hereby, it uses the unlevered cost of equity to discount the free-cash-flows. Further, it calculates the net value of debt (e.g. tax shields, bankruptcy costs or subsided financing) and adds it to the "all-equity financed" enterprise value. This approach follows the assumptions of Modigliani & Miller who described that, "in a perfect capital market, the capital structure does not affect the value of a company". (Miller, 1988; Myers, 1974)

The concept of APV is widely recognized and appreciated although rarely used by Investment Banks. One reason for that might be that investment bankers do not feel comfortable valuing the expected bankruptcy-costs, a main component in the APV, for their clients. While direct bankruptcy costs have been studied and can easily be measured, there is not much evidence on how to evaluate the indirect costs of bankruptcy. For example, losses resulting from the fear of stakeholders if bankruptcy becomes more likely. They will start abandon the firm as they believe their claims will not be settled, which will lead in declining profitability and consequently making filing for bankruptcy more likely. (Sautner & Vladimirov, 2013) Given that drawbacks, and the stable capital structure of Gerresheimer, this concept is not applicable for this thesis.

2.3 Contingent Claim Valuation

The basic idea of the contingent claim valuation is that securities sharing the same characteristics as options, can be valued as options. An asset is an option once it derives its value from an underlying asset and once its cash flows are dependent on the appearance of specific events. The "owner of a real option has a right, but not the obligation, to execute certain business activities (call option) or to not execute them (put option)". Business activities as such can be M&A, restructuring deals or other investments that meet the criteria of an option. (Koller et al., 2015)

As the Contingent Claim Valuation is not applicable in Gerresheimer´s case, it will not be further discussed in this thesis.

3 Market Conditions

A critical part of any equity valuation is the assessment of the macroeconomic performance and the industry the target company is operating in. After providing a macroeconomic analysis, this chapter identifies the main drivers of the "medical equipment, supplies and distribution industry" and the overall "healthcare" sector:

3.1 Macroeconomic Overview

Current research articles of Goldman Sachs (2019) and the International Monetary Fund, (2019b) have elaborated that the global economic strength is anticipated to decrease slightly from 3,7% in 2018 to 3,5% in 2019 and 3,6% in 2020. The global forecast for the years 2019 and 2020 has previously noticed a downward correction with further corrections being expected due to the "trade-war" between US and China. (IMF, 2019b) The EU also faces a range of potential risks in 2019 in the light of a disorderly Brexit, Italians Budget crisis and threats emitted from the US Administration as well as general trade tensions. Therefore, the European Central Bank remains its pro-active growth policies leading to an expected Euro-area growth of 1,6% in 2019. (IMF, 2019b; Hatzius et al., 2019) In the long run, the Euro-area and particularly Germany, are expecting to suffer a slowdown in real GDP growth, meaning that it will grow significantly less than during its highs in 2017 and 2018.

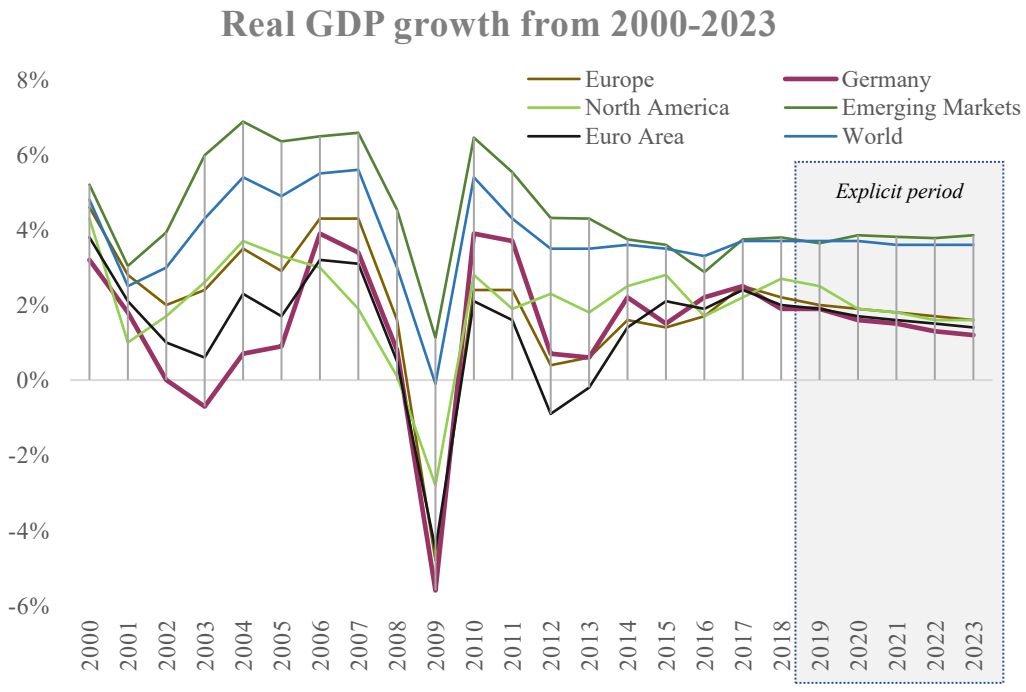


Figure-1: Real GDP growth from 2000-2023 as of October 2018, (IMF, 2019b)

When looking at the Emerging Markets, one can see that the GDP growth rate[1] remains rather flat while the inflation rate[2] is expected to decrease significantly by 2% till 2023. Heavily contributing to EM´s slowdown is China; the People´s Republic is suffering from fears of more damaging trade war and further decreases in domestic demand growth. Political uncertainties in Brazil also caused a slowdown in EM`s growth forecast. (IMF, 2019b; Hatzius et al., 2019)

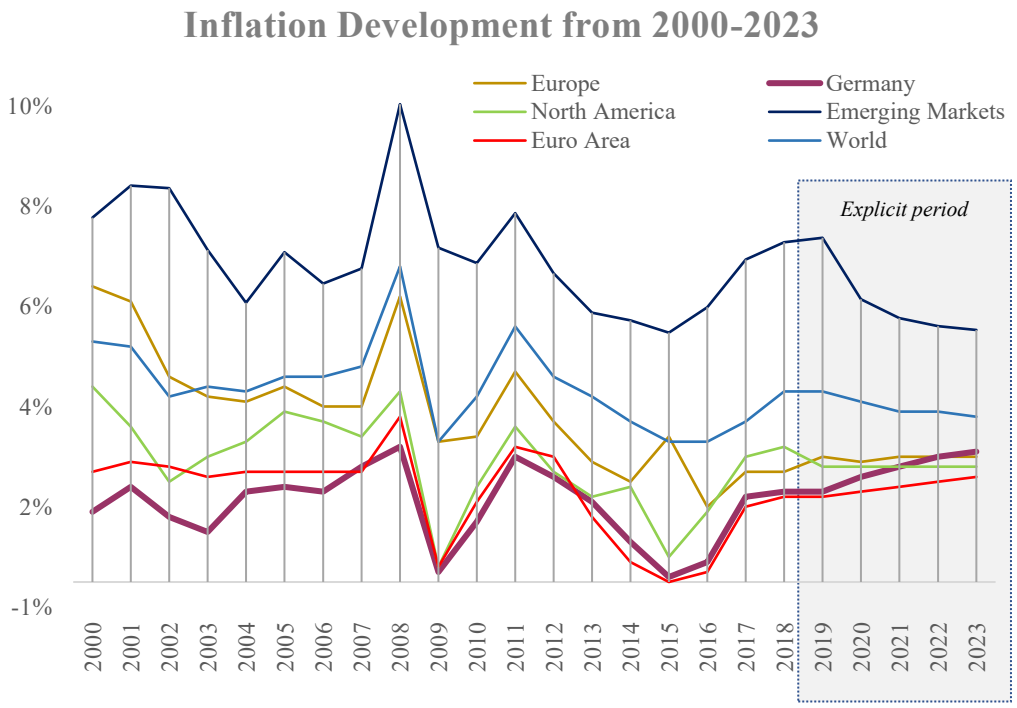


Figure-2: Inflation, 2000-2023 as of October, 2018; (IMF, 2019a)

In line with ECB´s growth fostering policies, the low interest rates are expected to remain unchanged since 2016. This further results in slight increases in the euro-inflation rate which is aimed to reach a level of 2%. (ECB, 2019) A higher inflation rate can be seen when looking at Europe and Germany, where the rate is expected to reach up to 2,4% and 2,2% respectively until 2023. A different pattern can also be monitored in North America; the lasting low gasoline prices put pressure on the inflation rate, which will remain flat throughout the explicit period. (IMF, 2019a)

[1] Average of the Emerging Markets Gerresheimer is operating in

[2] See footnote no. 3

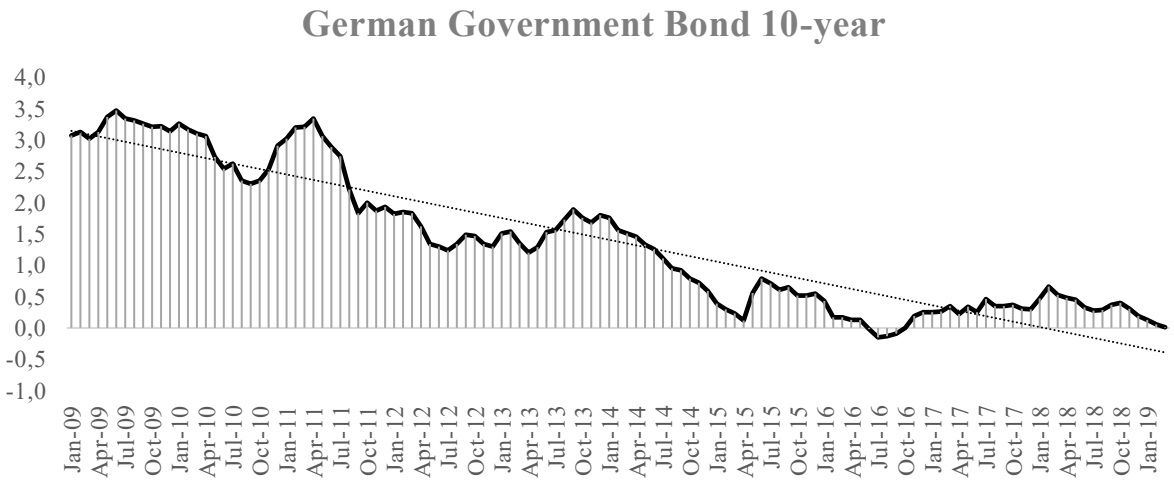


Figure-3: Risk-free rate development (FRED, 2019)

As the German government bond (10-years) will be used as a risk-free rate for WACC purposes, Figure-3, illustrates the historical development until March-19. For the last 10 years, but also since the early 90s, the rate has experienced a notable downward trend.

3.2 The Healthcare Equipment and Supplies Industry

Gerresheimer is operating in the "Healthcare Equipment & Supplies Industry" - a sub-industry of the "Healthcare Services and Equipment- and the Healthcare sector". (Gerresheimer, 2019) Given it´s dependency on the sector, it is worth to analyze the dynamics and drivers of this segment as well. A focus will lie on megatrends and impacts that will shape the packaging industry, completed by a Porter´s five forces analysis. (Appendix-1)

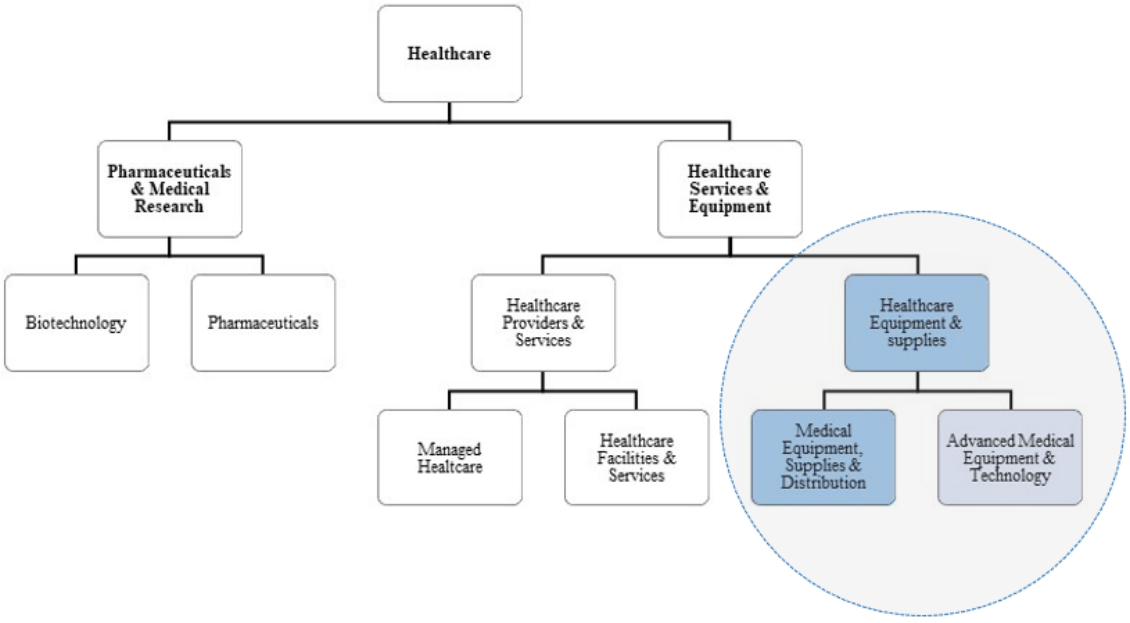


Figure-4: Healthcare Industry-breakdown (Reuters, 2019)

3.2.1 Trends and Developments

Total revenues for the industry amount to roughly 350 USDbn in 2019 and expected to growth by 18% within the next 5 years. Their underlying growth is mainly triggered by megatrends, technological improvements, increased healthcare access in emerging countries, and generic market growth (MarketLine, 2019). The biggest players as illustrated in Figure-5, are the Medical-Devices division of Johnson & Johnson and Thermo-Fisher.

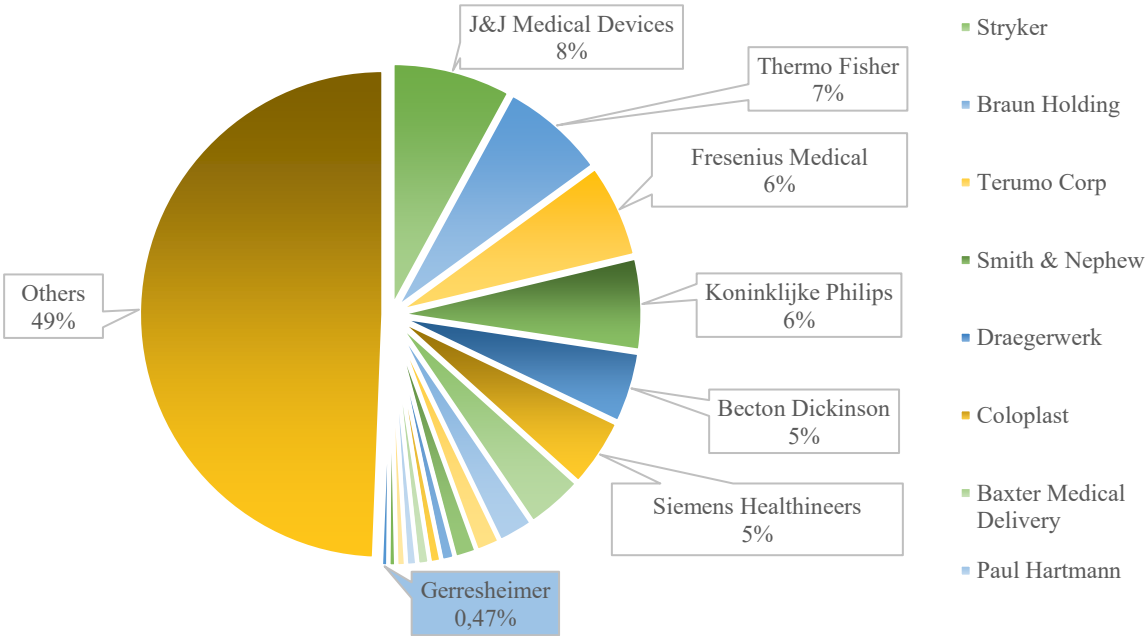


Figure-5: Main industry-players (Reuters, 2019; own computation)

3.2.1.1 Megatrends

The pharma and healthcare sector are dependent on several economic and demographic developments mainly triggered by the so-called “megatrends”. Particularly, the sector is benefitting from improvements and access of medical supplies in less developed areas and boosts in demand due to the “rise in chronic diseases, aging population, increase in global life expectancy, rapid growth in generics and growing trends towards self-medication”. Chronic diseases, as for example diabetes, a major core competency of Gerresheimer, are expected to affect more than 630 Million people until 2040, compared to 425 Million in 2018 according to latest research of the World Health Organization. (WHO, 2018) These figures go in hand with the overall aging population; according to the United Nations, the number of people aging over 80 is expected to triple within the next 30 years. (UN, 2017) These demographic developments foster demand, revealing a great spectrum of possibilities in the industry. (Gerresheimer, 2019)

Other trends and changes in the industry radiate from technological improvements such as artificial intelligence and machine-learning (Industry 4.0). When correctly implementing them

in the business strategy, these developments can improve productivity on the supply side and reduce the cost of packaging. New technologies are forcing the market players to redefine innovative approaches in order to tackle new arising customer needs. However, strict network of regulations in the sector (Good Manufacturing Process Regulations) might harm the pace in which innovation occurs and will make it difficult to effectively reduce production costs. (Radhakrisnan, 2019)

3.2.1.2 Further prospects and outlooks

Not only demographic developments and new technological inventions are going to shape the industry: The FDA is expected to accelerate the approval process of pharmaceuticals allowing players to increase their product development process. The IQVIA Institute (2019) predicts the number of new products released per year to increase from (on average) 46 in the last 5 years to roughly 54 in 2023. This volume increase is triggered by new developed biotech and biosimilar products. (Aitken, 2019)

Figure-6: Pharmaceutical-market CAGR 2019-2023; (Passport, 2019; Aitken, 2019)

As illustrated in Figure-6, the overall global pharmaceutical market is expected to report a CAGR of 2,2% from 2019 to 2023 and 3,7% for the Pharmerging[3] Markets ("PM") in the same period, generics are expected to grow on average 2,9% globally and 4,9% in the PM´s in volume per year till 2023. Although, the pharma sector will perform slightly inferior than expected, the sector is considered as being less affected by economic downturns and will profit from demographic developments triggered by the increasing global life expectancy. (Aitken, 2019; Passport, 2019)

[3] Pharmaceutical market activities in Emerging countries

3.2.2 Energy- and commodity prices

As the industry is highly dependent on energy and commodities resources, it is worth analyzing their expected development.

According to Reuters (2019), natural gas and crude oil are expected to remain at a low level after the drop that followed the high at the end of October 2018. Partly responsible for the decrease is the remaining high supply.

According to Management, Gerresheimer hedges up to 65% and limits the exposure on commodities significantly. (Gerresheimer, 2019) Furthermore, specific contracts often allow the producers to pass on price increases to the customer. Likewise, decreases in commodities are passed on to the customer, making changes in the long-term (e.g. in perpetuity) expected to off-set each other. Lastly, country specific regulations often allow energy-intensive businesses to limit electricity charges to a certain extent, to maintain international competitiveness. (BMWi, 2017)

4 Company Overview

Gerresheimer is a global partner of pharmaceutical and healthcare companies, providing special glass and plastic products for the use of pharmaceutical and healthcare packaging. The company is based in Düsseldorf, Germany, and generated revenues of 1,4 EURbn in 2018 and a net income of 131 EURm, through its "Plastic & Devices", "Primary Packaging Glass" and "Advanced Technologies" division. At the end of the fiscal year 2018, the company had 9890 employees and managed 44 production operations in 15 countries in Europe, America and Asia[4]. (Gerresheimer, 2019) Appendix-2 presents a concluding SWOT-Analysis.

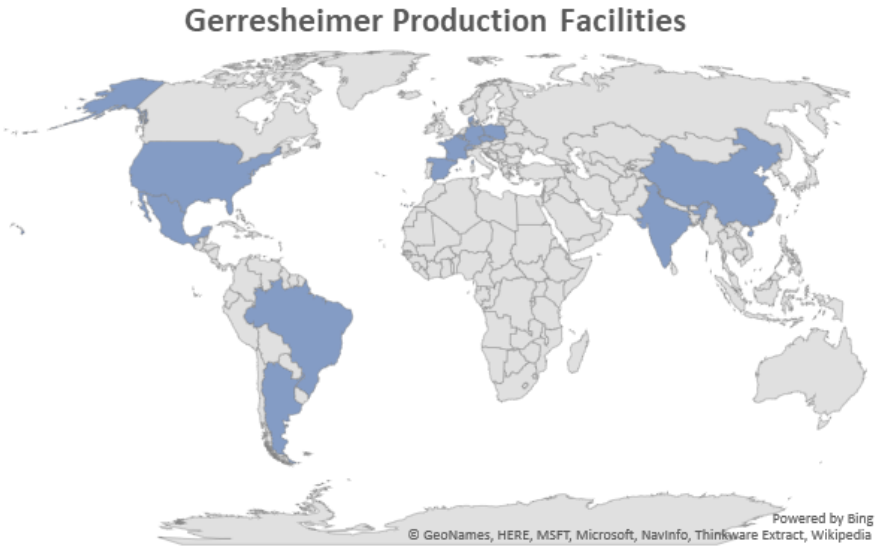


Figure-7: Production Facilities (Gerresheimer, 2019)

The company was founded as a glassblowing business in 1864 and became the world's largest glass bottle producer by 1886. In 1888, Gerresheimer took on the legal form of a joint stock company and moved into the pharmaceutical glass production business a hundred years later. After several restructuring activities, the company managed to get a foothold in the production of plastic systems. In July 2007, Gerresheimer was taken public by Blackstone, the owner at that time, who then completely withdrew from the company. Since December 2008, Gerresheimer is listed in the MDAX, the mid-cap stock index of German companies. (Gerresheimer, 2019).

[4] a list of countries is provided in appendix-17

Recently, the following valuation relevant events occurred:

New CEO November 1, 2018

- Dietmar Siemssen was appointed as the new CEO of Gerresheimer.

Sensile-Medical July 11, 2018

- Acquisition of the Swiss technology company and creation of a new divison, **"Advanced Technologies".** The division is part of the Q3 consolidated Statements and will, for valuation purposes, be excluded from the 2018 financial statements.

Centor September 1, 2015

- The plastic container producer is the biggest acquistion in company history. Consequently, Gerresheimer´s consolidated financial statements increased signficiantly after incorporating Centor´s accounts.

Figure-8: Company news relevant for valuation purposes; (Gerresheimer, 2019)

4.1 Divisions

Gerresheimer is operating through three divisions (Gerresheimer, 2019):

- The **Plastic & Devices** division includes products for simple and safe drug delivery made of plastic. The most common products are for example “insulin pens, inhalers, nasal spray vials and pharmaceutical plastic containers”.
- The **Primary Packaging Glass** unit covers the packaging made of glass for medicines and cosmetics as “jars, ampoules, perfume flacons and special glass containers”. This segment also delivers the food & beverage industry by serving bottles, customized vails and jars.
- The **Advanced Technologies (“Atech”)** division was established through the acquisition of Sensile-Medical, a Swiss based Tech-company, in 2018. Currently, this unit offers “micro-pumps used for self-medication for Diabetes or Parkinson”.

When observing the overall drug value chain, as illustrated below, one can see that Gerresheimer is positioned as a packaging manufacturer and first involves with the client roughly three years before commercialization. The lack of the ability to support throughout the whole value chain, as compared to an “integrated solution provider” might hinder the company to address customer´s needs successfully through in-house R&D services. (Halitsa, 2019) With its new division, Gerresheimer is trying to get involved with the customer at an earlier stage, aiming to achieve more lucrative customer relationships particularly in the generics-market and bio-solution business. (Gerresheimer, 2019)

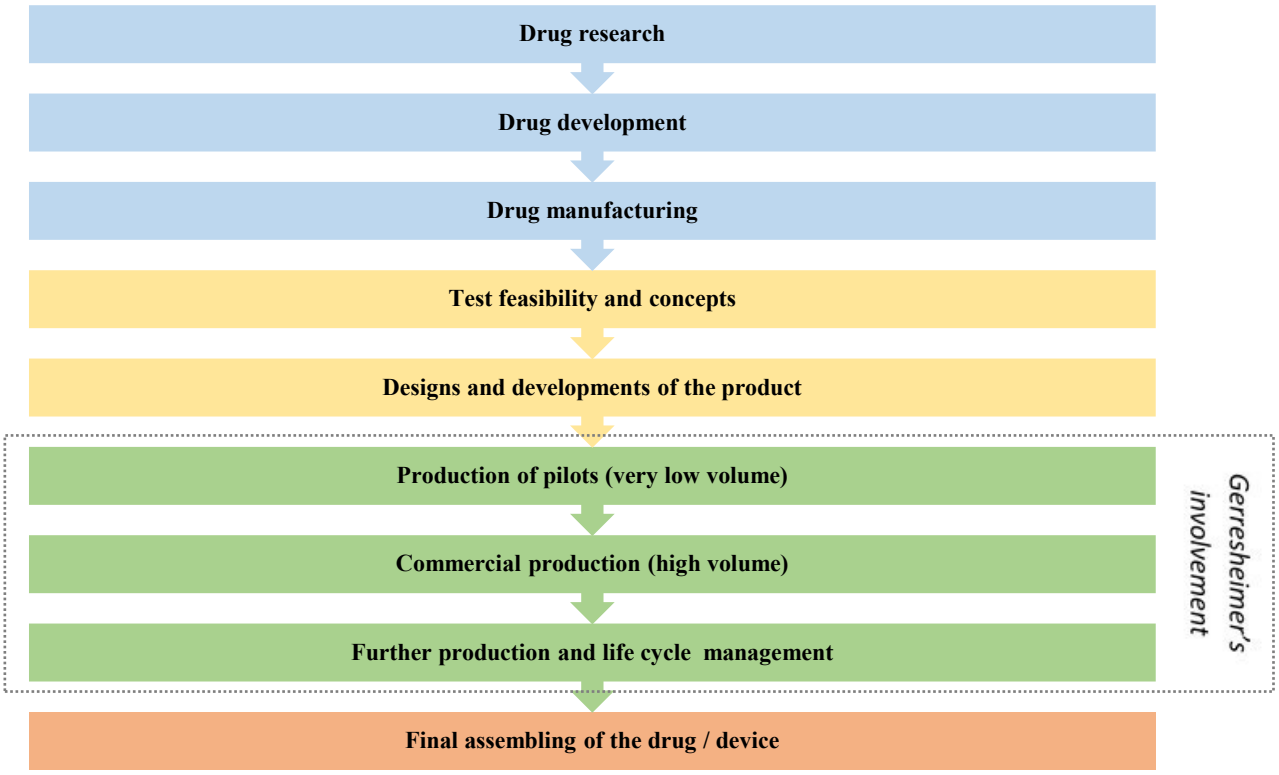


Figure-9: Simplified Drug Value Chain (Halitsa, 2019)

4.1.1 Share price development

Table-3 illustrates Gerresheimer´s stock, the MDAX, as well as the performance of the healthcare sector between Q1 2014 and Q1 2019.

Period	Gerresheimer	MDAX	Healthcare Sector
Q1 2018 - Q1 2019	1,13%	-4,50%	-9,18%
Q1 2017 - Q1 2018	-10,22%	7,06%	-9,23%
Q1 2014 -Q1 2019	43,48%	48,47%	48,88%

Table-3: Changes of Gerresheimer Stock, MDAX and the Healthcare Sector (Reuters, 2019)

At the beginning of the period (March 2014), Gerresheimer´s stock stood at 47 € and increased to roughly 67 € after 5 years, despite some slight setbacks. Looking at the previous year, the stock increased by 1,1%, with trading volume remaining constant at a level of 119.286 shares, compared to a growth rate of -9,2% of the overall healthcare sector.

Uncertainties derived from the "Brexit" and lingered trade tensions put a pressure on the stock, but Gerresheimer still managed to outperform its benchmarking indices. Between Q1 2014 and Q1 2019, the MDAX head towards 24.440 starting from 16.462 points. Nonetheless, the index could not escape the negative environmental conditions and experienced some drawbacks in late 2018 and decreased by 4,5% in last year's period.

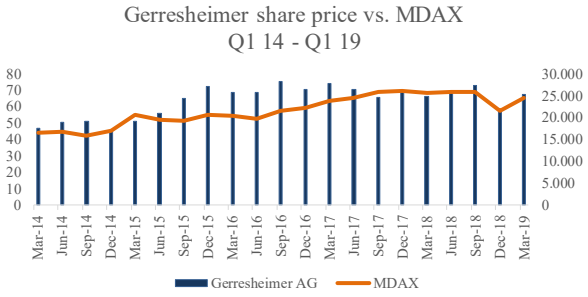


Figure-10: Gerresheimer share price MDAX-benchmarking (Reuters: March 19, 2019)

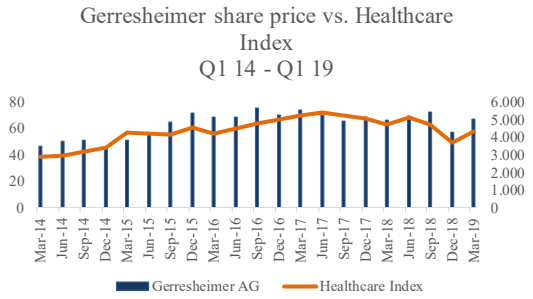


Figure-11: Gerresheimer share price Healthcare-benchmarking (Reuters: March 19, 2019)

4.1.2 Shareholder Structure

100% of Gerresheimer's shares are currently in free-float, according to the criteria of "Deutsche-Börse". The three main shareholders hold around 15,4% of the total 31,4 million shares, as per January 18, 2019 (Gerresheimer, 2019).

Company	Share in %
NN Group	5,20%
Stichting Pensioenfonds ABP	5,10%
BNP Paribas Investment Parnters S.A.	5,07%

Table-4: Gerresheimer´s main shareholder (Gerresheimer AG, 2019)

4.1.3 Historical Performance

The historical performance will be analyzed from 2014-2018 to make sure the whole business cycle of Gerresheimer is captured and will illustrate the impacts of the Sensile-acquisition. The consolidated Income Statement and Balance Sheet as reported, as well as necessary "Sensile-adjustments", are provided in appendix-3 & 4.

If not stated else, all data/information is taken from Gerresheimer´s annual reports (2014-2018).

4.1.3.1 Sensile-Medical Acquisition

In Q3 2018, Gerresheimer acquired Sensile for a maximum consideration of 335 EURm (161 EURm initial payment, 174 EURm allocated as liabilities; payment subject to milestones over the next 3 years). As the acquisition is assumed to be at fair-value, the maximum of the purchase price of 335 EURm represents the enterprise value (value of eebt and equity) of Atechs as of 30.11.2018.

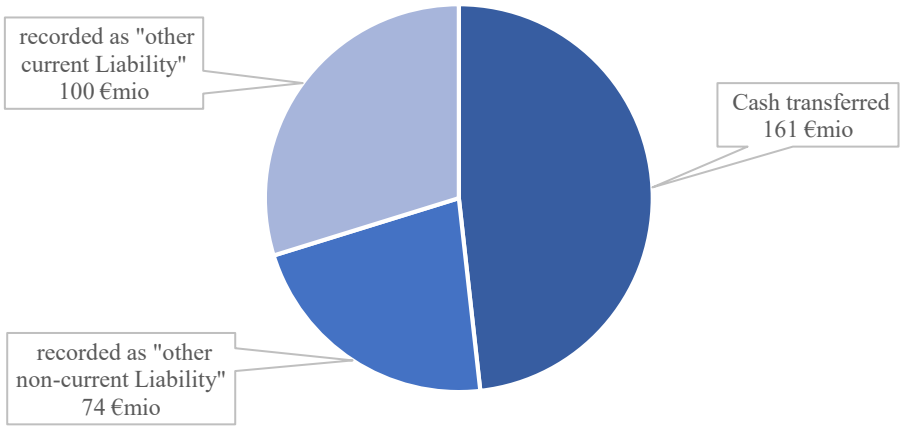


Figure-12: Allocation of max. consideration transferred (Gerresheimer, 2019)

As the company only presents its accounts on a consolidated basis, Sensile's figures will be deducted from the 2018 statements in order to present its impact.

4.1.3.2 Revenue performance

In 2018, Gerresheimer generated more than half of its total sales in Europe (56%) -including Germany – followed by North America and the Emerging Markets. Germany is the most important segment with a contribution to overall revenues of 22%. More detailed figures are attached in the appendix-5.

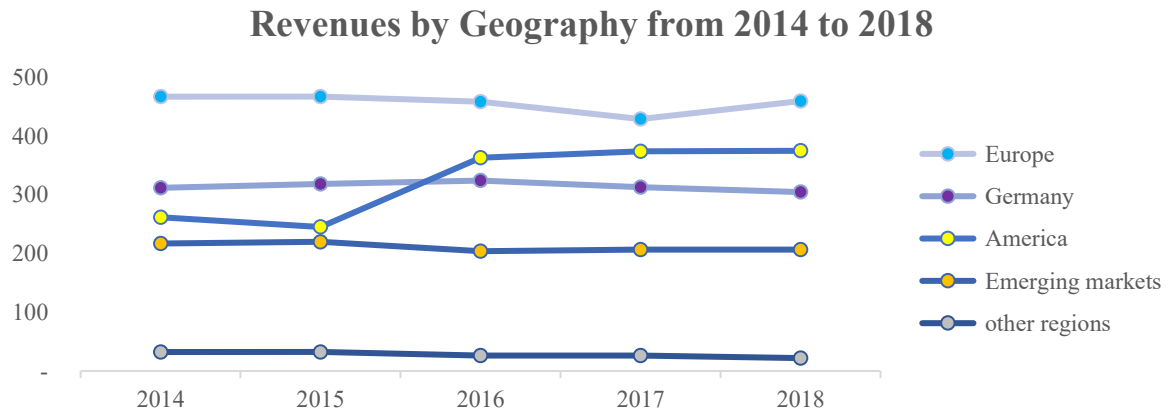


Figure-13: Revenues by geography 2014-2018 (Gerresheimer, 2019)

As for the revenue allocation per division, the "Plastic & Devices" business contributed with 55% (752 EURm) to the total revenue generation in 2018 and developed positively from 2014 onwards at a CAGR of 5,8%. This positive development is mainly due to the acquisition and inclusion of "Centor" in September 2015 (American subsidiary). The "Primary Packaging" unit reported sales of 605 EURm in 2018 which represents a share of 44% based on overall revenues. Its historical development has been slightly negative at a CAGR of -0,7%. Lastly, the newly acquired division "Advanced Technologies" contributed with 1% (13 EURm) to overall revenues.

€m	2014A	2015A	2016A	2017A	2018A	CAGR
Plastic & Devices	**599**	**645**	**765**	**757**	**751**	*5,84%*
y-y-growth in %		*7,8%*	*18,6%*	*-1,1%*	*-0,8%*	
Primary Packaging Glass	**622**	**651**	**611**	**592**	**605**	*-0,69%*
y-y-growth in %		*4,6%*	*-6,2%*	*-3,0%*	*2,2%*	
Life Science Research[5]	**87**					
y-y-growth in %						
Advanced Technologies					**13**	
y-y-growth in %						
Intercompany Sales	(18)	(13)	(1)	(1)	(2)	
Total	**1.290**	**1.283**	**1.376**	**1.348**	**1.368**	*1,47%*
y-y-growth in %		*-1%*	*7%*[6]	*-2%*	*1%*	

Table-5: Revenues by division 2014-2018 (Gerresheimer, 2019)

4.1.3.3 Cost Structure

According to Gerresheimer, the cost of sales (COGS) include "the cost of goods manufactured and sold and the purchase cost of merchandise". SG&A expenses consist of the "personnel and non-personnel expense for administrative functions as well as for the sales and distribution organization". D&A and Impairment charges are shared between COGS and SG&A-expenses.

Gerresheimer is an energy-intense business and relies on commodities, particularly on oil for the glass- and plastic production. Gerresheimer agreed on certain "price variation clauses" in some contracts that allow them to pass on changes in commodities to customers. Due to strong management-skills, Gerresheimer managed to delink itself from fluctuations in commodity prices and to keep a stable COGS-Margin of 70% on average. The increase of COGS in 2016 was mainly due to the acquisition and inclusion of "Centor". Detailed costs attributable to Sensile cannot be replicated. However, the impact is not material due to Sensile's small size.

[5] Sold as of October 31, 2016: divisions revenue and earnings were deducted from 2015 and 2016 results
[6] High revenue increases due to the inclusion "Centor" in the consolidated financials

€m	2014A	2015A	2016A	2017A	2018A	CAGR
COGS	**(934)**	**(909)**	**(944)**	**(934)**	**(968)**	*0,89%*
thereof D&A	*83*	*84*	*84*	*85*	*99*	
y-y-growth in %		*-3%*	*4%*	*-1%*	*4%*	
% sales	72%	71%	69%	69%	71%	
Gross Profit	**356**	**374**	**432**	**414**	**400**	*2,96%*
y-y-growth in %		*5%*	*16%*	*-4%*	*-3%*	
Gross Margin	28%	29%	31%	31%	29%	
SG&A	**(222)**	**(243)**	**(255)**	**(256)**	**(259)**	*3,96%*
Thereof D&A	*22*	*40*	*43*	*40*	*38*	
y-y-growth in %		*9%*	*5%*	*0%*	*2%*	
% sales	17%	19%	19%	19%	19%	

Table-6: Historical cost development (Gerresheimer, 2019)

4.1.3.4 Profitability

Table-7 provides profitability measurements and illustrates the impact of the Sensile-Acquisition. Sensile performed negatively, which leads to an improvement in net income, when not including it. Overall, EBITDA- and EBIT-margins are still in line with historical values and only changed marginally after the consolidation.

							Acquisition-impact		
€m	**2014A**	**2015A**	**2016A**	**2017A**	**2018A**	**CAGR**	**Sensile**	**2018A w/o**	**CAGR**
EBITDA	**235**	**306**	**307**	**306**	**277**	*4,16%*	3	**274**	*3,89%*
y-y-growth in %		*30,4%*	*0,1%*	*-0,3%*	*-9,5%*			*-10,5%*	
EBITDA-Margin	18,2%	23,9%	22,3%	22,7%	20,2%			20,2%	
EBIT	**130**	**182**	**180**	**181**	**139**	*1,79%*	(7)	**147**	*3,13%*
y-y-growth in %		*40,1%*	*-0,8%*	*0,2%*	*-22,9%*			*-18,7%*	
EBIT-Margin	10,1%	14,2%	13,1%	13,4%	10,2%			10,8%	
Net Income	**73**	**113**	**168**	**103**	**131**	*15,83%*	(7)	**138**	*17,36%*
y-y-growth in %		*54,6%*	*49,3%*	*-38,7%*	*27,2%*			*34,1%*	
NI-Margin	5,6%	8,8%	12,2%	7,6%	9,6%			10,2%	

Table-7: Profitability figures as reported (Gerresheimer, 2019)

The company made use of tax-loss carry forwards of 24 EURm in the last year leading to a comparatively high net income. Otherwise, the tax rate would have been 27,6% which would have resulted in a hypothetical net income of 77,6 EURm (6% of sales). An overview of the tax-rates is attached in appendix-20.

For valuation purposes, EBITDA and EBIT are usually adjusted for non-recurring items in order to provide a normalized view of the profitability of a company. (Rosenbaum et al., 2009) By doing so, one arrives at margins that are slightly lower, but more realistic given the M&A-activities in the past that led to several one time-effects. Examples of the biggest line-items are "one-off-income/expenses", that are directly linked to the "Centor-acquisition" and significantly influenced operating results.

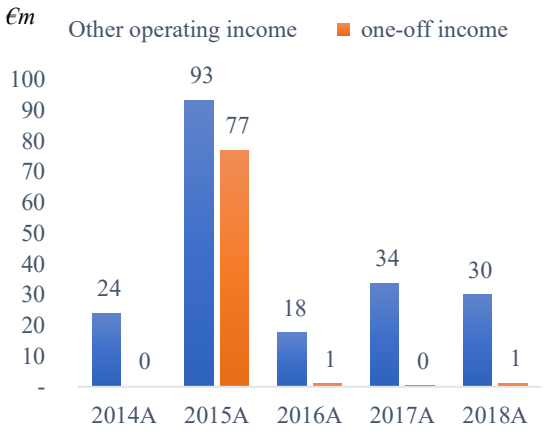


Figure-14: one-off income (Gerresheimer, 2019)

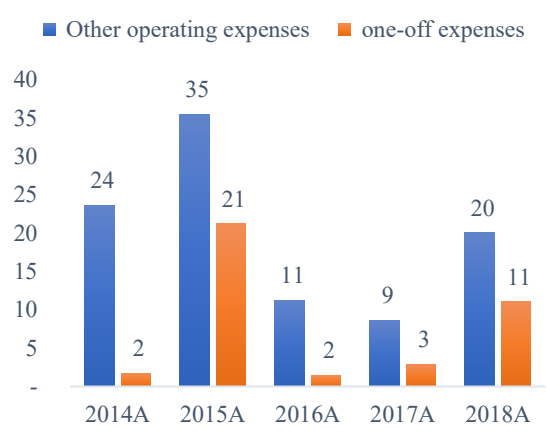


Figure-15: one-off expense (Gerresheimer, 2019)

The exclusion of non-recurring items results in lower margins as illustrated below:

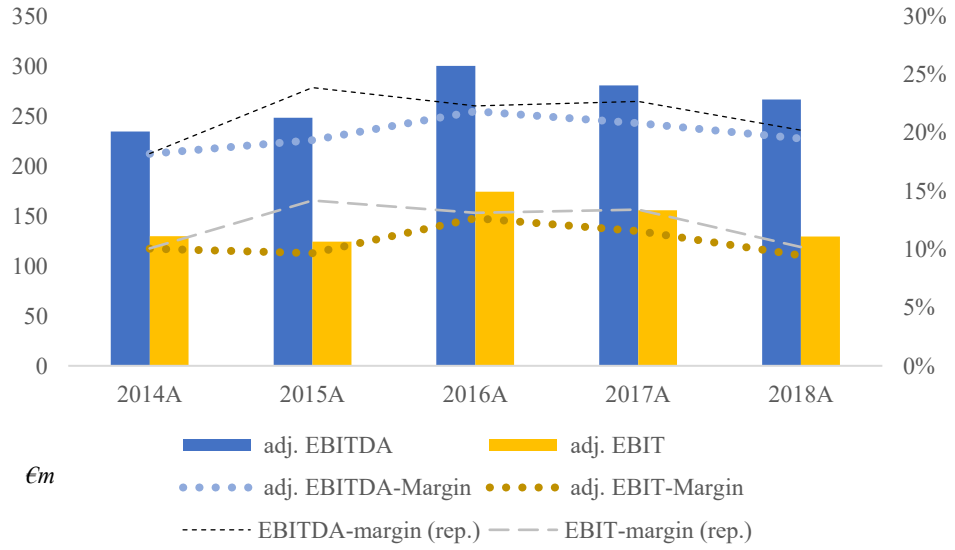


Figure-16: Adjusted EBIT(DA)-margins (Gerresheimer, 2019)

More information is provided in chapter 5.3.2 and the full derivation is shown in appendix-7.

4.1.3.5 D&A and Capex

Important items in Gerresheimer´s financials are D&A and capex. In the analyzed period, depreciation was on average 14,4% of PPE, while amortization amounted to 3,3% of Intangibles. D&A refer to PPE/Intangibles as of the end of the period. By excluding Sensile-Medical, amortization decreased slightly, but depreciation stayed constant as Sensile is mainly technology-driven and no material tangible assets were identified.

Capex decreased steady since 2014 and amounted to 9,0% of total sales in the same period, or 8,9% excluding Sensile. Most of the investments, are allocable to tangible assets.

Historically, the company depreciated (617,39 EURm) slightly more than re-invested (599,0 EURm) which equals a percentage-relationship of D&A and capex of 103,6%. the focus of last year's capex was the expansion of the inhaler production in the US and Czech Republic and the general production plant modernization/automation in Germany and US.

							Acquisition-impact		
€m	**2014A**	**2015A**	**2016A**	**2017A**	**2018A**	**Mean**	**Sensile**	**2018 w/o**	**Mean**
Amortization	19	42	41	36	45		10	34	
% Intangibles	*3,5%*	*3,4%*	*3,4%*	*3,3%*	*3,2%*	*3,3%*		*3,2%*	*3,3%*
Depreciation	86	82	85	89	92			92	
% PPE	*14,8%*	*13,6%*	*14,0%*	*14,8%*	*14,9%*	*14,4%*		14,9%	*14,4%*
Total D&A	**105**	**124**	**126**	**125**	**137**			**127**	
% sales	*8,1%*	*9,7%*	*9,2%*	*9,3%*	*10,0%*	*9,3%*		*9,3%*	*9,1%*
Capex (tangible)	123	122	109	99	110		0,45	109	
% sales	*9,5%*	*9,5%*	*7,9%*	*7,3%*	*8,0%*	*8,5%*		*8,0%*	*8,5%*
Capex (Intangible)	3	4	4	20	5				
% sales	*0,3%*	*0,3%*	*0,3%*	*1,5%*	*0,4%*	*0,5%*			
Total Capex	**126**	**126**	**113**	**119**	**115**			**109**	
% sales	*9,8%*	*9,8%*	*8,2%*	*8,8%*	*8,4%*	*9,0%*		*8,0%*	*8,9%*

Table-8: Overview D&A and Capex; 2014-2018 (Gerresheimer, 2019)

4.1.3.6 Financial Position

As illustrated in Table-9, the financial position developed stable despite several M&A-activities. The figures are based on book values and refer to "Post-Sensile-Acquisition" as the data presented by Gerresheimer does not allow a more detailed breakdown. Net debt was computed by deducting the cash position (all cash is assumed to be excess cash) of the financial debt.

€m (book values)	2014A	2015A	2016A	2017A	2018A	CAGR
Net Debt	419	903	813	881	942	*22,48%*
Net Debt / EBITDA	1,8x	3,0x	2,7x	2,9x	3,4x	*17,58%*
Fin. Debt / Assets	0,3x	0,4x	0,4x	0,4x	0,4x	*4,50%*
Fin. Debt / Equity	0,9x	1,6x	1,2x	1,3x	1,1x	*5,20%*
EBIT interest coverage ratio	1,1x	1,0x	1,0x	1,0x	1,2x	*1,99%*
Cash	73	68	94	118	80	*2,21%*
Cur. Assets / Cur. Liabilities	1,1x	0,8x	1,0x	1,1x	0,7x	*-9,34%*

Table-9: Financial position 2014-2018 (Gerresheimer, 2019)

The financial debt consists mainly of promissory- and syndicated loans as shown in Figure-17. Compared to its peers, Gerresheimer is slightly more leveraged. The peer group Net Debt/EBITDA ratio (LTM-median) is 1,8x.

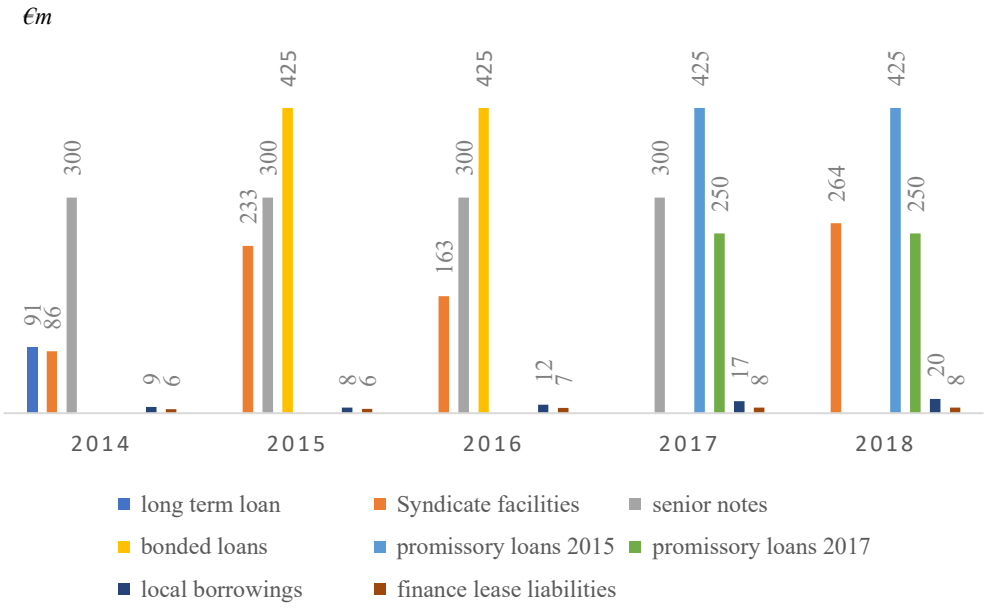


Figure-17: Financial Debt (Gerresheimer, 2019)

4.1.4 Gerresheimer's strategy moving forward

The new CEO, Dietmar Siemssen, switched to "attacking-mode" according to Februaries earnings call and focuses on tackling opportunities arising from the latest megatrends.

Siemssen seems to have a structured idea on how to improve operational performance, productivity and profitability. In the past, Gerresheimer struggled in providing promising growth and was engaged in organizing the business and managing its acquisitions. According to Management, the company does not plan any further M&A-activities and is expecting organic sales growth of 4-7% until 2022.

Siemssen wants to further focus on quality and puts a lot of trust on Sensile-Medical. Given the high variable consideration of the purchase price, the success of the division will be highly dependent on the attainability of the milestones set.

5 Valuation

5.1 Valuation approach

The Valuation of Gerresheimer will be conducted based on the 30.11.2018. (end of the fiscal year) If available, all information will be sourced as of this date.

For the purpose of this thesis, the DCF- and the trading multiples-approach have been chosen as most applicable. The enterprise value will be determined using the sum-of-the-parts method, as illustrated in Figure-18. Thus, the core-units P&D and PPG will be projected on a consolidated basis, while Atech will be excluded from the accounts and valued based on its fair market value. The newly generated unit will be covered in chapter 5.2, whereas chapters 5.3 and subsequent refer to the core-business.

The output will be benchmarked using a set of trading multiples derived from the financials of comparable companies. For this purpose, a peer group will be selected.

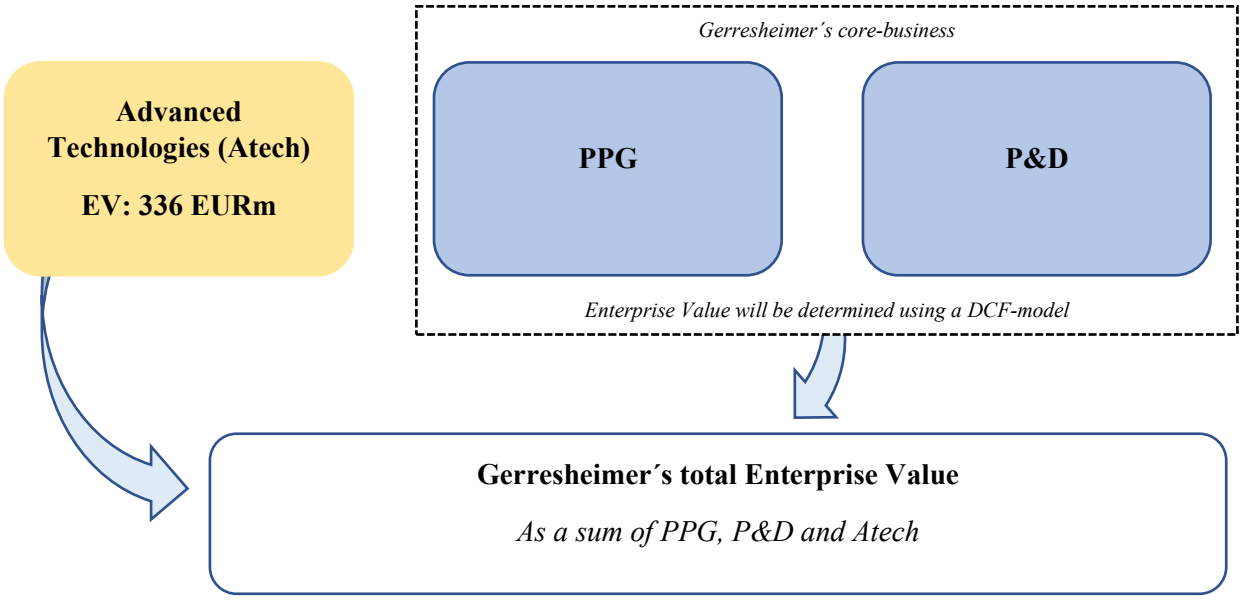


Figure-18: Valuation approach

5.2 Advanced Technologies

Due to the lack of historical information, it is not possible to reasonably forecast Atech´s financials. Hence, the purchase price is assumed to be measured at fair value and will be added to the enterprise value derived by the sotp-DCF of the remaining business units.

The purchase price (fair value) of Sensile/Atech amounts to 335,754 EURk, of which 175 EURm are dependent on milestones throughout the next 3 years. The purchase price could mainly be allocated to R&D, technology, patents, contracts and other intellectual property. No material tangibles were identified, making the division solely technology driven.

Through the newly generated division, Gerresheimer's plans to get access to more lucrative customer relationships and to move up the "drug value chain" – especially in the Parkinson-pumps-business; a market that is roughly valued at 3,4 USDbn according to Hock & Aufhäuser (2019).

5.3 Financial Forecast – Core Business

In the following, Gerresheimer's core business financials are projected based on the data as of 30.11.2018. The forecast is modeled from 2019 to 2023, including terminal value adjustments. The corresponding financial statements (excluding Sensile/Atech) are projected in appendix-8 to-10. The underlying data for the projection period is taken from the sources as quoted in Chapter 3-4.

5.3.1 Revenues

Revenues are projected separately based on division specific drivers and expectations. Figure-19 provides a summary of the developments as discussed in Chapter 3.2.1.

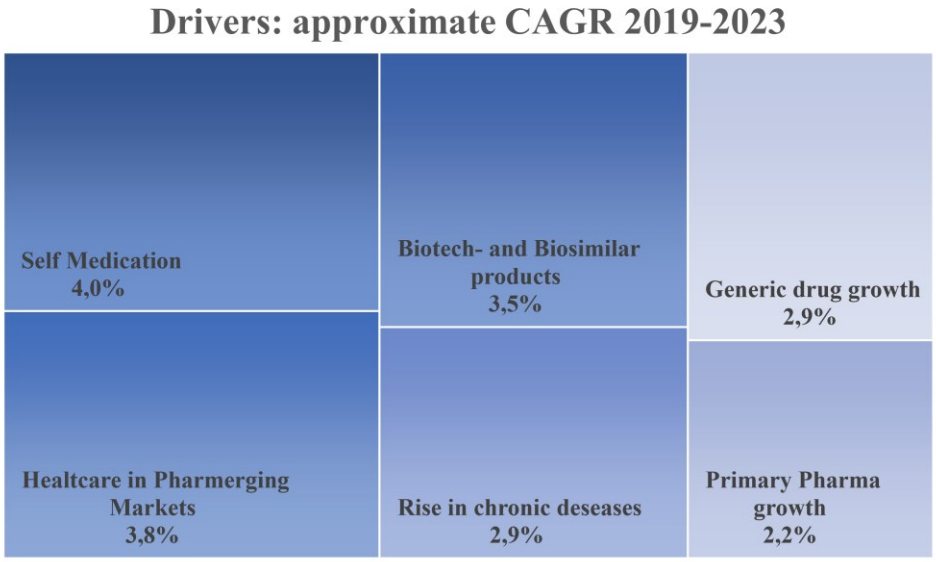


Figure-19: Drivers: approximate CAGR 2019-2023

A weighted average of the above trends is applied and afterwards adjusted for different projects and expectations. It is assumed that intercompany sales are zero in the explicit period as there is no indication to assume differently and as intercompany sales were negligible in 2018 (0,1% of total revenues).

In 2018, sales were assumed to grow by 4-5% according to Management´s mid-term guidance for the fiscal-year 2018. This was missed by 2,5-3,5% compared to a reported CAGR of 1,5% in 2018. Thus, 2019's Management expectations of 4-7% might also be less meaningful.

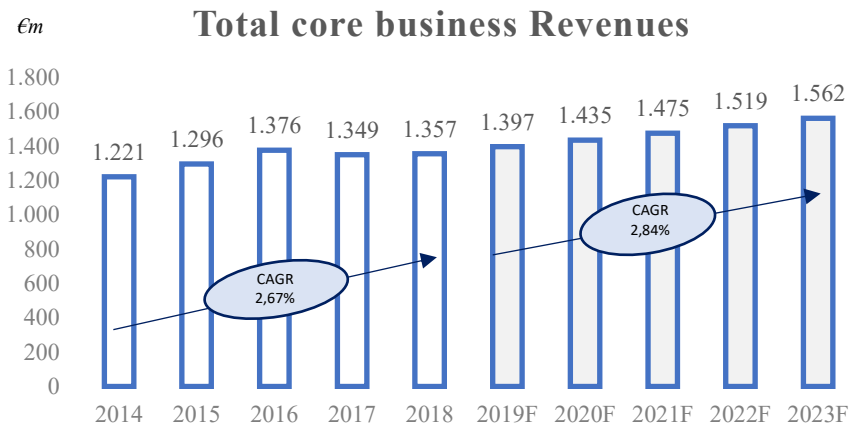


Figure-20: Revenues development – core business

5.3.1.1 Plastic & Devices

The Plastic & Devices division is Gerresheimer's biggest unit in terms of revenue generation. Sales are expected to grow less than historical rates due to non-organic growth in 2015/2016 that inflated sales.

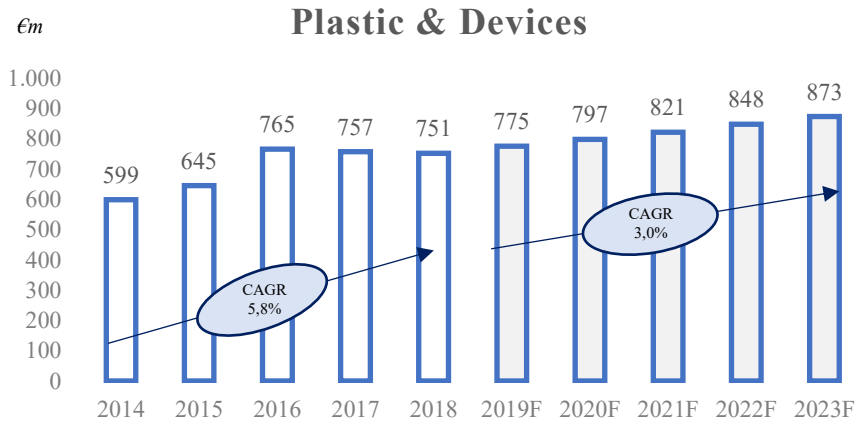


Figure-21: Revenue development P&D

It is assumed that revenues are tied with pharma growth of 2,2% and generic-/biosimilar products growth of 3,5% as well as other megatrends. Furthermore, given Gerresheimer's recent cooperation with Sanofi, who exchanged its animal health business with Boehringer-Ingelheim's consumer healthcare business (self-medication), orders from Sanofi for insulin-products in the self-medication area are expected to increase.

Additionally, new inhalation contracts worth 30,0 EURm per year are taken into consideration, as stated in the Management´s presentation in the earnings call 2019. High capex in 2019 and 2020 will allow to meet the increased demand and is modeled to additionally pay off from 2022 onwards. (appendix-6a) provides more information regarding the sales evolution)

€m	2019F	2020F	2021F	2022F	2023F
Market Growth / Megatrends	773	795	819	844	869
Plus: New inhaler projects	*30*	*30*	*30*	*32*	*32*
Less: Expiration of projects	*(28)*	*(28)*	*(28)*	*(28)*	*(28)*
Net Market outperformance	2	2	2	4	4
Total Revenue	777	799	823	852	877
	3,4%	*2,9%*	*2,9%*	*3,5%*	*3,0%*

Table-10: Revenue derivation P&D

Although, Gerresheimer presented promising projects in its 2019 earnings call, author´s forecast is on the lower end of management expectations that projected sales to be up to 4-7% from 2018 onwards. This is mainly due to the expiration of projects with Pfizer and the trend towards non-plastic products. In line with consensus (ranging between 3% and 5%), Management expectations were considered as being too optimistic and more conservative models are presumed to be more accurate.

5.3.1.2 Primary Packaging Glass

The revenue figures of the PPG business are expressed in Figure-22:

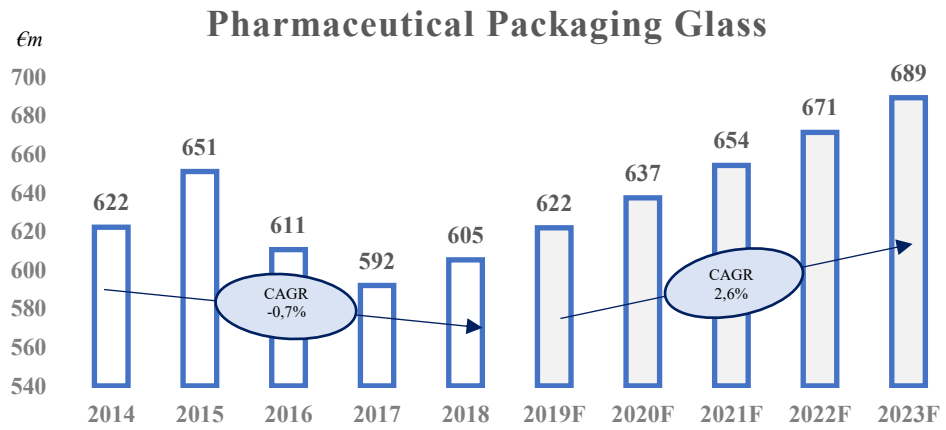


Figure-22: Revenue development PPG

The underlying assumption of the revenue growth in the glass business is the mission of the new CEO to bring the glass business "back on track" by focusing on "growth and excellence".

Like for the Plastic division, first the drivers are projected and then company specific adjustments are pursued. The Glass unit is following the pharma growth (2,2%) as well as the generics- and biosimilar growth. The last two are expected to impact the glass business slightly less (2,6% and 2,0% respectively) as they are less common for liquid drugs. Market growth is exceeding historical growth in the explicit period, mainly due to the confidence of the new CEO in the glass business and the possible decrease in demand in the plastic sector. (A detailed revenue forecast is provided in appendix-6b)

Gerresheimer is a main supplier for heparin pre-fillable syringes and gained new customers that add additional 20,0 EURm of revenue per year. The heparin projects are Gerresheimer's most promising ones and will maintain relatively strong in the upcoming years.

Glass business's sales are below management assumptions mainly due to the shutdown of two of Pfizer's facilities in India as a reaction of falling demand in the injectable penicillin business. (Mathias, 2019) According to own research based on historical values, the corresponding impact on the unit´s sales is measured at 18,0 EURm. Overall, the unit is projected to grow 2,6% per year.

€m	2019F	2020F	2021F	2022F	2023F
Revenues from market growth	620	635	652	669	687
Plus: New syringes contracts	20	20	20	20	20
Less: Pfizer and other contract losses	(18)	(18)	(18)	(18)	(18)
Net Market outperformance	2	2	2	2	2
Total Revenue	624	639	656	673	691
	3,1%	2,5%	2,6%	2,6%	2,7%

Table-11: Revenue derivation PPG

5.3.2 Cost Structure

Gerresheimer does not report detailed information about their cost structure and values cannot be reasonably broken down to its divisions. According to Management, less information is provided as the cost structure represents their competitive advantage. Therefore, function costs follow a stable gross margin of 29,6%, as illustrated in Figure-24. This is on the rather higher end of historical values (chapter 4.1.3.3) due to automation and modernization improvements in Gerresheimer's facilities.

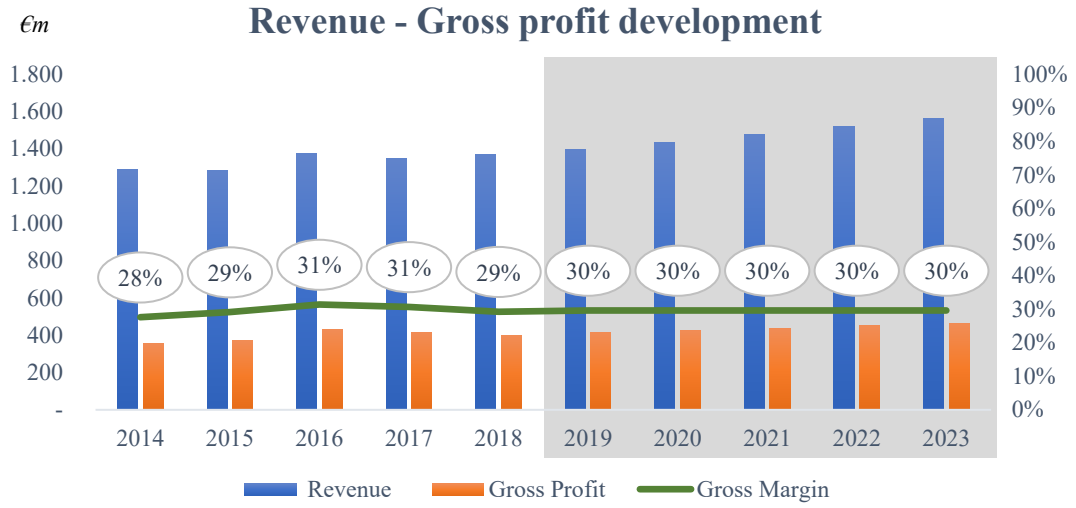


Figure-24: Relationship between revenues and gross profit

An overview of the cost-development, as a percentage of sales, is shown in Figure-23. SG&A are following stable historical values of 18,5% of sales, except for 2019 and 2020 where it increases by 0,3%. Non-recurring items, as for example income/losses from derecognition of liabilities or from the disposal of assets and similar items as stated in appendix-7, are not included in the forecast. They are not likely to persist continuously, and no historical pattern could be discovered. Furthermore, exchange gains were 0,03% of sales on average over the last 5 years and will not be projected due to its low impact and the lack of information. Similarly, R&D (0,19% of sales - historical average) is considered as not relevant, as Gerresheimer is not active in R&D since the sale of its research-department in 2016.

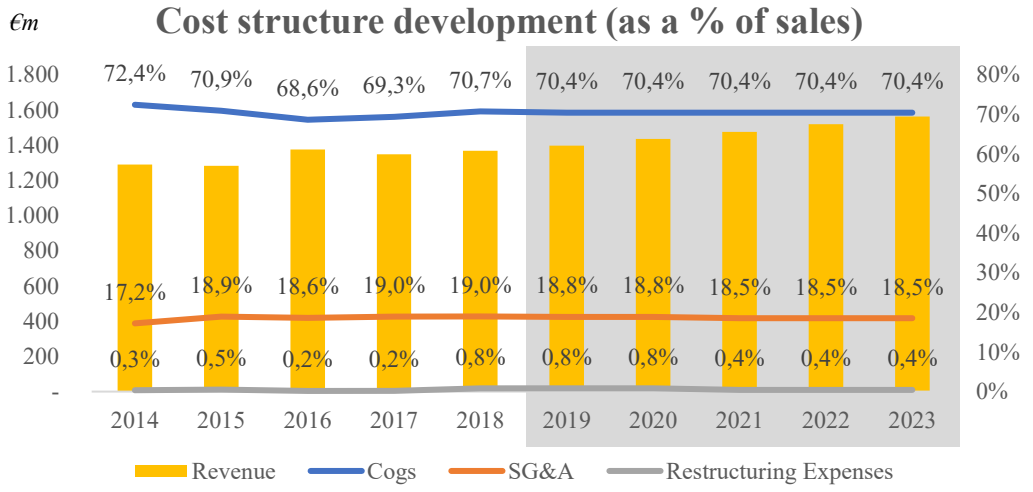


Figure-23: Cost-structure development as a % of sales

Any potential "other operating income/expenses" are expected to offset each other and have thus no impact on the valuation. Restructuring expenses, that fall under the IFRS (IAS 37) regulations, are considered as recurring. Given the non-organic growth and capex increases in the past years as well as planned in 2019–2020, Gerresheimer is expected to be subject to higher

expenses in that regard. Therefore, restructuring expenses are included in the model and expected to be 0,8% (in line with 2018´s values) of sales in 2019 and 2020 and 0,4% (historical average) in the following years.

Figure-25 illustrates the cost-items in absolute values.

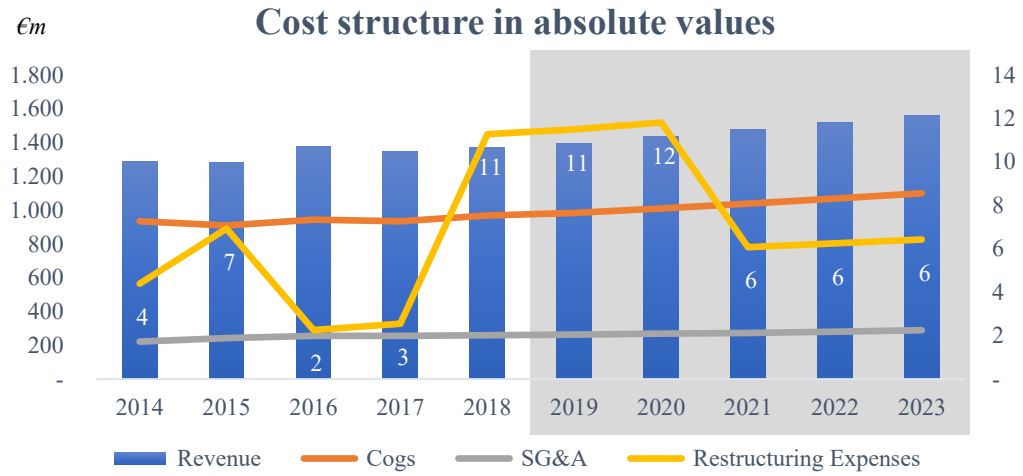


Figure-25: Cost structure development -absolute values (restructuring exp. being on the secondary axis)

5.3.3 EBIT/DA

Below, EBIT and EBITDA are projected, excluding Sensile-Medical:

€m	14A	15A	16A	17A	18A	19F	20F	21F	22F	23F	TV
EBITDA	**235**	**306**	**307**	**306**	**274**	**269**	**279**	**294**	**300**	**307**	**314**
Margin	*18,2%*	*23,9%*	*22,3%*	*22,7%*	*20,2%*	*19,2%*	*19,5%*	*20,0%*	*19,7%*	*19,7%*	*19,7%*
EBIT	**130**	**182**	**180**	**181**	**147**	**139**	**143**	**158**	**162**	**167**	**170**
Margin	*10,1%*	*14,2%*	*13,1%*	*13,4%*	*10,8%*	*10,0%*	*10,0%*	*10,7%*	*10,7%*	*10,7%*	*10,7%*

Table-12: EBIT(DA) development

EBIT is modelled based on the forecasts of revenues and costs in line with historical figures. Given the competitiveness of the industry, historical margins (EBITDA-margin along with peers average is shown in Figure-26) have been in line with its peers, which is assumed to retain in the future in order to not be significantly more/less profitable than its environment.

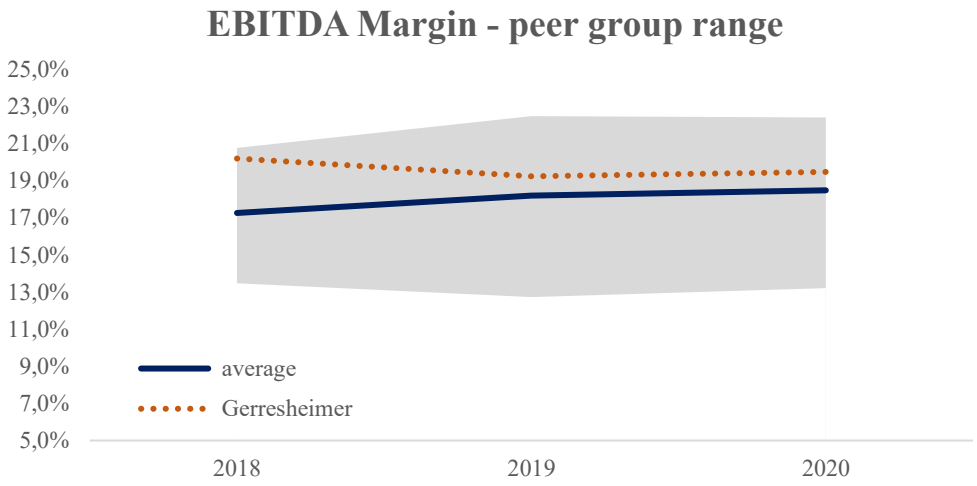


Figure-26: EBTIDA-margin; peer comparison

As illustrated below in Figure-27, EBIT margin will decrease marginally in 2019 and 2020 due to slight increases of SG&A and restructuring expenses that come in line with Gerresheimer´s growth path. From 2021 onwards, margins will go back to normal levels. Lastly, EBITDA is calculated by adding back D&A. Compared to reported historical values, margins are slightly lower in the projected period, but in line with historical adjusted values. This is due to several one-times-effects in the past, especially in the light of disposals of business units, that positively affected margins and are not included in the forecast. EBITDA-margin in TV matches with last planning's years´ value.

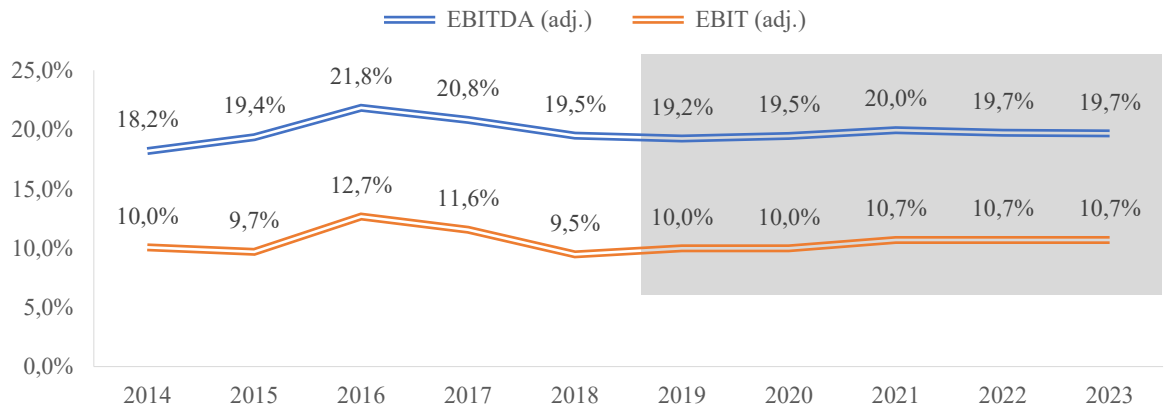


Figure-27: adjusted EBIT(DA) and projection

5.3.4 Capital expenditures and D&A

As suggested by Koller et al., (2015), PPE should be a function of revenues, as PPE/revenue-ratios tend to be quite stable over long periods. In Gerresheimer´s case, PPE increases in 2019 and 2020, as predicted by the management and follows a stable ratio of 49% afterwards. Similarly, intangibles are linked to revenues, but decrease throughout the explicit period as no more non-organic activities are planned, that would allow the identification of intangibles in the course of a purchase price allocation. Furthermore, as Gerresheimer´s core-business is tangible-focused, intangibles are expected to decrease by 3% per year.

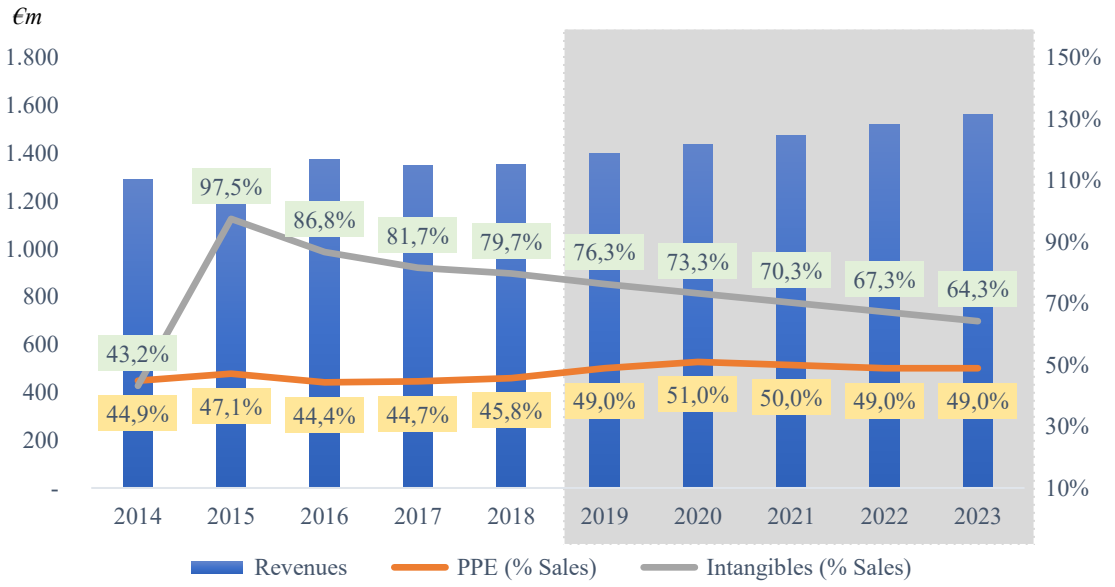


Figure-28: PPE/Intangibles development

D&A is following a function of PPE/Intangibles at the end of the year as illustrated in Figure-29. Particularly, depreciation is modeled as 15,3% of PPE in line with historical values and management guidance. Management presented several investment projects that justify the growth in PPE, accompanied by deprecation increases.

Amortization follows a 2,4%-margin of intangibles constantly and is lower than historical values, due to impairment losses following the acquisition of "Centor" in 2015 that biased the financials.

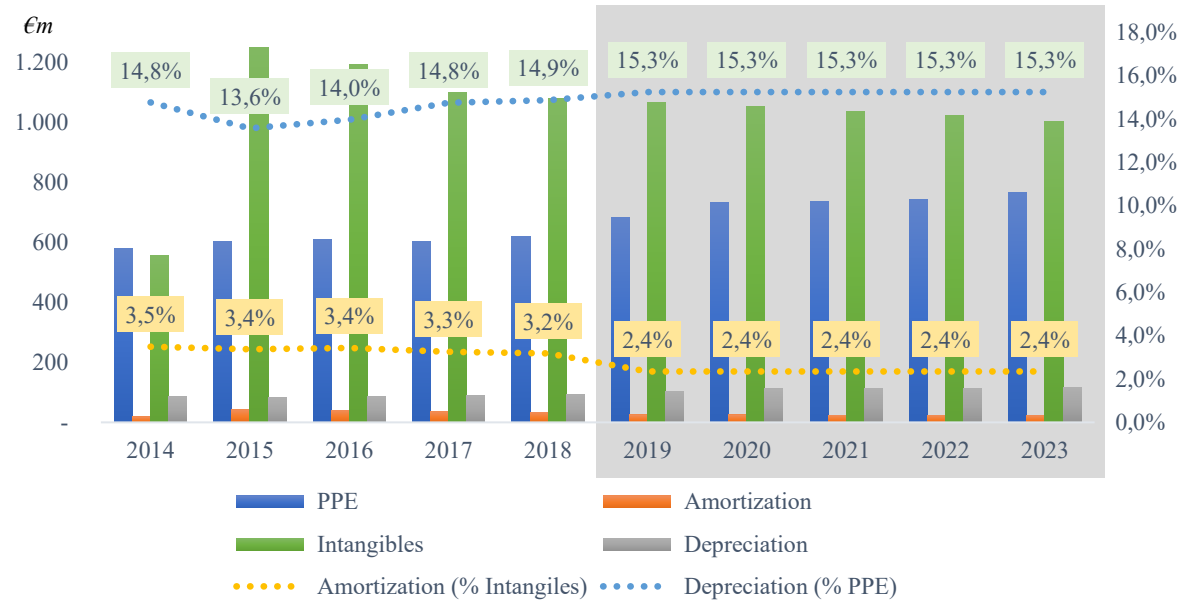


Figure-29: D&A development

In order to complete the PPE/Intangibles computation, one has to compute investments; capex represents the difference between the asset´s value at the beginning of the period, less current years D&A and asset´s value at the end of the period, as calculated using a function of sales. The computation is in line with Management's estimation of capex being between 8-12% of sales, where the higher end should be at the beginning of the explicit period. Detailed figures of D&A/Capex- and PPE/Intangibles-computation is provided in appendix-14 &-15.

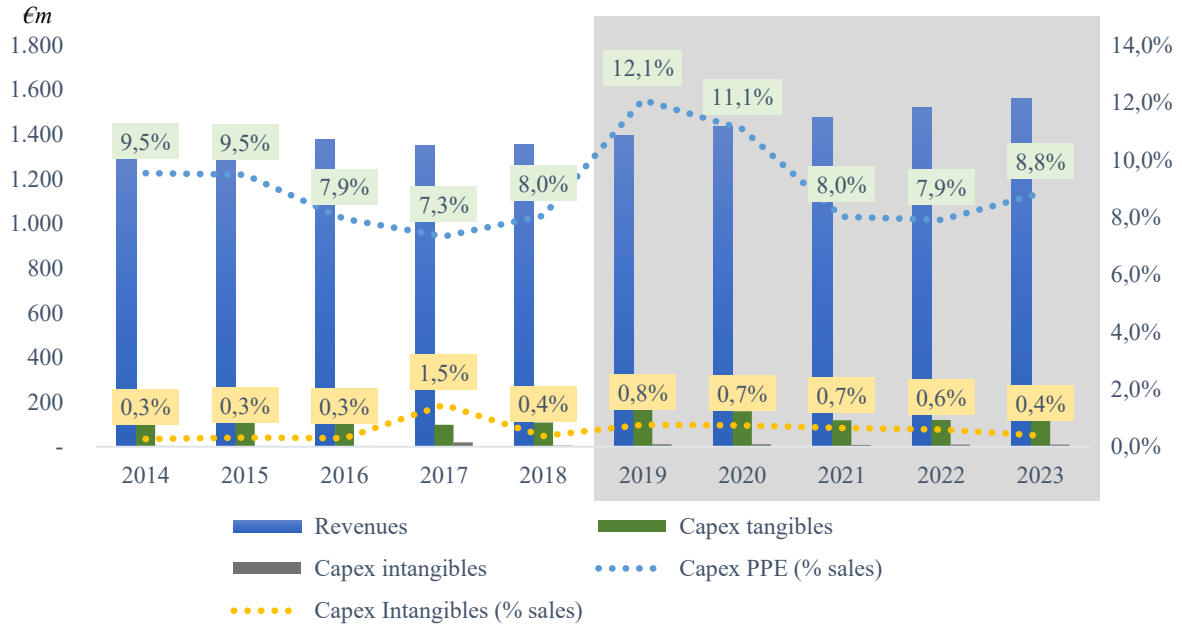


Figure-30: Capex development

Finally, for TV purposes, it is assumed that D&A and capex converge over time and company's asset base will stay constant in perpetuity. Thus, they are neither growing nor decreasing faster than depreciation.

5.3.5 Net Working Capital

The change in working capital is computed by deducting non-cash operating current assets from operating current liabilities, taking into consideration the portion of operating long-term assets and liabilities.

Accounts receivable, inventory and accounts payable are projected based on days sales outstanding (DSO), days inventory held (DIH) and days payable outstanding (DPO) as an average of the last 5-years (illustrated in Figure-31).

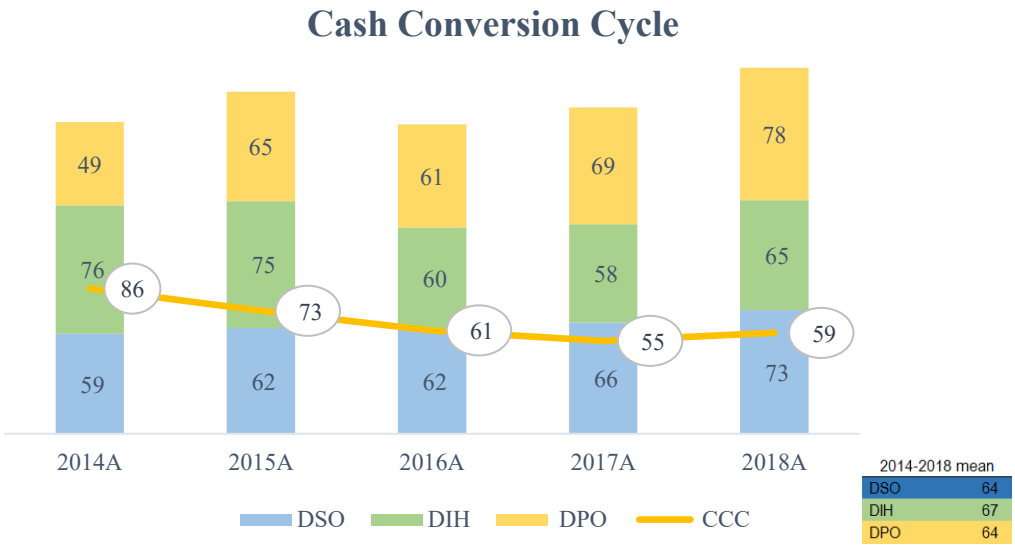


Figure-31: Cash conversion cycle in days

Deferred tax assets/liabilities are assumed to grow with operations (revenues) in line with historical values. All other NWC-items are projected as a percentage of sales in line with historical levels or stay constant. Change in NWC in the TV is following the historical net change as percentage of revenue. Particularly, the average NWC-change from 2014-2023 (excluding 2015), was 0,5%, which is multiplied by sales and the TV growth rate.

The cash conversion cycle indicates that less cash is tied up from 2017 onwards compared to the past. As it cannot be predicted if this trend is sustainable, the whole 5-years' cycle was captured when calculating DSO, DIH and DPO. All underlying WC assumptions are illustrated in appendix-13.

€m	14A	15A	16A	17A	18A	19F	20F	21F	22F	23F
A/R	208	219	232	243	264	246	253	260	268	275
Inventory	194	186	155	148	171	180	184	190	195	201
Prepaid Expenses	4	4	5	3	5	4	4	5	5	5
Income Tax Receivable	5	5	8	4	7	5	5	5	6	6
Other receivables	24	29	21	19	24	24	23	22	21	20
Deferred Tax Assets	7	8	14	11	12	11	11	11	12	12
Deferred Tax Liabilities	(33)	(147)	(158)	(144)	(92)	(120)	(123)	(126)	(130)	(134)
Income Tax Liabilities	(22)	(55)	(25)	(9)	(5)	(7)	(8)	(8)	(8)	(8)
Other provisions[7]	(62)	(71)	(61)	(45)	(55)	(55)	(55)	(55)	(55)	(55)
A/P	(125)	(161)	(157)	(176)	(205)	(173)	(178)	(183)	(188)	(194)
Deferred Revenue	(44)	(31)	(30)	(28)	(35)	(35)	(36)	(37)	(38)	(39)
NWC	**158**	**(14)**	**4**	**26**	**92**	**79**	**81**	**83**	**86**	**89**
Δ in NWC	**(44)**	**(172)**	**18**	**22**	**66**	**(12,6)**	**2,1**	**2,3**	**2,7**	**2,7**
Δ in NWC as % of Revenue	*-3,4%*	*-13,8%*	*1,6%*	*1,6%*	*4,8%*	*-0,7%*	*0,1%*	*0,2%*	*0,2%*	*0,2%*
Mean Δ in NWC										*0,5%*

Table-13: Change in NWC

The change in NWC of -172 EURm in 2015 that led to a boost in FCFF, was mainly due to increases in deferred tax liabilities and accounts payable following the acquisition of "Centor".

5.3.6 FCFF

Based on the projected financials, the FCFF for the P&D and PPG units is illustrated below. A reformulated core FCF-derivation is provided in appendix-11.

€m	2014A	2015A	2016A	2017A	2018A	2019E	2020E	2021E	2022F	2023F	TV
EBIT	**130**	**182**	**180**	**181**	**147**	**139**	**143**	**158**	**162**	**167**	**170**
less: Taxes	(35)	(54)	(52)	(53)	33**	(38)	(39)	(43)	(45)	(46)	(47)
EBIAT	**95**	**128**	**128**	**128**	**180**	**101**	**104**	**114**	**117**	**121**	**123**
Plus: D&A	105	124	126	125	127	129	136	137	138	140	144
Less: CAPEX	(127)	(126)	(113)	(119)	(114)	(180)	(170)	(128)	(129)	(144)	(144)
Less: Δ in NWC	44,2	172,0*	(17,9)	(22,1)	(66,0)	12,6	(2,1)	(2,3)	(2,7)	(2,7)	(0,2)
FCFF	**118**	**299**	**123**	**112**	**126**	**63**	**68**	**121**	**123**	**114**	**123**

Table-14: FCFF derivation core business

*boost in FCF following the acquisition of "Centor"

**use of tax-loss carry forward

[7] Mainly personnel obligations and warranties

5.3.7 Terminal Value growth rate

Gerresheimer´s growth rate in perpetuity is assumed to be 2,25% following the formula in Figure-32. The value is derived by firstly analyzing the nominal GDP growth of the German economy (appendix-29 provides the computation). German`s economy was chosen as Gerresheimer is headquartered in Germany and as its GDP growth represents a good guidance of a developed environment. It is expected that emerging countries with a temporary high nominal GDP growth, will converge with German´s growth in perpetuity making their current status as a "fast-growing-economy" not sustainable.

Secondly, given the competitiveness of the industry, it is assumed that Gerresheimer´s TV growth rate should be in line with its peers. For that purpose, an implied TV growth rate of 1,9% based on an Exit-EBITDA-Multiple of 11x (peer group median-2019) is applied.

The third component is based on Gerresheimer´s expected long-term growth of 1,5% which is in line with historical performance and consensus estimates from equity reports. Finally, the average of the components was taken in order to arrive at a conservative TV growth rate of 2,3%. This matches with the estimated pharma long-term growth of 2,2% according to IQVIA, as well as the long-term inflation rate for Germany (2,2%, according to IMF). Appendix-30 provides sensitivities and hypothetical share price ranges.

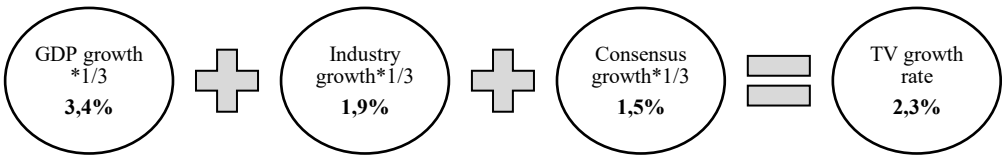


Figure-32: Terminal value growth rate derivation

5.4 Cost of Capital

The WACC, and its components, are presented "post-Sensile-acquisition" in order to reflect the undistorted risks and capital structure as of the valuation date. This assumption is supported by the low impact of the newly generated division and the lack of detailed public information in that regard.

5.4.1 Capital Structure

According to Gerresheimer, the current capital structure is in the best interest of its shareholders and management and will not change it significantly in the future. Therefore, the capital

structure at market value (net debt/market cap) as per 30.11.2018 is applied in the WACC-computation. The market value of equity is obtained by multiplying the share price as of 30.11.2018 with its shares outstanding. Market value of debt is computed by discounting future interest expenses and future debt-repayments to the valuation date using the cost of debt at market value as explained in chapter 5.4.6.

Debt @market-value	*€m*	1.003	
Less: Cash	*€m*	(80)	
Net Debt	*€m*	**923**	**Leverage**
Share price	*€*	63	**47%**
Times: Shares outstanding		31,4 m	
Market Cap	*€m*	**1.975**	

Table-15: Capital Structure at market values as per 30.11.2018

Gerresheimer plans to keep a rather stable payout-ratio for its shares. Historically, the dividends per share were 1,0€ on average (2014-2018) and are planned to stay constant at 1,1€ for the projected period. This represents a dividend yield of 1,4%. (appendix-12)

5.4.2 Beta

The levered beta is computed by regressing the MSCI World Index against the 5-years weekly returns of every single peer. The MSCI was chosen as it represents a global market-cap-weighted stock index of more than 1600 companies. Given that the beta is regressed on a 5y basis, the author made sure that a whole business cycle is captured and that impacts from 2008's financial crisis are excluded.

Secondly, the raw betas are adjusted according to Blume as stated in chapter 2.2.2.1.

Thirdly, every adjusted levered beta is unlevered using the capital structure of the individual peer company. It is assumed that the peers have already achieved their target capital structure. It is further assumed, that the market value of debt of the peers equals the book value. Companies with an R-square lower than 0,1 have been considered as not significant. In a next step, the weighted average is taken to arrive at a beta of **0,83**. Another possibility would be to take the raw-betas from sources as Reuters. However, as Reuters does not provide values as of the valuation date, the author considers the values derived by the regression analysis to be more accurate as of 30.11.2018. For comparison purposes, betas pulled from Reuters in the period of April to May, result in a beta of **0,85** which is in line with own calculations. The possible impact on the share price is low.

Finally, the unlevered beta is levered back using Gerresheimer`s capital structure at market value and the effective tax rate. An overview of the beta-derivation is attached in appendix-21.

5.4.3 Effective Tax Rate

The effective tax rate of 27,6% is obtained based on the annual report 2018. This is in line with 2019`s first quarter rate of 27,9%. Due to changes in US-tax law in 2017 and further changes coming in France in 2019, the effective tax-rate is difficult to measure, and historical rates before 2018 only provide a limited insight. Therefore, it will be subject to a sensitivity analysis.

5.4.4 Cost of Equity

As a risk-free rate, a 10y German government bond is applied as of valuation date. Regarding the computation of the equity-risk-premium, literature review showed (chapter 2.2.2) that one possible approach would be to derive the geometric mean of the total returns on the MDAX over a long period (to cover bullish and bearish markets). However, as this data is hardly available, a MRP of 7% in line with theory and recommendations was applied.

Figure-33: German government bond

By applying the CAPM, one arrives at a Cost of Equity of 8,1% as illustrated in Figure-34.

Figure-34: Cost of Equity derivation

As mentioned in chapter 2.2.2, no country risk premium will be added, as Gerresheimer is considered as being diversified, given its globally well spread facilities and sales-generation.

5.4.5 Cost of Debt

As Gerresheimer does not have traded bonds outstanding, the cost of debt is computed by using a synthetic rating based on the coverage ratio and the analogous credit spread. The coverage ratio (EBIT/interest expenses) equals 5,8x in Gerresheimer´s case which corresponds to an "A-rating" according to Damodaran´s table (appendix-32).

In a next step, an A-rated corporate bond (EUR Industrial; average of 45 euro-area rated corporate A-bonds) was sourced from Capital IQ as of 30.11.2018. (as illustrated in Figure-35 and in more details in appendix-19) Its maturity matches the average of the remaining term of the debt outstanding. Finally, as the credit spread represents the value of the corporate bond over the risk-free rate, a spread of 0,90% (4 years maturity) is derived. By adding the corresponding risk-free rate of -0,40%, and by applying the tax-shield, one derives at a cost of debt of 0,33%.

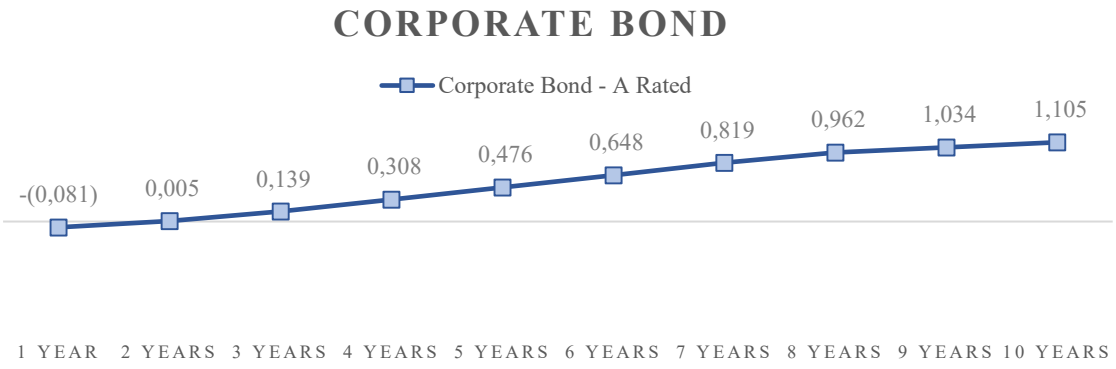


Figure-35: Corporate Bond

Figure-36: Cost of Debt

5.4.6 Market Value of Debt

To determine the market value of debt, first the interest payments per year are computed and discounted to the valuation date using the cost of debt of 0,3%. Similarly, the debt repayments are discounted and added to the present value of the interest payments to derive at a total of 1 EURbn. This includes 8 EURm of financial leases, of with the market value equals the book value as it is presented at fair value at the end of the fiscal year in the annual report.

€m	Amount in EUR	Start	Maturity	Due in (years)	Interest	Interest per year	Fair Value
Promissory loans	170	2015	2020	2	1,0%	1,7	172
	20	2015	2020	2	0,8%	0,2	20
	160	2015	2022	4	1,4%	2,3	167
	50	2015	2022	4	1,0%	0,5	51
	26	2015	2025	7	2,0%	0,5	29
	90	2017	2022	4	0,8%	0,7	92
	6	2017	2022	4	0,6%	0,0	6
	105	2017	2024	6	1,3%	1,3	110
	5	2017	2024	6	0,8%	0,0	5
	45	2017	2027	9	1,7%	0,8	51
Liabilities to Bank	189	2014	2019	1	5,3%	10,0	197
	12	2014	2019	1	2,1%	0,3	13
	80	2014	2019	1	0,8%	0,6	80
	0,05	2014	2019	1	26,3%	0,0	0
	3	2014	2019	1	9,3%	0,3	3

Table-16: Market value of debt

5.4.7 WACC

By applying the individual components, the author arrives at a base-case WACC of 5,6%. A full derivation is provided in the appendix-18.

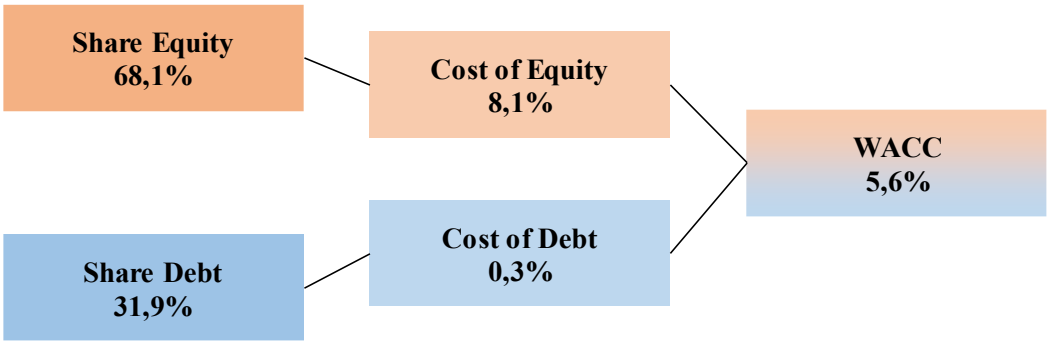


Figure-37: WACC derivation

5.5 Sum of the parts DCF

Based on the FCF one can perform the DCF-valuation in order to compute the share price. A complete set of the DCF valuation is provided in Appendix-33.

	30.11.2018	2019F	2020F	2021F	2022F	2023F	TV
FCF		63,4	68,2	120,6	123,1	114,4	123,2
WACC	5,62%						
TV growth	2,25%						
Mid-year convention		0,5	1,5	2,5	3,5	4,5	5,5
PV factor		*0,97*	*0,92*	*0,87*	*0,83*	*0,78*	*23,23*
PV of FCF		**61,7**	**62,9**	**105,2**	**101,7**	**89,5**	**2.861,5**

Table-17: PV of Free-cash-flow

The enterprise value equals the sum of the individual present values of the free cash flows including the terminal value. The TV is obtained by applying the perpetuity-growth-formula on the FCF of the "terminal-value year". A mid-year convention is applied, as Gerresheimer´s cash flows are received throughout the year rather than at year-end. This results in a slightly higher valuation since the FCFs are received sooner.

The purchase price of Sensile (at fair value) is added to the sotp enterprise value to arrive at Gerresheimer´s total firm value of 3,6 EURbn.

in €m **Enterprise Value**	
Cumulative PV of FCF	420,9
Terminal Value	2.861,5
in % of (core) Enterprise Value	*87,2%*
Enterprise Value PPG and P&D	3.282,4
Enterprise Value Adv. Technologies	334,8
	3.617,1
Implied Exit-Multiple	**12x**
implied perpetuity growth (Peer Exit-Multiple)	**1,9%**

in €m **Equity Value**	
Enterprise Value	3.617,1
Plus: Cash	*79,8*
Less: Debt	*(1.002,8)*
Less: NCI	*(76,2)*
Less: Pensions and others	*(184)*
Adjustments to EV	(1.182,9)
Equity Value	**2.434,2**
Shares Outstanding (m)	*31,4*
Share Price (30.11.2018)	**78**

Table-18: Enterprise – Equity Value

As illustrated Figure-38, in excess cash, market value of debt, non-controlling interests as well as other items as illustrated above, are deducted/added-back from the enterprise value to arrive at the equity value. The market value of non-controlling interests are computed using an industry P/BV-multiple of 4,36x according to Damodaran (2019).

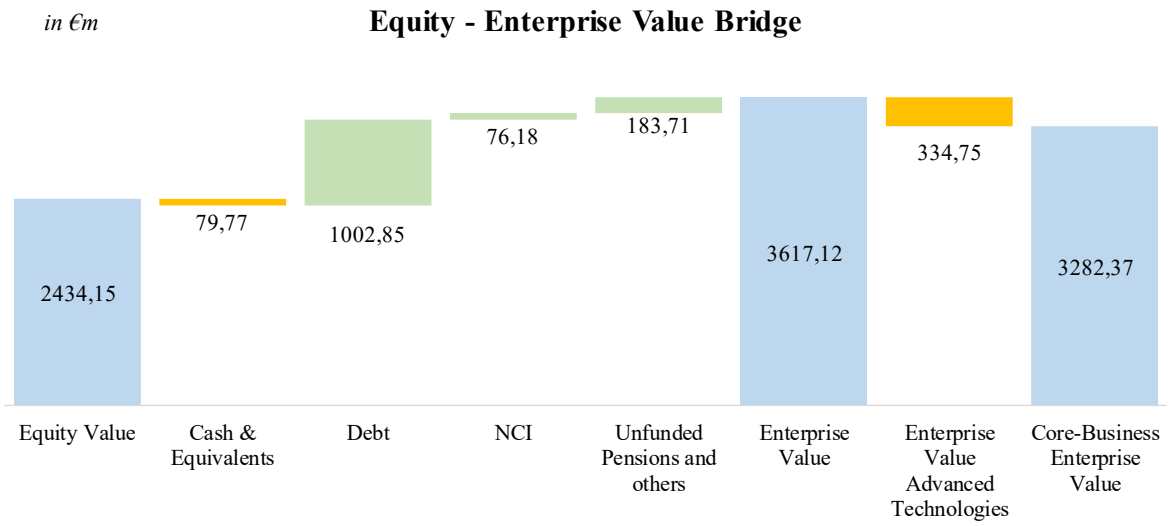


Figure-38: Equity-bridge

Afterwards, the equity value is divided by the number of outstanding shares (31,4m) to obtain the share price of €78 (outperform). This represents an upside potential of 15% compared to the share price of €69 as per 8th of May, 2019. Compared to the price as of valuation date (€63), the target price represents an upside-potential of 24%.

In conjunction with the perpetuity growth model, an Exit-multiple based on EBTIDA of the terminal year was computed. Gerresheimer´s implied Exit-multiple is 12x, whereas forward peer-group multiples average at 15-13x (forward year 1 to year 3).

Figure-39: Buy-recommendation

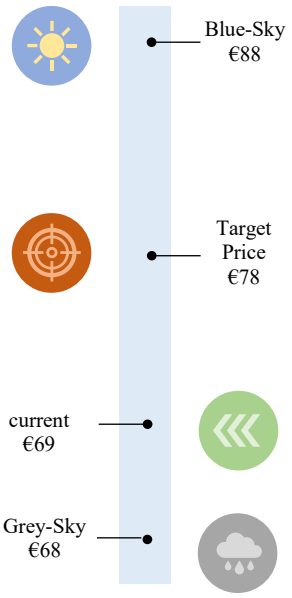
5.6 Sensitivity Analysis

The **"Base-Case"** (target price) represents the main scenario applied in this valuation using the inputs as described in the previous chapters.

The **"Blue-Sky"** valuation is arrived by applying an underlying growth of 5% per year, assuming strong contribution from new products.

The **"Grey-Sky"** scenario is assuming a revenue growth of 1% due to the lack of contribution from new products and a poor pharma market situation.

The **"current price"** is based on the share price as per 08.05.2019.



Other sensitivity analyses are based on variations of the WACC and the terminal value growth rate as illustrated in Table-19:

Enterprise Value

WACC \ TV	1,9%	2,1%	2,3%	2,5%	2,7%
4,6%	4.388	4.677	5.016	5.417	5.899
5,1%	3.763	3.965	4.194	4.459	4.766
5,6%	3.304	3.452	**€3.617**	3.803	4.015
6,1%	2.952	3.065	3.189	3.327	3.481
6,6%	2.675	2.763	2.859	2.965	3.081

Share price

WACC \ TV	1,9%	2,1%	2,3%	2,5%	2,7%
4,6%	102	111	122	135	150
5,1%	82	89	96	104	114
5,6%	68	72	**€78**	83	90
6,1%	56	60	64	68	73
6,6%	48	50	53	57	60

Implied EV/EBITDA Exit-Multiple

WACC \ TV	1,9%	2,1%	2,3%	2,5%	2,7%
4,6%	15	16	17	19	20
5,1%	12	13	14	15	16
5,6%	11	11	**12,0x**	13	14
6,1%	9	10	10	11	12
6,6%	9	9	9	10	10

Implied EV/EBTIDA Y1

WACC \ TV	1,9%	2,1%	2,3%	2,5%	2,7%
4,6%	16	17	19	20	22
5,1%	14	15	16	17	18
5,6%	12	13	**13,5x**	14	15
6,1%	11	11	12	12	13
6,6%	10	10	11	11	11

Table-19: WACC/TV-growth sensitivities

Additionally, Table-20 shows further share price sensitivities by varying critical input factors. As expected, the assumptions made regarding the tax-rate and mid-year convention are rather insignificant compared to changes in EBIT-margin, Beta or Cogs.

Cogs	+-1,5%	63	*78*	94
EBIT-margin	+-1,5%	64	*78*	82
Tax-rate	+-2%	77	*78*	80
Mid-year convention	N/Y	76	*78*	78
Beta	+-0,1	61	*78*	103

Table-20: Additional sensitivities

Although, changes in gross-margins are unlikely given their historical consistency, a variation still shows that, for example, increases in commodity prices that cannot be passed on to the customer, impact the share price.

Besides, a Monte Carlo analysis is performed by varying the inputs as described in Table-20 including revenue growth (+-7%) and excluding mid-year discounting. The results support the "buy" recommendation. The mean of 10000 trials is €75. The corresponding histogram to Figure-40 is provided in appendix-28.

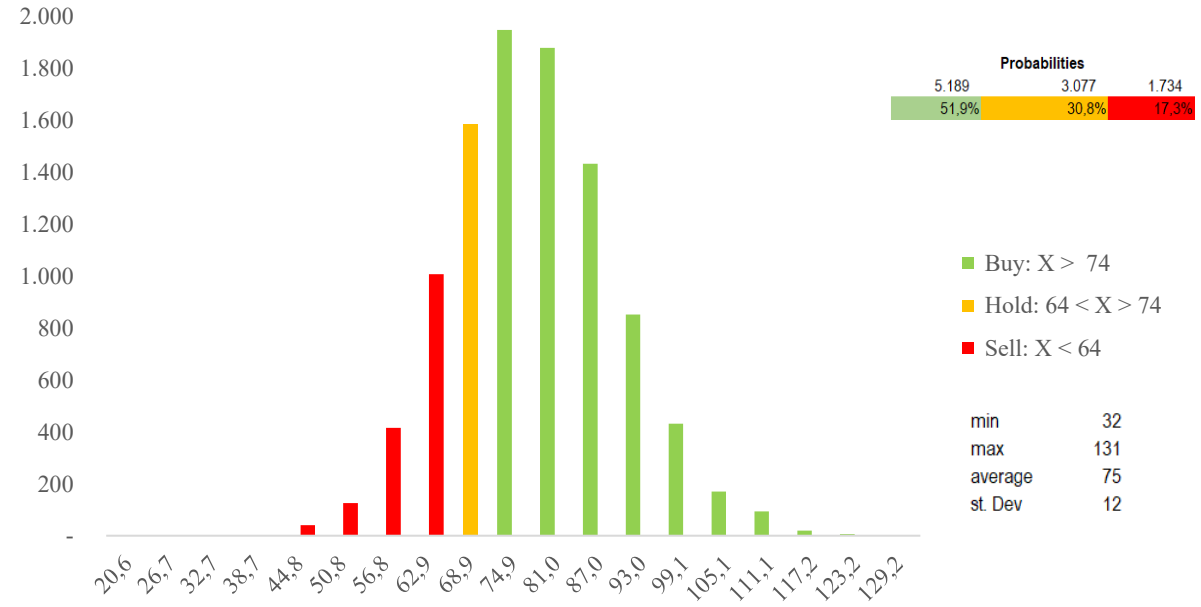


Figure-40: Monte Carlo analysis

5.6.1 Advanced Technologies

The author has limited insights into the acquisition details of Sensile/Atech and the variable-consideration of the purchase price. In this thesis, the enterprise value equals the maximum purchase price and a failure of the achievement of milestones, would consequently decrease the enterprise value. However, the author concluded that any sensitivities regarding the fair value of Sensile/Atech would not directly impact the share price; a failure of payment of the variable compensation would, on the one hand, decrease the purchase price, but on the other hand, would also increase excess-cash. These two effects are assumed to off-balance in the enterprise-equity value bridge.

5.7 Peer Group

The peer group was selected, to derive the multiples for the relative valuation and to compare main valuation inputs.

A "broad" peer group was created using Reuters, industry reports and Gerresheimer´s announcements. In a next step, companies' financial ratios and performance indicators consisting of financials and efficiency measures, return on investment, leverage ratios, coverage ratios and credit ratings were derived. Within those criteria, most attention lies on:

Business Description,
EBITDA-Margin,
Revenue CAGR (5y),
Return On Invested Capital (ROIC),
Debt-to-Equity (leverage ratio),
and Coverage Ratio.

As Gerresheimer and its multinational customers are operating globally, a geographical criterion is not considered for the peer group derivation. Based on the above criteria, a rating from 1 to 3, with 1 being "high fit", 2 "medium fit" and 3 "no fit", is applied. It must be mentioned that "Business/Product fit" is considered as being most relevant due to the specific nature of the industry. Hereby, a forward-looking approach is applied, meaning that peers are not only selected based on Gerresheimer´s current status quo, but also on how well they refer to Gerresheimer's expected development over time. Particularly, megatrends and technological changes are considered.

Once the peer "passed" the business-check (rated either with a 1 or 2), a complete rating is conducted. Companies with less than eleven points are considered as being "most accurate". Based on this approach, nine peer companies are derived. Figure-41 provides a summary, and appendix-26 &-27 the full peer group derivation.

in USDm	Company Name	Country	Market Cap	Sales	EBITDA-Margin	ROIC	Revenue (5y Cagr)	D/E	Rating
1	Demant A/S	DNK	8434	2126	21,59%	15,20%	9,04%	0,75	AAA
2	Ypsomed Holding AG	CH	1515	489	20,50%	15,40%	13,77%	0,17	AAA
3	West Pharmaceutical Services In	US	7475	1717	20,07%	14,60%	4,65%	0,15	AAA
4	PSB Industries SA	FRA	128	316	17,95%	4,00%	8,81%	0,80	A+
5	Consort Medical PLC	UK	562	428	19,86%	5,80%	26,76%	0,47	AA
6	Becton Dickinson and Co	US	65789	15983	24,81%	8,41%	14,69%	1,02	BBB
7	Draegerwerk AG & Co KGaA	GER	917	2982	6,09%	10,71%	1,62%	0,20	A+
8	Ansell Ltd	AUS	2522	1493	15,60%	5,70%	4,20%	0,36	AA
9	AGC Inc	JPN	7968	13900	15,94%	6,10%	2,90%	0,48	AAA

Figure-41: Peer-group overview

5.8 Multiples Valuation

EV/EBITDA and P/E multiples, both forward-looking and current, are applied in the relative valuation as illustrated in Table-21. A range is presented by multiplying the median-, average- as well as the weighted average multiple with the corresponding metric. The complete multiple-derivation is attached in appendix-22 to-25.

	EV/EBITDA				P/E			
	FY0	*FY1*	*FY2*	*FY3*	*FY0*	*FY1*	*FY2*	*FY3*
Weighted average	20,3	15,5	14,0	13,4	67,3	21,7	19,7	17,3
Average	13,4	12,3	11,8	10,4	34,0	22,2	22,6	18,2
Median	12,4	11,0	10,1	9,7	32,2	20,4	17,9	15,6

SOTP (€m)	Implied Enterprise Value				Implied Equity Value			
	2018	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*
Metric	**274**	**269**	**279**	**294**	**138**	**81**	**83**	**94**
Weighted average	5.557	4.156	3.916	3.953	9.309	1.751	1.641	1.635
Average	3.659	3.298	3.291	3.057	4.695	1.788	1.882	1.716
Median	3.388	2.948	2.820	2.851	4.452	1.643	1.488	1.476

Table-21: Relative valuation overview

The implied **Enterprise Value** is derived by applying the multiple on the EBITDA of the core-business and by adding the firm value of Atech to arrive at the total consolidated enterprise value. The preferred FY2 multiples range between 10x-14x and lead to an enterprise value range between 2,9 EURbn and 4,2 EURbn. In a next step, net debt and similar items are deducted from the EV, as discussed in the DCF-analysis and illustrated in Table-22, in order to receive the share price.

Enterprise Value	
Plus: Cash	*80*
Less: Debt	*(1.003)*
Less: Noncontrolling Interests	*(76)*
Less: Pensions and others	*(184)*
Equity Value	

Table-22: Enterprise value adjustments

Regarding the implied **Equity Value**, Atech could not be taken into consideration, as the corresponding financial metric (net income) is not computed on a consolidated basis. Thus, the presented values and share prices only reflect the equity value of the core-business.

The share prices are illustrated in Figure-42. The lowest value refers to the median, the highest to the weighted mean.

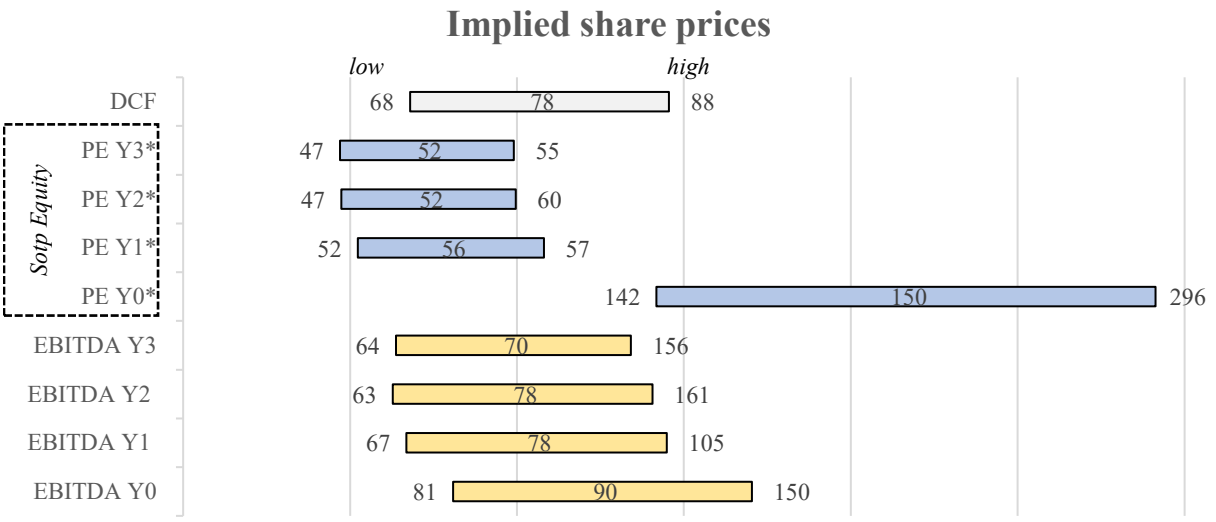


Figure-42: implied share prices

As mentioned, the implied equity value refers to the sotp-valuation (metric is the net income of PPG and P&G) and the equity of Atech is not captured. In order to still get comparable results of the consolidated equity value derived by multiples, consensus of the corresponding metrics was pulled from Reuters. (appendix-24) The ranges are presented below:

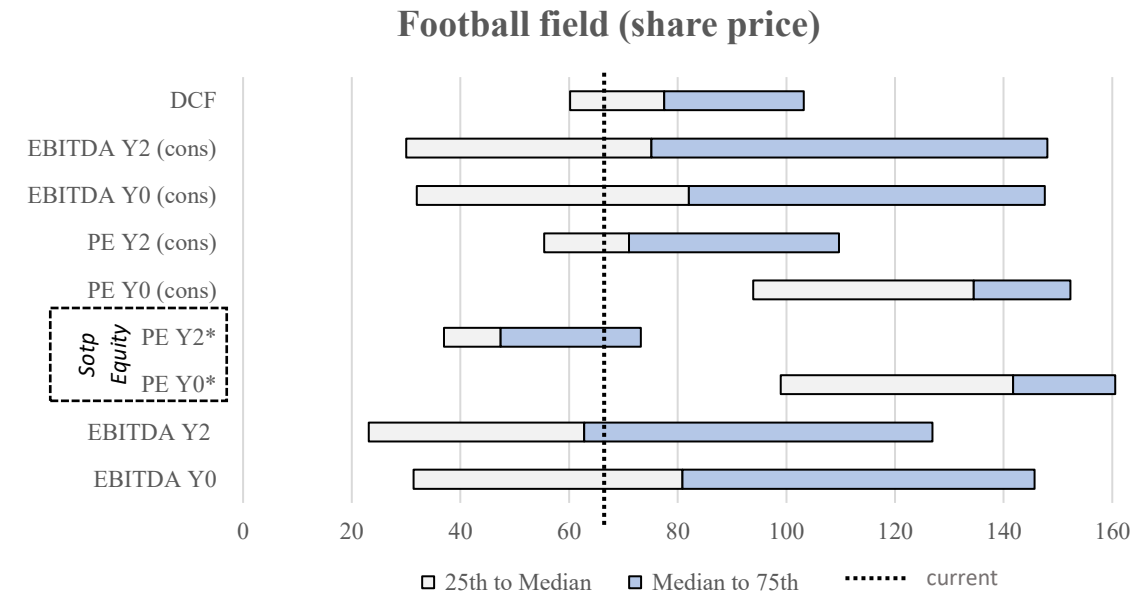


Figure-43: football field (share price)

The Y0 P/E-multiples do not give clear insights and significantly mislead the results, and might refer to a potential overvaluation of the peers. More attention should therefore be paid to the forwards, that show a more realistic picture of Gerresheimer. When comparing the PE-ratios of the core-business to the ratios obtained by applying consensus metrics (including Atech), one sees that analysts have high expectations on Atech and values including this division are

significantly higher. Overall, the implied share prices obtained using the multiples, are in line with the intrinsic valuation. As mentioned in the literature review, forward multiples are preferred as they capture analyst's expectation and often result in a better estimate.

In conclusion, current multiples (Y0) indicate a possible undervaluation of Gerresheimer´s share price obtained by the DCF. However, given that no peer company is truly comparable, the DCF is still to be favored and multiples should be used for rough comparisons purposes only and for indications of share price targets. In this case, multiples support the buy sentiment issued in this thesis. For comparison purposes, Gerresheimer´s implied multiples, derived by consensus metrics, are illustrated below:

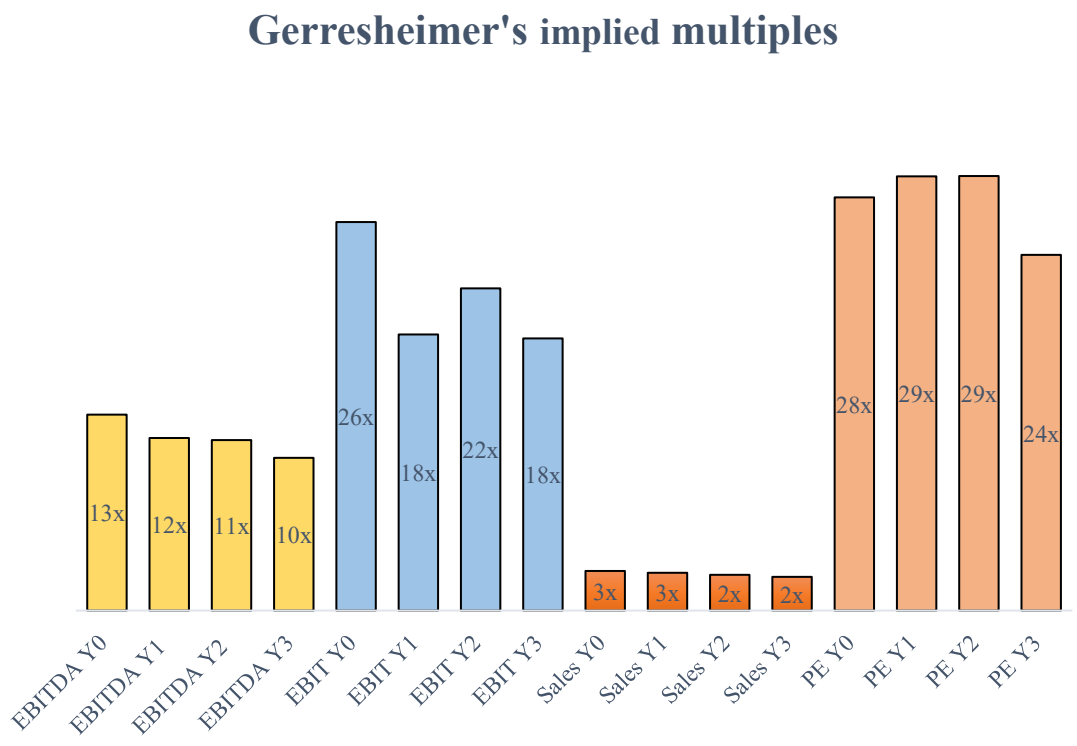


Figure-44: Gerresheimer´s implied multiples

6 Investment Bank Comparison

The results and methodologies applied in this thesis are compared with the equity report provided by Credit Suisse ("CS"). The investment bank report was published on February 14, 2019 and is based on Gerresheimer´s 2018 annual report. As illustrated in Table-23, CS issued a "buy (outperform) recommendation", targeting a price of 82€, compared to Gerresheimer´s share price of 58€ as of February 13, 2019. This recommendation was decreased by 6€ (based on 88€) compared to Credit Suisse´s sentiment as of September 17, 2018.

	Credit Suisse	Thesis
Target	82€ (outperform)	78€ (outperform)
Methodology	DCF	DCF – Sotp
Explicit Period	10 years	5 years
Revenue CAGR	5%	2,84%
TV-growth	1,5%	2,25%
Mean EBIT-Margin	13%	10,4%
Average WACC	6,6%	5,6%
Tax Rate	28,0% in 2019, thereafter steady decreases until reaching 23,8% in 2029	27,6%
Operating WC (% sales)	9,5%	8,0% on average
CAPEX (% sales)	12% in 2019 and 2020, 8% in 2021 and 2022, thereafter steady decreases until reaching 7,0% in 2019	12,9% in 2019 and 11,8% in 2020, 8,8% (mean) from 2021 onwards
EV/Sales 2020	2,0x	2,4x
EV/EBITDA 2020	8,9x	11,4x
EV/EBIT 2020	17,8x	21,5x
P/E 2020	14,1x	29,0x

Table-23: Summary Investment Bank comparison

The main difference in the valuation lies in the nature of the methodology. While CS applied a consolidated DCF-model, the assumed a sum-of-the-parts approach to be more accurate. This method is supported given the lack of historical data for Atech. There is only a few information as well as projections and assumptions available and thus, the financial development could not be reasonably measured and projected.

Furthermore, different financial drivers were assumed in the valuations: CS applied a 10y explicit period in their model with an average revenue growth of 5% and an EBIT-margin of 13%. The long explicit period allows to decrease the dependeny on the Terminal Value, but it is often difficult to reasonably project over more than 5-6 years. Concerning revenue growth and margins, the author applied a more conservative approach given that CS`s values seem too high compared to historical data and industry reports. Differences also arise in the TV growth rate of 1,5% vs. 2,3% used in this report. Credit Suisse also applied a different tax-rate; from 2020 onwards, the rate is substantially lower than 27,6% used by the author. Probably, CS estimated the decreases given the US- and France-tax changes, to be higher.

Regarding the Cost of Capital, CS applied a periodic-specific WACC that averages at 6,6% and is on average around 1% higher than the rate calculated by the author. One reason that the difference in the share price is less significant is, that CS discounted its “rather optimistic assumptions” with a higher WACC.

Differences also arise in the NWC of 9,5% in Credit Suisse´s case as opposed to 8,0% (average) applied in this thesis. In both valuations, changes in NWC are decreasing the FCF (use of cash). Capex are rather similar in both valuations because Gerresheimer announced guidance in that regard. After 2020, capex and D&A are back to normal values which is at around 7-9%, where the upper range seems more accurate given the high capital intensity of the business.

Another difference lies in the forward PE multiple, which is significantly lower in CS`s valuation (14,1x) indicating a possible undervaluation of Gerresheimer. Compered to peer group’s 2y-forward PE-multiple that averages at 22,6x and the LTM PE-ratio of 27,6x of Gerresheimer according to Reuters, the value derived by CS seems not to be in line with comparable values.

Other investment banks sentiments are attached in appendix-31.

7 Conclusion

After the state-of-the-art valuation theory was presented, the share price of **Gerresheimer AG** was obtained by applying a sotp DCF/WACC-approach as of 30.11.2018.

Gerresheimer´s consolidated statements were adjusted for impacts of the latest "Sensile-Medical" acquisition, that is now the newly created business unit "Advanced Technologies". The remaining business units were then valued using the DCF-approach. To reach a target share price of **€78**, the fair value (purchase price) of the Atech-division was added**.** The underlying assumptions were embossed by industry- (megatrends), and macroeconomic-developments, that overall, present promising conditions for Gerresheimer.

As Gerresheimer traded at **€63**/share on Nov. 30, 2018, an outperform recommendation with an upside-potential of **24%** was issued. This is in line, though rather on the lower end, with forward peer multiples. Despite substantial differences in revenue growth rates and WACC derivations, the share price is only slightly below Credit Suisse´s equity valuation.

The equity valuation has limitations, and is, as all valuations, subject to the preferences of the author. Nevertheless, a Monte Carlo analysis shows that the chance of buying the stock is above 50% which makes the author confident to issue a buy recommendation.

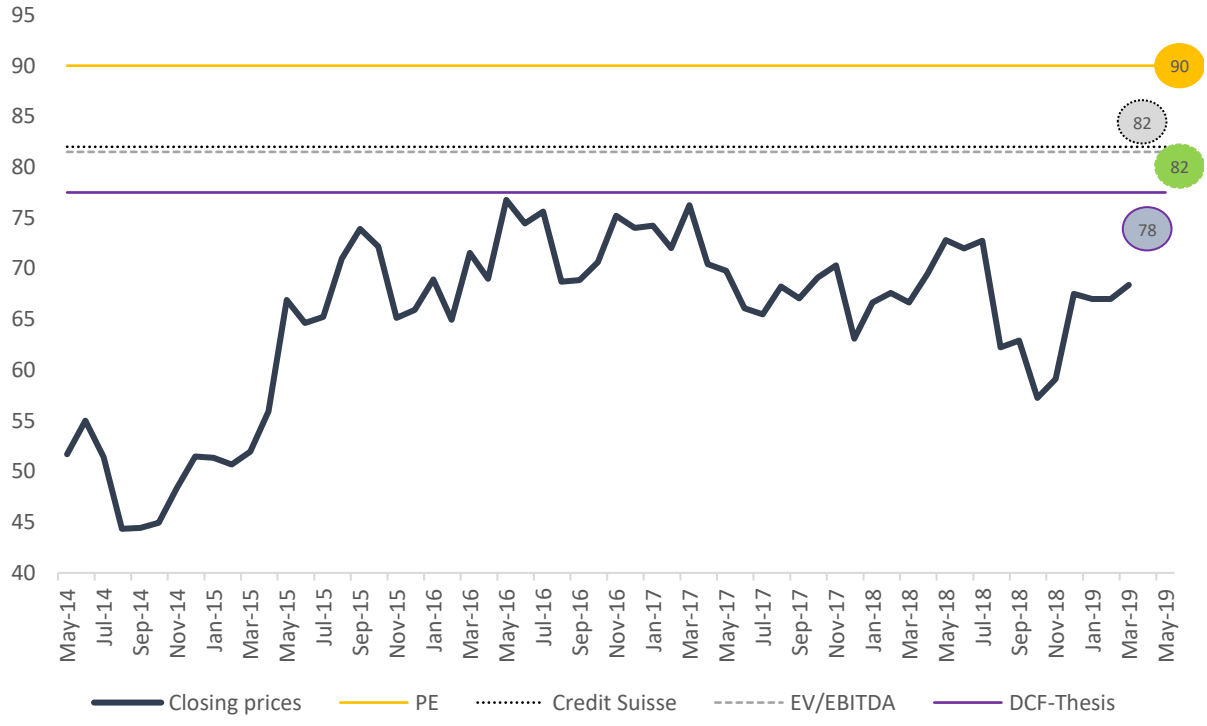
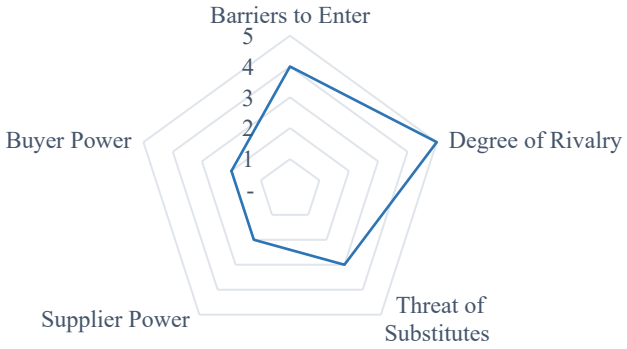


Figure-45: target prices, use of consensus for PE and EV/EBITDA-ratio

8 Appendix

1. Porter´s five forces



Barriers to enter – high

In most countries, the pharma and healthcare sector, as well as its sub-industry, the medical equipment, supplies and distribution business, are considered as being a difficult environment to enter. Potential reasons might be the high capital intensity required, strict laws as well as regulations particularly in the light of trademarks and patents.

Degree of Rivalry – high

Besides Gerresheimer, the main players in the glass and plastic packaging industry are for example SCHOTT, Becton Dickinson or Ypsomed which are all well established in the market. Due to the presence of many actors, the degree of rivalry is rather high and the ability to increase market share is limited. In such environments, companies try to harm competitor's profitability.

Threat of Substitutes – moderate

As most customers prefer traditional pharma packages, the threat of substitutes is rather low. Currently, there are limited substitutes available at the market that provide the same quality and solutions as traditional products. However, possible changes in packaging towards more sustainable products, might threaten the current status-quo.

Supplier Power - Low

The supplier power in the industry can be considered as low as several well established raw-materials (oil and gasoline) supplier own notable market shares. Furthermore, the supply of certain raw-materials, particularly oil and gas, overwhelms demand, which decreases the power of suppliers. Other energy sources as electricity is often governed and regulated by the country making the supplier power low.

Buyer Power – Low

Healthcare companies are often seen as having a high market share and thus, buyer power. However, according to Rickman et al. (2017) the Hirscher Herfindahl Index ("HHI"), a reflection of the degree of concentration in the market, lies between 500-700 points (1998-2015), which is well below the guidelines of the Department of Justice (Antitrust Division) that consider a HHI of 1500 – 2500 points to be *"moderately concentrated"*. (DOJ, 2018) (Rickmann, et al., 2017) In general, in the pharma packaging industry is standard practice, to negotiate contracts with the buyers that allow suppliers to pass on prices (mainly due to increases in commodity prices).

2. Swot Analysis

Strengths	Weaknesses
• Geographic diversification, global representation and low dependency on a certain market • High quality products that raises customer´s confidence • Well-known brand-portfolio	• Past declining performance of the Glass Business • Weak organic growth, growth was in the past mainly due to M&A • Gerresheimer is a contractual-manufacturer and has limited excess to the more profitable R&D-business
Opportunities	**Threats**
• Raising global demand for packaging products, especially in emerging markets • Technological changes, increase in chronic diseases and other megatrends as explain in Chapter 3.2.1	• Rising public aversion against plastic products • Increasing commodity prices • Stricter regulations and laws

3. Historical Income Statement

in Mio. €	2014	2015	2016	2017	2018	CAGR	Sensile	2018 adjusted	CAGR
Revenues	1.290	1.283	1.375	1.348	1.368	*1,47%*	13	1.355	*1,23%*
Cost of Sales	(934)	(909)	(944)	(934)	(968)	*0,89%*			
Gross Profit	356	374	432	414	400	*2,96%*			
Selling and administration expense	(222)	(243)	(255)	(256)	(259)	*3,96%*			
Other operating income	24	93	18	34	30	*5,87%*			
Other operating expenses	(24)	(35)	(11)	(9)	(20)	*-4,07%*			
Restructuring expenses	(4)	(7)	(2)	(3)	(11)	*26,61%*			
Share of profit/loss of associated companies	0	0	0	0	0	*3,18%*			
EBIT	130	182	180	181	139	*1,79%*	(7)	147	*3,13%*
interest income	*3*	*5*	*5*	*4*	*2*	*-8,63%*			
interest expense	*(34)*	*(34)*	*(34)*	*(35)*	*(30)*	*-3,32%*			
other financial expenses	-	*(6)*	*(4)*	*(5)*	*(5)*				
Net finance expense	(31)	(35)	(34)	(35)	(32)	*1,37%*			
Net income before income taxes	99	147	147	145	107	*1,92%*			
Income taxes	(26)	(43)	(42)	(42)	24				
Net Income from continuing operations	73	104	104	103	131	*15,83%*	(7)	138	*17,36%*
Net income from discontinued operations	-	9	64	-	-				
Net Income	73	113	168	103	131	*15,83%*	(7)	138	*17,36%*

As a % of sales	2014A	2015A	2016A	2017A	2018A	Average 14-18
Cogs	72,4%	70,9%	68,6%	69,3%	70,7%	*70,4%*
SG&A	17,2%	18,9%	18,6%	19,0%	19,0%	*18,5%*
Other operating income	2%	7%	1%	2%	2%	*3,0%*
Other operating expenses	2%	3%	1%	1%	1%	*1,5%*
Restructuring expenses	0,3%	0,5%	0,2%	0,2%	0,8%	*0,4%*
Interest income (% of Cash)	5,1%	5,1%	4,0%	1,5%	3,0%	*3,8%*
Interest expense (% of Debt)	3,2%	2,0%	2,1%	2,1%	1,6%	*1,6%*

Only revenues, EBIT and net income were adjusted, as Gerresheimer does not provide more information for a detailed “pre-acquisition” breakdown.

4. Historical Balance Sheet (1/2)

Total Assets in Mio €	2014	2015	2016	2017	2018	CAGR	Sensile	2018 adjusted	CAGR adj.
Intangible Assets	558	1.251	1.194	1.101	1.506	*28,19%*	(426)	1.080	*17,98%*
Property, plant and equipment	579	605	610	603	621	*1,75%*	(1)	620	*1,72%*
Investment property	4	6	6	6	5	*4,54%*	-	5	*4,54%*
Investments accounted for using the equity method	0	0	0	0	0	*36,32%*	-	0	*36,32%*
Income Tax receivables	-	1	1	1	2	*32,22%*	-	2	*32,22%*
other financial assets	6	5	5	5	4	*-10,68%*	-	4	*-10,68%*
other receivables	-	5	1	2	3	*-18,31%*	(0)	3	*-18,49%*
deferred tax assets	7	8	14	11	19	*27,91%*	(8)	12	*13,20%*
Long-term Assets	1.154	1.881	1.832	1.729	2.159	*17,0%*	(434)	1.725	*10,58%*
							-	-	
Inventories	194	186	155	148	171	*-2,99%*	-	171	*-2,99%*
Trade receivables	208	219	232	243	274	*7,03%*	(9)	264	*6,09%*
Income tax receivables	5	4	7	3	5	*0,46%*	-	5	*0,46%*
other financial assets	3	11	11	17	18	*18,32%*	-	18	*60,82%*
other receivables	24	24	19	18	22	*-2,38%*	(0)	22	*-2,66%*
cash and cash equivalents	68	94	118	287	81	*4,36%*	161	241	*37,27%*
Non-current assets and disposal groups held for sale	-	-	-	-	1		-	1	
Short-term Assets	502	538	543	715	572	*3,30%*	151	723	*9,53%*
Total Assets	**1.656**	**2.419**	**2.374**	**2.444**	**2.731**	***13,32%***	**(283)**	**2.448**	***10,27%***

Historical Balance Sheet (2/2)

Total Equity and Liabilities in Mio €	2014	2015	2016	2017	2018	CAGR	Sensile	2018 adjusted	CAGR adj.
Subscribed capital	31	31	31	31	31	*0,0%*	-	31	*0,00%*
capital reserve	514	514	514	514	514	*0,0%*	-	514	*0,00%*
IAS 39 Reserve	(0)	(0)	(0)	(0)	(0)	*-61,1%*	-	(0)	*-61,14%*
currency translation reserve	(32)	(32)	(26)	(71)	(67)	*20,7%*	-	(67)	*20,68%*
retained earnings	30	113	207	279	395	*90,3%*	-	395	*90,27%*
Equity attributable to equity holders of the parent	543	626	726	753	873	*12,6%*	-	873	*12,57%*
non-controlling interests	61	72	37	36	17	*-26,8%*	(0)	17	*-27,21%*
Equity	604	698	763	790	890	*10,2%*	(0)	890	*10,15%*
Deferred tax liabilities	33	147	158	144	168	*50,7%*	(76)	92	*29,59%*
provisions for pensions and similar obligations	170	158	160	145	142	*-4,4%*	(10)	132	*-6,09%*
other provisions	5	7	8	10	11	*19,1%*	-	11	*19,08%*
Trade payables	-	-	-	-	0		-	0	
other financial liabilities	386	741	745	681	751	*18,1%*	(74)	678	*15,11%*
other liabilities	2	0	0	1	1	*-27,3%*	-	1	*-27,28%*
Long-term Liabilities	596	1.054	1.070	981	1.072	*15,8%*	(159)	913	*11,27%*
Provisions for pensions and similar obligations	14	19	14	14	14	*0,1%*	-	14	*0,14%*
other provisions	56	65	53	35	45	*-5,5%*	(1)	44	*-5,92%*
trade payables	125	161	157	176	207	*13,4%*	(2)	205	*13,08%*
other financial liabilities	124	250	185	338	390	*33,1%*	(111)	278	*22,33%*
income tax liabilities	22	55	25	9	5	*-31,2%*	(0)	5	*-31,46%*
other liabilities	114	118	107	101	108	*-1,4%*	(9)	99	*-3,56%*
Short-term Liabilities	456	668	541	673	768	*13,9%*	(123)	645	*9,06%*
Total Equity and Liabilities	**1.656**	**2.419**	**2.374**	**2.444**	**2.731**	***13,3%***	**(283)**	**2.448**	***10,27%***

5. Revenues by Geography from 2014 - 2018

in Mio. €	2014A	2015A	2016A	2017A	2018A	CAGR
Europe	467	467	458	429	460	*-0,39%*
y-y-growth in %		0,0%	-1,8%	-6,4%	7,2%	
Germany	312	319	324	313	305	*-0,60%*
y-y-growth in %		2,1%	1,7%	-3,4%	-2,7%	
America	262	245	363	374	375	*9,40%*
y-y-growth in %		-6,3%	48,1%	2,9%	0,3%	
Emerging markets	217	220	204	207	207	*-1,21%*
y-y-growth in %		1,3%	-7,3%	1,3%	0,1%	
other regions	32	32	26	26	22	*-9,26%*
y-y-growth in %		0,3%	-19,8%	0,4%	-16,1%	
Total	**1.290**	**1.283**	**1.376**	**1.348**	**1.368**	***1,47%***

6. Revenue Forecasts - Drivers and Trends

a) Plastic & Devices

Drivers - Plastic & Devices	weighting	2019E	2020E	2021E	2022E	2023E	*Mean*
Generic drug growth	*30%*	2,9%	2,9%	2,9%	2,9%	2,9%	*2,9%*
Primary Pharma growth	*30%*	2,2%	2,2%	2,2%	2,2%	2,2%	*2,2%*
Rise in chronic diseases	*10%*	2,4%	2,6%	2,9%	3,2%	3,5%	*2,9%*
Healthcare in “Pharmerging Markets”	*10%*	3,7%	3,7%	3,9%	3,9%	3,9%	*3,8%*
Biotech- and Biosimilar products	*10%*	3,5%	3,5%	3,5%	3,5%	3,5%	*3,5%*
Self-Medication	*10%*	4,0%	4,0%	4,0%	4,0%	4,0%	*4,0%*
Plastic & Devices		**2,9%**	**2,9%**	**3,0%**	**3,0%**	**3,0%**	

b) Pharmaceutical Packaging Glass

Drivers - Primary Packaging Glass	weighting	2019E	2020E	2021E	2022E	2023E	*Mean*
Generic drug growth	*20%*	2,6%	2,6%	2,6%	2,6%	2,6%	*2,6%*
Primary Pharma Growth	*20%*	2,2%	2,2%	2,2%	2,2%	2,2%	*2,2%*
Rise in chronic diseases	*20%*	2,1%	2,3%	2,6%	2,9%	3,2%	*2,6%*
Access to HC in PM	*20%*	3,2%	3,2%	3,4%	3,4%	3,4%	*3,3%*
Biotech and Biosimilar products	*20%*	2,0%	2,2%	2,4%	2,0%	2,0%	*2,1%*
Primary Packaging Glass		**2,4%**	**2,5%**	**2,6%**	**2,6%**	**2,7%**	

7. Non-recurring items

Other operating income/expenses items are not subject to forecasts due to their status as “non-recurring”. Furthermore, exchange gains and research and development costs, are also not considered in the forecasts given that almost no information is provided in the annual reports and the amount is insignificant. An overview the non-recurring items is presented below:

Other operating income	2014A	2015A	2016A	2017A	2018A
income from refunds	5,80	2,45	1,66	4,22	13,30
income from insurance reimbursements	6,38				
income from the derecognition of liabilities	1,08	1,48	3,50	6,09	5,99
income from the reversal of provisions	1,83	5,69	5,54	9,18	4,68
one-off income	0,22	77,00	0,99	0,28	1,09
income from sale of scrap	0,68	0,80	0,73	0,83	1,07
income from compensation payments	0,56				
income from other tax claims				2,55	0,06
income from the disposal of asset	0,45	0,53	1,22	1,70	0,03
income from the fair value measurement of put options	2,37			3,61	
exchange gains		0,62	0,46	0,39	0,23
sundry other income	4,56	4,73	3,46	4,79	3,56
Total other operating income	**23,92**	**93,29**	**17,55**	**33,64**	**30,00**

Other operating expenses	2014A	2015A	2016A	2017A	2018A
one-off expenses	1,74	21,20	1,50	2,90	11,03
Research and development	1,50	1,85	3,16	3,51	2,92
Expenses from network charges		1,16			1,35
expenses from supervisory board remuneration and expense reimbursement			1,11	1,11	1,19
loss from the fair value measurement of the put option			1,40		1,12
loss from the disposal of fixed assets	0,39	0,72	0,39	0,27	0,30
sundry other expenses	2,77	1,61	2,62	0,86	2,11
Expenses from furnace damage	4,64				
Portfolio adjustments	12,60	8,96	1,03		
Total other operating expenses	**23,64**	**35,50**	**11,22**	**8,65**	**20,02**

The EBITDA as reported was adjusted based on the values illustrated above, that cannot, following the reasoning of the author, be taken as an indicator for possible future economic performance. One can see that non-recurring items particularly in the light of divestments and one-off income resulted in a distorted view of the business. For example, in 2015, the company profited from the sale of the "glass tubing business" and gained additional 77 EURm.

in Mio. €	2014A	2015A	2016A	2017A	2018A	2018A adj.
EBITDA as reported	**234,9**	**306,2**	**306,6**	**305,6**	**276,5**	**273,6**
Less: other operating income	*(23,9)*	*(93,3)*	*(17,6)*	*(33,6)*	*(30,0)*	*(30,0)*
Pluss: other operating expenses	*23,6*	*35,5*	*11,2*	*8,7*	*20,0*	*20,0*
net operating income/expenses	(0,3)	(57,8)	(6,3)	(25,0)	(10,0)	(10,0)
EBITDA adjusted	**234,6**	**248,4**	**300,3**	**280,7**	**266,5**	**263,6**
adj. EBITDA-Margin	*18,2%*	*19,4%*	*21,8%*	*20,8%*	*19,5%*	*19,5%*
EBIT as reported	**129,9**	**181,9**	**180,5**	**180,8**	**139,5**	**146,9**
net operating income/expenses	(0)	(58)	(6)	(25)	(10)	(10)
EBIT adjusted	**129,6**	**124,2**	**174,1**	**155,8**	**129,5**	**137,0**
adj. EBIT-Margin	*10,0%*	*9,7%*	*12,7%*	*11,6%*	*9,5%*	*10,1%*

8. Projected Income Statement: Core-Business

in Mio. €	2019E	2020E	2021E	2022E	2023E	*CAGR*
Revenues	1.397	1.435	1.475	1.519	1.562	*2,8%*
Cost of Sales	(983)	(1.010)	(1.038)	(1.069)	(1.100)	*2,8%*
Gross Profit	**414**	**425**	**437**	**450**	**463**	*2,8%*
Gross margin	*29,6%*	*29,6%*	*29,6%*	*29,6%*	*29,6%*	
Selling and administration expense	(263)	(270)	(273)	(281)	(289)	*2,4%*
Other operating income	0,00	0,00	0,00	0,00	0,00	
Other operating expenses	0,00	0,00	0,00	0,00	0,00	
Restructuring expenses	(11)	(12)	(6)	(6)	(6)	*-13,5%*
Share of profit/loss of associated companies	0,03	0,03	0,03	0,03	0,03	*0,0%*
EBIT	**139**	**143**	**158**	**162**	**167**	*4,6%*
EBIT Margin	*10,0%*	*10,0%*	*10,7%*	*10,7%*	*10,7%*	
Interest income	6	7	9	11	13	*24,2%*
Interest expense	(34)	(35)	(36)	(38)	(39)	*4,0%*
Net finance expense	(28)	(28)	(27)	(26)	(26)	*-1,8%*
NI before taxes	**111**	**115**	**130**	**136**	**141**	*6,1%*
Taxes	(31)	(32)	(36)	(37)	(39)	*6,1%*
Net Incomes	**81**	**83**	**94**	**98**	**102**	*6,1%*
D&A	124	133	141	141	143	
EBITDA	269	279	294	300	307	
EBITDA margin	*19,2%*	*19,5%*	*20,0%*	*19,7%*	*19,7%*	

Income Statement Assumptions						
Revenue growth (y-o-y growth)	*3,10%*	*2,72%*	*2,81%*	*2,95%*	*2,86%*	
Cogs (% margin)	*70,38%*	*70,38%*	*70,38%*	*70,38%*	*70,38%*	
SG&A (% sales)	*18,83%*	*18,83%*	*18,53%*	*18,53%*	*18,53%*	
Other expenses (% sales)	*0,82%*	*0,82%*	*0,41%*	*0,41%*	*0,41%*	
EBIT margin	*9,97%*	*9,97%*	*10,68%*	*10,68%*	*10,68%*	
Interest income (% cash)	*2,00%*	*2,00%*	*2,00%*	*2,00%*	*2,00%*	
Interest expense (% debt)	*3,08%*	*3,08%*	*3,08%*	*3,08%*	*3,08%*	
Tax-rate	*27,60%*	*27,60%*	*27,60%*	*27,60%*	*27,60%*	

9. Projected Balance sheet: Core-Business

in Mio. €	2019E	2020E	2021E	2022E	2023E	*CAGR*
Intangible Assets	1.066	1.052	1.037	1.022	1.004	*-1,5%*
Property, plant and equipment	684	732	738	744	765	*2,8%*
Investment property	5	5	5	6	6	*4,5%*
Investments (equity method)	0	1	1	1	1	*36,3%*
Income Tax receivables	1	1	1	1	1	*2,8%*
other financial assets	3	3	3	2	2	*-10,7%*
other receivables	2	2	2	1	1	*-18,3%*
deferred tax assets	11	11	11	12	12	*2,8%*
Long-term Assets	**1.773**	**1.806**	**1.797**	**1.789**	**1.794**	*0,3%*
Inventories	180	184	190	195	201	*2,8%*
Trade receivables	246	253	260	268	275	*2,8%*
Income tax receivables	5	5	5	6	6	*2,8%*
other financial assets	24	33	45	61	83	*35,8%*
other receivables	21	21	20	20	19	*-2,4%*
cash and cash equivalents	248	296	406	518	620	*25,8%*
Non-current assets held for sale	1	1	1	1	1	*0,0%*
Short-term Assets	**725**	**794**	**927**	**1.069**	**1.205**	*13,5%*
Total Assets	**2.498**	**2.600**	**2.725**	**2.858**	**2.999**	*4,7%*

in Mio. €	2019	2020	2021	2022	2023	*CAGR*
Subscribed capital	31	31	31	31	31	*0,0%*
capital reserve	514	514	514	514	514	*0,0%*
IAS 39 Reserve	(0)	(0)	(0)	(0)	(0)	*0,0%*
currency translation reserve	(71)	(75)	(79)	(84)	(88)	*5,7%*
retained earnings	441	489	549	613	680	*11,5%*
Equity of equity holders of the parent	915	960	1.015	1.074	1.137	*5,6%*
non-controlling interests	-	-	-	-	-	
Equity	**915**	**960**	**1.015**	**1.074**	**1.137**	*5,6%*
Deferred tax liabilities	120	123	126	130	134	*2,8%*
provisions for pensions and similar obligations	132	132	132	132	132	*0,0%*
other provisions	11	11	11	11	11	*0,0%*
Trade payables	-	-	-	-	-	
other financial liabilities	700	737	781	828	876	*5,8%*
other liabilities	-	-	-	-	-	
Long-term Liabilities	**963**	**1.003**	**1.051**	**1.101**	**1.153**	*4,6%*
Provisions for pensions and similar obligations	14	14	14	14	14	*0,0%*
other provisions	44	44	44	44	44	*0,0%*
trade payables	173	178	183	188	194	*2,8%*
other financial liabilities	287	302	321	340	359	*5,8%*
income tax liabilities	7	8	8	8	8	*2,8%*
other liabilities	99	100	101	102	103	*1,0%*
Short-term Liabilities	**625**	**646**	**670**	**696**	**723**	*3,7%*
Total Equity and Liabilities	**2.498**	**2.600**	**2.725**	**2.858**	**2.999**	*4,7%*

10. Projected Cash Flow Statement: Core-Business

in €m	2019	2020	2021	2022	2023
Net Profit	81	83	94	98	102
D&A	129	136	137	138	140
Other expenses	(5)	(3)	(4)	(4)	(4)
Change in NWC	13	(2)	(2)	(3)	(3)
Operating activities	**218**	**214**	**225**	**229**	**236**
Capex	(180)	(170)	(128)	(129)	(144)
Change in fin. Assets	(6)	(9)	(12)	(16)	(22)
Change in other investments	(0)	(0)	(0)	(0)	(0)
Other	(1)	(1)	(1)	(1)	(1)
Investing Activities	**(187)**	**(179)**	**(141)**	**(146)**	**(167)**
Payment of dividend	(35)	(35)	(35)	(35)	(35)
Increases in long-term debt	20	34	42	45	48
Increases in short-term debt	8	14	17	19	20
NCI	(18)	-	-	-	-
Financing Activities	**(25)**	**13**	**25**	**29**	**33**
Change in Cash	**6**	**49**	**109**	**112**	**102**
Cash BoP	241	248	297	406	518
Change in Cash	6	49	109	112	102
Cash EoP	248	297	406	518	620

11. ROIC and re-formulated FCF

in €m	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Invested Capital	1.146	1.867	1.815	1.715	1.709	1.759	1.792	1.783	1.775	1.779
Total Assets	1.656	2.419	2.374	2.444	2.448	2.498	2.600	2.725	2.858	2.999
Reinvestment Rate	*69%*	*77%*	*76%*	*70%*	*70%*	*70%*	*69%*	*65%*	*62%*	*59%*
EBIAT	95	128	128	128	180	101	104	114	117	121
ROIC	***6,4%***	***11,2%***	***6,9%***	***7,1%***	***10,5%***	***5,9%***	***5,9%***	***6,4%***	***6,6%***	***6,8%***
WACC						*5,6%*	*5,6%*	*5,6%*	*5,6%*	*5,6%*

in €m	**2019**	**2020**	**2021**	**2022**	**2023**
EBIAT	101	104	114	117	121
D&A	129	136	137	138	140
Operating CF	**230**	**240**	**251**	**255**	**261**
Fixed Assets	1.759	1.792	1.783	1.775	1.779
Gross Capex Investment	*(50)*	*(33)*	*9*	*8*	*(4)*
Net Capex	(179)	(170)	(128,0)	(129)	(144)
NWC	13	(2)	(2)	(3)	(3)
Core Business Cash Flow	**63,5**	**68,2**	**120,6**	**122,9**	**114,1**

12. Dividend Yield

in €m	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Dividend/share	0,8	0,9	1,1	1,1	1,2	1,1	1,1	1,1	1,1	1,1
Total	23,6	26,7	33,0	34,5	36,1	34,5	34,5	34,5	34,5	34,5
Dividend Yield	1,7%	1,5%	1,5%	1,6%	1,8%	1,4%	1,4%	1,4%	1,4%	1,4%

$$Dividend\ yield = \frac{annual\ dividend}{share\ price}$$

Equation-10: Formula for dividend yield

13. Working Capital derivation

$$DIH\ (days\ inventory\ on\ hands) = \frac{Inventory}{COGS} * 365$$

Equation-11: Days inventory on hands

$$DSO\ (days\ sales\ outstanding) = \frac{Accounts\ Receivable}{Revenues} * 365$$

Equation-12: Days sales outstanding

$$DPO\ (days\ payable\ outstanding) = \frac{Accounts\ Paybale}{COGS} * 365$$

Equation-13: Days payable outstanding

$$CCC\ (cash\ conversion\ cycle) = DIH + DSO - DPO$$

Equation-14: Cash conversion cycle

Below, a summary of all working capital items assumptions is provided:

in €m	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Accounts Receivable	208	219	232	243	274	246	253	260	268	275
DSO	*59*	*62*	*62*	*66*	*73*	*64*	*64*	*64*	*64*	*64*
Inventory	194	186	155	148	171	180	184	190	195	201
DIH	*76*	*75*	*60*	*58*	*65*	*67*	*67*	*67*	*67*	*67*
Prepaid Expenses	4	4	5	3	5	4	4	5	5	5
% Sales	*0,3%*	*0,3%*	*0,3%*	*0,2%*	*0,3%*	*0,3%*	*0,3%*	*0,3%*	*0,3%*	*0,3%*
Tax Receivable (s.t.)	5	4	7	3	5	5	5	5	6	6
% Sales	*0,4%*	*0,3%*	*0,5%*	*0,2%*	*0,4%*	*0,4%*	*0,4%*	*0,4%*	*0,4%*	*0,4%*
Tax Receivable (l.t.)	-	1	1	1	2	1	1	1	1	1
% Sales	*0,0%*	*0,1%*	*0,1%*	*0,1%*	*0,1%*	*0,1%*	*0,1%*	*0,1%*	*0,1%*	*0,1%*
Accounts Payable	125	161	157	176	207	173	178	183	188	194
DPO	*49*	*65*	*61*	*69*	*78*	*64*	*64*	*64*	*64*	*64*
Prepayments received	44	31	30	28	35	35	36	37	38	39
% Sales	*3,4%*	*2,4%*	*2,2%*	*2,1%*	*2,6%*	*2,5%*	*2,5%*	*2,5%*	*2,5%*	*2,5%*
Tax Liability	22	55	25	9	5	7	8	8	8	8
% Sales	*1,7%*	*4,3%*	*1,8%*	*0,7%*	*0,4%*	*0,5%*	*0,5%*	*0,5%*	*0,5%*	*0,5%*
DTA	7	8	14	11	12	11	11	11	12	12
% Sales	*0,6%*	*0,6%*	*1,0%*	*0,8%*	*0,8%*	*0,8%*	*0,8%*	*0,8%*	*0,8%*	*0,8%*
DTL	33	147	158	144	120	123	126	130	134	120
% Sales	2,5%	11,5%	11,5%	10,6%	8,6%	8,8%	8,8%	8,8%	8,8%	8,6%

14. D&A and Capex overview

in €m	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Revenues	**1.290**	**1.283**	**1.375**	**1.348**	**1.355**	**1.397**	**1.435**	**1.475**	**1.519**	**1.562**
PPE	**579**	**605**	**610**	**603**	**620**	**684**	**732**	**738**	**744**	**765**
% of Sales	*44,9%*	*47,1%*	*44,4%*	*44,7%*	*45,8%*	*49,0%*	*51,0%*	*50,0%*	*49,0%*	*49,0%*
Intangibles	**558**	**1.251**	**1.194**	**1.101**	**1.080**	**1.066**	**1.052**	**1.037**	**1.022**	**1.004**
% of Sales	*43,2%*	*97,5%*	*86,8%*	*81,7%*	*79,7%*	*76,3%*	*73,3%*	*70,3%*	*67,3%*	*64,3%*
Depreciation	**86**	**82**	**85**	**89**	**92**	**104**	**112**	**112**	**113**	**117**
% of PPE	*14,8%*	*13,6%*	*14,0%*	*14,8%*	*14,9%*	*15,3%*	*15,3%*	*15,3%*	*15,3%*	*15,3%*
Amortization	**19**	**42**	**41**	**36**	**34**	**25**	**25**	**24**	**24**	**24**
% of Intangibles	*3,5%*	*3,4%*	*3,4%*	*3,3%*	*3,2%*	*2,4%*	*2,4%*	*2,4%*	*2,4%*	*2,4%*
Capex PPE	**123**	**122**	**109**	**99**	**109**	**169**	**159**	**118**	**120**	**138**
% of sales	9,5%	9,5%	7,9%	7,3%	8,0%	12,1%	11,1%	8,0%	7,9%	8,8%
Capex Intang.	**3**	**4**	**4**	**20**	**5**	**11**	**11**	**10**	**9**	**6**
% of sales	0,3%	0,3%	0,3%	1,5%	0,4%	0,8%	0,7%	0,7%	0,6%	0,4%
Total D&A	**105**	**124**	**126**	**125**	**127**	**129**	**136**	**137**	**138**	**140**
Total Capex	**126**	**126**	**113**	**119**	**114**	**180**	**170**	**128**	**129**	**144**

15. Derivation of tangibles and intangibles explicit period

Intangibles	**2019**	**2020**	**2021**	**2022**	**2023**
Intangibles BoP	1.080	1.066	1.052	1.037	1.022
Amortization	(25)	(25)	(24)	(24)	(24)
Investments (capex)	11	11	10	9	6
Intangibles EoP	**1.066**	**1.052**	**1.037**	**1.022**	**1.004**

PP&E	**2019E**	**2020E**	**2021E**	**2022E**	**2023E**
Tangibles BoP	620	684	732	738	744
Depreciation	(104)	(112)	(112)	(113)	(117)
Investments (capex)	169	159	118	120	138
Tangibles EoP	**684**	**732**	**738**	**744**	**765**

16. CAPEX Projects Overview

a) Main Growth Projects:

	2019	2020
Extension in Horsovsky Tyn (Czech Republic)	X	X
North Macedonia	X	X
New Facility Brazil Anapolis	X	X
Extension in Wackersdorf (GER)	X	
Bünde Projects (GER)	X	X
Repair in Essen (GER)	X	
Repair in Lohr (GER)		X
Decoration Tettau (GER)	X	X
Converting Machines in Poland and India	X	X

b) Main Productivity Projects:

	2019	2020
Optimization of Packaging Syringes	X	
Automation systems in Pfreimd (GER)	X	X
Several automation packaging / packing / ampules / spraying projects	X	X
Digitalization projects of PPG Systems	X	X

17. Gerresheimer's production facilities

Argentina	Belgium	Brazil
China	Denmark	Germany
France	India	Mexico
Poland	Singapore	Czech Republic
Spain	Switzerland	USA

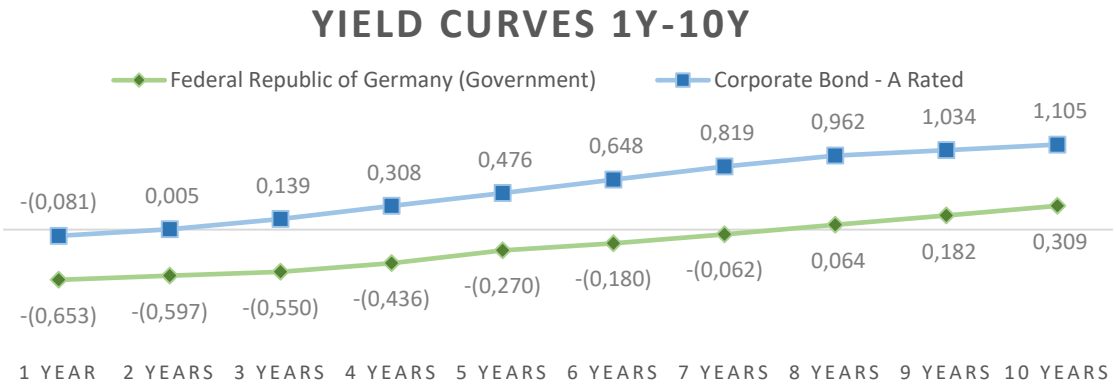
18. WACC derivation

WACC	Input	TR Peers-Mean	TR Peers-Median	TR Peers-weighted	Peers - Mean	Peers-Median	Peers-weighted
Risk-free	0,31%	0,31%	0,31%	0,31%	0,31%	0,31%	0,31%
MRP	7,00%	7,0%	7,0%	7,0%	7,0%	7,0%	7,0%
Beta unlevered		0,88	0,91	0,85	0,88	0,91	0,85
leverage	46,74%	0,47	0,47	0,47	0,47	0,47	0,47
Tax rate	27,60%	27,6%	27,6%	27,6%	27,6%	27,6%	27,6%
Beta levered		1,17	1,21	1,14	1,17	1,21	1,14
Cost of Equity		**8,5%**	**8,8%**	**8,3%**	**8,5%**	**8,8%**	**8,3%**
Risk-free	-0,44%	-0,4%	-0,4%	-0,4%	-0,4%	-0,4%	-0,4%
Spread	0,90%	0,90%	0,9%	0,9%	0,9%	0,9%	0,9%
Cost of Debt		0,5%	0,5%	0,5%	0,5%	0,5%	0,5%
Tax rate		27,6%	27,6%	27,6%	27,6%	27,6%	27,6%
Cost of Debt after tax		**0,3%**	**0,3%**	**0,3%**	**0,3%**	**0,3%**	**0,3%**
Share Equity		68,1%	68,1%	68,1%	68,1%	68,1%	68,1%
Share Debt		31,9%	31,9%	31,9%	31,9%	31,9%	31,9%
WACC		**5,9%**	**6,1%**	**5,8%**	**5,9%**	**5,8%**	**5,6%**
TV Growth rate	2,25%	2,3%	2,3%	2,3%	2,3%	2,3%	2,3%
TV WACC		**3,7%**	**3,9%**	**3,5%**	**3,6%**	**3,5%**	**3,4%**

19. Yield Curves

Risk-free rate*	1y	2y	3y	4y	5y	6y	7y	8y	9y	10 y
30.11.2018	-0,653	-0,597	-0,550	-0,436	-0,270	-0,180	-0,062	0,064	0,182	0,309
Corporate Bond**										
30.11.2018	-0,200	-0,010	0,230	0,460	0,690	0,890	1,090	1,270	1,430	1,580
Credit Spread										
EUR Industrial	0,453	0,587	0,780	0,896	0,960	1,070	1,152	1,206	1,248	1,271

**German Government Bond | ** EUR Industrial Corporate Bond*



20. Effective tax rates

effective tax rates	2014A	2015A	2016A	2017A	2018A	2019Q1
considering Tax loss carry forwards	26,7%	29,4%	28,9%	29,2%	/	/
no consideration of Tax loss carry forwards	26,7%	29,4%	28,9%	29,2%	27,6%	27,9%

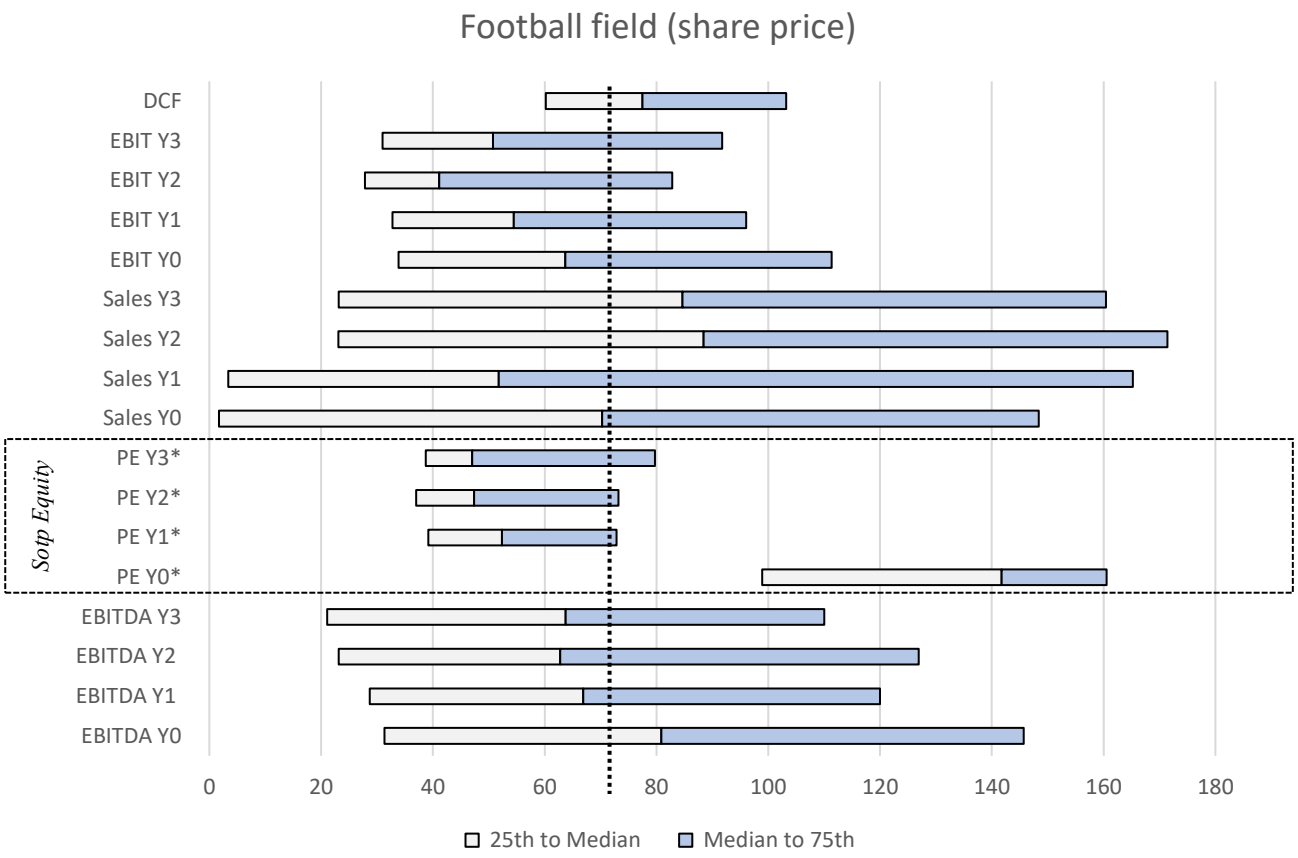
21. Beta derivation

Company Name	Market Cap	Total Debt	Cash	Net Debt	Leverage	Tax Rate	ßu	Blume	ßl
William Demant	6.673	955	84	870	13%	22%	0,73	0,82	0,74
Ypsomed	1.451	82	31	51	4%	18%	0,57	0,71	0,69
West Pharma	7.624	171	294	(123)	-2%	27%	1,05	1,03	1,04
PSB	125	65	79	(14)	-11%	33%	0,52	0,68	0,74
Consort	517	135	27	108	21%	19%	0,44	0,62	0,53
Becton Dickinson	58.586	18.372	997	17.375	30%	27%	0,99	0,99	0,81
Draegerwerk	840	189	196	(7)	-1%	30%	0,88	0,92	0,92
Ansell	2.232	477	362	115	5%	30%	0,50	0,67	0,64
AGC Inc	6.921	4.312	983	3.329	48%	31%	1,16	1,11	0,83
median							0,99	0,99	0,83
average							0,96	0,97	0,87
weighted average							0,98	0,99	**0,83**

The Reuters betas were pulled between April and Mai and are presented for comparison purposes only. Given that Reuters does not publish historical betas and that own regression analysis resulted in the exclusion of non-significant betas, the author assumes that Reuters betas might have limited accuracy. However, overall, they are fairly similar and the impact on the valuation is low.

Company Name	Levered Beta	Blume Adjustment	Unlevered Beta
William Demant Holding A/S	1,00	1,00	0,91
Ypsomed Holding AG	0,66	0,77	0,75
West Pharmaceutical Services Inc	1,19	1,13	1,14
PSB Industries SA	0,78	0,85	0,92
Consort Medical PLC	0,48	0,65	0,56
Becton Dickinson and Co	0,97	0,98	0,81
Draegerwerk AG & Co KGaA	0,89	0,93	0,93
Ansell	1,10	1,07	1,03
AGC Inc	1,19	1,13	0,84
Median	0,97	0,98	0,91
Average	0,92	0,95	0,88
Weighted average	1,00	1,00	0,85

22. Relative Valuation – complete Football field



23. Relative Valuation - raw data overview

Peer Group	EV / EBITDA				EV / Sales				EV / EBIT				P/E			
	FY0	*FY1*	*FY2*	*FY3*	*FY0*	*FY1*	*FY2*	*FY3*	*FY0*	*FY1*	*FY2*	*FY3*	*FY0*	*FY1*	*FY2*	*FY3*
Demant A/S	17,3	15,9	14,5	13,2	3,6	3,7	3,3	3,1	20,1	19,3	17,6	16,1	25,3	22,6	19,9	17,7
Ypsomed Holding AG	19,5	18,3	22,0	15,1	4,0	4,0	4,2	3,5	30,5	31,9	52,9	26,1	35,3	27,4	58,8	29,4
West Pharmaceutical Services Inc	20,1	21,7	20,1	17,9	4,1	4,6	4,4	4,1	28,6	30,6	26,3	23,7	36,2	40,9	35,3	31,5
PSB Industries SA	3,2	4,4	4,2	4,2	0,4	0,4			8,6	10,1	9,1		20,5	16,2	14,5	
Consort Medical PLC	11,4	10,0	9,5	9,0	2,3	1,8	1,7	1,7	19,4	14,1	13,0	12,4	36,8	14,3	13,4	12,4
Becton Dickinson and Co	23,0	16,1	14,4	14,2	5,7	5,0	4,7	4,5	43,3	19,0	16,9	15,5	86,4	20,4	18,1	16,3
Draegerwerk AG & Co KGaA	7,9	7,6	6,2	5,4	0,5	0,4	0,4	0,4	17,9	17,7	12,0	9,4	32,2	29,4	17,9	14,1
Ansell Ltd	12,4	11,0	10,1	9,7	1,9	1,8	1,7	1,6	14,9	13,3	12,1	11,6	24,4	17,6	15,9	14,9
AGC Inc	5,5	5,4	5,0	4,8	0,9	0,9	0,9	0,9	11,1				8,6	10,9	9,7	8,9
Min	3,2	4,4	4,2	4,2	0,4	0,4	0,4	0,4	8,6	10,1	9,1	9,4	8,6	10,9	9,7	8,9
Max	23,0	21,7	22,0	17,9	5,7	5,0	4,7	4,5	43,3	31,9	52,9	26,1	86,4	40,9	58,8	31,5
Weighted average	20,3	15,5	14,0	13,4	4,8	4,3	4,1	3,9	36,1	18,5	16,8	15,0	67,3	21,7	19,7	17,3
Average	13,4	12,3	11,8	10,4	2,6	2,5	2,7	2,5	21,6	19,5	20,0	16,4	34,0	22,2	22,6	18,2
Median	12,4	11,0	10,1	9,7	2,3	1,8	2,5	2,4	19,4	18,4	15,0	15,5	32,2	20,4	17,9	15,6
0,25 Quartile	6,7	6,5	5,6	5,1	0,7	0,7	1,1	1,1	13,0	13,5	12,0	11,6	22,5	15,3	14,0	12,9
0,75 Quartile	19,8	17,2	17,3	14,6	4,1	4,3	4,3	4,0	29,6	27,7	24,1	23,7	36,5	28,4	27,6	26,5

Note: More technology-oriented peers trade substantially higher than contract manufacturing pharmaceutical packaging companies, where the up-side potential is limited. As Gerresheimer will be able to shift its business into more profitable environments, applying higher multiples seems appropriate.

Gerresheimer Relative Valuation (SOTP)	EV / EBITDA				EV / Sales				EV / EBIT				P / E			
	2018	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*
Metric	**274**	**266**	**273**	**291**	**1.355**	**1.397**	**1.435**	**1.475**	**147**	**139**	**143**	**158**	**138**	**81**	**83**	**93**
Min	883	1.173	1.142	1.218	497	586	622	615	1.270	1.410	1.295	1.479	1.192	882	800	825
Max	6.305	5.781	6.016	5.228	7.748	6.958	6 787	6.628	6.362	4.439	7.572	4.105	11.947	3.309	4.863	2.927
Weighted average	5.557	4.112	3.829	3.910	6.513	6.069	5 913	5.757	5.308	2.583	2.404	2.363	9.309	1.757	1.632	1.609
Average	3.659	3.263	3.218	3.025	3.518	3.508	3 840	3.661	3.176	2.716	2.859	2.581	4.695	1.795	1.871	1.688
Median	3.388	2.917	2.757	2.820	3.056	2.474	3 625	3.507	2.848	2.558	2.139	2.442	4.452	1.649	1.480	1.452
0,25 Quartile	1.833	1.731	1.539	1.494	903	954	1 572	1.575	1.910	1.877	1.722	1.821	3.107	1.235	1.155	1.196
0,75 Quartile	5.423	4.567	4.724	4.257	5.507	6.036	6 230	5.885	4.345	3.863	3.448	3.729	5.041	2.297	2.286	2.463

Gerresheimer Share price	EV / EBITDA				EV / Sales				EV / EBIT				P / E*			
	2018	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*
Min	2	12	11	13	*0*	*0*	*0*	*0*	15	19	15	21	38	28	25	26
Max	175	158	166	141	221	196	189	185	177	116	215	105	380	105	155	93
Weighted average	151	105	96	99	182	168	162	158	143	57	51	49	296	56	52	51
Average	91	78	77	71	86	86	96	91	75	61	65	56	150	57	60	54
Median	82	67	62	64	72	53	89	86	65	56	42	52	142	53	47	46
0,25 Quartile	33	29	23	22	3	5	23	24	35	34	29	32	99	39	37	38
0,75 Quartile	147	120	125	110	150	166	172	162	113	97	84	93	161	73	73	78

Equity / enterprise value in €m | share price in €

Note:

1) Enterprise Value multiples include Atech. Thus, they represent the whole Business of Gerersheimer

2) P/E-multiples refer to the equity-value of Plastic & Devices and Pharmaceutical Packaging Glass.

3) Using 2y-forward multiples yields the most preferred result, in line with literature review.

24. Relative Valuation – consensus estimates

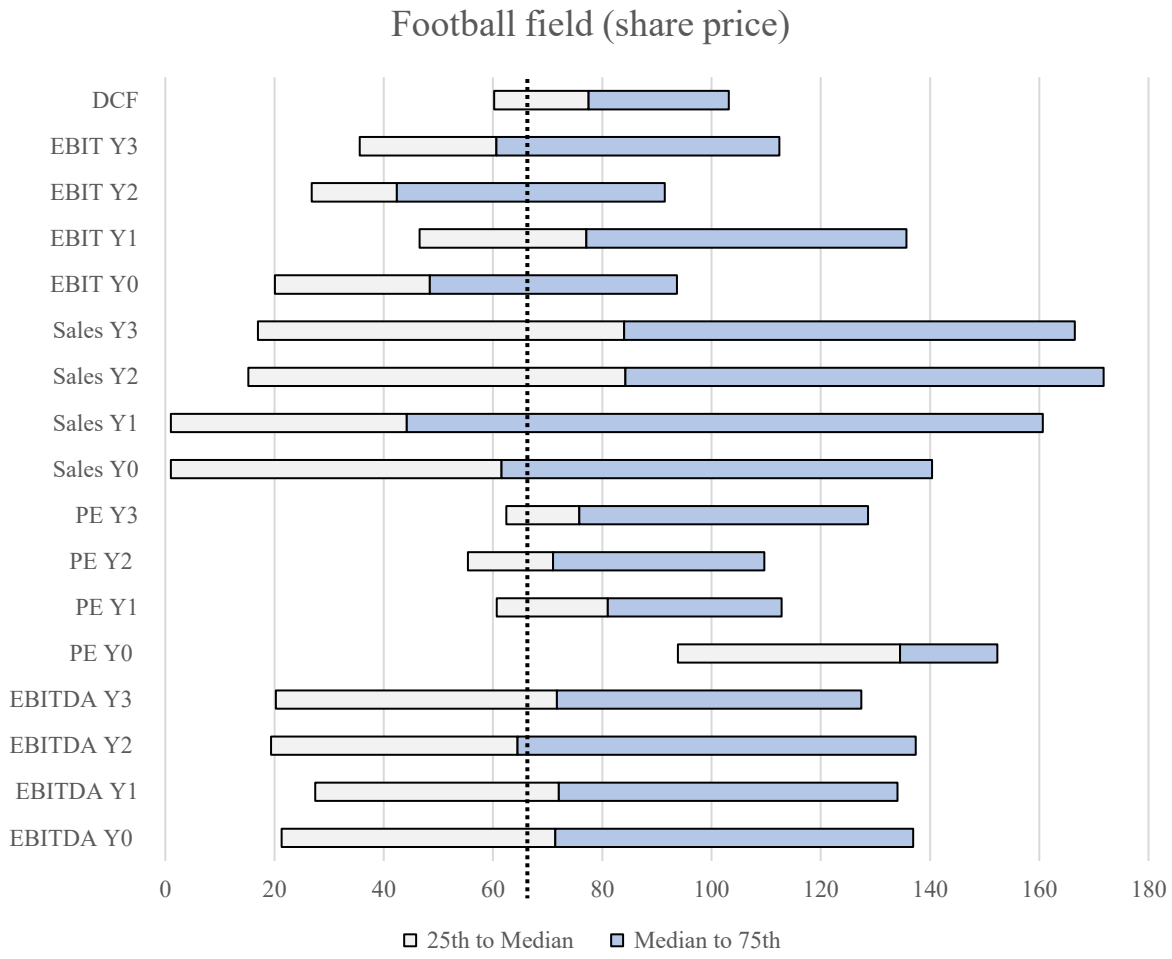
Below, consensus estimates of the financial metrics were pulled from Reuters. Since the PE multiples are based on the "sum of the parts"- Net Income, one could not arrive at a consolidated share price. (consensus is highlighted in yellow). The 2y-forward multiples are considered as most relevant in line with literature review and are highlighted in light blue.

Gerresheimer Relative Valuation (consolidated)	**EV / EBITDA**				**EV / Sales**				**EV / EBIT**				**P/E**			
	2018	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*
Metric (@ Reuters)	**277**	**314**	**318**	**355**	**1.368**	**1.434**	**1.515**	**1.607**	**139**	**196**	**168**	**199**	**131**	**125**	**125**	**152**
Min	892	1.386	1.329	1.483	501	601	656	670	1.205	1.986	1.522	1.869	1.131	1.362	1.206	1.352
Max	6.373	6.826	7.001	6.367	7.822	7.143	7.166	7.220	6.038	6.255	8.901	5.186	11.335	5.106	7.326	4.800
Weighted average	5.617	4.856	4.455	4.763	6.575	6.230	6.243	6.271	5.038	3.640	2.826	2.985	8.831	2.711	2.458	2.638
Average	3.698	3.853	3.744	3.684	3.552	3.601	4.054	3.988	3.014	3.827	3.361	3.261	4.454	2.769	2.819	2.769
Median	3.424	3.445	3.208	3.435	3.085	2.540	3.828	3.820	2.703	3.604	2.514	3.086	4.223	2.545	2.230	2.381
0,25 Quartile	1.853	2.044	1.791	1.819	912	979	1.660	1.716	1.813	2.645	2.024	2.301	2.948	1.906	1.741	1.961
0,75 Quartile	5.481	5.393	5.498	5.184	5.560	6.196	6.578	6.411	4.124	5.444	4.054	4.712	4.782	3.544	3.444	4.039

Gerresheimer share price (consensus)	**EV / EBITDA**				**EV / Sales**				**EV / EBIT**				**P/E**			
	2018	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*	*2018*	*2019*	*2020*	*2021*
Min	-	6	5	10	-	-	-	-	1	26	11	22	36	43	38	43
Max	165	180	185	165	211	190	191	192	155	162	246	127	361	163	233	153
Weighted average	141	117	104	114	172	161	161	162	123	78	52	57	281	86	78	84
Average	80	85	82	80	75	77	91	89	58	84	69	66	142	88	90	88
Median	71	72	64	72	61	43	84	84	48	77	42	61	135	81	71	76
0,25 Quartile	21	27	19	20	-	-	15	17	20	47	27	36	94	61	55	62
0,75 Quartile	137	134	137	127	139	160	172	166	94	136	91	112	152	113	110	129

Equity / enterprise value in €m | share price in €

25. Relative Valuation – complete Football field (consensus)



26. Peer group derivation – overview

Company Name	Market Cap	Enterprise Value	LTM Sales	Gross Profit	EBITDA	EBITDA Margin	EBIT	Net Income	Revenue CAGR (5y)	ROIC (%)	Debt / Equity	Net Debt /EBITDA (x, LTM)	Interest Expense (Mio. USD)	EBITDA / Int. Exp. (x)	EBIT / Int. Exp. (x)
Gerresheimer	2.248	3.486	1.587	474	328	21%	175	113	1,6%	4,2%	1,11	2,72	30	11	5,8
Carl Zeiss Meditec AG	7.803	7.848	1.487	825	269	18,1%	233	147	7,2%	15%	0,02	0	2	113	98
Sartorius AG	11.763	13.033	1.796	NULL	313	17%	310	206	10,7%	11%	1,62	2	13	24	24
Fresenius Medical Care AG & Co KGaA	23.397	31.089	21.333	7.202	3.674	17%	2.792	1.535	10,2%	11%	0,76	2	476	8	6
Draegerwerk AG & Co KGaA	917	952	2.982	NULL	182	6%	85	45	1,6%	11%	0,20	0	9	20	9
Siemens Healthineers AG	39.427	38.743	15.588	6.347	3.102	20%	2.485	1.468	3,2%	19%	0,01	NULL	238	13	10
Koninklijke Philips NV	36.204	39.394	20.783	9.809	3.483	17%	2.234	1.250	-3,8%	12%	0,40	1	222	16	10
Coltene Holding AG	575	578	172	125	32	19%	26	20	1,2%	19%	0,07	0	0	103	84
Coloplast A/S	18.775	19.199	2.560	1.722	898	35%	800	598	7,2%	61%	0,21	0	2	481	428
Smith & Nephew PLC	16.418	17.476	4.904	3.606	1.464	30%	1.010	663	2,4%	17%	0,30	1	49	30	21
Straumann Holding AG	11.695	11.651	1.141	865	334	29%	293	280	10,1%	23%	0,19	NULL	6	54	47
William Demant Holding A/S	8.434	9.293	2.126	1.621	459	22%	394	283	9,0%	15%	0,75	2	11	41	35
Ypsomed Holding AG	1.515	1.572	489	147	100	20%	64	55	13,8%	15%	0,17	0	0	294	188
AGC Inc	7.968	12.808	13.900	3.832	2.215	16%	1.105	818	2,9%	6%	0,48	2	64	35	17
Compagnie de Saint Gobain SA	19.454	30.388	48.956	12.464	4.986	10%	3.539	1.879	-1,1%	11%	0,50	2	357	14	10
Berry Global Group Inc	6.718	12.165	7.869	1.431	1.335	17%	797	496	11,1%	9%	4,08	4	253	5	3
Nippon Sheet Glass Co Ltd	771	4.268	5.683	1.524	638	11%	337	58	3,0%	2%	2,74	5	145	4	2
West Pharmaceutical Services Inc	7.475	7.374	1.717	545	345	20%	240	207	4,7%	15%	0,15	NULL	7	49	34
PSB Industries SA	128	129	316	NULL	57	18%	27	11	8,8%	4%	0,80	0	3	19	9
Consort Medical PLC	562	683	428	NULL	85	20%	50	22	26,8%	6%	0,47	2	4	19	11
Nipro Corp	2.296	6.084	3.721	1.196	594	16%	255	111	10,4%	2%	2,97	8	33	18	8
Becton Dickinson and Co	65.789	85.914	15.983	7.262	3.966	25%	2.111	311	14,7%	8%	1,02	4	706	6	3
Sonova Holding AG	12.244	12.601	2.775	1.959	662	24%	521	420	8,1%	16%	0,31	0	1	494	389
Zignago Vetro SpA	967	1.136	313	241	78	25%	41	48	-2,7%	14%	1,05	2	2	39	21
Thermo Fisher Scientific Inc	89.991	106.847	24.358	10.859	6.143	25%	3.876	2.938	13,2%	6%	0,69	3	667	9	6
Ansell	2.522	2.665	1.493	583	229	16%	158	120	4,2%	6%	0,36	1	20	11	8

all Values in Million US Dollar @Reuters, based on February 20, 2019

27. Peer group derivation – results

Company name	Business / Product	EBITDA Margin	Debt / Equity	Rating	ROIC	CAGR	Total Score
Carl Zeiss Meditec AG	2	1	3	2	2	2	12
Sartorius AG	2	2	1	2	2	2	11
Fresenius Medical Care AG & Co KGaA	3	2	1	1	2	2	n/a
Draegerwerk AG & Co KGaA	1	3	2	1	2	1	10
Siemens Healthineers AG	2	1	3	2	3	2	13
Koninklijke Philips NV	2	2	2	2	2	3	13
Coltene Holding AG	2	1	3	2	3	1	12
Coloplast A/S	2	3	2	2	3	2	14
Smith & Nephew PLC	2	3	2	2	3	1	13
Straumann Holding AG	2	3	2	2	3	2	14
William Demant Holding A/S	2	1	1	2	2	2	10
Ypsomed Holding AG	1	1	2	2	2	2	10
AGC Inc	1	2	2	2	2	1	10
Compagnie de Saint Gobain SA	2	3	2	2	2	3	14
Berry Global Group Inc	2	2	3	1	2	2	12
Nippon Sheet Glass Co Ltd	3	3	3	3	2	1	n/a
West Pharmaceutical Services Inc	1	1	2	2	2	2	10
PSB Industries SA	2	2	1	1	1	2	9
Consort Medical PLC	1	1	2	2	1	3	10
Nipro Corp	2	2	3	1	1	2	11
Becton Dickinson and Co	1	2	1	2	2	2	10
Sonova Holding AG	2	1	2	2	3	2	12
Zignago Vetro SpA	3	2	1	2	2	3	n/a
Thermo Fisher Scientific Inc	3	2	1	1	1	2	n/a
Ansell	1	2	2	2	1	2	10

Peer Group is highlighted

28. Histogram – Monte Carlo

z	bins		Buy: X > 75	Hold: 55,1 < X > 74,9	Sell: X < 55
-(4,50)	22,8	-			-
-(4,00)	28,7	-			-
-(3,50)	34,6	-			-
-(3,00)	40,5	2			2
-(2,50)	46,5	36			36
-(2,00)	52,4	140			140
-(1,50)	58,3	399		399	
-(1,00)	64,2	983		983	
-(0,50)	70,1	1.593		1.593	
-	76,0	2.022	2.022		
0,5	82,0	1.862	1.862		
1,0	87,9	1.365	1.365		
1,5	93,8	875	875		
2,0	99,7	437	437		
2,5	105,6	181	181		
3,0	111,5	73	73		
3,5	117,5	20	20		
4,0	123,4	9	9		
4,5	129,3	3	3		

29. GDP and Inflation rates of the German economy

	2018	2019	2020	2021	2022	2023
Inflation	1,80%	1,80%	2,10%	2,30%	2,50%	**2,20%**
Real GDP	1,90%	1,90%	1,60%	1,50%	1,30%	**1,20%**
Nominal GDP	3,70%	3,70%	3,70%	3,80%	3,80%	**3,40%**

30. Terminal Value Sensitivities

a) Possible Terminal Value growth rates and the corresponding share prices

		Company driver	Industry growth	Inflation / IQVIA	Thesis	GDP
		1,5%	**1,9%**	**2,2%**	**2,3%**	**3,4%**
WACC	**4,6%**	89	102	119	122	259
	5,1%	73	82	94	96	174
	5,6%	60	68	76	**€78**	128
	6,1%	51	56	63	64	99
	6,6%	43	48	53	53	79

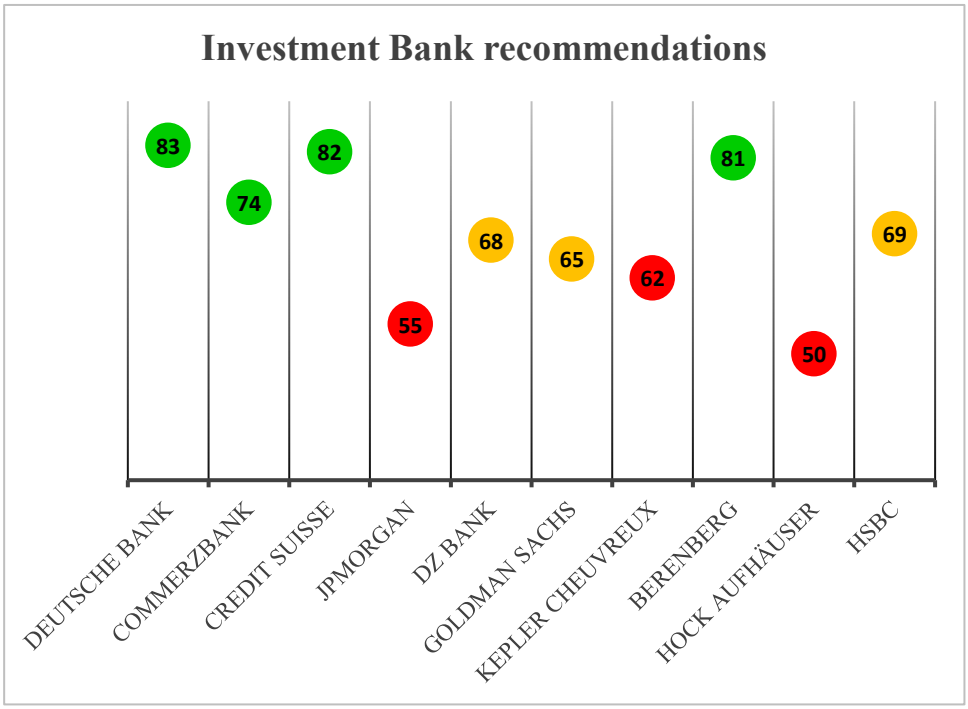
b) Implied growth rates arrived by applying different Exit-Multiples

The Multiples used for the Exit-Multiple model are based on the EV/EBTIDA 2019 multiples from the peer group. Applying these multiples, the following implied growth rates an be determined:

Exit Multiple (EV/EBITDA Y1)	11x - median	12x - mean	16x - weighted mean
Implied growth rate	1,85%	2,25%	2,93%

31. Investment Bank Recommendations

All Investment Bank reports refer to the data published in the latest available annual report (2018). As illustrated below, there is no clear consensus about target price, and it appears that Gerresheimer is not the most favored among analysts. One reason for that might be that the company lacked of convincing underlying growth performance and analysts argued in their reports that communication and management execution was not ideal. However, the author does not consider analysts' sensations of Gerresheimer´s former management to be relevant for the purpose of this thesis and is therefore confident that the company can substantially increase performance and provide convincing results in the future.



Hock & Aufhaeuser (H&A) predicted the lowest share price for Gerresheimer among the investment banks. Therefore, it is worth to analyse the reasons behind this sentiment. The target price of 50 € was compared to the price of 68,70 € as of 07 March 2019. The sell-recommendation is based on the ill positioning of Gerresheimer in the industry in order to sustainable increase sales growth. H&A describes the company as being exposed to price pressure and slow growth in the pharma market.

The main difference between the CS, H&A and the model of this thesis is, is that H&A applied a relatively low EV/Sales multiple of 1,6x, which is not in line with the peer-group. A summarising table with the main valuation-assumptions is provided on the next page.

	Hock & Aufhäuser	**This thesis**
Target	50€ (down to sell)	78€ (outperform)
Methodology	Multiples – Sotp (H&A applied an EV/Sales multiple of 1,6x on 2020 Revenues)	DCF – Sotp
EV/Revenue peers	Peer group suggests a Revenue multiple (forward 2020) that varies between 2,5 (median) and 4,1 (weighted average) with an overall average of 2,7	
Advanced Technologies	260 EURm	335 EURm (equals the purchase price)
Core Business Revenues 2020	1461,9 EURm	1435,9 EURm
WACC	7,5% (implied IRR)	5,6%

32. Synthetic Rating Damodaran (2019)

For all emerging market firms and developed market firms with market cap < $5 billion				**For developed market firms with market cap > $5 billion**			
If interest coverage ratio is				*If interest coverage ratio is*			
greater than	**≤ to**	**Rating is**	**Spread is**	**>**	**≤ *to***	***Rating is***	**Spread is**
- (100.000,00)	0,50	D2/D	19.38%	- (100.000,00)	0,20	D2/D	19.38%
0,50	0,80	C2/C	14.54%	0,20	0,65	C2/C	14.54%
0,80	1,25	Ca2/CC	11.08%	0,65	0,80	Ca2/CC	11.08%
1,25	1,50	Caa/CCC	9.00%	0,80	1,25	Caa/CCC	9.00%
1,50	2,00	B3/B-	6.60%	1,25	1,50	B3/B-	6.60%
2,00	2,50	B2/B	5.40%	1,50	1,75	B2/B	5.40%
2,50	3,00	B1/B+	4.50%	1,75	2,00	B1/B+	4.50%
3,00	3,50	Ba2/BB	3.60%	2,00	2,25	Ba2/BB	3.60%
3,50	4,00	Ba1/BB+	3.00%	2,25	2,50	Ba1/BB+	3.00%
4,00	4,50	Baa2/BBB	2.00%	2,50	3,00	Baa2/BBB	2.00%
4,50	6,00	A3/A-	1.56%	3,00	4,25	A3/A-	1.56%
6,00	7,50	A2/A	1.38%	4,25	5,50	A2/A	1.38%
7,50	9,50	A1/A+	1.25%	5,50	6,50	A1/A+	1.25%
9,50	12,50	Aa2/AA	1.00%	6,50	8,50	Aa2/AA	1.00%
12,50	100.000,00	Aaa/AAA	0.75%	8,50	100.000,00	Aaa/AAA	0.75%

33. Complete DCF summary

Free Cash Flow

Currency: € Mio	2013A	2014A	2015A	2016A	2017A	2018A	2019E	2020E	2021E	2022F	2023F	TV	CAGR 14-23	CAGR 14-18	CAGR 19-23
Revenues	**1.266**	**1.290**	**1.283**	**1.375**	**1.348**	**1.355**	**1.397**	**1.434,9**	**1.475**	**1.519**	**1.562**	**1.597**	*2,15%*	*1,23%*	*2,84%*
Revenue growth y-o-y in %		*1,9%*	*(0,6%)*	*7,2%*	*(2,0%)*	*0,5%*	*3,1%*	*2,7%*	*2,8%*	*3,0%*	*2,9%*	*2,25%*			
EBITDA		**235**	**306**	**307**	**306**	**274**	**269**	**279**	**294**	**300**	**307**	**314**	*3,03%*	*3,89%*	*3,40%*
EBITDA Margin		*18,2%*	*23,9%*	*22,3%*	*22,7%*	*20,2%*	*19,2%*	*19,5%*	*20,0%*	*19,7%*	*19,7%*	*19,7%*			
Depreciation & Amortisation		**(105)**	**(124)**	**(126)**	**(125)**	**(127)**	**(129)**	**(136)**	**(137)**	**(138)**	**(140)**	**(144)**	*3,28%*	*4,80%*	*2,04%*
EBIT		**130**	**182**	**180**	**181**	**147**	**139**	**143**	**158**	**162**	**167**	**170**	*2,82%*	*3,13%*	*4,62%*
EBIT Margin		*10,1%*	*14,2%*	*13,1%*	*13,4%*	*10,8%*	*10,0%*	*10,0%*	*10,7%*	*10,7%*	*10,7%*	*10,7%*			
EBIT		**130**	**182**	**180**	**181**	**147**	**139**	**143**	**158**	**162**	**167**	**170**			
less: Taxes		(35)	(54)	(52)	(53)	33	(38)	(39)	(43)	(45)	(46)	(47)			
EBIAT (Earnings Before Interest After Taxes)		**95**	**128**	**128**	**128**	**180**	**101**	**104**	**114**	**117**	**121**	**123**	*2,68%*	*17,20%*	*4,62%*
Plus: Depreciation & Amortisation		105	124	126	125	127	129	136	137	138	140	144	*3,28%*	*4,80%*	*2,04%*
Less: Capital Expenditures		(127)	(126)	(113)	(119)	(114)	(180)	(170)	(128)	(129)	(144)	(144)	*1,44%*	*-2,53%*	*-5,37%*
Less/Plus: Change in Working Capital		44,2	172,0	(17,9)	(22,1)	(66,0)	12,6	(2,1)	(2,3)	(2,7)	(2,7)	(0,2)			
FCFF - Core Business		**118**	**299**	**123**	**112**	**126**	**63**	**68**	**121**	**123**	**114**	**123**	*-0,33%*	*1,70%*	*15,92%*

DCF Model

Currency: € '000	2019E	2020E	2021E	2022F	2023F	TV
Free Cash Flow	63	68	121	123	114	123
Partial year adjustment	1,0	1,0	1,0	1,0	1,0	1,0
Free Cash Flow, adjusted	**63**	**68**	**121**	**123**	**114**	**123**
WACC	5,6%	5,6%	5,6%	5,6%	5,6%	3,4%
mid year discounting	0,5	1,5	2,5	3,5	4,5	5,5
Present value factor	0,97	0,92	0,87	0,83	0,78	23,23
Present Value of the Free Cash Flows	**62**	**63**	**105**	**102**	**89**	**2.861,5**
Enterprise Value PPG and P&D	3.282,4					*87,2%*
Enterprise Value Advanced Technologies	334,8					
Group Enterprise Value	**3.617,1**					
Plus: Cash	*80*					
Less: Debt	*(1.003)*					
Less: Noncontrolling Interests	*(76)*					
Less: Pensions and others	*(184)*					
Total Adjustments to EV	(1.183)					
Equity Value as per 30.11.2018	**2.434**					
Shares Outstanding as of 30.11.2018	31,4					
Share Price as of 30.11.2018	**77,52 €**					

Sensitivity

WACC \ *Terminal Value*	**1,9%**	**2,1%**	**2,3%**	**2,5%**	**2,7%**
4,6%	102	111	122	135	150
5,1%	82	89	96	104	114
5,6%	68	72	77,52 €	83	90
6,1%	56	60	64	68	73
6,6%	48	50	53	57	60

9 References

Aliaksandr Halitsa (2019). *Equity Report: Gerresheimer AG.* Hauck & Aufhäuser.

Aswath Damodaran (2010). *It is all relative… Multiples, Comparables and Value!* Retrieved May 19, 2019, from NYU: http://pages.stern.nyu.edu/~adamodar/pdfiles/country/relvalAIMR.pdf.

Aswath Damodaran (2019). *Price and Value to Book Ratio by Sector.* Retrieved May 05, 2019, from NYU: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/pbvdata.html.

Barak Rickmann, Will Mitchell, Elena Vidal, Kevin Schulman (2017). Pharmaceutical M&A Activity: Effects on Prices, Innovation, and Competition. *Loyola University Chicago Law Journal, 48*.

Berk, J. B., & DeMarzo, P. M. (2014). *Corporate finance* (Third edition). *The Pearson series in finance.* Harlow, Essex, Pearson.

BMWi (2017). *Renewable Energy Sources Act (EEG 2017).* Federal Ministry for Economic Affairs and Energy. Retrieved May 19, 2019, from https://www.bmwi.de/Redaktion/EN/Downloads/renewable-energy-sources-act-2017.pdf%3F__blob%3DpublicationFile%26v%3D3.

Bruner, R., M. Eades, K., Harris, R., & Higgins, R. (1998). Best Practices in Estimating the Cost of Capital: Survey and Synthesis. *Financial Practice and Education, 8*.

Christian Zwirner (2018). *IDW-Empfehlung zur Marktrisikoprämie weiterhin aktuell (IDW-recommendation regarding the MRP is still accurate).* Munich: Fachausschuss für Unternehmensbewertung und Betriebswirtschaft (FAUB) des IDW. Retrieved May 01, 2019, from https://rsw.beck.de/cms/?toc=BC.5608&docid=407809.

Damodaran, A. (2012). *Investment valuation* (3rd ed.). *Wiley finance.* Hoboken, N.J., Chichester: Wiley; John Wiley [distributor].

DOJ (2018). *HERFINDAHL-HIRSCHMAN INDEX.* Retrieved May 19, 2019, from Department of Justice: https://www.justice.gov/atr/herfindahl-hirschman-index.

ECB (2019). *Monetary policy.* Retrieved May 19, 2019, from European Central Bank: https://www.ecb.europa.eu/mopo/html/index.en.html.

Eugene F. Fama (1968). Risk, Return and Equilibrium: Some Clarifying Comments. *The Journal of Finance, 23*(1), 29–40.

Fernández Pablo (2001). Valuation using multiples. How do analysts reach their conclusions? *IESE Business School, University of Navarra*. (450).

Fernández Pablo (2007a). *Company Valuation Methods. The most common errors in valuation.* Spain: IESE Business School.

Fernández Pablo (2007b). Valuing companies by cash flow discounting: ten methods and nine theories. *Managerial Finance, 33*(11).

Fischer Black, Micheal Jensen, Myron Scholes (1972). The Capital Asset Pricing Model: Some Empirical Tests. *Studies in the theory of capital markets, 81*(3), 79–121.

FRED (2019). *Long-Term Government Bond Yields.* Retrieved May 19, 2019, from Federal Reserve bank of St. Louis: https://fred.stlouisfed.org/series/IRLTLT01DEM156N.

Fred D. Arditti (1973). The Weighted Average Cost of Capital: Some Questions on its Defintion, Interpretation and Use. *The Journal of Finance, 28*(4), 1001–1007.

Gerresheimer AG (2019). *Gerresheimer AG annual report 2018.* Retrieved June 01, 2019, from Gerresheimer AG: https://www.gerresheimer.com/fileadmin/Gerresheimer_Website/Investor_Relations/Berichte/20190214_Gerresheimer_Annual_Report_2018_EN_g.pdf.

Gordon, M.J and Eli Shapiro (1956). Capital Equipment Analysis: The Required Rate of Profit. *Management Science, 3*(1), 102–110.

IMF (2019a). *Inflation rate, average consumer prices.* Retrieved May 05, 2019, from https://www.imf.org/external/datamapper/PCPIPCH@WEO/OEMDC/ADVEC/WEOWORLD/AFQ/NAQ/SSQ/APQ/AZQ/CAQ/EAQ/PIQ/SAQ/SEQ/EUQ/EEQ/WEQ/MEQ/WHQ/CBQ/CMQ/NMQ.

IMF (2019b). *World Economic Outlook: A Weakening Global Expansion.* International Monetary Fund. Retrieved May 05, 2019, from https://www.imf.org/en/Publications/WEO/Issues/2019/01/11/weo-update-january-2019.

Jan Hatzius, Sven Jari Stehn, Nicholas Fawcett, Soeren Radde, & Manav Chaudhary (2019). *Global Economic Outlook 2019: Landing the Plane.* Goldman Sachs. Retrieved May 05, 2019, from https://www.goldmansachs.com/insights/pages/outlook-2019/global-outlook/report.pdf.

Jerarld Pinto, Elaine Hery, Thomas Robinson, John Stowe, & Pinkney, J. (2010). *Equity Asset Valuation.* New York: Dial Books for Young Readers.

Klaus Schmidt & Emma Moesle (2018). *Germany, Corporate deductions.* Retrieved May 19, 2019, from PWC: http://taxsummaries.pwc.com/ID/Germany-Corporate-Deductions.

Lie, E., & Lie, H. J (2002). Multiples Used to Estimate Corporate Value. *Financial Analysts Journal, 58*(2), 44–72.

Liu, N. a. T. (2002). Equity Valuation Using Multiples. *Journal of Accounting Research, 40*(1), 135–172.

MarketLine (2019). *Gerresheimer AG: MarketLine Strategy, SWOT and Corporate Finance Report.* MarketLine.

Marshall Blume (1971). On the assessment of risk. *The Journal of Finance, 26*(1), 1–10.

Merton Miller (1988). The Modigliani-Miller Propositions After Thirty Years. *Journal of Economic Perspectives, 1*(4), 99–120.

Moody´s Corporation (2018). *Moody´s withdraws Gerresheimer´s ratings.* Retrieved May 19, 2019, from https://www.moodys.com/research/Moodys-withdraws-Gerresheimers-ratings--PR_386476.

Morgan Stanley Dean Witters (1999). *How we Value Stocks.* Retrieved May 19, 2019, from Morgan Stanley Dean Witters.

Murray Aitken (2019). *The Global Use of Medicine in 2019 and Outlook to 2023.* IQVIA Institute. Retrieved May 05, 2019, from https://www.iqvia.com/institute/reports/the-global-use-of-medicine-in-2019-and-outlook-to-2023.

Passport (2019). *Pharmaceutical and medical equipment global industry overview.* Passport.

Paweł Mielcarz and Franjo Mlinarič (2014). The superiority of FCFF over EVA and FCFE in capital budgeting. *Economic Research-Ekonomska Istraživanja, 27*(1), 559–572.

Peterson Drake, P., & Fabozzi, F. J. (2009). *Foundations and applications of the time value of money. The Frank J. Fabozzi series.* Hoboken, N.J.: John Wiley & Sons.

Rosenbaum, J., Pearl, J., & Perella, J. R. (op. 2009). *Investment banking: Valuation, leveraged buyouts, and mergers & acquisitions.* Hoboken (NJ), Canada: J. Wiley & Sons.

Siriram Radhakrisnan (2019). *Pharmaceutical Packaging Market: Global Opportunity Analysis and Industry Forecast.* Allied Market Research. Retrieved May 05, 2019, from https://www.alliedmarketresearch.com/pharmaceutical-packaging-market.

Steven N. Kaplan and Richard S. Ruback (1995). The Valuation of Cash Flow Forecasts: An Empirical Analysis. *The Journal of Finance, 50*(4), 1059-1093.

Stewart Myers (1974). Interactions of Corporate Financing and Investment Decisions-Implications for Capital Budgeting. *The Journal of Finance, 29*(1), 1–25.

Susan Foushee, Tim Koller, and Anand Mehta (2012). *Why bad multiples happen to good companies.* McKinsey. Retrieved May 01, 2019, from https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/why-bad-multiples-happen-to-good-companies.

Tamara Mathias, A. F. (2019). *Pfizer to shut two manufacturing plants in India.* Retrieved February 02, 2019, from Reuters: https://www.reuters.com/article/us-pfizer-facilities/pfizer-to-shut-two-manufacturing-plants-in-india-idUSKCN1P31R0.

Tim Koller, Marc Goedhart, & David Wessels (2015). *Valuation: Measuring and managing the value of companies* (6. ed.). Hoboken, N.J.: Wiley.

UN (2017). *World Population Prospects: The 2017 Revision.* New York: United Nations. Retrieved May 19, 2019, from https://esa.un.org/unpd/wpp/Publications/Files/WPP2017_KeyFindings.pdf.

WHO (2018). *Diabetes.* World Health Organization. Retrieved May 19, 2019, from https://www.who.int/news-room/fact-sheets/detail/diabetes.

Zacharias Sautner, & Vladimir Vladimirov (2013). *Indirect Bankruptcy Costs and Bankruptcy Law.* University of Amsterdam.

Financial Services Platforms used in this Thesis:

- S&P Capital IQ
- Thomson Reuters