



Lisbon School
of Economics
& Management
Universidade de Lisboa

**MASTER OF SCIENCE IN
FINANCE**

**MASTERS FINAL WORK
PROJECT**

**EQUITY RESEARCH:
BAYER AG**

DIANA GODINHO SARDINHEIRO

OCTOBER 2021



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**SUPERVISOR:
TELMO FRANCISCO SALVADOR VIEIRA**

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Abstract

The present Equity Research Report about Bayer AG Pharmaceuticals follows the guidelines and regulations of *Lisbon School of Economics and Management (ISEG)* Master Final Work and, in addition, was written in line with the guidelines of the research report format recommended by CFA Institute, reflecting public information published by the company in its Annual and Quarterly Reports until 30th June 2021.

Bayer AG is a German multinational Pharmaceutical and Life Sciences company, that is committed to the principles of sustainable growth, with a 2020FY Revenue estimated in €41 400 million.

The selection of this company and the Pharmaceutical Industry was an easy choice for me. I always felt curious about this industry and the impact that it could have in people's life. Moreover, with the current situation that we are living, with the Covid-19 Pandemic, this industry is a trend topic nowadays.

Bayer has a BUY recommendation with Medium Risk, based on a forecast period of 6 years (2021E-2026F), with a 2022YE **Price Target of €63.39/share**, using the Discounted Cash Flow Method (DCF), meaning a 18.75% Upside Potential when compared with €53.38/share at 2021, June 30th. Other valuation methods to achieve Bayer's Target Price includes the Dividend Discount Model (DDM), the Adjusted Present Value (APV), the Flow to Equity Method through Free Cash Flow to the Firm (FCFF) and a Relative Valuation using Peers' Multiples.

This report also includes a Monte Carlo Simulation, performed with Crystal Ball software and a Sensitivity Analysis, in order to understand what are the risks that could affect Bayer's Price Target Recommendation. These risks include Litigation Issues, Supply Disruptions and Risks linked to the Agricultural Industry.

JEL classification: F01; G10; G17; G30; G32; G34; G35; J10; J11; K41; L65; I10; J11

Keywords: Bayer AG; Pharmaceutical Industry; Crop Science Segment; Equity Research; Valuation; Mergers & Acquisitions; Litigation Issues; Covid-19 Pandemic.

Resumo

Este projeto é uma *Equity Research* sobre a Bayer AG Pharmaceuticals que segue as orientações e normas do Instituto Superior de Economia e Gestão (ISEG) sobre o Trabalho Final de Mestrado e que simultaneamente respeita as diretrizes recomendadas pelo *CFA Institute*, refletindo informação pública publicada pela empresa nos seus Reportes Quadrimestrais e Trimestrais até 30 de Junho de 2021.

Bayer AG é uma empresa multinacional alemã que atua na Indústria Farmacêutica, estando comprometida com princípios de desenvolvimento sustentável e que no fim do ano de 2020 teve as suas vendas avaliadas em 41 400 milhões de euros.

A seleção desta empresa e da Indústria Farmacêutica foi uma escolha fácil para mim, uma vez que sempre senti curiosidade sobre a forma como esta indústria pode afetar a população mundial, podendo mudar o rumo das nossas vidas. Além disso, com a corrente situação vivida devido à Pandemia de Covid-19, é uma das indústrias com maior impacto hoje em dia.

A Bayer AG tem uma recomendação de Investimento de “Compra” com médio risco, com um **price target de €63.39/acção** no fim de 2022, obtido através do *Discounted Cash Flow Method (DCF)*, com uma valorização potencial de 18.75% quando comparada com o preço da ação de €53.38/acção em 30 de Junho de 2021. Outros métodos de avaliação foram calculados para obter o *Price Target* como o *Dividend Discount Model (DDM)*, o *Adjusted Present Value (APV)*, o *Flow to Equity Method* e por fim uma *Relative Valuation*.

Por fim, este reporte também incluí uma *Monte Carlo Simulation*, obtida através do programa *Crystal Ball* e uma Análise de Sensibilidade, para perceber quais os riscos que podem afetar o *Price Target* da Bayer. Estes riscos incluem Problemas Legais, Disrupções na Cadeia de Fornecimentos e riscos ligados à Agricultura.

Classificação JEL: F01; G10; G17; G30; G32; G34; G35; J10; J11; K41; L65; I10; J11

Palavras-Chave: Bayer AG; Indústria Farmacêutica; *Crop Science Segment*; Equity Research; Avaliação de Empresas; Fusões e Aquisições; Problemas Legais; Covid-19

Acknowledgements

“The most difficult thing is the decision to act, the rest is merely tenacity.”

- Amelia Earhart

This Master Final Work was one of the major challenges that I have accomplished until now, but in end was a rewarding effort that I couldn't finish without the support of my supervisor, family and friends. Thank you also *ISEG* for an amazing five-year journey.

Firstly, I would like to thank my mother Maria José and my father José for all the effort they have done during my all life, without them I wouldn't be here today and for all the love and caring they always give me. Thank you to my little sister Daniela, that is the shine and the love of my life and to all my family for all the support and understanding during the development of my thesis, especially in the hardest times.

Thank you also to my supervisor Professor Telmo Vieira, for all the availability and guidance during the development of my Master's Final Work and to all professors that I had during the five years that I have studied at *ISEG*.

Lastly, but not least, I would like to thank all my friends and team workers for all the motivation they have given me during this time.

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Abbreviations

A

API Active Pharmaceutical Product

B

Bn Billions

bps Basis Points

C

CAGR Compound Annual Growth Rate

CAPEX Capital Expenditures

CAPM capital asset pricing mode

CEO Chief executive officer

CFO Chief Financial officer

D

D

D&A Depreciations and Amortizations

DCF Discounted Cash Flow

DDM Dividend Discount Model

E

E

EU European Union

EMA European Medicines Agency

EBIT Earnings before interest and taxes

EBITDA Earnings Before Interest, Taxes, Depreciation, and Amortization

ESG Environmental, Social, and Governance

EV Enterprise Value

ERP Equity Risk Premium

F

FCFE Free Cash Flow to Equity

FCFF Free Cash Flow to the Firm

FDA Food and Drug Administration

G

g* Perpetual Growth Rate

GDP Gross Domestic Product

GSK GlaxoSmithKline plc.

J

J&J Johnson&Johnson

M

M Millions

P

PV Present Value

Q

Q1 First Quarter

R

R&D Research and Development

Rf Risk free rate

S

SG&A Selling, General and Administrative Expenses

T

TV Terminal Value

U

US United States of America

W

WACC Weighted Average Cost of Capital

Date: 30th June 2021 **Close Price:** €53.38/share **Price Target:** €63.39/share 2022HY
Recommendation: BUY (18.75% Upside) Medium-Risk



RESEARCH SNAPSHOT

Bayer AG is a German multinational **Pharmaceutical and Life Sciences** company that is committed to the principles of sustainable growth.

BUY is the recommendation for **Bayer Pharmaceuticals AG (BAYN)**, based on a forecast period of 6 years (2021E-2026F), with a **2022YE Price Target of €63.39/share**, using the Discounted Cash Flow Method (DCF), meaning a **18.75% Upside Potential** when compared with **€53.38/share at 2021, June 30th** (Figure 1). Concerning the Risk Assessment, this company has **Medium Risk** due to the risks that Bayer faces, especially during the **Covid-19 Pandemic**.

Solid Market Presence. In a competitive market environment, with high risks associated with R&D, Bayer has a strong leadership in the industry and a large product portfolio, whose principal segments are Crop Science, Pharmaceuticals and Consumer Health. The key segment of the company is Crop Science, representing 46% of the Net Sales of the company in 2020. Bayer Revenues are expected to grow with a CAGR of 2.73% from 2021E to 2026F and the CapEx is expected to increase 1.80% each year during the forecasted period (Figure 2 and Figure 3).

Strength during a Pandemic. Despite the slightly reduction of the long-term growth expectations in the **agricultural segment**, Bayer is supporting the development operations of **CureVac's COVID-19 vaccine candidate CVnCoV** and has been working hard to ensure that the **R&D activities** could continue without interruptions during the Pandemic

Transforming Everyday Health. Bayer has been working to **empower the transformation of everyday health**, providing resources and knowledge about how to improve it and by supplying to more people around the world the access to these services.



Price Target	63.39 €
Current Share Price (30th June 2021)	53.38 €
Upside Potential (Medium Risk)	18.75%
Annualized Return	10.54%
Bloomberg Code	BAYN
Market Cap (€B)	47.30 €
#Shares Outstanding (M)	982.42

Figure 1 - Valuation Summary

Source: Author Analysis

Year	2020	2021E
Net Sales	41 400 €	39 665 €
CapEx	3 138 €	3 194 €
R&D Expenses	-15 932 €	- 7 149 €
D&A	13 259 €	4 652 €
Intangible Assets	26 029 €	26 834 €
Goodwill	36 080 €	34 214 €
Total Debt	41 766 €	41 763 €
Dividend Payment	- 2 768 €	-1 886 €

Figure 2 – Bayer Forecast Key Points

Source: Author Analysis

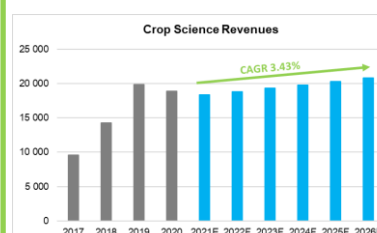


Figure 3 - Crop Science Segment Revenues

Source: Author Analysis



Figure 4 - Bayer Focus SDG's

Source: Bayer Annual Report 2020

Focus on a Sustainable Future. By 2030 Bayer desires to become a **100% carbon-neutral** company and is helping to **limit global warming to 1.5°C** by accomplishing the Paris Climate Agreement (Figure 4).

BUSINESS DESCRIPTION

Bayer AG is a **multinational pharmaceutical** enterprise with headquarters in **Leverkusen, Germany**, founded on founded 1st August 1863 by **Johann Friedrich Weskott** and by **Friedrich Bayer** as a dyestuff firm¹. The company is listed on the Euro Stoxx 50 Market Index and its **CEO** is **Werner Baumann** since 2016.

Between 1981 and 2014 it developed into a chemical company with international operations. In 2014 the company strengthened its **oncology business** with the acquisition of **Algeta ASA** and in 2018 the company successfully completed the purchase of **Monsanto Chemical Works** (Figure 5).

In **2020YE** Bayer has its **Net Sales** distributed worldwide, divided into 4 different regions: **EMEA** (€12.81M), **North America** (€14.35M), **Asia/Pacific** (€8.26M), and **Latin America** (€5.9M) (Figure 6).

Business Segments

Bayer's core skills are in the segments of **Pharmaceuticals**, **Consumer Health** and **Crop Science**, with its first and best-known product being Aspirin (Figure 7).

Pharmaceuticals

The **Pharmaceuticals Division** (42% of Total Net Sales in 2020YE) is focused on the improvement, manufacture, and marketing of prescription products, primarily in the therapeutic areas of cardiology, gynecology, oncology, hematology, and ophthalmology.

This **market grew about 3% in 2020** (2019: 6%), with a smaller increase arising from new challenges due to the COVID-19 pandemic. Moreover, markets in **Latin and North America** and **several parts of Europe** showed a confident growth in 2020.

Consumer Health

Likewise to Pharmaceuticals, the **Consumer Health Area** (12% of Total Net Sales in 2020YE) is focused on the production, development and marketing, mainly in products linked to dermatology, nutritional segments, digestive health, allergy, cough and cold, pain and cardiovascular risk prevention categories².

Crop Science

The **Crop Science Segment** (46.00% of Total Net Sales in 2020YE) is focused on development, production, and marketing of a broad portfolio of products in plant trails and seeds, crop protection and customer services to **support a more sustainable agriculture** (Figure 8).³

¹ According to Bayer 2020 Annual Report and Official Website

² According to Bayer 2020 Annual Report

³ According to Bayer 2020 Annual Report



Aleve™, Alka Seltzer™, Aspirin™

€41.400 M
REVENUES (2020)

€7.126 M
R&D EXPENSES (2020)

83 COUNTRIES
99,538 EMPLOYEES

Figure 5 - Bayer 2020FY Key Points

Source: Company Data

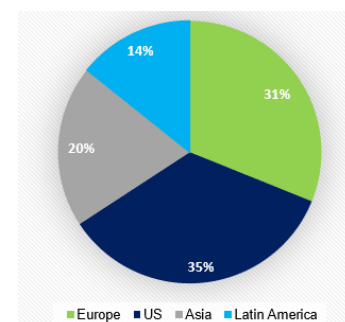


Figure 6 - Revenues by Region in 2020

Source: Company Data

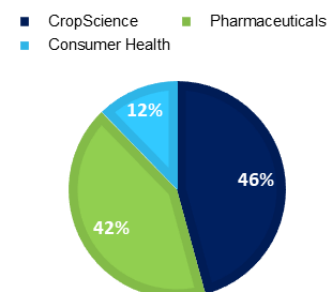


Figure 7 - Revenues by Business Segment in 2020

Source: Company Data

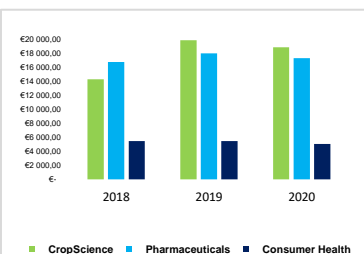


Figure 8 - Revenues by Segment

Source: Company Data

Global agriculture is facing many challenges, such as climate change, lack of water and population growth. This sector must meet the needs of a growing population while at the same time encouraging sustainability and the protection of the ecosystems.

Company Strategies

The **focus of Bayer AG Strategies** is guided by the purposes **Science for a better life & Health for all, hunger for none**⁴ and by a long-term profitable growth transversal to all business segments.

Bayer has been **adapting its strategies** as the world population is increasing and aging (the share of older people in the worldwide population is projected to increase from 9.3% in 2020 to 16.00% in 2050⁵), playing a major role in creating solutions to deal with these challenges.

Driven by its purpose, the company aims to **deliver breakthrough innovations** in agriculture and health care, contributing to a world in which diseases are prevented and cured and not only treated. The focus is to create a world where the population can take a better care of their health and where agriculture can become more sustainable⁶.

Despite the **COVID-19 Pandemic**, Bayer's strategy remains unchanged. Although, at the same time, the pandemic has speeded up numerous trends, meaning that Bayer needs to implement its strategy and the transformations of the company at a faster pace.

Bayer is focusing in four strategies levels that are not just only attractive to its **environment**, but also to the **industry (Figure 9)**:

1. **Development** of new products and solutions by improving the access to innovation in collaboration with third parties, as Governments;
2. **Optimization** of resource allocation, efficiency, and structural measures though the operational performance;
3. **Making the business strategy more sustainable**, contributing positively to society and the environment. One of Bayer's targets is to fully step in the United Nations' Sustainable Development Goals and the climate targets of the Paris Agreement by 2030⁷.
4. Creation of value with a strategy-based on the sectors of **Health and Nutrition**.

Crop Science

The focus in the Crop Science segment is to **leverage its R&D expertise** and leading positions in seeds, traits, crop protection and digital farming in the mid and in the long-term (Figure 10).

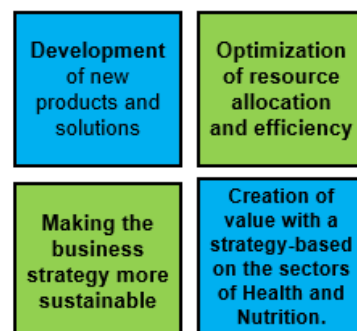


Figure 9 - Bayer Main Strategies

Source: Company Data

Divisional Drivers	
CAGR_{cpa} 2020-24²	Sales:
3-4%	Herbicides: Xtendimax with VaporGrip Xtra recovery, Bayer Plus and other integrated offerings, pricing
6-7%	Fungicides and Insecticides: New products like Fox Xpro, Ikon, Luna and Vayego, integrated offerings
3-4%	Corn S&T: New hybrids, VTPro4 and SmartStax PRO traits
Decline in 2021, open	Decline in 2021, open:
-1-2%	Soybean S&T: Transition in 2021, then grow thereafter with trait upgrades in the Americas
4-5%	Vegetable Seeds: New hybrids/varieties
1-2%	Other: ThryvOn Technology, U.S. and Brazil cotton, offset by loss of TSA sales to BASF

Figure 10 - Divisional Drivers for Crop Science Segment

Source: Company Data

4 According to Bayer Sustainability Report 2020

5 According to United Nations (Department of Economic and Social Affairs)

6 Source: Bayer Annual Report 2020

7 Source: Exploring the Future of Agriculture (Bayer Official Website)

On the other hand, Bayer wishes to **increase food security** by empowering 100 million smallholder farmers in low- and mid-income countries by improving access to agronomic knowledge, products partnerships, and services⁸. Bayer will do this by developing its product and service portfolio, including **new digital solutions**, such as the automation of the processes to drive greater innovation in Bayer's R&D pipeline (Appendix 3).

Pharmaceuticals

The **aging population** is leading to a **growing number of chronic illnesses** (according to World Health Organization)⁹ and, in this line, the merger between data science and biology will be a key element of innovation in this segment. Besides, the **Covid-19 Pandemic** has speeded up the digital transformation of the Pharmaceuticals Segment (Figure 11).

Key Drivers of Profitability

Bayer is a **leading company in the life science segment**, distinctively positioned at the intersection of health and nutrition, with prospects to grow in the future.

In this direction, **Bayer's Key Drivers of Profitability** are the **increase of worldwide population** and linked to this is the **increase of life expectancy** (by 2050 it is expected to exceed 80 years).¹⁰

The Pandemic brought a new set of pressures to Pharmaceutical Companies. These **new pressures** would bring **new opportunities** for some companies and **the investment in R&D** and in Technology will increase the production of new drugs, leading to creation of new patents. This could be seen in two perspectives: be a barrier representing a high level of bureaucracy associated and a huge possibility to raise the profits exponentially.

Shareholder Structure and Stock Performance

The **capital stock of Bayer** (BAYN) is Euro 2,515,005,649.92, divided into 982,424,082 outstanding shares, in the end of 2020¹¹. These shares are traded in New York (New York Stock Exchange) and in Frankfurt (Frankfurt Stock Exchange).

The company's global presence is also reflected in its **shareholder structure** and the biggest share of **Bayer's capital stock** (29.7%) is held by investors in **North America**. In contrast, another significant group is based in **Germany**, holding 22.5% of Bayer's shares and 13.9% of this stock belongs to investors in the **United Kingdom**¹² (Figure 12).

Private stockholders hold 12% of the company's shares outstanding and 1% are held by Bayer employees.

Over the past year, **Bayer's stock performance** has been decreasing due to the impact of the COVID-19 pandemic and due to the negative impact of Legal

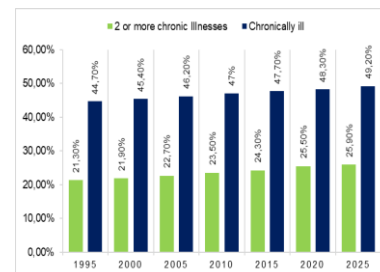


Figure 11 - Chronic Illnesses

Source: PWC Company

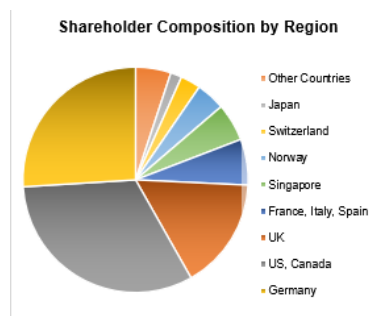


Figure 12 - Bayer Shareholder Composition by Region

Source: Company Data

⁸ Source: Bayer Annual Report 2020

⁹ Source: Costly chronic care needs are growing and exerting considerable demand on health systems, by PWC

¹⁰ According to IMF

¹¹ According to Bayer Investors Shareholder Presentation

¹² Source: Bayer Annual Report 2020

Mitigations. Soon, the company's stock performance will likely trail the S&P 500 performance, even setting aside the current situation of the COVID-19 outbreak.

Dividend Policy

Bayer aims to maintain its dividend policy, which means a payout ratio within the target range of 30% to 40% of core EPS¹³. In 2020, Bayer's payout ratio was about 37%. On the other hand, the company expects a lower payout ratio in the upcoming years.

The Board of Management and the Supervisory Board proposed a dividend payment of around € 1 965 Millions (€2.00 per share) in 2020, which corresponds to 31.3% of core EPS from continuing operations. Based on Bayer's share price at the end of 2020, the dividend yield was 4.2% (Figure 13).

Future Perspectives

According to *Bayer Investment Case - May 2021*, the company expects to increase its profitability by accelerating its transformation processes and in 2021 anticipates that the world economy will slowly recover from the deep recession seen in 2020 (Figure 14).

The COVID-19 pandemic will likely continue to weigh on growth, however, vaccines are expected to be widely available throughout the world over the course of 2021, helping to gradually contain the pandemic. The recovery is expected to be particularly strong in the United States and the Emerging Markets, especially China and India. By contrast, the recuperation in the European Union is likely to be somewhat slower, mainly due to a potential further increase in unemployment rate¹⁴.

MANAGEMENT AND ESG

Environment, Social and Governance (ESG)

For Bayer, Sustainability is a central group strategy, and the company aims to reach this by connecting economic growth with social and environmental responsibility. Regarding ESG, Bayer's goal is to achieve a fair assessment of sustainability performance by its stakeholders¹⁵ (Figure 15).

In March 2020, Deutsche Börse launched an index for sustainable companies (Dax 50 ESG Index)¹⁶ in Germany and Bayer AG was included in this index as one of the most heavily weighted companies. At Industry Level, Bayer occupies the place 144 out of 899 companies and according to Bloomberg the overall ESG Score of the company is 71.79 out of 100.

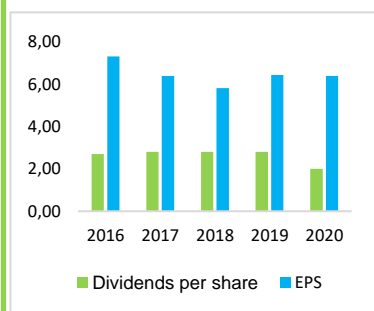


Figure 13 - DPS and EPS (Historical Years)

Source: Company Data

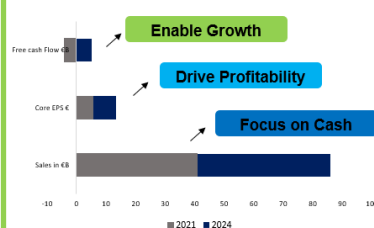


Figure 14 - Future Perspectives

Source: Bayer Investment Case May 2021

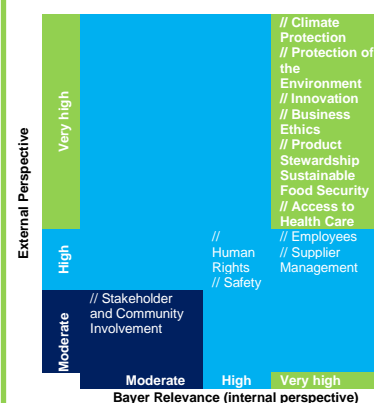


Figure 15 - Bayer's ESG Key Drivers

Source: Bayer Investment Case May 2021

¹³ Source: Bayer Annual Report 2020

¹⁴ According to EuroStat

¹⁵ According to Bayer Sustainability Report

¹⁶ Deutsche Börse uses the results of the international ESG rating agency Sustainalytics to rate companies according to the ESG criteria.

Innovation & Sustainability go hand in hand

Bayer defends that **Sustainability and Innovation** are profoundly rooted in its **corporate culture** and so laid out an ambitious timeline for reaching sustainable goals by 2030 to help to achieve the Sustainable Development Goals of the United Nations (Figure 16).

Becoming a **100% carbon-neutral company** and is helping **to limit global warming to 1.5°C**¹⁷ and accomplish the Paris Climate Agreement are some of the Bayer's Goals.

On the other hand, Bayer is working on innovative medicines and improvements in health care to prevent or cure diseases in the foreseeable future. In this point, Bayer is helping in the development of a smart platform to improve the quality of medical care and provide personalized solutions to manage, treat and prevent diseases¹⁸.

In the Crop Science Segment, Bayer aims to reduce the environmental impact of crop protection by 30% in key cropping systems and decrease the greenhouse gas emissions by 30%.

Corporate Governance

Bayer Group complies with the recommendations of the German Corporate Governance Code and conforms with the German Stock Corporation Act. The Board of Management and the Supervisory Board are committed to a transparent and responsible style of management. The supervision is one of the fundamental parts of the governance model of the company, aiming to increase Bayer's value over the long term.

Board of Management

The **Bayer AG Board of Management** is dedicated to serving the interests of the entire firm and achieving a continuous growth of the corporate value. The **Chairman of the Board Werner Baumann** (CEO since 1st May 2020) directs the principles of corporate policy¹⁹(Figure 17).

The **core tasks of the Board** are the development of the corporate strategy, setting the maximum budget and the distribution of the corporate resources. The **Board of Management** also ensures that receives regular and complete information on all matters relating to Bayer AG's planning, business development and risk management²⁰.

The Board is composed by **six members**: Werner Baumann (Chairman), Wolfgang Nickl (CFO), Sarena Lin (Chief Transformation and Talent Officer), Liam Condon (Responsible for the Crop Science Segment), Stefan Oelrich (Responsible of Pharmaceuticals) and Heiko Schipper (Consumer Health Responsible)²¹.

¹⁷ Source: "How to Reach Net-Zero Carbon Emissions." Sea Technology, vol. 62, no. 4, Compass Publications, Inc.

¹⁸ Source: Prevention is Within Reach With Artificial Intelligence

¹⁹ Source: Bayer Annual Report 2020

²⁰ Source: Board of Management Members

²¹ According to Bayer Official Website



Figure 16 - Target Goals by 2030

Source: Bayer 2020 Sustainability Report

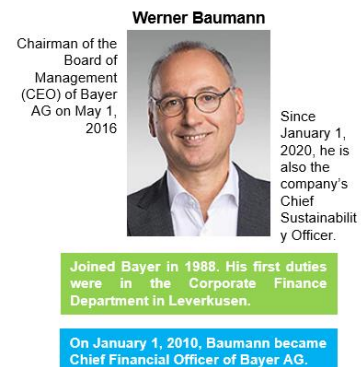


Figure 17 - Bayer CEO Werner Baumann

Source: Company Data

Supervisory Board

The **role of Bayer's Supervisory Board** is to oversee and advise the Management Board. According to the **German Codetermination Act**, half of the members of this Board are elected by the shareholders and the other half by the company's employees.

The **Supervisory Board** is directly involved in fundamental decisions for the company and helps the Board of Management with the company's strategic alignment, as the company's business strategy (Figure 18).

The **Chairman** of this board organizes its work and directs the meetings. The annual budget and the consolidated financial statements of Bayer AG and the Bayer Group are accepted by the **Supervisory Board**.

Committees of the Supervisory Board

The **Supervisory Board** is composed of **Presidial Committee**, an **Audit Committee**, a **Human Resources Committee**, a **Nominations Committee**, an Innovation Committee, and the special committee created in 2019 due to the glyphosate litigation, linked to Roundup weed killer from Monsanto Company.

Presidial Committee – it is composed by the Chairman and Vice Chairman of the Supervisory Board next to a shareholder and an employee representative. It has the mission of submitting proposals to the Supervisory Board.

Audit Committee – includes three shareholder representatives and three member of staff representatives. This committee has the duty of satisfying the requirements concerning the expertise in the fields of accounting and auditing.

The **Chairman of the Board of Management** and the **Chief Financial Officer** regularly attended the meetings of the Audit Committee²².

Human Resources Committee – on this committee there is equality of representation between stockholders and employees. The Human Resources Committee resolves on behalf of the Supervisory Board on the service contracts of the members of the Board of Management.

Nominations Committee – perform the preliminary work when an election of shareholder representatives to the Supervisory Board is to be held. It ensures appropriate candidates for the Supervisory Board to propose to the Annual Stockholders' Meeting for voting.

Innovation Committee – is primarily related to with the innovation strategy and innovation management, the strategy for the protection of intellectual property, and major research and development programs at Bayer.

Glyphosate Litigation Committee – was established as a non-standing committee. It intensively deals with the glyphosate litigations and oversees and advises the

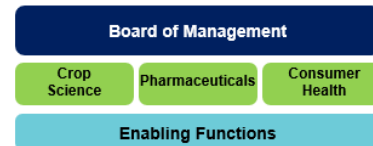


Figure 18 - Board of Management

Source: Company Data

²²Source: Supervisory Board Committees

Board of Management on related matters. The eight-member committee involves four stockholder representatives and four employee representatives.

INDUSTRY OVERVIEW

Outlook of Pharmaceutical Industry

The **Pharmaceutical Industry** is a part of the healthcare sector that deals with medicines. The industry includes a range of subcategories concerning the development, production, and marketing of drugs. These correlated subcategories consist of drug marketers, drug manufacturers and biotechnology companies.

The **industry's main objective** is to provide medicines that **avoid infections, increase health and treat diseases**. Due to **advances in R&D and technology**, the pharmaceutical industry is starting a new era in medicines development. According to **Evaluate Pharma report 2021**: “*worldwide pharmaceutical R&D spend is forecast to grow at an annualized rate of 4.2% between 2020 and 2026.*”²³ (Figure 19).

It is expected that prescription drug sales will reach almost \$1.4trn by 2026. In spite of the COVID-19 Pandemic, “*the industry demand for innovative and effective therapies continues to drive long-term growth.*”

Industry Trends

The **Pharmaceutical Industry** is in constant change due to the discovery of new illnesses, the **fast-growing worldwide population** and the **population aging**. In consequence, new trends are showing every day. The **COVID-19 Pandemic** also fast-forwarded several of these trends that were already under way, including the increase of digital solutions and new investments in innovative breakthrough medicines (Figure 20).

Digital Transformation

According to McKinsey²⁴, for **Pharmaceutical Industry**, digital transformation is crucial for medicine development, improved production, greater patient care and cost-effectiveness. According to *Evaluate Pharma Report 2021*, COVID-19 has fast-forwarded **digital transformation** in the industry by more than 5 years. The digital transformation of the industry created new solutions, including virtual clinical trials, online healthcare provision and an expanding biotech investor base (Figure 21).

There is also a place for the **machine learning** and the artificial intelligence in the supply chain to decrease the production cycle, helping producers reduce downtime and product waste.

Investments in innovative breakthrough medicines

Between the **risks of the Pharmaceutical Industry**, **pricing pressure** and high costs in R&D are two of the main ones, and one way to fight these is to invest in innovative medicines. In this way, Pharma companies can diversify their portfolios,

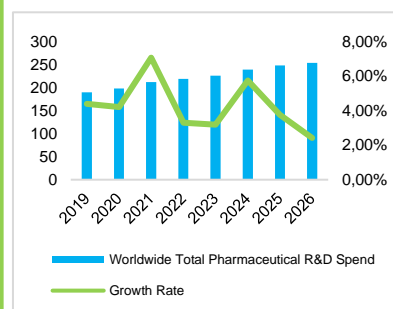


Figure 19 - Worldwide Total Pharmaceutical R&D Spend in 2012-2026 (€B)

Source: EvaluatePharma Report 2021

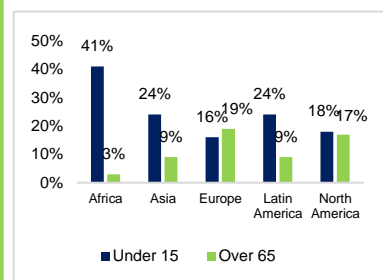


Figure 20 - Aging Population by Region 2020

Source: EvaluatePharma Report 2021

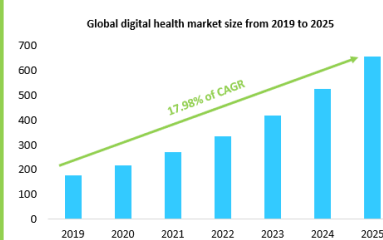


Figure 21 - Global Digital Health Market Size

Source: EvaluatePharma Report 2021

²³ Source: EvaluatePharma Report 2021

²⁴ Source: The road to digital success in pharma

principally in the areas of gene therapies and oncology, with more than 700 hundred cancer drugs being in the late stage of their development (Figure 22).

Increasing Global Market Presence

According to Deloitte²⁵, it is expected that the global presence of the Pharmaceutical Companies will increasing, in part due to the increase of population worldwide and because markets like China and USA are sources of innovation and growth.

Crop Science Trends

One trend in this segment is the **incorporation of synthetic biological chemistries** in the **crop management program**. On the other hand, many chemical and pharma companies are rushing to develop products with lower residues.

The impact of COVID-19

According to McKinsey & Company²⁶, the **Covid-19 Pandemic** has accelerated some trends in the healthcare industry, such as **Globalization, China influence, innovation** and **digitalization**.

With COVID-19 companies faced a **temporary stagnation in R&D returns**, but it is estimated to increase again in the near future. Attempts and effort from these companies to be more sustainable are also being suspended for a while due to the global supply and demand needs globally. After 2020, the companies are trying to be back with same goals and resources to be **more sustainable** like was planned before the pandemic.

While the risk for pharmaceutical companies making **branded products** is lower, given that they have several months of safety stock in **APIs**, some changes should be taken into deliberation such as assessing existing **relationships with suppliers, establishing inventory adjustments, and looking for opportunities** to vary the supply in the event of business interruption.

Furthermore, other relevant aspect to mention is that the way digital interaction is growing, which also signifies a challenge in this industry, as companies will need to review the way they deal with some products in their portfolio.

Key Drivers

Drivers of Costs

Despite all, this industry faces **real challenges**. The **expenditures in R&D** and the **Patent Expiration** can put at risk the worldwide revenues of the industry (Figure 23).

Nevertheless, the additional government regulations have been severely hit by the impact of fiscal austerity.

The long **development of new medicines** can result in delays in study initiation, leading to increasing costs. Nevertheless, these studies are necessary to ensure a

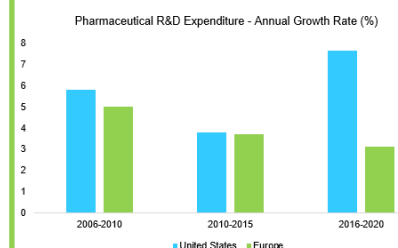


Figure 22 - Pharmaceutical R&D Expenditure

Source: EvaluatePharma Report 2021



Figure 23 - Expiration Patent Risk

Source: EvaluatePharma Report 2021

²⁵Biopharma leaders prioritize R&D, technological transformation, and global market presence, by Deloitte.

competitive drug classification and to boost the likelihood of obtaining a good quality medicine.

Competitive Environment of the Industry

Economic (global) outlook

According to the **International Monetary Fund**, *the global economy is climbing out from the depths to which it had plummeted during the Great Lockdown in April.*

As stated in the **World Economic Outlook**, October 2020: *A Long and Difficult Ascent, the COVID-19 pandemic has had a more negative impact on activity in the first half of 2020 than anticipated*²⁷. In January 2021, the updated previsions are that the global growth is projected to be 5.5% for 2021 and 4.2% in 2022.

The **global growth in 2021** is projected to be 5.4%. According to the **United Nations**, *the aggregate OECD unemployment rate stood at 5,2% in February 2020, as several OECD member states entered 2020 with historically low unemployment rates, but by April it had increased to 8.5 per cent, its highest value in a decade.* In April 2021, the aggregate unemployment rate, was 6.6% which means 1.3p.p above the pre-pandemic rate registered in February 2020²⁸ (Figure 24).

Europe Economic Outlook

Europe Economy suffered huge shifts due to this new pandemic, and the second quarter of 2020 was probably the harshest quarter in the last years for all countries. According to **Eurostat data**, it's possible to compare the growth rate of **Gross Domestic Product (GDP)**, interest rates and unemployment rates, which impact all companies operating in this continent.

In the second quarter of 2020, **GDP** decreased 11.8% in Europe and 11.4% in the EU when compared with the first quarter of the same year. When compared with the same quarter of 2019, the numbers are even more outrageous, with a decrease of 14.70% in Europe and 13.90% in the EU (Figure 25).

Employment rates also fell by 3.1% in Europe and 2.9% in the EU, and **inflation rates** (July 2020) dropped by 0.4% in Europe and 0.2% in the EU. These numbers can be explained by the several lockdowns that occurred in Europe, which shutdown all economies during this quarter. The UK has even more dramatic numbers right now due to the Brexit costs.

USA Economic Outlook

The **USA GDP** suffered a huge impact due to the pandemic. According to the Congressional Budget Office (CBO),²⁹ *“Growth declined by 5.0% in the first quarter, signaling the onset of the 2020 recession. In Q2, the full effect of the recession commenced, and the economy contracted 31.4%.*

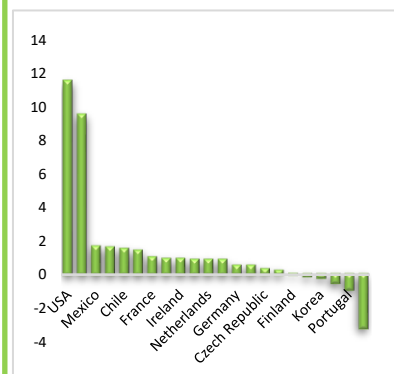


Figure 24 - Harmonized Unemployment Rates in the OECD

Source: OECD

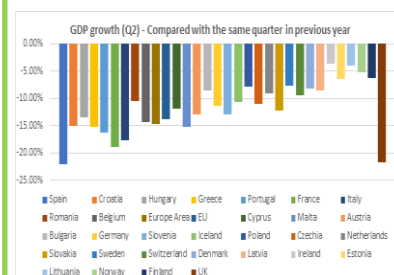


Figure 25 - GDP growth (Q2) - Compared with the same quarter in previous year

Source: Eurostat

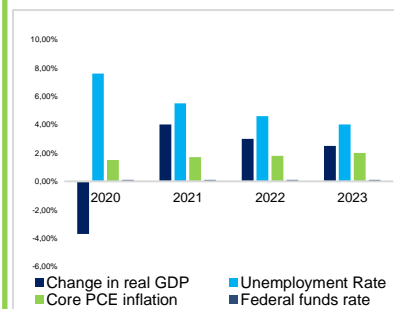


Figure 26 - Compare the projected rates for Growth, Unemployment and Core Inflation

Source: Federal Reserve

²⁷ Source: World Economic Outlook - IMF

²⁸ Source: World Economic Situation And Prospects: August 2020

²⁹ Source: The Reward of Work, Incentives, and Upward Mobility

The economy won't return to its pre-pandemic level until 2022". The **real GDP growth** is estimated to be 3.7% in 2021. The unemployment, like was expected, increased, 7.6% in 2020 and 5.3% in 2021.

According to the **Federal Reserve System (FED)**, the target for the inflation to set the monetary policy is 2% and the projections to reach this level are 1.2% in 2020, 1.7% in 2021, 1.8% in 2022, and 2.0% in 2023. To reach the inflation rate at 2% as a benchmark, the FED funds rate (interest rate) is between 0.0% and 0.25%. Is relevant to emphasize that FED also keeps in mind that long-term rates should be low, so it's restarting the Quantitative Easing (QE) program (Figure 26).

Demand Analysis for Pharmaceutical Industry

Prescription of Medicines

The **demand** for medicines can be **measured by its prescription**. In Figure 27, it is possible to identify its growth trend from 2017 to 2020, and the forecast growth rate of 6.05% CAGR³⁰ from 2021 to 2025. This upward trend of medicines' consumption depends on some economic and demographic trends, including, the increase of chronic diseases as consequence of the aging population, as well as a sedentary lifestyle, greater government expenditures on health especially after the COVID-19 pandemic, and a higher demand for new and more efficient treatments.

Population Growth

As stated before, the **world population is growing at a tremendous rhythm**, with projections pointing to global population reaching 8.5 billion in 2030³¹. At the same time, the population is getting older and sedentary (Figure 20 helps support the idea that European and North American populations are **getting older**, which will provoke an increase in demand for medicines in these regions in upcoming years). Also in Figure 20, it shows that **emerging markets** in regions like **Asia, Africa and Latin America** tend to lead companies to want to shift towards those markets since a **higher rate of sales growth is expected**. As can be confirmed in Figure 28, in the 2010 to 2015 period, the **revenues** in China grew at 22.4% CAGR and it is expected a forecast growth rate of 8% CAGR for the next five years. For the rest of the emerging markets, it's expected that in 2025 the revenues will achieve the double of the revenues registered in 2015.

Chronic diseases

Another key driver of the **demand for medicines** is the number of people that suffer from chronic diseases. Figure 29 shows the projections for the percentage of the American population that could be suffering from at least one chronic disease, with almost half of the American population (49.57%) suffering from at least one chronic disease by 2030.

Government expenses on healthcare

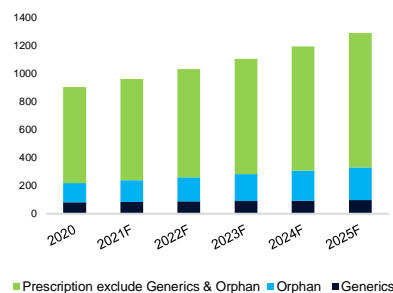


Figure 27 - Worldwide Total Prescription Drug Sales

Source: OECD

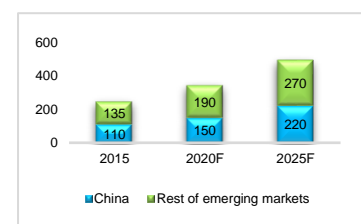


Figure 28 - Pharma emerging markets \$ billions

Source: McKinsey Company

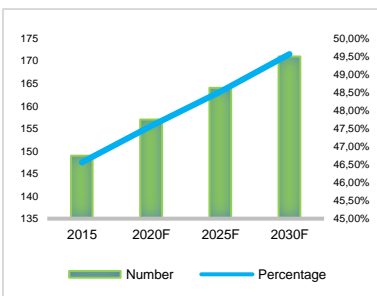


Figure 29 - Number of people with Chronic diseases (millions)

Source: Statista and American Hospital

³⁰ Compound Annual Growth Rate

³¹ Source: United Nations

According to the **World Bank**³², **Government Expenditures** on healthcare showed a **growth trend** in previous years and it is expected this trend to continue in the foreseeable future, especially due to the COVID-19 Pandemic. Recent studies point to an increase of upon 50% for next years in health expenditures for some countries, a factor that will contribute to a higher demand for pharmaceutical products in the future (Figure 30).

M&A Activity

The **M&A** could lead to an increase of the geographic area that companies operate, increase in the economic profit, benefit from new drugs revenues and a decrease in overall costs due to the larger capacity.

Supply Analysis for Pharmaceutical Industry

Exchange Rates

The **supply** for medicines is affected by **exchange rates**, since it directly affects the companies' profitability, costs and revenues and therefore companies' financial statements. Since the volatility of these rates can be difficult to predict and given the exposure exchange fluctuations, companies can mitigate this risk by hedging.

Expiration of Patents

Another driver of supply is the **expiration of the patents**, as companies lose their exclusivity rights for some treatments, the supply of generics increases, leading to price competition that negatively affects companies' revenues. Figure 23 evaluates the sales at risk due to patent expiration, and between 2020 and 2025 it is expected that, on average, 3.2% of the market will be at risk.

Competitive Position

PESTLE Analysis

The **world** is **constantly changing** and external factors tend to have a long-term impact, what requires more time and research from companies. The Table below specifies these factors (Figure 31):

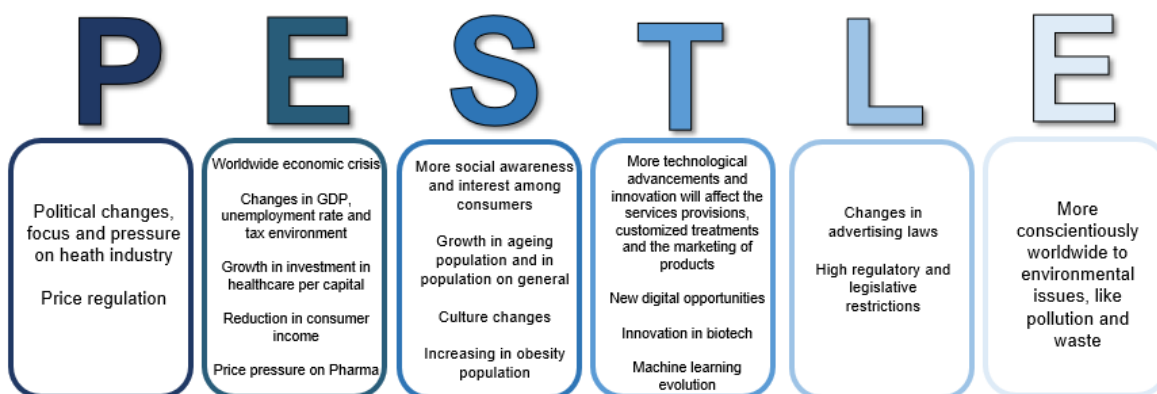


Figure 31 - PESTLE Analysis (Source: Author Analysis)

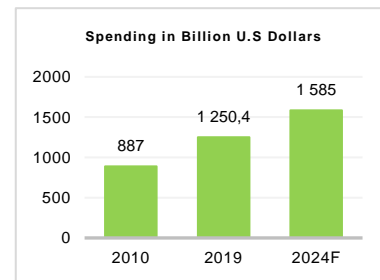


Figure 30 - Global Spending in medicines
Source: Statista and American Hospital

³² Source: World Bank

Comparative Analysis (Peers Identification)

Peer Group refers to companies that are in the **same industry**, have **roughly similar sizes** and **operate in similar geographic regions**. The peer group selected for Bayer represents part of the Health and Healthcare Industry leaders, which have been focusing on similar areas where the company operates. Each area is approached differently from each company, but every approach seems to be aligned with this idea of innovation and sustainability. Innovation has certainly been an even more important topic nowadays due to this new COVID-19 pandemic, which demands a transformation in the companies' business models.

The chosen peer group for Bayer is **Pfizer, Johnson and Johnson, Merck and Co, Novartis** and **GlaxoSmithKline (GSK)** (Figure 32).

Peers Strategies

The Pharmaceutical Industry is a highly competitive industry. As there exists lots of complex diseases, and pharmaceutical companies are always searching for the best treatment and medicine for them, it's important to know which players are in the market.

Pfizer focus lies on internal medicine, rare diseases, inflammation & Immunology, vaccines, and oncology³³. The main strategy here is to provide the best services and products in each area with transparency, sustainability and with a sense of care for global health.

Johnson & Johnson narrows their operations to consumer health products, medical services, and pharmaceutical products. The company is organized in three business segments: Consumer, Pharmaceuticals and Medical Devices.

Novartis operates through the following segments: Innovative Medicines, Sandoz, and Corporate, and its strategy focus on build a leading, focused medicines company powered by advanced therapy platforms and data science³⁴.

Merck and Co desires to become the leading science and Technology Company with three strong and innovative business sectors: Healthcare, Life Science and Performance Materials

GSK business is focused on the delivery of three strategic priorities: grow a balanced global business, deliver more products of value, and simplify the operating model³⁵. The Company operates in two main segments: Pharmaceuticals and Vaccines.

These companies **share the same vision** towards environmental issues, with different investments according to their businesses. Their strategies do not differ in terms of investments, which are R&D, innovation and medical services, but they do differ in terms of the purpose of those investments.

Pfizer

Market Cap (€M)
210 717

Revenue (€M)
51 750

Share (%) 16

Head Quarters
USA

Johnson-Johnson

Market Cap (€M)
379 007

Revenue (€M)
82 059

Share (%) 26

Head Quarters
USA

NOVARTIS

Market Cap (€M)
192 663

Revenue (€M)
58 624

Share (%) 15

Head Quarters
Switzerland

MERCK

Market Cap (€M)
199 405

Revenue (€M)
46 480

Share (%) 15

Head Quarters
USA

gsk

Market Cap (€M)
88 350

Revenue (€M)
43 957

Share (%) 14

Head Quarters
United Kingdom

Figure 32 - Peer Group Key Points

Source: Bloomberg

³³ Source: Pfizer 10K Report

³⁴ Source: NOVARTIS AG (Form: 20-F)

³⁵ Source: GSK 2020 Annual Report

Bayer's SWOT Analysis

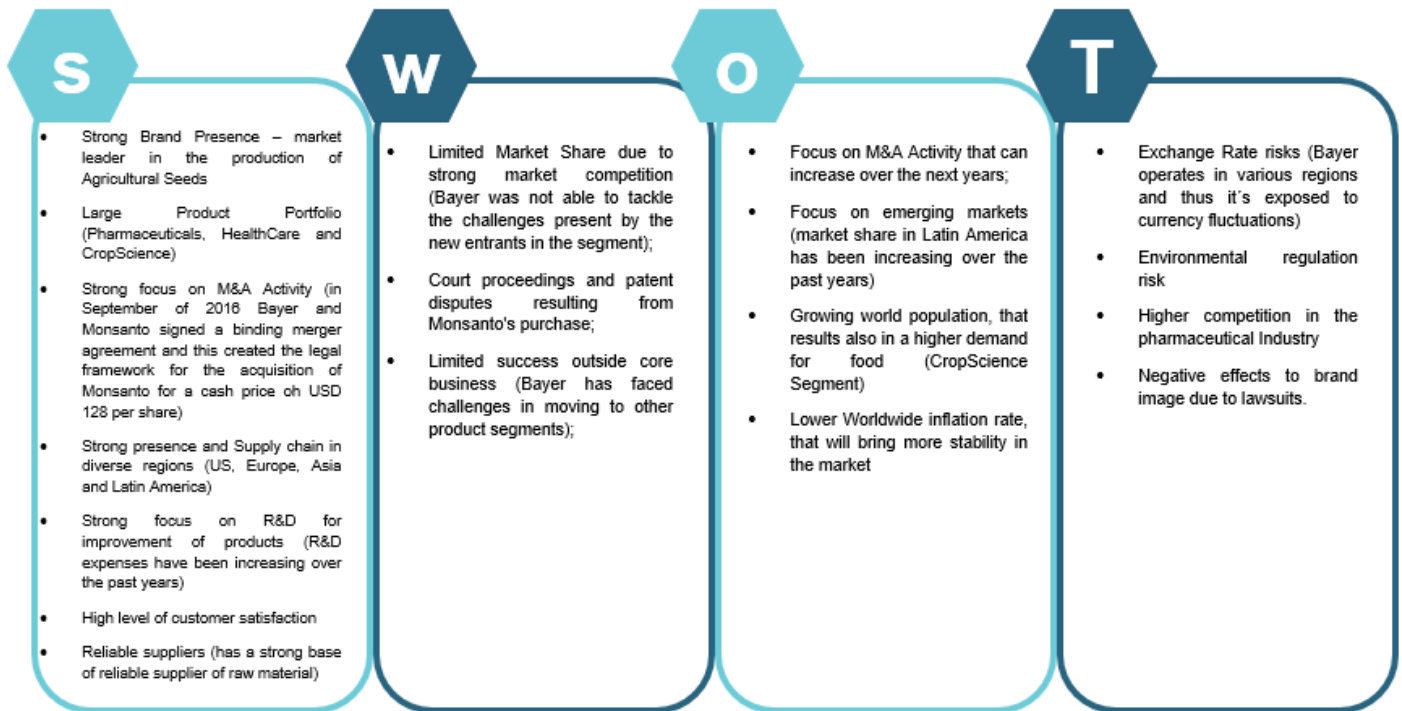


Figure 33 - Bayer SWOT Analysis / Source: Author Analysis

Porter's 5 Forces

Threat of New Entrants: LOW

The **threat of new entrants** is **low** for pharmaceutical industry, due to the fact of the high government regulations and laws to enter (EMA – European Medicines Agency and FDA – Food and Drug Administration). The expenditures with establishing a manufacturing firm and the investment in R&D of new drugs are high. Establishing product differentiation, leading to client engagement is also difficult and the existing companies have developed economies of scale, leading to increased profits, which is challenging to achieve for new companies. To conclude, most drugs have patents, so a new firm must start from zero to produce a new pharm (Figure 34).

Bargaining power of Buyers: MEDIUM

The **bargaining power of buyers** is **medium** in Europe and the USA. Patents of new medicines last 20 years in both regions, allowing the producer to set the price. When the time ends, generic production begins and prices become more competitive, so customers have a higher set of choices, and the switching costs are low. On the other hand, a higher client base pressures pharmaceuticals to keep price quite low. However, hospitals, health care insurance companies and governments have significant bargaining power since they can choose to not subsidize certain medicines. Furthermore, the patients have the "obligation" to follow the medical prescriptions, having in this way less bargaining power.

Bargaining Power of Suppliers: LOW

The **bargaining power of suppliers** is **low** because sales are concentrated in the larger companies and there are multiple providers. Firms have higher switching costs

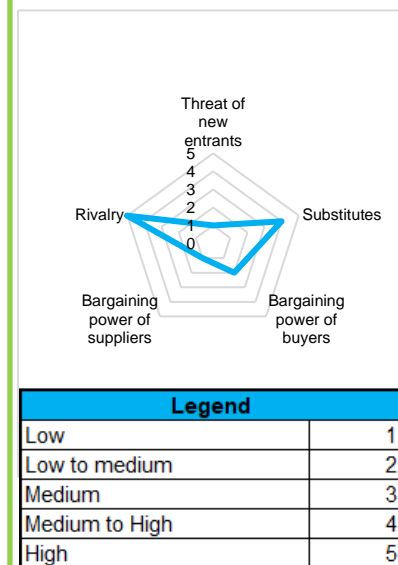


Figure 34 - Porter's Five Forces Framework
Source: Author Analysis

when investing in new medicines (high investment in R&D) and the raw materials used in the drug production are available in large quantities. On the other hand, when researchers discover new products, the company of which they belong have a vast bargaining power, due to the fact that new patents are created.

Threat of Substitute Products: MEDIUM to HIGH

The **threat of substitute products** can be **medium or high** because if the drug is still in its patent period, there is no substitute product. However, when this time ends, its generic production starts, and a high number of substitutes are produced and the demand for low cost drugs increases. Moreover, alternative medicines and promotion of a healthy lifestyle can be other alternatives to medicines.

Industry Rivalry: HIGH

The **pharmaceutical industry** is quite competitive because most of its players have a good brand recognition. The profit margins are high, there are a lot of firms and the government laws make this market highly competitive. The investment in R&D has been increasing and the constant pressure to innovate is leading companies to become more competitive. Additionally, a huge number of M&A for the development of new drugs and chemicals have been appearing.

INVESTMENT SUMMARY

BUY is the recommendation for Bayer Pharmaceuticals AG (BAYN), based on a forecast period of 6 years (2021E-2026F), with a **2022YE Price Target of €63.39/share**, using the Discounted Cash Flow Method (DCF), meaning a **18.75% Upside Potential** when compared with €53.38/share at 2021, June 30th, with **Medium Risk (Figure 35)**.

Key Drivers of Profitability

The major profitability key drivers that can affect Bayer's Buy Recommendation are the **Growth of Population Worldwide** (according to the World Bank) and linked to this the **population aging** (according to United Nations), that could lead to the increase of chronic diseases, leading to a higher number of prescriptions (Figure 36).

Despite the **Covid-19 Pandemic**, in the **Pharmaceutical Segment**, markets in North and Latin America and in some parts of Europe should show a positive development in the next years, according to Bayer Analysts. In the **Consumer Healthcare** segment, the sale of products that help people's immune systems had a sharp rise during the Pandemic, which is an expected behavior to be maintained in the future. In the **Crop Science segment**, it is expected that the growth of population will lead to an increase of the necessity for more food.

Valuation Methods

To achieve **Bayer AG Price Target (PT)**, different methodologies were performed, ranging a price per share from €58.62/share to €63.39/share. The **Enterprise Value (EV)** was computed using the **Free Cash Flow to the Firm (FCFF)** model, reaching a price target of €63.39/share.

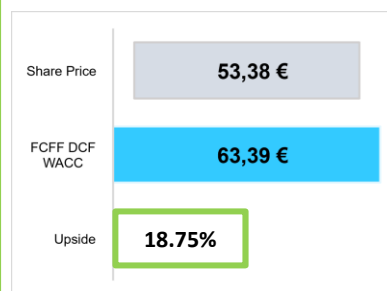


Figure 35 - Bayer Target Price 2022YE
Source: Author Analysis

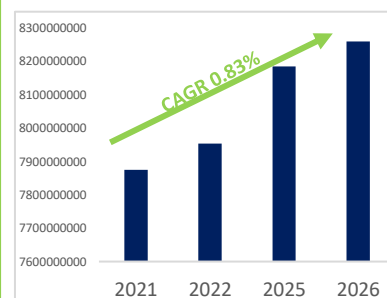


Figure 36 - Worldwide Population Growth
Source: Author Analysis

The **lowest PT** obtained was performed through the **DDM Method** using a 3-stage model, obtaining a PT of €58.62/share (Appendix 26) and **highest share price** was €63.39/share, using the **DFC Model**. Concerning the **Flow-to-Equity method**, the value reached was €60.62/share (Figure 37).

Investment Risks

Investors should be aware that Bayer AG Business is subject to numerous risks that can affect its Price Target. Firms in Pharmaceutical Industry are the ones that invest more in **Research and Development**, including **Bayer Ag**, when compared to other comparable markets and according to a study performed by Deloitte³⁶, these firms are the ones with the greatest risk of failure in the development of a drug, which can affect Bayer Target Price negatively (Figure 38).

Moreover, the **Litigation Issues** regarding glyphosate that Bayer suffered in the past could affect its brand image in the market and so affect its share price. On the other hand, the **Supply Disruptions, Risks linked to the Agricultural Industry**, also can affect this recommendation due to the unexpected development of resistances, that may lead to a small decrease in Bayer's revenues and subsequently to a decrease of its share price

FORECAST ANALYSIS

Net Sales

Bayer's Total Net Sales registered in 2020 a value of **€41 400 million**, representing a decrease of 4.9% (€2 145 million). The value of the company's revenues can be divided by Region (Europe, United States, Asia, and Latin America) or by Business Segment (Pharmaceuticals, Health Care and Crop Science).

The forecast of Bayer's Revenues was performed by **each Business Segment** and its total sales were forecasted to rise at a CAGR of 2.73% in the estimated/forecasted period (2021E-2026F).

For the estimated **year of 2021**, these projections were performed based on the variation of 2020Q121 and 2021Q1 in which Bayer registered a decrease of 4.19% for € 39 665 million in 2021E (Figure 40).

For the **remaining forecasted years (2022F-2026F)**, this forecast was performed based on a median of the growth rates from Bayer's Analysts and from Market Projections for each Business Segment (Figure 41).

According to Bayer's analysts, the **Crop Science Segment** would increase by 2% a year until 2025 and according to a Report retrieved from Deloitte³⁷ it is expected an increase of 3.2% in this segment and thus an increase of 2.60% each forecasted year, reaching € 20 838 million in 2026F.

Pharmaceutical Segment will increase by 4.14% each year during the forecasted period, a combination of an increase of 5% according to Bayer's analysts and a

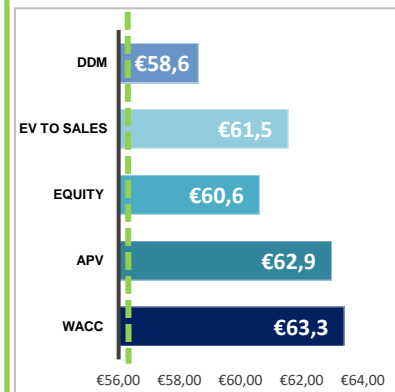


Figure 37 - Target Prices by all Methods

Source: Author Analysis

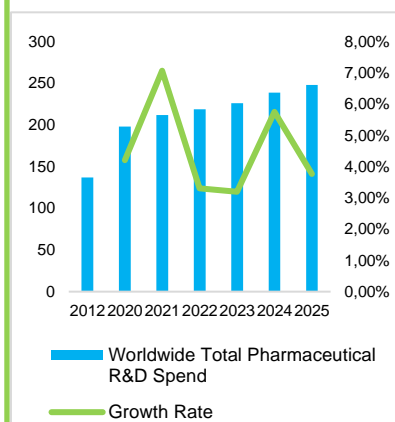


Figure 38 - Worldwide Pharmaceutical spend in R&D

Source: Author Analysis

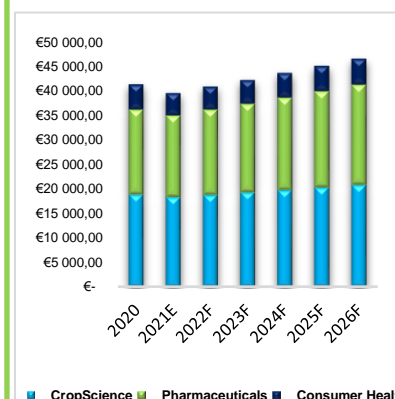


Figure 39 - Revenues by segment in forecasted year

Source: Author Analysis

³⁶Source: High value, high uncertainty: Measuring risk in biopharmaceutical research and other industries Investing in the future of health

³⁷ Source: Deloitte (From Agriculture to AgTech)

market increase of 3.27%, according to the 2021 Evaluate Pharma Report, achieving €20 330 million by 2026F, meaning a CAGR of 3.43% (2021E-2026F).

Health Care Segment will increase by 2.95% in the forecasted years, a pattern of a 4.00% increase in the industry segment according to the 2021 Evaluate Pharma Report and a 2.00% increase according to Bayer's investors, reaching €5 234 million in 2026F.

As an analyst, I have chosen to use this methodology to forecast Bayer's Revenues to show a more conservative way of forecasting, because in the Long Term it is not possible to know in fact what will be the impact of the Covid-19 Pandemic and the Litigation Issues for the company.

Total Net Sales will achieve **€46 612 million in 2026F**, meaning a **CAGR of 2.73%** in the projected period, achieving a similar value to the one in 2019, before the impact of the Covid-19 Pandemic (Figure 39).

Cost of Goods Sold (COGS) and R&D Expenses

In the **historical period (2016-2020)**, the fluctuation of **COGS³⁸** and **R&D Expenses** are in the same line with the increase of the Net Sales, thus for the forecasted period these items from the Income Statement will grow at the historical percentage of Revenues. COGS will be 38.87% of Net Sales and a constant rate will be applied throughout the years forecasted.

The impact of the Digital Transformation can both reduce the pharmaceutical companies' costs and increase its revenues, however in the long term these changes are difficult to forecast, and thus, the impact of this trend was not mentioned in the assumptions of both.

On the other hand, the Litigation issues can have a negative impact in the company's revenues and cost, but as this is a Non-recurring item, it is also really difficult to predict in a valuation forecast.

R&D Expenses will increase at a CAGR of 2.73% in the forecasted period, mainly because Bayer is one of the worldwide companies performing research in the field of both agriculture and health, and the focus of the research projects is determined by the R&D strategies of the company's divisions. Therefore, from 2021E to 2026F, R&D Expenses will be 18.00% of Net Sales, reaching a value of €8 401 million in the last projected year.

Capital Expenditures (CAPEX)

Capital Expenditures are the **capital resources** used by Bayer. Over the last years the company has been investing in its global production network for crop protection products and seeds, in **its R&D of a modular production center for biological products** in Berkeley and in the Digital Transformation of its product supply organization. Bayer wishes to maintain these investments in the upcoming years.

2020Q1	2021 Q1	Variation
6834	6646	-2,8%
4546	4365	-4,0%
1398	1252	-10,4%

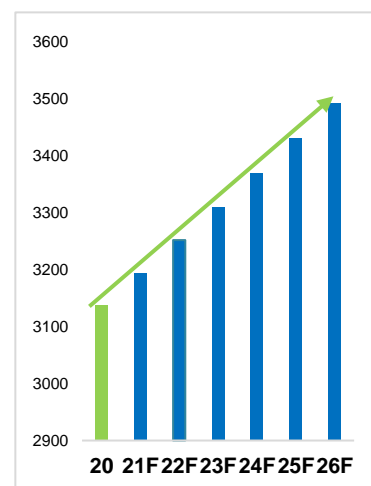
Figure 40 - Revenues Variation for 2021E

Source: Author Analysis

Growth Forecast	Bayer Investors	Market	Author
CropScience	2%	3,2%	2,60%
Pharmaceuticals	5%	3,27%	4,14%
Consumer Health	2%	3,9%	2,95%

Figure 41 - Revenues Growth Rates by segments (2022F - 2026F)

Source: Author Analysis



³⁸ Cost of Goods Sold

Consequently, **Bayer's CaPex** will grow at the same rate as g^* (1.80%) each year, reaching €3 492 million in 2026F, increasing at a CAGR of 1.50% in the forecasted period (2021E-2026F) (Figure 42).

PP&E and Intangible Assets

Bayer's **Intangible Assets** concerns Patents and Technologies (with a useful life between 8 to 30 years), Trademarks, Marketing and Distribution and Production rights. These occupies a big part of the company's business and thus a huge part of its Total Assets, mainly due to Patents.

According to **Bayer's 2020 Annual Report**, the estimation of **Intangible Assets** is based on assumptions concerning the outcomes of R&D activities and the long-term sales projections, consequently for the forecasted period, this element will grow at the average growth of the revenues between 2021E-2026F (3.09%), reaching €30 800 million in 2026F.

Property, Plant and Equipment comprises Buildings, Plant Installations, machinery and Furniture, fixtures, and other equipment. On the same line of **Intangible Assets**, PP&E will grow at the average growth of the revenues (3.09%) in the forecasted period, achieving €14 059 million in 2026F (Figure 43).

Both items will grow at a CAGR of 2.73%.

Dividends and Payout Policy

For the forecasted years the **Dividend Payments** were performed based on the average of the **Payout Ratio** (DPS/EPS) for the historical years of **40.79%** times the Net Income in each estimated year, ranging values from €1886M in 2021E to €222M in 2026F (Figure 44).

VALUATION

The only technique to value Bayer was **forecasting the company's consolidated financial segments**. The valuation considered a **forecast period of 6 years**, from **2021E to 2026F**. The **year of 2021** is considered estimated and not forecasted, because it considers some information retrieved from the Bayer's First Quarterly Report of 2021.

The **price target** will be estimated to **31st December 2022** and two main different approaches were considered: a **Relative Valuation** using a selected range of Peer Companies from Pharmaceutical Industry and an **Absolute Valuation**, using Bayer's Financial Statements.

For the Valuation using Bayer's Financial Statements, three methods were performed: The Adjusted Present Value (APV Method), the Discounted Cash Flow Method (DCF) and the Dividend Discount Model (DDM).

WACC Method

The first method used to compute Bayer AG Price Target was the WACC method, using a projection of the Free Cash Flow to the Firm (FCFF) for each forecasted year and a Normalized FCFF for the Terminal Period, achieving a **2022YE Price Target**

Figure 42 - CapEx in Forecasted Years

Source: Author Analysis

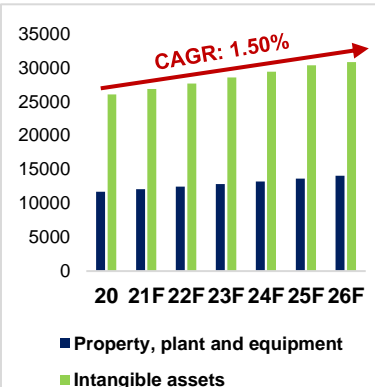


Figure 43 - PP&E and Intangible Assets

Source: Author Analysis

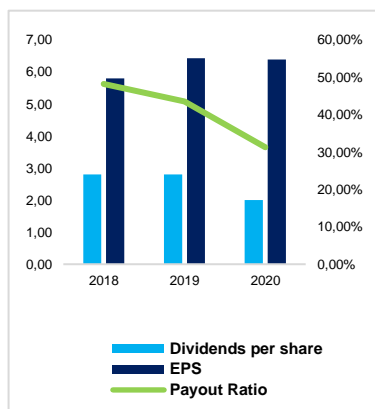


Figure 44 - EPS, DPS and Payout Ratio

Source: Author Analysis

of €63.39/share with an upside potential of 18.75% alongside the current share price of € 53,38/share (Figure 45).

WACC Method Assumptions

Risk-free Rate (rf)

The **Risk-free Rate (rf)** was performed by normalizing the data using the 10-year monthly average of the German 10Year Bond (from 2011 to 2021) reaching 0.73% and this value will remain constant during the forecast period.

Equity Risk Premium (ERP)

For the forecasted period, an **Equity Risk Premium** of 5.76% will be used and it was performed based on the percentages of Revenues of the different Regions where Bayer operates its business (US, Europe, Asia, and Latin America) (Figure 46).

Beta Levered (BL)

A **Beta Levered** of 1.216 used for the forecasted period was performed using the **Pure Play Method**:

$$\beta_L = \beta_U * (1 - T) * (1 + \left(\frac{D}{E}\right))$$

Cost of Debt (Kd) and Cost of Equity (Ke)

To estimate the **Cost of Debt**, the Interest Expenses were divided by Bayer's total Debt in each forecasted year, reaching values between 4.48% and 4.69%.

Cost of Equity was estimated using the **CAPM Formula**, achieving a value of 7.73% that will be used throughout the forecasted period:

$$K_e = R_f + \beta_L * ERP$$

WACC Rate

The **WACC Rate** used during the forecasted period is 5.87%, considering a steady D/(E+D) ratio around 46%, calculated through the below formula:

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

FCFF, Growth Rate (g*) and Normalized Terminal Value

The **Free Cash Flow to the Firm (FCFF)** was calculated for each forecasted year using: FCFF= EBIT*(1-t) + D&A - ΔWCR -CapEX, reaching values between 3 919 and 4500 in 2026F.

WACC METHOD (M€)	
NPV using WACC	18 863
Terminal Value	107 499,543
PV (Terminal Value)	78 992
Enterprise Value	97 855
Net Debt	35 583
Equity Value	62 272
Price Target	63,39
Shares Outstanding	982,42

Figure 45 - WACC Method

Source: Author Analysis

Regions	Revenues	% revenues by Region	ERP
Europe	12881	31%	1,73%
US	14352	35%	1,64%
Asia	8267	20%	1,15%
Latin America	5900	14%	1,24%
Total	41400		5,76%

Figure 46 - Equity Risk Premium

Source: Author Analysis



Figure 47- Normalized Terminal Value

Source: Author Analysis

For the **Terminal Period**, a growth rate (g^*) of 1.80% was calculated through the **Fisher Formula**, an economic theory created by economist Irving Fisher, that describes the relationship between inflation and both nominal and real interest rate. This was performed based on the percentages of Revenues of the different Regions where Bayer operates its business (US, Europe, Asia, and Latin America).

For the second phase of the execution of the DCF Model, a **normalized FCFF** for the **Terminal Period** was estimated using a linear trend based on the Least Square Method over the historical and forecasted period, to ensure a Stable Working Capital Investment in the perpetuity and to smooth the impact of the business cycle effect, that can be observed from 2021E to 2022F in Bayer, due to the negative impact in the changes in the WCR (Figure 47).

Adjusted Present Value (APV) Method

The second method that is suitable for estimating the Target Price of Bayer AG is the **APV Method**, using the **FCFF** computed for each forecasted year, which considers the Unlevered Firm Value, calculated using the pre-tax Cost of Capital (k_u), achieving a rate of 6.31%. This method also considers the Net effect of Debt, calculated as the Interest Tax Shield.

Throughout this model, it was reached a **2022YE Price Target of €62.98/share**, with an **upside potential of 17.98%** when compared to current share price of €53.38/share (Figure 48).

Flow-to-Equity Method

The third method used to estimate the Target Price of Bayer is the **Flow-to-Equity Method**, computed with the Free Cash Flow to the Equity (FCFE) for each forecasted year and with a cost of equity of 7.73%, achieving a **2022YE Price Target of €60.62/share, with an upside potential of 13.56%**.

Relative Valuation

Besides the previous absolute models (WACC, APV and Flow to Equity), to achieve the Target Price of Bayer AG, a **Market Based Valuation**, using **Entity-based Multiples** was performed. For this methodology, not all peers mentioned above in the Industry Overview were used, J&J and Pfizer were considered outliers.

The below EV multiples were used:

- With the EV to EBIT ratio was achieved a 2022YE Price Target of €61.55, meaning an upside potential of 15.31%.

Dividend Discount Model

APV METHOD	
NPV using K_u	22 058
Terminal Value	82 176
PV of Terminal Value	61 418
Unlevered Intrinsic Ev	83 476
PV of Tax Shield	2 469
PV of TV Tax Shield	11 511
Intrinsic EV	97 455
Net Debt	35 583
Equity Value	61 872
Equity Value per Share	62,98
Shares Outstanding	982,42

Upside Potential	17,98%
------------------	--------

Figure 48 - APV Method
Source: Author Analysis

EQUITY METHOD (M€)	
NPV using K_e	27 110
Terminal Value	47 020
PV (Terminal Value)	32 398
Equity Value	59 508
Equity Value per share	60,62
Shares Outstanding	981,69

Upside Potential	13,56%
------------------	--------

g^*	1,80%
K_e	7,73%

Figure 49 - Flow to Equity Method
Source: Author Analysis

Concerning the **Dividend Discount Model**, a 3-stage Model was considered with the H-Model for the calculation of the Terminal Period. The forecast of the Payout Ratio predicts that the Payout Policy of Bayer will be constant throughout the forecasted period considered. For the calculation of this model was considered a short-term growth rate (gS) of 3.30% and the long-term growth rate (gL) was considered 1.80%, as the growth rate of the economy in the long run. With this model was achieved a share price of €58.62/share, meaning a upside potential of 9.81%.

FINANCIAL ANALYSIS

Expanding Liquidity

Bayer's **Current Ratio**, a company's ability to pay its short-term obligations within one year, is ranged between 1.08x and 1.15x in the forecasted years. On the other hand, the **Cash Ratio** ranged between 0.11x and 0.58x in historical years (2016-2020), stabilizing on 0.24x in forecasted years and the **Quick Ratio** varies among 0.56x and 0.62x in 21E-26F (Figure 50).

The **Company's Cash Flows** are always positive in the forecasted years, since the Operating Cash Flow is higher than the FCO and the ICF, meaning that the company's usual operations are enough to cover its near-term obligations.

Stable Profitability

Looking into Bayer's Profitability Ratios, it is evident that the company has consistent and expanding statistics.

The **Net Profit Margin** shows stable values throughout the 2021E-2026F period, showing a CAGR of 0.44%, mainly due to a steady Net Income in the forecasted years. The EBIT Margin in the historical periods is extremely inconsistent (with -39.02% in 2020, mainly due to legal issues), on the other hand is stable with 9.92% in the period of 2021E-2026F. In the same page, Bayer's ROE is very consistent in the forecasted years, showing figures between 13.67% and 14.25% (Figure 51).

Enhancing Operational Efficiency

Bayer Total Assets Turnover is expected to increase 20pp in the forecasted period (21E-26F) to 0.36x in 2026F, mainly due to a positive CAGR of 2.73% in Revenues that is greater than the CAGR of 2.00% in Total Assets. This increase could mean that Bayer is expected to improve its operational efficiency to generate a higher level of Net Sales with its Assets.

The **Fixed Assets Turnover** show stable, but slightly decreasing values throughout the forecasted periods, reaching 1.93x in 2026F, primarily due to a positive CAGR of 1.81%.

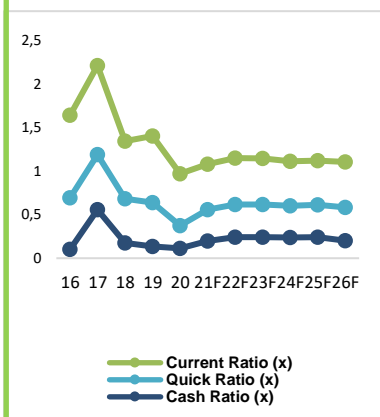


Figure 50 - Liquidity Ratios

Source: Author Analysis

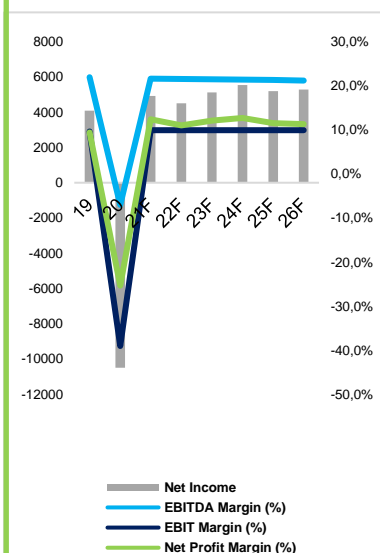


Figure 51 - Profitability Ratios

Source: Author Analysis

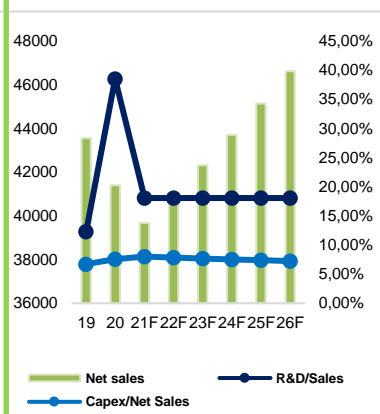


Figure 52 - Key Industry Ratios

Source: Author Analysis

Expanding Solvency

Bayer expanded its Solvency Ratios, with an increase in the Interest Coverage Ratio from 1.36x to -8.65x in 2016-2020 (the negative value in 2020 is due to legal disputes) to 2.09x in 2026F. The Debt Structure is expected to maintain around 15.2% in 2026F, reaching constant Values throughout the forecasted period, mainly due to a slightly increase in the Total Debt, with a CAGR of 1.62% (Figure 53).

Bayer should maintain a constant capital structure in the forecasted period.

INVESTMENT RISKS

Bayer **AG deals with** both external risks associated with the Pharma Industry **and the Macroeconomic, Political and Regulatory Environment** (such as R&D Risk, Competition from Generics, Patent Risks, Significant Price Fluctuations and Exchange Rate) and also with internal risks, where the company **can act. These are** risks that can jeopardize the investment recommendation (Figure 54).

Economic and Legal Risks (ELR)

Exchange Rate (ELR1)

Bayer AG operates worldwide and thus is subject to **several different currencies**, mainly EUR, USD and GBP, and changes in exchange rates can result in significant increases or decreases in reported sales, costs and earnings, and in the reported value of assets, liabilities and cash flows.

Tax Risks and Legislations (ELR2)

As **Bayer operates internationally**, is subject to many different tax laws and regulations, so it is obligated to comply with the laws of all countries in which they operate. Such requirements are extensive and complex, with the change of new requirements to be imposed because of changing government and public expectations regarding the healthcare industry. Amendments to **tax laws, regulations and legal judgments** may result in higher tax expense and payments, therefore also influencing the level of tax receivables, tax liabilities and deferred tax assets and liabilities.

Pandemic

COVID-19

The **COVID-19 pandemic** represents a **risk for Bayer AG** because the pandemic curtailed most industry and government research related to basic science and clinical studies, redirecting the research to COVID-19³⁹. The pandemic also **delayed the supply of several medicines**, and the **food supply chain** was also affected, causing a negative impact in Bayer's distribution channels, and there may be long-term ramifications that will affect farmers all around the world.

Market Risks (MR)

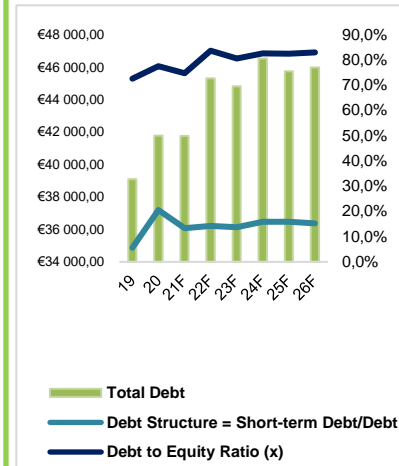


Figure 53 - Solvency Ratios

Source: Author Analysis

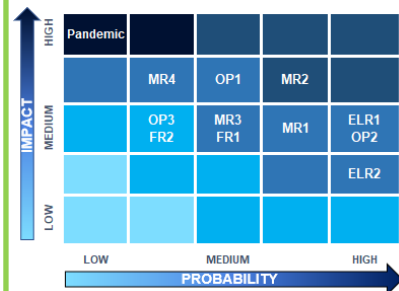


Figure 54 - Bayer AG Risk Matrix

Source: Author Analysis

³⁹ Source: Impact of COVID-19 on the Pharmaceutical Sector

Competition from Generics (MR1)

If important products **lose patent protection** in profitable markets, sales of those products are likely to decline significantly due to Competition from Generics. Greater competition among generic medicines is associated with lower generic drug prices and this can represent an Industry Risk for Bayer AG. However, **Regulatory measures from OECD**, such as registration procedures and substitute limitations, may have restrictive effects on this competition.

Pricing Pressure (MR2)

Pricing pressures are particularly strong given the **increasing demand for healthcare**, resulting from the aging of the global population and associated increases in non-communicable diseases, and the resulting impact on healthcare budgets. These **burdens** are further compounded by significant disagreements and intense political debate and publicity about prices for pharmaceuticals that some consider excessive, including government regulatory efforts, funding restrictions, legislative proposals, policy interpretations, investigations and legal proceedings regarding pharmaceutical pricing practices that can affect Bayer AG.

Counterfeit Products (MR3)

Counterfeit drugs have been defined as products deliberately and fraudulently produced and mislabeled with respect to identity and source to make it appear to be a genuine product. The **presence** of these falsified medicines **is growing**, and these medicines pose patient safety risks and can be very harmful or life threatening. For years, the number of counterfeit meds that have made their way into trusted pharmacies has been on the rise. Reports of adverse events affect patient confidence in the original medicine and healthcare in general.

Complex Manufacture of Products (MR4)

The **rise of highly complex drug product profiles** requires significant advances in pharmaceutical manufacturing, which is extremely dependent on the product nature and can lead to a digital adaption of strategies, causing dependency on sophisticated software and computing infrastructure. Similarly, **cyber-attacks** may lead to a disruption of operations, being a risk for Bayer AG.

Operational Risks (OP)

Research and Development (OP1)

Developing new healthcare products and bringing them to the market is a costly, lengthy, and uncertain process. **Technological advances in pharmaceutical product development** may, at the same time, also represent a risk for Bayer AG. There can be no guarantee that the research and development activities will produce commercially successful new products that will enable companies to replace revenue and income lost to generics and other competition and grow their business.

Patent Expiration (OP2)

Even if the company succeeds in **obtaining patents**, when **these expire**, it can bring great risks for Pharmaceutical Companies, such as Bayer, because this will enhance competition from generics, produced at a lower cost.

Supply of Products (OP3)

Despite all the efforts, operations at Bayer’s sites may be disrupted by **power outages**, fires and process changeovers or plant breakdowns, for example. These risks can lead to production disruptions and declines in sales/margins, affecting the supply of products.

Financial Risks (FR)

Liquidity Risk (FR1)

For Bayer, **financial risks are** defined as the possible inability of the Bayer Group to meet current or future payment obligations.

Credit Risks (FR2)

Credit risks arise from the possibility of counterparties not being able to meet their payment or other performance obligations, impacting the value of Bayer’s receivables or other financial assets.

Litigation Risk (FR3)

The Litigation risk is the risk a company, in this case Bayer can face legal action due to the company's products, services, actions, or another event, as happened to Bayer in the end of 2020 with the glyphosate-based weedkillers product. This risk can have a high impact in the company’s revenues (due to bad brand image) and is considered an non-recurring item, because it is unforeseeable.

Price Target Sensitivity Analysis

Target Share Price	Terminal Growth Rate												
	0,60%	0,80%	1,00%	1,20%	1,40%	1,60%	1,80%	2,00%	2,20%	2,40%	2,60%	2,80%	3,00%
63,39	69,0	73,4	78,4	83,8	90,0	96,9	104,8	113,9	124,5	136,9	151,7	169,8	192,1
4,67%	64,1	68,1	72,5	77,3	82,7	88,8	95,7	103,5	112,5	123,0	135,3	150,0	167,8
5,07%	59,6	63,2	67,1	71,5	76,3	81,6	87,7	94,5	102,2	111,1	121,5	133,6	148,2
5,27%	55,5	58,8	62,3	66,2	70,5	75,3	80,6	86,5	93,3	100,9	109,7	120,0	132,0
5,47%	51,8	54,7	57,9	61,4	65,3	69,5	74,2	79,5	85,4	92,1	99,7	108,4	118,5
5,67%	48,3	51,0	53,9	57,1	60,6	64,4	68,6	73,3	78,5	84,3	90,9	98,4	107,0
5,87%	45,2	47,6	50,3	53,1	56,3	59,7	63,39	67,7	72,3	77,4	83,2	89,7	97,2
6,07%	42,2	44,5	46,9	49,5	52,4	55,5	58,9	62,6	66,7	71,3	76,4	82,1	88,6
6,27%	39,5	41,5	43,8	46,2	48,8	51,6	54,7	58,0	61,7	65,8	70,3	75,4	81,0
6,47%	36,9	38,8	40,9	43,1	45,5	48,0	50,8	53,9	57,2	60,9	64,9	69,4	74,4
6,67%	34,5	36,3	38,2	40,2	42,4	44,8	47,3	50,1	53,1	56,4	60,0	64,0	68,4
6,87%	32,3	34,0	35,7	37,6	39,6	41,7	44,1	46,6	49,3	52,3	55,6	59,2	63,1
7,07%	30,2	31,8	33,4	35,1	37,0	38,9	41,1	43,4	45,9	48,6	51,6	54,8	58,3

Figure 55 - Sensitivity Analysis

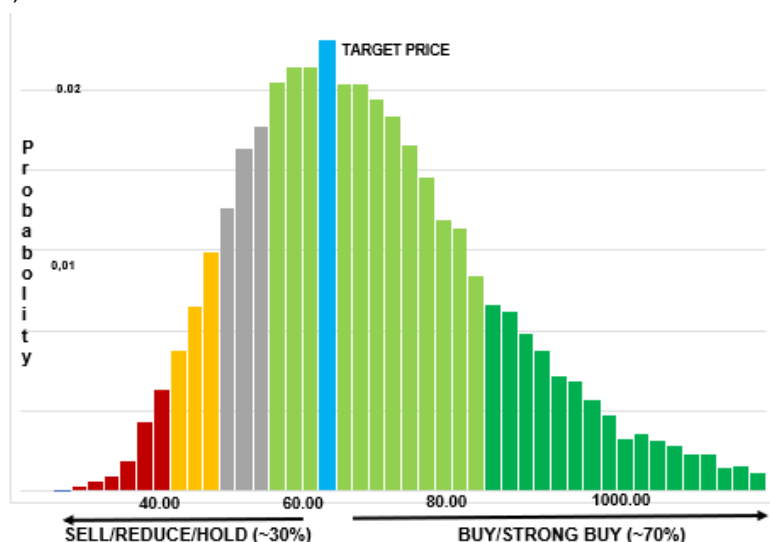
Source: Author Analysis

A variation in the **Growth Rate (g*)**, in **WACC** or in **both** would affect this recommendation due to the fact these variables are essential in any **DFC Model** (Figures 55). The **g*** is set on **1.80% in the base case** and an increase (decrease) of 20bps could lead to a target price increase (decrease) of about €3.00/share (*ceteris paribus*). On the other hand, the **WACC Rate** is set to **5.87% in the base case** and an increase (decrease) of this can lead to a decrease (increase) of about €2.5/share (*ceteris paribus*). These fluctuations easily lead to a **Downside Potential** and change this **Investment Decision to Hold/Sell** (Figure 55).

Monte Carlo Simulation

A **Monte Carlo Simulation** was performed using Crystal Ball, as a complementary analysis to Bayer's Valuation, considering the simultaneous changes in the **WACC Rate** from 2021E of **5.87%**, the **Tax Rate of 22.50%**, the **Gross Profit Margin** from the last forecasted period and a **Growth Rate (g*) of 1.80%**.

With **19 750 simulations**, the Average Price Target obtained was around **€65.59/share**, matching with the Buy Recommendation previously mentioned, with an estimated 68.00% certainty and an **Upside Potential of 20.41%** (Figure 56 and Figure 57).



Source: Author Analysis

Figure 57 - Monte Carlo Simulation

Scenario Analysis

To complement the analysis of Bayer's Valuation a Scenario Analysis was performed, using three different scenarios through an increase/decrease of the Long Term Sustainable Growth Rate (g*) (Appendix 33 and Figure 58):

- **An Optimistic Scenario** where g* was estimated to be 2.50%, that shows us a Price Target of 80.14€/share, with a Upside Potential of 25.97%, meaning a Strong Buy Recommendation.
- **A Base Case**, with a Target Price of 63.39€/share.
- **A Pessimistic Scenario** where g* was estimated to be 0.60%, that shows us a Price Target of 45.13€/share, with a Downside Potential of -15.46%, which means that our recommendation for Bayer will change from

Monte Carlo Simulation	
# of Observations	19750
Mean	65,59 €
Median	63,56 €
S. Dev	16,25 €
10th Percentile	47,73 €
90th Percentile	87,40 €
Upside Potential	22,87%

Figure 56 - Monte Carlo Simulation Data

Source: Author Analysis

Buy to Sell. This can happen mainly due to Litigation issues, that can have bad impression for the brand's image.

UPSIDE CASE - $g^*=2.5\%$

Price Target	80,14
Upside	50,13%

Strong Buy Recommendation

BASE CASE- $g^*=1.8\%$

Price Target	63,39
Upside	18,75%

Base Case

DOWNSIDE CASE- $g^*=-0.6\%$

Price Target	45,13
Upside	-15,46%

Sell Recommendation

Figure 58 – Scenario Analysis

Source: Author Analysis

Appendix

Appendix 1: Bayer AG Worldwide



Source: Bayer AG

Appendix 2: Product Innovation Pipeline in Crop Science Segment

Product Innovation Pipeline in Crop Science Segment				
Crop / digital application launch	First	Product group	Indication	Product / trait / number of hybrids or varieties
Corn	2022	Biotechnology trait	Pest management	SmartStax PRO / VTPro4
	2023	Biological	Crop efficiency	BioRise third-generation seed treatment
	2023	Breeding / native trait	Crop efficiency / yield	Short Stature Corn
Soybeans	Annual	Breeding / native trait	Crop efficiency	> 150 new corn seed hybrids
	2021	Biotechnology trait	Pest management	Intacta2Xtend Soybeans
	2022	Crop protection	Disease management	Fox Supra (Indiflin) ²
Cotton	Annual	Breeding / native trait	Crop efficiency	> 150 new soybean seed varieties
	2021	Biotechnology trait	Pest management	ThryvOn Technology
Horticulture	Annual	Breeding / native trait	Crop efficiency	> 10 new cotton seed varieties
	2021	Biological	Disease management	High-concentration biological for seed and soil application (Minuet in U.S.A.)
Vegetables	Annual	Breeding / native trait	Crop efficiency, disease management	~ 130 new seed varieties launched with highlights in pepper, tomato and melon seed
	Annual	Biological / small molecule LCM	Crop efficiency, disease, pest and weed management	~ 8 new formulations of crop protection
All major crops	Annual	Biological / small molecule LCM	Crop efficiency, disease, pest and weed management	products between 2021–2023
	2021	Digital / climate	Crop efficiency	Advanced seed prescription service for corn in Argentina, Brazil and the EU
Digital applications	2022	Digital / climate	Crop efficiency	Seed Advisor tool within FieldView™ enabling seed placement and density recommendations for North American corn growers

Source: Bayer AG

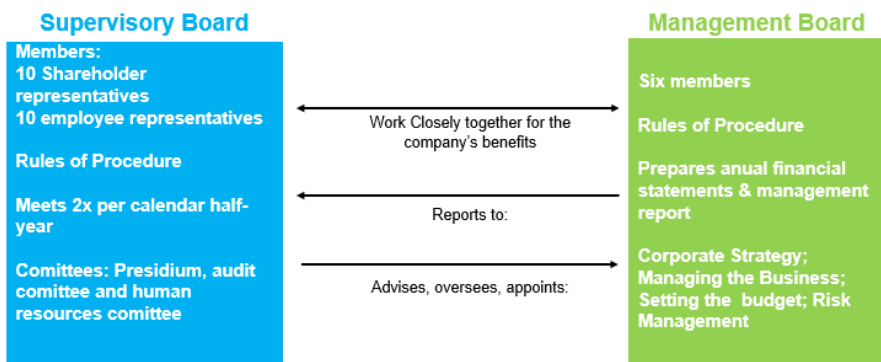
Appendix 3: Bayer's Focus SDG's

Bayer AG desires to make a key contribution to the Sustainable Development Goals with its business - guided by the principles of the U.N. Global Compact and keeping this focus SDG's in line with Bayer's Vision of "Health for All, Hunger for None".



Source: Bayer AG

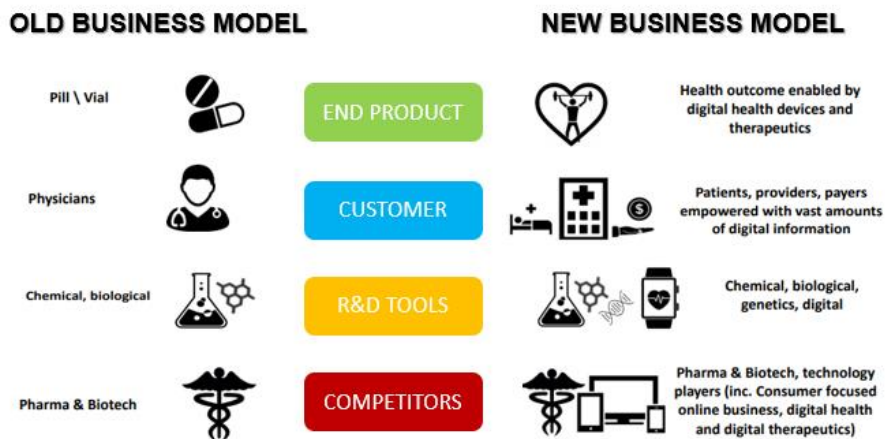
Appendix 4: Bayer's Management Board and Supervisory Board



Source: Bayer AG

Appendix 5: Industry Trends

The COVID-19 Pandemic fast-forwarded several trends in the Pharmaceutical Industry that were already under way, including the increase of digital solutions and new investments in innovative breakthrough medicines.



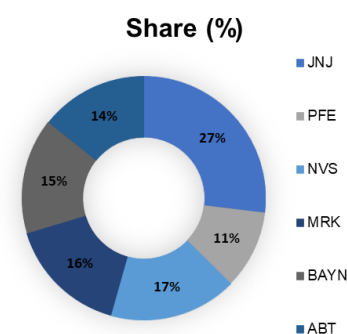
Source: The Future of the Pharma: Beyond the Pill

Appendix 6: Peer group

Company Name	Revenues	Headquarters
Novo Nordisk (NVO)	122 021,00	EU
Jhonson & Johnson (JNJ)	82 059,00	U.S.
Roche (RHHBY)	61 466,00	EU
Pfizer (PFE)	51 750,00	U.S.
Novartis (NVS)	48 624,00	EU
Merck (MRK)	46 840,00	U.S.
GlaxoSmithKline (GSK)	43 957,00	EU
Bayer (BAYN)	43 545,00	EU
Sanofi (SNY)	37 631,00	EU
AbbVie (ABBV)	33 266,00	U.S.
Bristol-Meyers Squibb (BMY)	26 145,00	U.S.
AstraZeneca (AZN)	24 384,00	EU
Amgen (AMGN)	23 362,00	U.S.
Gilead (GILD)	22 249,00	U.S.

Source: Bloomberg

Ticker	Company name	Market Cap (€M)	Revenues (eM)	Share (%)	Country
JNJ	Johnson & Johnson	389 921,20	82 059,00	27%	USA
PFE	Pfizer Inc.	210 833,60	51 750,00	17%	USA
NVS	Novartis	194 774,50	48 624,00	16%	Switzerland
MRK	Merck & Co.	201 909,30	46 840,00	15%	USA
BAYN	Bayer AG	44 022,42	43 545,00	14%	Germany
ABT	Abbott Laboratories	194 174,00	31 904,00	10%	USA



Source: Bloomberg

Appendix 7: Income Statement Forecasted

€ million	2016	2017	2018	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F
Net sales	34 943	35 015	36 742	43 545	41 400	39 665	40 962	42 303	43 691	45 126	46 612
Cost of goods sold	(11 756)	(11 382)	(15 381)	(17 467)	(19 138)	(15 418)	(15 922)	(16 443)	(16 983)	(17 541)	(18 118)
Gross profit	23 187	23 633	21 361	26 078	22 262	24 247	25 040	25 860	26 708	27 586	28 494
Research and development expenses	(4 405)	(4 504)	(5 105)	(5 342)	(15 932)	(7 149)	(7 383)	(7 624)	(7 874)	(8 133)	(8 401)
SG&A	(12 952)	(13 142)	(14 867)	(16 164)	(7 126)	(13 438)	(13 877)	(14 332)	(14 802)	(15 288)	(15 791)
Other operating income	787	864	5 043	1 633	1 540	2 056	2 123	2 193	2 265	2 339	2 416
Other operating expenses	(879)	(948)	(2 978)	(2 016)	(16 913)	(1 781)	(1 839)	(1 899)	(1 961)	(2 026)	(2 093)
EBIT	5 738	5 903	3 454	4 189	(16 169)	3 935	4 064	4 197	4 335	4 477	4 625
Equity-method income (loss)	(6)	20	68	160	(96)	-96	-96	-96	-96	-96	-96
Financial income	149	289	908	475	885	551	569	588	607	627	648
Financial expenses	(1 108)	(1 635)	(2 544)	(1 944)	(1 870)	-1884	-1945	-2009	-2075	-2143	-2214
Financial result	(965)	(1 326)	(1 568)	(1 309)	(1 081)	-1428	-1472	-1517	-1563	-1612	-1662
Income before income taxes (EBT)	4 773	4 577	1 886	2 880	(17 250)	2 507	2 592	2 680	2 771	2 866	2 963
Income taxes	(1 017)	(1 329)	(496)	(450)	1 689	(564)	(583)	(603)	(624)	(645)	(667)
Income from continuing operations after income taxes	3 756	3 248	1 390	2 430	(15 561)	1 943	2 009	2 077	2 148	2 221	2 296
of which attributable to noncontrolling interest	13	(1)	16	19	8	8	8	8	8	8	8

of which attributable to Bayer AG stockholders	3 743	3 249	1 374	2 411	(15 569)	1 951	2 017	2 085	2 156	2 229	2 304
Income from discontinued operations after income taxes	1 070	4 846	321	1 680	5 074	2 688	2 776	2 867	2 961	3 059	3 159
of which attributable to Bayer AG stockholders	788	4 087	321	1 680	5 074	2 688	2 776	2 867	2 961	3 059	3 159
Income after income taxes	4 826	8 094		4 110	(10 487)	4 632	4 785	4 944	5 109	5 279	5 456
of which attributable to noncontrolling interest	295	758	16	19	8	8	8	8	8	8	8
Net Income	4 531	7 336	(16)	4 091	(10 495)	4 624	4 777	4 936	5 101	5 271	5 448

EBITDA	8 801	8 563	9 695	9 556	(2 910)	8 587	8 830	9 081	9 340	9 607	9 883
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Appendix 8: Common-size Income Statement

€ million	2016	2017	2018	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F
Net sales	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cost of goods sold	-33.6%	-32.5%	-41.9%	-40.1%	-46.2%	-38.9%	-38.9%	-38.9%	-38.9%	-38.9%	-38.9%
Gross profit	66.4%	67.5%	58.1%	59.9%	53.8%	61.1%	61.1%	61.1%	61.1%	61.1%	61.1%
Research and development expenses	-12.6%	-12.9%	-13.9%	-12.3%	-38.5%	-18.0%	-18.0%	-18.0%	-18.0%	-18.0%	-18.0%
SG&A	-37.1%	-37.5%	-40.5%	-37.1%	-17.2%	-33.9%	-33.9%	-33.9%	-33.9%	-33.9%	-33.9%
Other operating income	2.3%	2.5%	13.7%	3.8%	3.7%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%
Other operating expenses	-2.5%	-2.7%	-8.1%	-4.6%	-40.9%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%	-4.5%
EBIT	16.4%	16.9%	9.4%	9.6%	-39.1%	9.9%	9.9%	9.9%	9.9%	9.9%	9.9%
Equity-method income (loss)	0.0%	0.1%	0.2%	0.4%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%
Financial income	0.4%	0.8%	2.5%	1.1%	2.1%	1.4%	1.4%	1.4%	1.4%	1.4%	1.4%
Financial expenses	-3.2%	-4.7%	-6.9%	-4.5%	-4.5%	-4.7%	-4.7%	-4.7%	-4.7%	-4.7%	-4.7%
Financial result	-2.8%	-3.8%	-4.3%	-3.0%	-2.6%	-3.6%	-3.6%	-3.6%	-3.6%	-3.6%	-3.6%
Income before income taxes (EBT)	13.7%	13.1%	5.1%	6.6%	-41.7%	6.3%	6.3%	6.3%	6.3%	6.4%	6.4%
Income taxes	-2.9%	-3.8%	-1.3%	-1.0%	4.1%	-1.4%	-1.4%	-1.4%	-1.4%	-1.4%	-1.4%
Income from continuing operations after income taxes	10.7%	9.3%	3.8%	5.6%	-37.6%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%
of which attributable to noncontrolling interest	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
of which attributable to Bayer AG stockholders	10.7%	9.3%	3.7%	5.5%	-37.6%	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%
Income from discontinued operations after income taxes	3.1%	13.8%	0.9%	3.9%	12.3%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
of which attributable to Bayer AG stockholders	2.3%	11.7%	0.9%	3.9%	12.3%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%
Income after income taxes	13.8%	23.1%	0.0%	9.4%	-25.3%	11.7%	11.7%	11.7%	11.7%	11.7%	11.7%
of which attributable to noncontrolling interest	0.8%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
of which attributable to Bayer AG stockholders (net income)	13.0%	21.0%	0.0%	9.4%	-25.4%	11.7%	11.7%	11.7%	11.7%	11.7%	11.7%

Appendix 9: Statement of Financial Position Forecasted

€ million	2016	2017	2018	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F
Noncurrent assets											
Property, plant and equipment	13 114	7 633	12 943	12 479	11 710	12 072	12 446	12 831	13 228	13 637	14 059
Goodwill	16 312	14 751	38 442	39 126	36 080	34 214	34 829	35 455	36 092	36 741	37 401
Intangible assets	13 567	11 674	36 696	34 709	26 029	26 834	27 664	28 520	29 403	30 312	30 800
Investments accounted for using the equity method	584	4 007	515	522	491	491	491	491	491	491	491
Other financial assets	1 281	1 634	2 212	1 536	1 555	1 555	1 555	1 555	1 555	1 555	1 555
Deferred taxes	6 350	4 915	4 333	4 576	4 686	4 686	4 686	4 686	4 686	4 686	4 686
Other Non Current Assets	583	400	526	751	835	968	968	968	968	968	968
Total Non Current Assets	51 791	45 014	95 667	93 699	81 386	80 821	82 639	84 506	86 423	88 391	89 961
Current assets											
Inventories	8408	6550	11132	10770	10961	9879	10202	10536	10882	11239	11609
Trade accounts receivable	10969	8582	11714	11678	9555	11444	11818	12205	12605	13020	13448

Other financial assets	6275	3529	1166	2326	7940	3625	3625	3625	3625	3625	3625
Other receivables	2210	1276	1958	1811	1667	1667	1667	1667	1667	1667	1667
Claims for income tax refunds	676	474	809	1 652	1 233	1 181	1 220	1 260	1 301	1 344	1 388
Cash and cash equivalents	1 899	7 581	4 052	3 185	4 191	6 180	7 577	7 929	8 448	8 978	7 529
Assets held for sale	10	2 081	234	1 137	113	113	113	113	113	113	113
Total Current Assets	30447	30073	31065	32559	35660	34089	36221	37335	38641	39986	39379
Total assets	82 238	75 087	126 732	126 258	117 046	114 910	118 861	121 841	125 064	128 376	129 339
Equity											
Capital stock	2 117	2 117	2 387	2 515	2 515	2 515	2 515	2 515	2 515	2 515	2 515
Capital reserves	9 658	9 658	18 388	18 261	18 261	18 261	18 261	18 261	18 261	18 261	18 261
Retained Earnings	18 558	25 026	25 202	26 561	9 748	12 486	12 577	15 409	15 597	18 530	18 823
Equity attributable to Bayer AG stockholders	30 333	36 801	45 977	47 337	30 524	33 262	33 353	36 185	36 373	39 306	39 599
Equity attributable to noncontrolling interest	1 564	60	171	180	175	182	181	191	195	202	209
Total Equity	31 897	36 861	46 148	47 517	30 699	33 444	33 534	36 375	36 568	39 509	39 808
Noncurrent liabilities											
Provisions for pensions and other post-employment benefits	11 134	8 020	8 717	8 213	8 454	8 454	8 454	8 454	8 454	8 454	8 454
Financial liabilities	16 180	12 483	37 712	36 912	33 196	34 892	38 635	38 635	39 358	38 562	39 097
Income tax liabilities	423	495	1 433	1 603	247	857	885	914	944	975	1 007
Deferred taxes	1 330	1 153	4 667	3 755	1 331	1 371	1 371	1 371	1 371	1 371	1 371
Provisions and Other Non Current Liabilities	2 737	2 482	4 930	5 043	6 391	4 392	4 535	4 684	4 837	4 996	5 161
Total Non Current Liabilities	31 804	24 633	57 459	55 526	49 619	49 966	53 880	54 058	54 965	54 358	55 090
Current liabilities											
Other provisions	0	0	3 365	3 251	10 127	5 432	5 610	5 794	5 984	6 180	6 384
Financial liabilities	3 401	1 935	3 682	2 182	8 570	6 871	6 679	6 179	7 177	7 173	6 888
Trade accounts payable	6 410	5 129	6 038	6 426	5 683	6 867	7 092	7 324	7 564	7 813	8 070
Income tax liabilities	884	422	1 050	758	2 269	2 174	2 245	2 318	2 395	2 473	2 555
Liabilities directly related to assets held for sale	0	111	12	662	0	0	0	0	0	0	0
Other Current Liabilities	7 842	5 996	8 978	9 936	10 079	10 079	10 079	10 079	10 079	10 079	10 079
						77	(258)	(286)	333	791	467
Total Current Liabilities	18 537	13 593	23 125	23 215	36 728	31 500	31 446	31 408	33 531	34 509	34 442
Total Liabilities	50 341	38 226	80 584	78 741	86 347	81 466	85 327	85 466	88 496	88 867	89 532
Total equity and liabilities	82 238	75 087	126 732	126 258	117 046	114 910	118 861	121 841	125 064	128 376	129 339
	<i>check</i>	0	0	0	0	0	0	0	0	0	0

Appendix 10: Common-size Balance Sheet

€ million	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F
Noncurrent assets											
Property, plant and equipment	15.9%	10.2%	10.2%	9.9%	10.0%	10.5%	10.5%	10.5%	10.6%	10.6%	10.9%
Goodwill	19.8%	19.6%	30.3%	31.0%	30.8%	29.8%	29.3%	29.1%	28.9%	28.6%	28.9%
Other intangible assets	16.5%	15.5%	29.0%	27.5%	22.2%	23.4%	23.3%	23.4%	23.5%	23.6%	23.8%
Investments accounted for using the equity method	0.7%	5.3%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Other financial assets	1.6%	2.2%	1.7%	1.2%	1.3%	1.4%	1.3%	1.3%	1.2%	1.2%	1.2%
Deferred taxes	7.7%	6.5%	3.4%	3.6%	4.0%	4.1%	3.9%	3.8%	3.7%	3.7%	3.6%
Other Non Current Assets	0.7%	0.5%	0.4%	0.6%	0.7%	0.8%	0.8%	0.8%	0.8%	0.8%	0.7%
Total Non Current Assets	63.0%	59.9%	75.5%	74.2%	69.5%	70.3%	69.5%	69.4%	69.1%	68.9%	69.6%
Current assets											

Inventories	10.2%	8.7%	8.8%	8.5%	9.4%	8.6%	8.6%	8.6%	8.7%	8.8%	9.0%
Trade accounts receivable	13.3%	11.4%	9.2%	9.2%	8.2%	10.0%	9.9%	10.0%	10.1%	10.1%	10.4%
Other financial assets	7.6%	4.7%	0.9%	1.8%	6.8%	3.2%	3.0%	3.0%	2.9%	2.8%	2.8%
Other receivables	2.7%	1.7%	1.5%	1.4%	1.4%	1.5%	1.4%	1.4%	1.3%	1.3%	1.3%
Claims for income tax refunds	0.8%	0.6%	0.6%	1.3%	1.1%	1.0%	1.0%	1.0%	1.0%	1.0%	1.1%
Cash and cash equivalents	2.3%	10.1%	3.2%	2.5%	3.6%	5.4%	6.4%	6.5%	6.8%	7.0%	5.8%
Assets held for sale	0.0%	2.8%	0.2%	0.9%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Total Current Assets	37.0%	40.1%	24.5%	25.8%	30.5%	29.7%	30.5%	30.6%	30.9%	31.1%	30.4%
Total assets	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Equity											
Capital stock	2.6%	2.8%	1.9%	2.0%	2.1%	2.2%	2.1%	2.1%	2.0%	2.0%	1.9%
Capital reserves	11.7%	12.9%	14.5%	14.5%	15.6%	15.9%	15.4%	15.0%	14.6%	14.2%	14.1%
Other reserves (Retained Earnings)	22.6%	33.3%	19.9%	21.0%	8.3%	10.9%	10.6%	12.6%	12.5%	14.4%	14.6%
Equity attributable to Bayer AG stockholders	36.9%	49.0%	36.3%	37.5%	26.1%	28.9%	28.1%	29.7%	29.1%	30.6%	30.6%
Equity attributable to noncontrolling interest	1.9%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Total Equity	38.8%	49.1%	36.4%	37.6%	26.2%	29.1%	28.2%	29.9%	29.2%	30.8%	30.8%
Noncurrent liabilities											
Provisions for pensions and other post-employment benefits	13.5%	10.7%	6.9%	6.5%	7.2%	7.4%	7.1%	6.9%	6.8%	6.6%	6.5%
Financial liabilities	19.7%	16.6%	29.8%	29.2%	28.4%	30.4%	32.5%	31.7%	31.5%	30.0%	30.2%
Income tax liabilities	0.5%	0.7%	1.1%	1.3%	0.2%	0.7%	0.7%	0.8%	0.8%	0.8%	0.8%
Deferred taxes	1.6%	1.5%	3.7%	3.0%	1.1%	1.2%	1.2%	1.1%	1.1%	1.1%	1.1%
Provisions and Other Non Current Liabilities	3.3%	3.3%	3.9%	4.0%	5.5%	3.8%	3.8%	3.8%	3.9%	3.9%	4.0%
Total Non Current Liabilities	38.7%	32.8%	45.3%	44.0%	42.4%	43.5%	45.3%	44.4%	43.9%	42.3%	42.6%
Current liabilities											
Other provisions	0.0%	0.0%	2.7%	2.6%	8.7%	4.7%	4.7%	4.8%	4.8%	4.8%	4.9%
Financial liabilities	4.1%	2.6%	2.9%	1.7%	7.3%	6.0%	5.6%	5.1%	5.7%	5.6%	5.3%
Trade accounts payable	7.8%	6.8%	4.8%	5.1%	4.9%	6.0%	6.0%	6.0%	6.0%	6.1%	6.2%
Income tax liabilities	1.1%	0.6%	0.8%	0.6%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	2.0%
Liabilities directly related to assets held for sale	0.0%	0.1%	0.0%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other Current Liabilities	9.5%	8.0%	7.1%	7.9%	8.6%	8.8%	8.5%	8.3%	8.1%	7.9%	7.8%
Total Current Liabilities	22.5%	18.1%	18.2%	18.4%	31.4%	27.4%	26.5%	25.8%	26.8%	26.9%	26.6%
Total Liabilities	61.2%	50.9%	63.6%	62.4%	73.8%	70.9%	71.8%	70.1%	70.8%	69.2%	69.2%
Total equity and liabilities	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Appendix 11: Managerial Balance Sheet

In Millions of €	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F
Property, Plant and Equipment	13 114	7 633	12 943	12 479	11 710	12 072	12 446	12 831	13 228	13 637	14 059
Intangible Assets & Goodwill & Other Non Current Assets	38 677	37 381	82 724	81 220	69 676	68 749	70 194	71 676	73 195	74 753	75 902
Fixed Assets	51 791	45 014	95 667	93 699	81 386	80 821	82 639	84 506	86 423	88 391	89 961
Inventories	8 408	6 550	11 132	10 770	10 961	9 879	10 202	10 536	10 882	11 239	11 609
Accounts Receivables	10 969	8 582	11 714	11 678	9 555	11 444	11 818	12 205	12 605	13 020	13 448
Tax Receivables	676	474	809	1 652	1 233	1 181	1 220	1 260	1 301	1 344	1 388
Accounts Payable	6 410	5 129	6 038	6 426	5 683	6 867	7 092	7 324	7 564	7 813	8 070
Deferred Tax Liabilities	884	422	1 050	758	2 269	2 174	2 245	2 318	2 395	2 473	2 555
Tax Payables	0	0	0	0	0	0	0	0	0	0	0

Working Capital Requirements (WCR)	12 759	10 055	16 567	16 916	13 797	13 463	13 903	14 358	14 829	15 317	15 821
Cash & Equivalents	1 899	7 581	4 052	3 185	4 191	6 180	7 577	7 929	8 448	8 978	7 529
Cash & Equivalents	1 899	7 581	4 052	3 185	4 191	6 180	7 577	7 929	8 448	8 978	7 529
INVESTED CAPITAL	66 449	62 650	116 286	113 800	99 374	100 464	104 119	106 794	109 701	112 685	113 310
Total Equity	31 897	36 861	46 148	47 517	30 699	33 444	33 534	36 375	36 568	39 509	39 808
Other Current/ Non Current Assets	8 495	6 886	3 358	5 274	9 720	5 405	5 405	5 405	5 405	5 405	5 405
Provisions and Other Non-Current Liabilities	23 466	18 257	32 102	32 463	36 629	30 585	30 934	31 295	31 669	32 055	32 455
Adjusted Equity	46 868	48 232	74 892	74 706	57 608	58 701	58 805	61 980	63 166	66 950	67 325
Long Term Debt	16 180	12 483	37 712	36 912	33 196	34 892	38 635	38 635	39 358	38 562	39 097
Short Term Debt	3 401	1 935	3 682	2 182	8 570	6 871	6 679	6 179	7 177	7 173	6 888
Total Debt	19 581	14 418	41 394	39 094	41 766	41 763	45 314	44 814	46 535	45 735	45 985
CAPITAL EMPLOYED	66 449	62 650	116 286	113 800	99 374	100 464	104 119	106 794	109 701	112 685	113 310
Check	0	0	0	0	0	0	0	0	0	0	0

Appendix 12: Cash-Flow Statement Forecasted

€ million	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F
Income from continuing operations after income taxes	2 410	(15 561)	1 943	2 009	2 077	2 148	2 221	2 296
Income taxes	443	(1 689)	(564)	(583)	(603)	(624)	(645)	(667)
Financial result	1 309	1 081	1 428	1 472	1 517	1 563	1 612	1 662
Income taxes paid	(2 554)	(1 063)	(2 174)	(2 245)	(2 318)	(2 395)	(2 473)	(2 555)
Depreciation, amortization and impairments	5 367	13 259	4 652	4 766	4 883	5 005	5 130	5 259
Change in pension provisions	(168)	(91)	-	-	-	-	-	-
(Gains) losses on retirements of noncurrent assets	(448)	(126)	-	-	-	-	-	-
Decrease (increase) in inventories	(103)	(900)	(1082)	323	334	346	358	370
Decrease (increase) in trade accounts receivable	14	695	1 889	374	387	400	414	429
(Decrease) increase in trade accounts payable	759	(347)	1 184	224	232	240	249	257
Changes in other working capital, other noncash items	954	9 311	(147)	110	113	117	121	126
Net cash provided by (used in) operating activities from continuing operations	7 983	4 569	7 130	6 449	6 623	6 801	6 986	7 177
Net cash provided by (used in) operating activities from discontinued operations	224	334	€ -	- €	- €	- €	- €	- €
Net cash provided by (used in) operating activities	8 207	4 903	7 130	6 449	6 623	6 801	6 986	7 177
Cash outflows for additions to property, plant, equipment and intangible assets	(2 650)	(2 418)	(3 194)	(3 252)	(3 310)	(3 370)	(3 430)	(3 492)
Cash inflows from sales of property, plant, equipment and other assets	283	329	-	-	-	-	-	-
Cash inflows from (outflows for) divestments less divested cash	2 546	4 172	-	-	-	-	-	-
Cash inflows from noncurrent financial assets	149	673	-	-	-	-	-	-
Cash outflows for noncurrent financial assets	(421)	(245)	-	-	-	-	-	-
Cash outflows for acquisitions less acquired cash	(410)	(2 263)	-	-	-	-	-	-
Interest and dividends received	135	134	-	-	-	-	-	-
Cash inflows from (outflows for) current financial assets	(303)	(4 455)	-	-	-	-	-	-
Net cash provided by (used in) investing activities	(671)	(4 073)	(3 194)	(3 252)	(3 310)	(3 370)	(3 430)	(3 492)
Dividend payments	(2 615)	(2 768)	(1 886)	(1 949)	(2 013)	(2 081)	(2 150)	(2 222)
Issuances of debt	7 464	10 891	11 282	3 864	3 864	3 936	3 856	3 910
Retirements of debt	(11 760)	(6 424)	(11 342)	(3 716)	(4 810)	(4 768)	(4 732)	(6 822)
Interest paid including interest-rate swaps	(1 517)	(1 301)	-	-	-	-	-	-
Interest received from interest-rate swaps	39	25	-	-	-	-	-	-
Net cash provided by (used in) financing activities	(8 389)	423	(1 946)	(1 801)	(2 960)	(2 913)	(3 026)	(5 134)

Change in cash and cash equivalents due to business activities	(853)	1 253	1 989	1 397	352	519	530	-1 449
Cash and cash equivalents at beginning of year	4 052	3 185	4 191	6 180	7 577	7 929	8 448	8 978
Change in cash and cash equivalents due to changes in scope of consolidation	(20)	(7)	€ -	- €	- €	- €	- €	- €
Change in cash and cash equivalents due to exchange rate movements	6	(240)	€ -	- €	- €	- €	- €	- €
Cash and cash equivalents at end of year	3 185	4 191	6 180	7 577	7 929	8 448	8 978	7 529

Appendix 13: Common-Size Cash-Flow Statement

€ million	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F
Income from continuing operations after income taxes	29,4%	-317,4%	27,3%	31,1%	31,4%	31,6%	31,8%	32,0%
Income taxes	5,4%	-34,4%	-7,9%	-9,0%	-9,1%	-9,2%	-9,2%	-9,3%
Financial result	15,9%	22,0%	20,0%	22,8%	22,9%	23,0%	23,1%	23,2%
Income taxes paid	-31,1%	-21,7%	-30,5%	-34,8%	-35,0%	-35,2%	-35,4%	-35,6%
Depreciation, amortization and impairments	65,4%	270,4%	65,2%	73,9%	73,7%	73,6%	73,4%	73,3%
Change in pension provisions	-2,0%	-1,9%	-	-	-	-	-	-
(Gains) losses on retirements of noncurrent assets	-5,5%	-2,6%	-	-	-	-	-	-
Decrease (increase) in inventories	-1,3%	-18,4%	-15,2%	5,0%	5,0%	5,1%	5,1%	5,2%
Decrease (increase) in trade accounts receivable	0,2%	14,2%	26,5%	5,8%	5,8%	5,9%	5,9%	6,0%
(Decrease) increase in trade accounts payable	9,2%	-7,1%	16,6%	3,5%	3,5%	3,5%	3,6%	3,6%
Changes in other working capital, other noncash items	11,6%	189,9%	-2,1%	1,7%	1,7%	1,7%	1,7%	1,8%
Net cash provided by (used in) operating activities from continuing operations	97,3%	93,2%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Net cash provided by (used in) operating activities from discontinued operations	2,7%	6,8%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Net cash provided by (used in) operating activities	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
Cash outflows for additions to property, plant, equipment and intangible assets	-32,3%	-49,3%	-44,8%	-50,4%	-50,0%	-49,5%	-49,1%	-48,7%
Cash inflows from sales of property, plant, equipment and other assets	3,4%	6,7%	-	-	-	-	-	-
Cash inflows from (outflows for) divestments less divested cash	31,0%	85,1%	-	-	-	-	-	-
Cash inflows from noncurrent financial assets	1,8%	13,7%	-	-	-	-	-	-
Cash outflows for noncurrent financial assets	-5,1%	-5,0%	-	-	-	-	-	-
Cash outflows for acquisitions less acquired cash	-5,0%	-46,2%	-	-	-	-	-	-
Interest and dividends received	1,6%	2,7%	-	-	-	-	-	-
Cash inflows from (outflows for) current financial assets	-3,7%	-90,9%	-	-	-	-	-	-
Net cash provided by (used in) investing activities	-8,2%	-83,1%	-44,8%	-50,4%	-50,0%	-49,5%	-49,1%	-48,7%
Dividend payments	-31,9%	-56,5%	-26,4%	-30,2%	-30,4%	-30,6%	-30,8%	-31,0%
Issuances of debt	90,9%	222,1%	158,2%	59,9%	58,3%	57,9%	55,2%	54,5%
Retirements of debt	-143,3%	-131,0%	-159,1%	-57,6%	-72,6%	-70,1%	-67,7%	-95,1%
Interest paid including interest-rate swaps	-18,5%	-26,5%	-	-	-	-	-	-
Interest received from interest-rate swaps	0,5%	0,5%	-	-	-	-	-	-
Net cash provided by (used in) financing activities	-102,2%	8,6%	-27,3%	-27,9%	-44,7%	-42,8%	-43,3%	-71,5%
Change in cash and cash equivalents due to business activities	-10,4%	25,6%	27,9%	21,7%	5,3%	7,6%	7,6%	-20,2%
Cash and cash equivalents at beginning of year	49,4%	65,0%	58,8%	95,8%	114,4%	116,6%	120,9%	125,1%
Change in cash and cash equivalents due to changes in scope of consolidation	-0,2%	-0,1%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Change in cash and cash equivalents due to exchange rate movements	0,1%	-4,9%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Cash and cash equivalents at end of year	38,8%	85,5%	86,7%	117,5%	119,7%	124,2%	128,5%	104,9%

Appendix 14: Revenues Assumptions

Segment (€ million)	2021E	2022F	2023F	2024F	2025F	2026F	Assumptions
CropScience	18329	18805	19294	19796	20310	20838	<p>The Revenues of Bayer Pharmaceuticals were forecasted based on the 3 main segments: Crop Science, Pharmaceuticals and Consumer Health. For the year 2021E were used the growth rates retrieved from Quarterly Statement First Quarter of 2021, that can be seen in the table "Growth Forecast 2021".</p> <p>From 2022F to 2027F were used the Growth Rates that can be found in Table "Growth Forecast 2021-2027".</p> <p>I focused on the Growth Rates from Bayer Analysts and on The Market CAGRs for each Segment and then I did de Median of the growth rate of each segment and I used this growth rates to forecast the remaining years.</p> <p>Constant Value equal to 2019 throughout the forecasted years</p>
Pharmaceuticals	16602	17288	18003	18747	19523	20330	
Consumer Health	4526	4660	4797	4939	5084	5234	
Reconciliation - Group	209	209	209	209	209	209	
Total Revenues	39665	40962	42303	43691	45126	46612	

Segment (in % of Total Revenues)	2016	2017	2018	2019	2020	2021F	2022F	2023F	2024F	2025F	2026F
CropScience	28.37%	27.35%	38.83%	45.54%	45.52%	46.21%	45.91%	45.61%	45.31%	45.01%	44.71%
Pharmaceuticals	34.15%	35.83%	45.58%	41.25%	41.76%	41.85%	42.21%	42.56%	42.91%	43.26%	43.62%
Consumer Health	12.08%	11.76%	14.83%	12.54%	12.21%	11.41%	11.38%	11.34%	11.30%	11.27%	11.23%
Reconciliation - Group	25.40%	25.05%	0.76%	0.66%	0.50%	0.53%	0.51%	0.49%	0.48%	0.46%	0.45%
Total Revenues	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Growth Forecast 2021	Bayer Investors	Market	Mine (2022F-2027F)	2020Q1	2021 Q1	Variation
CropScience	2%	3.2%	2.60%	6834	6646	-2.8%
Pharmaceuticals	5%	3.27%	4.14%	4546	4365	-4.0%
Consumer Health	2%	3.9%	2.95%	1398	1252	-10.4%

Appendix 15: Forecasting Assumptions Balance Sheet

Notes		Summary	2021E	2022F	2023F	2024F	2025F	2026F	Assumption
BALANCE SHEET									
	PP&E		3,09%	3,09%	3,09%	3,09%	3,09%	3,09%	Depends on the Average growth of the revenues between 2021E-2027F
	Intangible Assets		3,09%	3,09%	3,09%	3,09%	3,09%	3,09%	Depends on the Average growth of the revenues between 2021E-2027F
Note 1	Goodwill	-5,17%	-5,17%	1,80%	1,80%	1,80%	1,80%	1,80%	For 2021E Goodwill will decrease by 5,17% and for the remaining forecasted years the value will grow with g*.
	WCR								
Note 2	Inventories		9879,10	10202,02	10536,07	10881,67	11239,21	11609,15	(Inventory Days/365)*COGS
	Accounts Receivables		11444	11818	12205	12605	13020	13448	(revenues*(average accounts receivables days/365)
	Tax Receivables (Claims for income tax refunds)		1181	1220	1260	1301	1344	1388	Forecasted in percentage of revenues
	Accounts Payable		6867	7092	7324	7564	7813	8070	(COGS *(average accounts payables days/365)
	Income Tax Liabilities (Current Liabilities)		2174	2245	2318	2395	2473	2555	Forecasted in percentage of revenues
	Other financial assets (Non Current)	0%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	Value equal to Historical Year 2020
	Investments accounted for using the equity method	0%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	Value equal to Historical Year 2020
	Deferred taxes (Current Assets)	0%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	Value equal to Historical Year 2020
	Other financial assets (Current)		3625	3625	3625	3625	3625	3625	In % of Net Sales for the Forecasted Years
	Other receivables		1667	1667	1667	1667	1667	1667	Value equal to Historical Year 2020
Note 3	Other Non Current Assets	15,94%	968	968	968	968	968	968	Value equal to Historical Year 2020
Note 5	Assets held for sale		0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	Value equal to Historical Year 2020

	Liabilities directly related to assets held for sale	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	Will be zero for the forecasted period due to the information that can be found in the 2020 Annual Report.
	Capital stock	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	No shares were issued during the last fiscal year (according to Quarterly Statement First Quarter of 2021 and the 2020 Annual Report) , therefore, it will be assumed the same value for the forecasted years (2021E-2027F).
	Capital reserves	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	As in 2019 and 2020 the Value of Capital Reserves was equal, then this constant value will be applied through the forecasted years
Note 6	Retained Earnings	10,87%	10,58%	12,65%	12,47%	14,43%	14,55%		Assuming that Other Reserves are the same as Retained Earnings (End Retained Earnings = Beg Retained Earnings + Net Income - Dividends)
Note 10	Equity attributable to noncontrolling interest	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	Value equal to Historical Year 2020
	Provisions for pensions and other post-employment benefits	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	Value equal to Historical Year 2020
Note 8	Financial Liabilities (Long Term Debt)	34892	38635	38635	39358	38562	39097		See Note 8 below to more Information
Note 9	Deferred taxes	3,09%	3,09%	3,09%	3,09%	3,09%	3,09%	3,09%	Increase by 3% in 2021E according to Q1 2021 Quarterly report and the remaining forecasted years have a constant value equal to 2021E
	Provisions and Other Non Current Liabilities	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	In % of Net Sales for the Forecasted Years
	Other provisions	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	In % of Net Sales for the Forecasted Years
	Financial liabilities	6871	6679	6179	7177	7173	6888		See Note 8 below to more Information
	Liabilities directly related to assets held for sale	0,0000	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	Value equal to Historical Year 2020
	Other Current Liabilities	8,61%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	In percentage of Total Assets (last percentage used in 2020)
Note 11	Income Tax Liabilities (Non-Current Liabilities)	2,16%	0,00%	0,00%	0,00%	0,00%	0,00%	0,00%	In % of Net Sales

Appendix 16: Forecasting Assumptions Income Statement

Notes		Summary	2021F	2022F	2023F	2024F	2025F	2026F	Assumption
INCOME STATEMENT									
	Revenues								See Revenues Assumptions Sheet for more information
	Cost of Goods Sold	-38,87%	-15418	-15922	-16443	-16983	-17541	-18118	38,87% of Net Sales (average from 2016 to 2020). Constant rate throughout the years forecasted (2021-2027), as can be seen in historical years.
Note 1	Research and Development Expenses	-18,02%	-7149	-7383	-7624	-7874	-8133	-8401	18% of Net Sales (average from 2016 to 2020). Constant rate throughout the years forecasted (2021-2027), as can be seen in historical years.
Note 2	SG&A	-33,88%	-13438	-13877	-14332	-14802	-15288	-15791	34% of Net Sales (average from 2016 to 2020). Constant rate throughout the years forecasted (2021-2027), as can be seen in historical years.
Note 3	Other operating income	5,18%	2056	2123	2193	2265	2339	2416	5,18% of Net Sales (average from 2016 to 2020). Constant rate throughout the years forecasted (2021-2027), as can be seen in historical years.
Note 4	Other operating expenses	-4,49%	-1781	-1839	-1899	-1961	-2026	-2093	4,49% of Net Sales (average from 2016 to 2019, 2020 is out of the average because is a outlier). Constant rate throughout the years forecasted (2021-2027), as can be seen in historical years.
	Equity-method income (loss)	-96	-96	-96	-96	-96	-96	0	Assuming a constant value equal to 2020YE
	Interest income	1,39%	551	569	588	607	627	648	Historical Average relationship (2016-2020) between Financial Income and Net Sales.
	Interest expenses	-4,75%	-1884	-1945	-2009	-2075	-2143	-2214	Historical relationship between Financial Expenses and Total Debt and growing at those rate for all the forecasted years
	Income taxes	22,50%	-564	-583	-603	-624	-645	-667	22,5% of Income before income taxes (EBT)
	Income from continuing operations after income taxes		8	8	8	8	8	8	Assuming a constant value equal to 2020YE
	of which attributable to Bayer AG stockholders		2688	2776	2867	2961	3059	3159	In % in Net Sales

Appendix 17: Debt Estimations

Bonds and Notes									
	Nominal volume	Nominal volume	Carrying amount as of Dec. 31, 2020	2021F	2022F	2023F	2024F	2025F	2026F
	as of Dec. 31, 2019	as of Dec. 31, 2020	€ million						
Hybrid bonds¹									
Hybrid bond 2016 / 2027 ² / 2076	EUR 1,500 million	EUR 1,500 million	1 497	1 500	1 500	1 500	1 500	1 500	1 500
Hybrid bond 2015 / 2029 / 2075	EUR 1,300 million	EUR 1,300 million	1 297	1 300	1 300	1 300	1 300	1 300	1 300
Hybrid bond 2019 / 2029 / 2079	EUR 1,000 million	EUR 1,000 million	991	1 000	1 000	1 000	1 000	1 000	1 000
Hybrid bond 2019 / 2027 ² / 2079	EUR 750 million	EUR 750 million	747	750	750	750	750	750	750
Exchangeable bond¹									
Exchangeable bond ³ 2017 / 2020	EUR 1,000 million	–	–						
USD bonds^{1,4}									
Maturity > 5 years	–	EUR 4,500 million	3 665	3 665	4 500	4 500	4 500	4 500	4 500
Maturity > 5 years	EUR 10,750 million	EUR 9,364 million	7 614	7 614	9 364	9 364	9 364	9 364	9 364
Maturity > 5 years	EUR 13,914 million	EUR 10,800 million	8 584	8 584	10 800	10 800	10 800	10 800	10 800
EUR bonds^{1,4}									
Maturity < 1 year	–	EUR 750 million	750	750	0	0	0	0	0
Maturity > 1 year < 5 years	EUR 3,000 million	EUR 3,750 million	3 738	3 750	3 750	3 750	3 750	3 750	0
Maturity > 5 years	EUR 3,250 million	EUR 7,750 million	7 704	7 750	7 750	7 750	7 750	7 750	7 750
JPY bonds¹									
Maturity < 1 year	–	JPY 10 billion							
Maturity > 1 year < 5 years	JPY 20 billion	JPY 10 billion	79	79	79	79	50		
Maturity > 5 years	–	–	–						
Total			36 745	36 742	40 793	40 793	40 764	40 714	36 964

Year	2021F	2022F	2023F	2024F	2025F	2026F
Short term Bonds	2 795 €	3 103 €	3 103 €	3 101 €	3 097 €	2 812 €
Long Term Bonds	33 947 €	37 690 €	37 690 €	37 663 €	37 617 €	36 152 €

Long Term Debt (Financial Liabilities)	Dec. 31, 2019	Dec. 31, 2020	2021E	2022F	2023F	2024F	2025F	2026F
Bonds and Notes	32 568	32 251	33 947	37 690	37 690	37 663	37 617	38 152
Liabilities to Banks	3 387	17	17	17	17	17	17	17
Lease Liabilities	952	925	925	925	925	925	925	925
Liabilities from Derivatives	0	0	0	0	0	0	0	0
Other Financial Liabilities	4	3	3	3	3	3	3	3
Long Term Debt (Financial Liabilities)	36 911	33 196	34 892	38 635	38 635	39 358	38 562	39 097

Growth Rate

Bonds and Notes	-0,973%
Liabilities to Banks	Value Equal to 2020
Lease Liabilities	Value Equal to 2020
Liabilities from Derivatives	Value Equal to 2020
Other Financial Liabilities	Value Equal to 2020

ShortTerm Debt (Financial Liabilities)	Dec. 31, 2019	Dec. 31, 2020	2021E	2022F	2023F	2024F	2025F	2026F
Bonds and Notes	1 001	4 494	2 795	3 103	3 103	3 101	3 097	2 812
Liabilities to Banks	675	3 654	3 654	3 654	3 654	3 654	3 654	3 654
Lease Liabilities	299	212	212	212	212	212	212	212
Liabilities from Derivatives	122	136	136	136	136	136	136	136
Other Financial Liabilities	85	74	74	74	74	74	74	74
ShortTerm Debt (Financial Liabilities)	2 182	8 570	6 871	6 679	6 179	7 177	7 173	6 888

Short Term Bond/ Long Term + Short Term Bonds	12,23%	2,98%
Average	7,61%	

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026
Long Term Debt (non current)	34 892	38 635	38 635	39 358	38 562	39 097
Short Term Debt (current)	6 871	6 679	6 179	7 177	7 173	6 888
Total Debt	41 763	45 314	44 814	46 535	45 735	45 985
Δ Debt	(3)	3 551	(500)	1 721	(800)	250

Capital Structure	71,15%	77,06%	72,30%	73,67%	68,31%	68,30%
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Appendix 18: D&A, PP&E and Intangible Assets Estimations

	2016	2017	2018	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F	Assumptions
Depreciations PP&E				1 862,0	1 682	1 715	1 768	1 822	1 879	1 937	1 997	Depends on the growth of the PP&E
CAPEX Total	2627	2418	2638	2920	3 138	3 194	3 252	3 310	3 370	3 430	3 492	Capex depends on the g*
PP&E	13114	7633	12943	12479	11710	12 072	12 446	12 831	13 228	13 637	14 059	Depends on the Average growth of the revenues between 2021E-2027F

	2016	2017	2018	2019	2020	2021E	2022F	2023F	2024F	2025F	2026F	Assumptions	
Amortizations on Intangible Assets				2 090,0	2 270,0	2 565	1 976	2 037	2 100	2 165	2 232	2 301	Depends on the growth of the Intangible Assets
Intangible Assets		13567	11674	36696	34709	26029	26 834	27 664	28 520	29 403	30 312	31 250	Depends on the Average growth of the revenues between 2021E-2026F

	2021F	2022F	2023F	2024F	2025F	2026F
Depreciations	1 715	1 768	1 822	1 879	1 937	1 997
Amortizations	1 976	2 037	2 100	2 165	2 232	2 301
Impairments	961	961	961	961	961	961
D&A	4 652	4 766	4 883	5 005	5 130	5 259

Appendix 19: Equity Risk Premium Estimation

According to **Eugene F. Fama and Kenneth R. French (2000)**, the **equity risk premium** measures the excess return above the risk-free rate and, as such, is seen as the price for risk. In this paper, the authors estimate the equity premium through an ex-ante methodology, by using dividend and earnings growth rates as a starting point to derive the implied equity premium.

Regions	Revenues	% Revenues by Region	ERP
Europe	12881	31%	5,56%
US	14352	35%	4,72%
Asia	8267	20%	5,75%
Latin America	5900	14%	8,71%
Total	41400		5,76%

Appendix 20: Beta Levered, Cost of Debt, Cost of Equity and WACC Rate Estimation

According to **Pablo Fernandez (2006)**, in a world without leverage cost the relationship between the Levered beta (L) and the Unlevered Beta (u) is the No-costs-of-leverage formula: $BL = u + (u - d) D (1 - T) / E$, for a company that maintains a fixed book-value leverage ratio. On the other hand, for a company that maintains a fixed market-value leverage ratio, the relationship is **Miles and Ezzell (1980)**, where BL is equal to $Bu + (D / E) (Bu - Bd) [1 - T Kd / (1 + Kd)]$.

	Formulas	Data	
Cost of Equity (Ke)	$RFR + \beta * ERP$	Risk free rate	0,73%
WACC	$E / EV * Re + D / EV * Rd$	Unlevered Beta	0,77
Cost of Debt (Kd)	Financial Expenses/Total Debt	Equity Risk Premium	5,76%
Beta Levered	$1 + [(1 - Tax) (Debt/Equity)]$	Beta Levered	1,216

Source: Damodaran

Source: Damodaran

$BL = Bu * (1 + (D/E) * (1 - t))$

	2021E	2022F	2023F	2024F	2025F	2026F	Terminal Value
Cost of Equity Ke	7,734%	7,734%	7,734%	7,734%	7,734%	7,734%	7,734%
Cost of Debt Kd	4,477%	4,511%	4,293%	4,483%	4,459%	4,686%	4,686%
Market Value of Equity	53 885	53 885	53 885	53 885	53 885	53 885	53 885
Debt	41 763	45 314	44 814	46 535	45 735	45 985	46538
Tax Rate	22,50%	22,50%	22,50%	22,50%	22,50%	22,50%	22,50%
ku (pre-tax WACC)	6,312%	6,262%	6,172%	6,227%	6,230%	6,330%	6,321%

Levered Beta	1,216	1,216070625	1,216070625	1,216070625	1,216070625	1,216070625	1,216070625
D/E	77,50%	84,09%	83,17%	86,36%	84,88%	85,34%	86,37%
E/(E+D)	56,34%	54,32%	54,60%	53,66%	54,09%	53,96%	53,66%
D/(E+D)	43,66%	45,68%	45,40%	46,34%	45,91%	46,04%	46,34%
WACC	5,87%	5,80%	5,73%	5,76%	5,77%	5,85%	5,83%

Appendix 21: Growth Rate Estimations

Two different methods were used to perform the Growth Rate (g^*), the **PRAT Model**, that is directly linked to the company (Bayer) and other that considers the long-term growth of the economy in the regions that Bayer operates, the **Fisher Formula Method**.

PRAT Model

PRAT MODEL	2021E	2022F	2023F	2024F	2025F	2026F	
Net Income	4 624	4 777	4 936	5 101	5 271	5 448	
Dividends	1 886	1 949	2 013	2 081	2 150	2 222	
Sales	39 665	40 962	42 303	43 691	45 126	46 612	
Total Assets	114 910	118 861	121 841	125 064	128 376	129 339	
Equity	33 444	33 534	36 375	36 568	39 509	39 808	
(NI-D)/NI (1)	59,21%	59,21%	59,21%	59,21%	59,21%	59,21%	
ROA	2,65%	2,65%	2,67%	2,69%	2,70%	2,77%	EBIT*(1-t)/Total Assets
ROE (2)	2,02%	1,94%	2,12%	2,01%	2,06%	2,04%	Average g^*
$g^*=1 \times 2$	1,20%	1,15%	1,26%	1,19%	1,22%	1,21%	1,203%

Fisher Formula

Regions	Revenues	% revenues by Region	Inflation Rate	
Europe	12 881,00 €	31,11%	0,68%	0,21%
US	14 352,00 €	34,67%	2,25%	0,45%
Asia	8 267,00 €	19,97%	0,50%	0,10%
Latin America	5 900,00 €	14,25%	1,00%	0,05%
Total/Average	41 400,00 €			0,81%

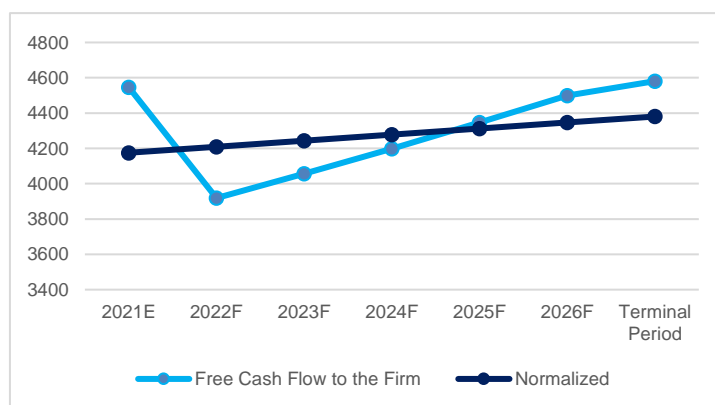
Regions	Revenues	% revenues by Region	GDP Growth	
Europe	12 881,00 €	31,11%	1,30%	0,40%
US	14 352,00 €	34,67%	1,61%	0,24%
Asia	8 267,00 €	19,97%	2,50%	0,25%
Latin America	5 900,00 €	14,25%	1,64%	0,08%
Total/Average	41 400,00 €			0,98%

Fisher Formula
1,80%

Appendix 22: Free Cash Flow to the Firm (FCFF) Estimation

Years	2021E	2022F	2023F	2024F	2025F	2026F	Terminal Value
Operating Profit (EBIT)	3 935	4 064	4 197	4 335	4 477	4 625	4 708
Tax Rate	22,50%	22,50%	22,50%	22,50%	22,50%	22,50%	22,5%
NOPAT (Net Operating Profit After Taxes)	2 755	2 845	2 938	3 034	3 134	3 237	3 295
(+) Depreciation&Amortization	4 652	4 766	4 883	5 005	5 130	5 259	5 353
- Increase in WCR	-334	440	455	471	487	504	513
- CAPEX	3 194	3 252	3 310	3 370	3 430	3 492	3 555
Free Cash Flow to the Firm	4 546	3 919	4 056	4 198	4 346	4 500	4 380
PV of FCFF using WACC	4 546	3 701	3 618	3 538	3 459	3 383	107 500

Appendix 23: Normalized Terminal Value for FCFF Estimation



	2021E	2022F	2023F	2024F	2025F	2026F	Terminal Period
Free Cash Flow to the Firm	4546	3919	4056	4198	4346	4500	4581
Normalized	4175	4210	4244	4278	4312	4346	4380

Appendix 24: Adjusted Present Value (APV) Model

	2021E	2022F	2023F	2024F	2025F	2026F	Terminal Value
Free Cash Flow to the Firm	4 546	3 919	4 056	4 198	4 346	4 500	4 380
PV of FCFF using k_u	4 546	3 688	3 598	3 502	3 413	3 311	82 176

Pre-tax WACC (k_u)	2021E	2022F	2023F	2024F	2025F	2026F	Terminal Value
	6,312%	6,262%	6,172%	6,227%	6,230%	6,330%	6,321%

Kd	4,477%	4,511%	4,293%	4,483%	4,459%	4,686%	4,686%
Tax Rate	22,50%	22,50%	22,50%	22,50%	22,50%	22,50%	22,50%
Interest Expenses	1 884	1 945	2 009	2 075	2 143	2 214	2 240

Interest Tax Shield	424	438	452	467	482	498	504
PV of Tax Shield	424	419	416	409	405	396	14 472

Appendix 25: Flow-to- Equity Model

Years	2021E	2022F	2023F	2024F	2025F	2026F	Terminal Value
Free Cash Flow to the Firm (FCFF)	4 546	3 919	4 056	4 198	4 346	4 500	4 380
Changes in Debt	-3	3 551	-500	1 721	-800	250	253,01
Interest Expenses * (1-t)	1 460	1 508	1 557	1 608	1 661	1 716	1 736
Free Cash Flow to the Equity	3 083	5 962	5 113	4 311	3 485	3 034	3 071
PV of FCFE using Ke	3083	5534	4405	3448	2587	2091	47 020,35 €

Appendix 26: Dividend Discount Model (DDM)

Concerning the **Dividend Discount Model**, a 3-stage Model was considered with the H-Model for the calculation of the Terminal Period. The forecast of the Payout Ratio predicts that the Payout Policy of Bayer will be constant throughout the forecasted period considered. For the calculation of this model was considered a short-term growth rate (gS) of 3.30% and the long-term growth rate (gL) was considered 1.80%, as the growth rate of the economy in the long run. With this model was achieved a share price of €58.62/share, meaning a upside potential of 9.81%.

DDM	2021E	2022F	2023F	2024F	2025F	2026F	Terminal Value
Shares Outstanding (in millions)	982,42	982,42	982,42	982,42	982,42	982,42	
Dividends	1886	1949	2013	2081	2150	2222	
EPS	4,71	4,86	5,02	5,19	5,37	5,55	
DVS	1,92	1,98	2,05	2,12	2,19	2,26	42,79 €
PV DPS	1,92	1,84	1,77	1,69	1,62	1,56	
Payout Ratio	40,79%	40,79%	40,79%	40,79%	40,79%	40,79%	

DPS 2026	2,26	
H(6 Years)	6	Transition Stage
Long growth rate (gL)	1,80%	Growth Rate of Economy
Short Growth Rate (gS)	3,30%	Expected Growth Rate
TV	42,79 €	
PV DPS	12,52 €	
PV Terminal Value	46,10 €	
Share Price	58,62 €	
Upside Potential	9,81%	

Appendix 27: Peer Group Data

all numbers in thousand

(currency in euros)	2017	2018	2019	2020	2021E	2022E
Pfizer						
Revenues	60 953,36 €	45 178,07 €	43 580,53 €	35 292,23 €	29 594,26 €	24 816,23 €

EBITDA	18 314,78 €	19 698,40 €	17 950,13 €	13 249,32 €	12 034,42 €	10 930,92 €
EBIT	11 432,00 €	11 117,03 €	16 216,17 €	7 533,75 €	7 271,85 €	7 019,05 €

all numbers in thousand

(currency in euros)	2017	2018	2019	2020	2021E	2022E
Novartis						
Revenues	42 220,49 €	44 773,00 €	40 992,65 €	42 020,90 €	42 036,40 €	42 051,91 €
EBITDA	13 388,28 €	18 316,46 €	13 285,54 €	14 494,00 €	15 384,86 €	16 330,46 €
EBIT	12 456,87 €	8 244,51 €	9 050,44 €	8 875,26 €	8 106,79 €	7 404,86 €

all numbers in thousand

(currency in euros)	2017	2018	2019	2020	2021E	2022E
J&J						
Revenues	64 381,29 €	68 702,29 €	69 104,83 €	69 546,95 €	71 387,00 €	73 275,73 €
EBITDA	21 024,77 €	22 998,73 €	21 736,37 €	20 511,91 €	20 393,40 €	20 275,57 €
EBIT	15 669,62 €	16 003,95 €	14 860,33 €	14 061,98 €	13 575,23 €	13 105,32 €

all numbers in thousand

(currency in euros)	2017	2018	2019	2020	2021E	2022E
GSK						
Revenues	35 015,76 €	35 752,36 €	39 154,64 €	39 554,84 €	41 221,68 €	42 958,75 €
EBITDA	11 479,36 €	11 431,80 €	11 735,72 €	12 219,44 €	12 478,74 €	12 743,54 €
EBIT	4 942,76 €	6 462,36 €	8 242,96 €	9 075,84 €	11 145,18 €	13 686,33 €

all numbers in thousand

(currency in euros)	2017	2018	2019	2020	2021E	2022E
Merck&Co						
Revenues	33 788,18 €	35 617,29 €	39 445,65 €	40 417,47 €	42 926,83 €	45 591,98 €
EBITDA	10 675,76 €	12 164,65 €	14 033,36 €	10 637,86 €	10 819,14 €	11 003,51 €
EBIT	6 125,96 €	7 952,03 €	10 406,27 €	8 103,03 €	9 143,96 €	10 318,61 €

Appendix 28: Peer Group Estimations

%	2017	2018	2019	2020	Average
Pfizer					
Revenues		-25,88%	-3,54%	-19,02%	-16,15%
EBITDA		7,55%	-8,88%	-26,19%	-9,17%
EBIT		-2,76%	45,87%	-53,54%	-3,48%

%	2017	2018	2019	2020	Average
Novartis					
Revenues		6,05%	-8,44%	2,51%	0,04%
EBITDA		36,81%	-27,47%	9,10%	6,15%
EBIT		-33,82%	9,78%	-1,94%	-8,66%

%	2017	2018	2019	2020	Average
J&J					
Revenues		6,71%	0,59%	0,64%	2,65%
EBITDA		9,39%	-5,49%	-5,63%	-0,58%
EBIT		2,13%	-7,15%	-5,37%	-3,46%

%	2017	2018	2019	2020	Average
GSK					
Revenues	-	2,10%	9,52%	1,02%	4,21%
EBITDA	-	-0,41%	2,66%	4,12%	2,12%
EBIT	-	30,74%	27,55%	10,10%	22,80%

%	2017	2018	2019	2020	Average
Merck&Co					
Revenues	-	5,41%	10,75%	2,46%	6,21%
EBITDA	-	13,95%	15,36%	-24,20%	1,70%
EBIT	-	29,81%	30,86%	-22,13%	12,85%

Source: Bloomberg

Appendix 29: Relative Valuation through Multiples

	Share Price (20th July 2021)	Shares Outstanding (in millions)	Equity Market Value (in thousands)	Net Debt = Debt-Cash (in thousands)	Enterprise Value (EV)
Competitors				2020	
Pfizer	46,86 €	5 598	262 344,67 €	71 506,05 €	333 850,72 €
Novartis	106,77 €	2 257	240 975,38 €	28 436,32 €	269 411,70 €
J&J	195,26 €	2 671	521 550,14 €	22 325,31 €	543 875,46 €
GSK	33,20 €	2 508	83 265,60 €	20 858,00 €	104 123,60 €
Merck&Co	90,62 €	2 565	232 450,56 €	12 496,13 €	244 946,69 €

ACCOUNTING DATA OF COMPARABLE FIRMS IN THE SAMPLE

	Sales (thousands)			EBITDA (thousands)			EBIT (thousands)		
	N-1	N	N+1	N-1	N	N+1	N-1	N	N+1
Competitors	2020	2021	2022	2020	2021	2022	2020	2021	2022
Pfizer	35 292,23 €	594,26 € ²⁹	816,23 € ²⁴	249,32 € ¹³	034,42 € ¹²	930,92 € ¹⁰	533,75 € ⁷	271,85 € ⁷	019,05 € ⁷
Novartis	42 020,90 €	036,40 € ⁴²	051,91 € ⁴²	494,00 € ¹⁴	384,86 € ¹⁵	330,46 € ¹⁶	875,26 € ⁸	106,79 € ⁸	404,86 € ⁷
J&J	69 546,95 €	387,00 € ⁷¹	275,73 € ⁷³	511,91 € ²⁰	393,40 € ²⁰	275,57 € ²⁰	061,98 € ¹⁴	575,23 € ¹³	105,32 € ¹³
GSK	39 554,84 €	221,68 € ⁴¹	958,75 € ⁴²	219,44 € ¹²	478,74 € ¹²	743,54 € ¹²	075,84 € ⁹	145,18 € ¹¹	686,33 € ¹³
Merck&Co	40 417,47 €	926,83 € ⁴²	591,98 € ⁴⁵	637,86 € ¹⁰	819,14 € ¹⁰	003,51 € ¹¹	103,03 € ⁸	143,96 € ⁹	318,61 € ¹⁰

Relative Valuation Market Approach

	EV/Sales			EV/EBITDA			EV/EBIT		
	N-1	N	N+1	N-1	N	N+1	N-1	N	N+1

Competitors	2020	2021	2022	2020	2021	2022	2020	2021	2022
Pfizer	9,46 €	11,28 €	13,45 €	25,20 €	27,74 €	30,54 €	44,31 €	45,91 €	47,56 €
Novartis	6,41 €	6,41 €	6,41 €	18,59 €	17,51 €	16,50 €	30,36 €	33,23 €	36,38 €
J&J	7,82 €	7,62 €	7,42 €	26,52 €	26,67 €	26,82 €	38,68 €	40,06 €	41,50 €
GSK	2,63 €	2,53 €	2,42 €	8,52 €	8,34 €	8,17 €	11,47 €	9,34 €	7,61 €
Merck&Co	6,06 €	5,71 €	5,37 €	23,03 €	22,64 €	22,26 €	30,23 €	26,79 €	23,74 €
Average	6,5	6,7	7,0	20,4	20,6	20,9	31,0	31,1	31,4
Median	5,7	5,6	5,4	19,2	18,8	18,4	27,7	27,4	27,3

ACCOUNTING DATA OF Bayer

	Sales (thousands)			EBITDA (thousands)			EBIT (thousands)		
	N-1	N	N+1	N-1	N	N+1	N-1	N	N+1
Bayer (values)	43545	39665	40962	9556	8587	8830	4189	3935	4064
Estimated EV (Mio) of Bayer based on:									
Pfizer	€ 411 918,65	€ 461,49 447	€ 551 056,38	€ 240 787,97	€ 238 212,99	€ 269 677,20	€ 185 631,47	€ 180 675,08	€ 193 300,62
Novartis	€ 279 183,30	€ 215,37 254	€ 262 428,09	€ 177 625,06	€ 150 370,03	€ 145 668,76	€ 127 158,53	€ 130 785,07	€ 147 862,88
J&J	€ 340 533,35	€ 197,71 302	€ 304 031,69	€ 253 378,36	€ 229 006,69	€ 236 850,83	€ 162 017,98	€ 157 667,83	€ 168 659,71
GSK	€ 114 627,24	€ 192,31 100	€ 99 283,50	€ 81 428,05	€ 71 650,10	€ 72 145,25	€ 48 058,78	€ 36 766,55	€ 30 918,72
Merck&Co	€ 263 900,80	€ 335,98 226	€ 220 070,93	€ 220 035,82	€ 194 409,28	€ 196 557,08	€ 126 629,39	€ 105 421,21	€ 96 473,90
Max	€ 411 918,65	€ 461,49 447	€ 551 056,38	€ 253 378,36	€ 238 212,99	€ 269 677,20	€ 185 631,47	€ 180 675,08	€ 193 300,62
Min	€ 114 627,24	€ 192,31 100	€ 99 283,50	€ 81 428,05	€ 71 650,10	€ 72 145,25	€ 48 058,78	€ 36 766,55	€ 30 918,72
Average	€ 282 032,67	€ 080,57 266	€ 287 374,12	€ 194 651,05	€ 176 729,82	€ 184 179,82	€ 129 899,23	€ 122 263,15	€ 127 443,16
Average Without J&J and Pfizer	€ 219 237,11	€ 581,22 193	€ 193 927,51	€ 159 696,31	€ 138 809,80	€ 138 123,69	€ 100 615,57	€ 91 490,94	€ 91 751,83
Median	€ 279 183,30	€ 215,37 254	€ 262 428,09	€ 220 035,82	€ 194 409,28	€ 196 557,08	€ 127 158,53	€ 130 785,07	€ 147 862,88
% Range between Average and median	1,0%	4,5%	8,7%	-13,0%	-10,0%	-6,7%	2,1%	-7,0%	-16,0%

Enterprise Value - BAYER

EV of Bayer- Range of comparables	193 928	219 237	Based on EV/sales	
EV of Bayer- Range of comparables	138 124	159 696		Based on EV/EBITDA
EV of Bayer- Range of comparables	91 491	100 616		
Selected Range	91 491	100 616		Based on EV/EBIT

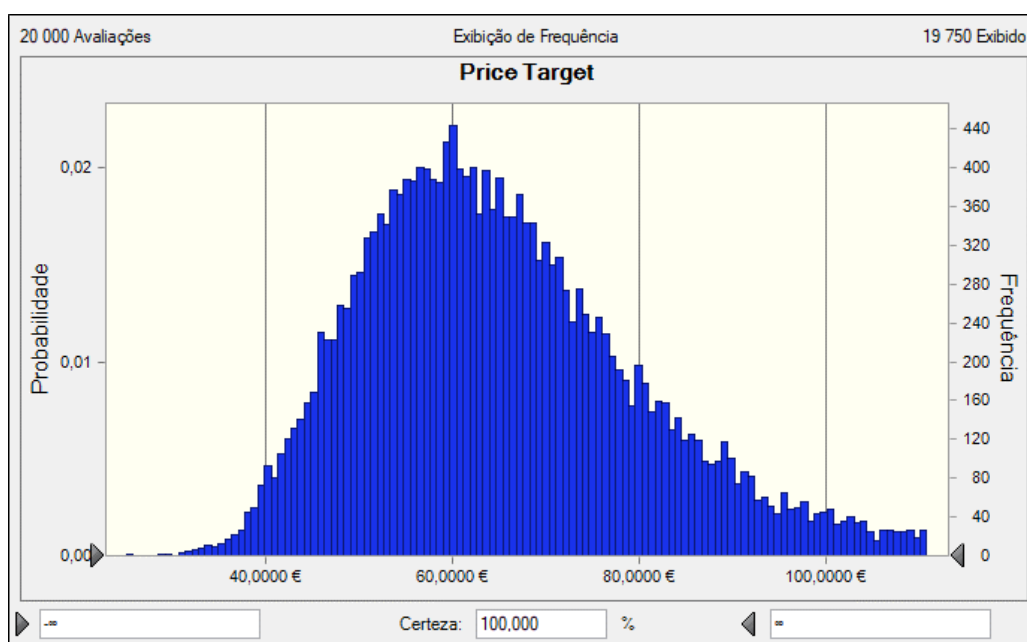
Equity Value - BAYER

Net Debt	35 583	35 583
Equity Value	55 908	65 033
Average of the range	60 471	
Share price	61,55 €	
	Upside Potential	
	15,31%	

Appendix 30: Relative Valuation using Upside Potential

Upside/Downside	Terminal Growth Rate												
18,75%	0,60%	0,80%	1,00%	1,20%	1,40%	1,60%	1,80%	2,00%	2,20%	2,40%	2,60%	2,80%	3,00%
4,67%	29,30%	37,59%	46,79%	57,04%	68,54%	81,55%	96,37%	113,41%	133,21%	156,49%	184,28%	218,01%	259,82%
4,87%	20,09%	27,52%	35,73%	44,83%	54,98%	66,36%	79,24%	93,90%	110,77%	130,36%	153,41%	180,91%	214,30%
5,07%	11,71%	18,41%	25,77%	33,89%	42,89%	52,94%	64,21%	76,95%	91,47%	108,16%	127,55%	150,37%	177,59%
5,27%	4,05%	10,11%	16,75%	24,03%	32,07%	40,98%	50,92%	62,08%	74,69%	89,06%	105,58%	124,78%	147,36%
5,47%	-2,97%	2,54%	8,54%	15,11%	22,32%	30,27%	39,09%	48,93%	59,98%	72,46%	86,68%	103,03%	122,03%
5,67%	-9,43%	-4,41%	1,04%	6,98%	13,48%	20,62%	28,49%	37,23%	46,97%	57,90%	70,25%	84,33%	100,52%
5,87%	-15,40%	-10,80%	-5,83%	-0,43%	5,45%	11,88%	18,94%	26,74%	35,38%	45,02%	55,84%	68,07%	82,01%
6,07%	-20,92%	-16,71%	-12,16%	-7,24%	-1,89%	3,93%	10,30%	17,29%	25,00%	33,56%	43,10%	53,81%	65,92%
6,27%	-26,05%	-22,17%	-18,00%	-13,50%	-8,63%	-3,34%	2,43%	8,73%	15,65%	23,29%	31,76%	41,20%	51,81%
6,47%	-30,83%	-27,25%	-23,41%	-19,28%	-14,82%	-10,00%	-4,76%	0,94%	7,18%	14,03%	21,59%	29,98%	39,33%
6,67%	-35,28%	-31,97%	-28,43%	-24,63%	-20,54%	-16,13%	-11,36%	-6,17%	-0,53%	5,65%	12,43%	19,92%	28,22%
6,87%	-39,45%	-36,38%	-33,11%	-29,60%	-25,84%	-21,79%	-17,42%	-12,70%	-7,57%	-1,98%	4,14%	10,85%	18,26%
7,07%	-43,35%	-40,51%	-37,47%	-34,23%	-30,76%	-27,03%	-23,03%	-18,70%	-14,02%	-8,94%	-3,41%	2,64%	9,29%

Appendix 31: Monte Carlo Simulation Graph from Crystal Ball



Appendix 32: Bayer Best-selling products by Segment

Pharmaceuticals Segment: Xarelto™, Eylea™, Adempas™, Xofigo™, Stivarga™, Mirena™-Produktfamilie, Kogenate™ / Kovaltry™ / Jivi™, Nexavar™, YAZ™ / Yasmin™ / Yasminelle™, Glucobay™, Adalat™, Aspirin™ Cardio, Betaferon™ / Betaseron™, Gadavist™ / Gadovist™ and Stellant™

Consumer Health Segment: Claritin™, Aspirin™, Bepanthen™ / Bepanthol™ Aleve™, Canesten™, Alka-Seltzer™-Produktfamilie, Elevit™, One A Day™ and MiraLAX™

Crop Science Segment: Confidor™ / Gaucho™ / Nativo™-Produktfamilie und die Prosaro™-Produktfamilie

Source: Bayer AG

Appendix 33: Scenario Analysis

UPSIDE CASE - Revenues increasing by 25% each Yeay

	2021E	2022F	2023F	2024F	2025F	2026F
Revenues	49 582	51 202	52 879	54 613	56 408	58 264

Price Target	67,24
Upside	25,97%

Buy Recommendation

BASE CASE

	2021E	2022F	2023F	2024F	2025F	2026F
Revenues	39 665	40 962	42 303	43 691	45 126	46 612

Price Target	63,39
Upside	18,75%

Base Case

DOWNSIDE CASE- Revenues decreasing by 10% each Yeay

	2021E	2022F	2023F	2024F	2025F	2026F
Revenues	29 749	30 721	31 727	32 768	33 845	34 959

Price Target	59,53
Upside	11,53%

Hold Recommendation

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Recommendation System

Level of Risk	SELL	REDUCE	HOLD/NEUTRAL	BUY	STRONG BUY
High Risk	$0\% \leq$	$>0\% \ \& \ \leq 10\%$	$>10\% \ \& \ \leq 20\%$	$>20\% \ \& \ \leq 45\%$	$>45\%$
Medium Risk	$-5\% \leq$	$>-5\% \ \& \ \leq 5\%$	$>5\% \ \& \ \leq 15\%$	$>15\% \ \& \ \leq 30\%$	$>30\%$
Low Risk	$-10\% \leq$	$>-10\% \ \& \ \leq 0\%$	$>0\% \ \& \ \leq 10\%$	$>10\% \ \& \ \leq 20\%$	$>20\%$