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Summary of WP Student Team

Synergy Valuation in the Pfizer-Seagen Acquisition

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Synergy Valuation in the Pfizer-Seagen Acquisition

Individual Part:

Influencing Factors on Abnormal Returns in R&D Intensive Industries for Non-U.S. Acquirers

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Abstract

This thesis examines the Pfizer-Seagen acquisition, a pivotal deal in the pharmaceutical industry. It starts with a literature review on valuation methods and further analyses the strategic motivations and financial implications of mergers and acquisitions in the industry. The thesis assesses both companies' market positions, strategies, and financial health, to perform two comprehensive standalone valuations. It also conducts a combined valuation to explore potential synergies and economically feasible offer prices, comparing these to Pfizer's announced offer. Additionally, the thesis analyses stock reactions post M&A announcements for non-U.S. acquirers in R&D intensive industries.

Keywords:

Mergers and acquisitions, valuation, pharmaceutical industry, Pfizer, Seagen

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1. Introduction

"The addition of Seagen's world-leading ADC technology will position us at the forefront of innovative cancer care, and strongly complements our existing portfolio across both solid tumors and hematologic malignancies" – Chris Boshoff, Chief Development Officer Oncology and Rare Disease (Pfizer 2023c)

The Pfizer acquisition of Seattle Genetics (Seagen) marks the largest acquisition in the pharmaceuticals industry since 2019 (Fierce Pharma 2023). Therefore, this thesis provides an in-depth analysis of mergers and acquisitions (M&As) in the industry, with a spotlight on the Seagen acquisition. The deal is announced on the 13th of March 2023 at $229 per Seagen share totalling a deal value of approximately $43.00bn (Pfizer 2023c). The deal is one of Pfizer's several strategic investments since 2021 when revenues doubled due to the sale of COVID-19 vaccines with the goal to offset potential future revenue declines driven by patent expirations and an expected normalization of COVID-19 sales in the future.

The analysis starts with a literature review on the valuation methods used throughout the work and then continues by framing the context of M&As, exploring the strategic motivations and financial implications. Afterwards, the acquirer and target are examined touching upon their market positions, strategies, and financial health to perform a comprehensive valuation, conducting a discounted cash flow and relative valuation, respectively. Finally, the combined entity is analysed with the goal to identify potential sources of synergies and to derive a range of economical feasible offer prices and compare this to the offer price announced by Pfizer. Moreover, across four individual analyses, the influencing factors on the magnitude of premiums paid in M&As and the stock reaction after M&A announcements are analysed.

2. Literature Review

2.1. Capital Structure

The capital structure is based on a composition of different sources of financing, which represent the composition of debt and equity a company uses to finance its business activities and growth. Companies are motivated partly to leverage debt financing for their operations because they can deduct interest payments from their profits, resulting in a reduction of taxable income (Berk and De Marzo 2017, 552). Nevertheless, an increase in the debt level not only has advantages but also bears risks. "Debt financing puts an obligation on a firm. A firm that fails to make the required interest or principal payments on the debt is in default" (Berk and De Marzo 2017, 552). For this reason, companies have to find a balanced capital structure for their business. In particular, the trade-off theory helps to find a suitable capital structure, which is derived from studies on taxes (Modigliani and Miller, 1963), bankruptcy, and financial distress costs (Warner 1977). It argues that companies have a unique optimal capital structure that weighs the tax advantage derived from debt financing against the expenses associated with financial distress. In theory, companies should keep raising their debt until the marginal benefit of further debt decreases while the marginal cost of financial distress is increasing.

2.2. Cost of Equity

The cost of equity (Re) describes the return investors demand for holding shares in a company. However, the costs are difficult to forecast as they are implicit costs that can differ greatly between various investors in the same company (Damodaran 2008b, 28). A common approach to estimating the Re is the Capital-Asset-Pricing-Model (CAPM), which is based on the portfolio theory of Sharpe (Sharpe 1964, 436-442), Lintner (Lintner 1965, 13-37), and Mossin (Mossin 1966, 768-783). A risk premium of $\beta * [E(Rm) - Rf]$ is added to the assumed risk-free interest rate (Rf), which represents an additional return that is required by investors for reallocating their money from a risk-free investment to an investment with a certain level of

risk:

$$Re = Rf + \beta * [E(Rm) - Rf]. \quad (1)$$

2.3. Cost of Debt

"The cost of debt measures the current cost to the firm of borrowing funds to finance its assets" (Damodaran 2008b, 64). Conventionally, the key advantage of debt has been conceptualized as the tax savings arising from interest deductibility (Kraus and Litzenberger 1973). Beyond this, debt carries other benefits, including the incentivization of managers to operate efficiently (Jensen 1986) and the engagement of lenders in actively monitoring the firm (Jensen and Meckling 1976). The cost of debt, often linked to default risk, is commonly assessed using the credit rating assigned by agencies like Moody's or Standard & Poor's. It functions as a reflection of the perceived default risk as this risk rises, lenders impose higher default spreads and the risk-free rate when lending to the firm (Damodaran 2008b, 64). However, the Refinitiv database provides the cost of debt data, drawing from a diverse sample of 1,378 international companies with an average market capitalization of $3,044.01 million. Typically, some global companies lack a credit rating because they do not issue any bonds. The industry's cost of debt is calculated by the weighted average based on enterprise value.

2.4. Weighted Average Cost of Capital

The weighted average cost of capital (WACC) is an important financial indicator for discounting future cash flows, reflecting the average cost that a company bears for raising debt and equity. The WACC also indicates the average risk of a company's capital investments, given that debt financing is generally considered less risky than equity financing (Berk and De Marzo 2017, 323). As a result, the WACC is tied closely to the composition of a company's capital structure so that the WACC is determined by the multiplication of the Re with the equity proportion ($\frac{E}{E+D}$) added to the product of the after-tax cost of debt ($(1 - Tc) * Rd$) and the debt

proportion ($\frac{D}{E+D}$):

$$WACC = \frac{E}{E+D} * Re + \frac{D}{E+D} * (1 - Tc) * Rd \quad (2)$$

2.5. Discounted Cash Flow Valuation

The Discounted Cash Flow (DCF) valuation method is based on the principle that the value of a target, whether it's a company, department, business, or a group of assets, can be determined by the present value of its expected free cash flows (FCF) in the future. Projected FCF involves assumptions and judgments regarding expected financial performance, encompassing factors like revenue growth rates, gross profit margins, capital expenditures, and net working capital (NWC) requirements. As one of the most used valuation methods, the DCF is considered an intrinsic valuation approach, asserting that the value of an asset is the present value of its future cash flows (Rosenbaum and Pearl 2009). Utilizing the Gordon Growth Model (Gordon 1959), the derived enterprise value can be expressed in the following manner:

$$EV_O = \sum_{t=1}^{n} \frac{FCF_t}{((1+WACC)^t} + \frac{TV}{(1+WACC)^n} \quad (3)$$

where:

$$TV = \frac{FCF_n \times (1+g)}{WACC-g} \quad (4)$$

EV_0 = Enterprise Value in year 0, FCF_t = free cash flow in year t, WACC = weighted average cost of capital, TV = terminal value, g = long-term growth rate.

2.6. Relative Valuation

The DCF method evaluates a company's intrinsic value according to its ability to generate future cash flows. At the same time, a relative valuation approach determines a company's value by analysing the market prices of comparable firms (Damodaran 2008b). Adhering to the law of one price, which posits that similar assets should have similar prices in competitive markets (Esty 2000), this analysis seeks to capture current market dynamics and provide the extrinsic

value of the firm. This approach is guided by the fundamental principle that companies with comparable performance in the same industry should be valued using similar multiples (Koller, Goedhart, Wessels 2020; Rosenbaum et al. 2009).

3. Industry Analysis and Drivers of Competition

The pharmaceutical industry has a significant global influence as "a key asset to scientific and medical progress" (EFPIA 2022, 2) in the strive to turn research into innovative treatments as recently seen with the COVID-19 pandemic. The industry revenues grow at a compounded annual growth rate (CAGR) of 6.10% from 2018 through 2022, and future growth expectations range from 3,00% to 6,00% CAGR through 2027 (IQVIA 2023, 36). In 2022, the ten largest pharmaceutical companies earn $512,400.00m in revenues and spend, on average, 19.87% on R&D, as presented in Figure 1.1.

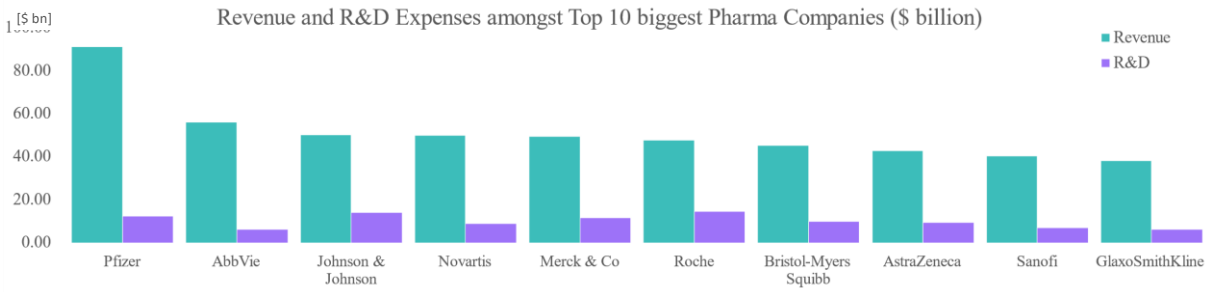

Figure 1.1. *Revenue and R&D Expenses amongst Top 10 biggest Pharma Companies ($ billion)*

The main drivers of industry growth are an aging population, new therapies, technological advancements, and increased patient access to data and technology (KPMG 2017). On the flipside, pharmaceutical companies face several operational challenges, amongst which are geopolitical uncertainties putting supply chains under pressure, unseen inflation levels driving up costs, and protectionist policies potentially pushing for more localized manufacturing. While profit margins in pharma have always been under pressure from generic and biosimilar producers, these additional challenges demand carefully developed strategic responses (McKinsey 2022). Therefore, a key success factor will be the ability to establish a solid market position in high growth areas since the solid overall revenue forecast is not equally promising

across sub-markets (IQVIA 2023). Besides the heterogeneous market growth dynamics, R&D expenses are another market characteristic. These are related to the drug development process, which can take up to ten years (EFPIA 2022). Once approved, the drug is covered by patent protection, which hinders biosimilar and generic producers from launching competing products. Depending on the location, the patent protection period usually lasts twenty years, yielding an active patent protection period of up to ten years (EFPIA 2022, 10).

However, the R&D business is not only time intensive but also expensive. The investment necessary to bring a chemical or biological entity to the market is estimated to be, on average, $2,558m in the 2000s (EFPIA 2022). Especially as a reaction to the COVID-19 pandemic, year-on-year (YoY) spending growth amounts to 7.90% in 2020 and 14.60% in 2021 (Evaluate Pharma 2022).

Not only R&D expenses surge during the COVID-19 pandemic in 2021, but equally, mergers and acquisitions (M&As) activity. Historically, the pharmaceutical industry maintains a high level of M&As due to the slow-moving nature of the R&D process. Therefore M&As are used to align the portfolio with high growth markets, realise synergies and optimize the product portfolio as patent expirations approach. The relevance of inorganic growth and partnerships is emphasized when looking at the share of revenue generated. Acquisitions and partnerships make up 43.00% and 23.00% of total revenue, respectively, while organic revenue sources make up 34.00% (McKinsey 2023).

While the deal count continuously increases each year, the volume decreases (Figure 1.2.). The, on average, smaller deals in value represent the role of smaller pharma companies as innovation drivers, which are expected to account for more than two-thirds of revenue growth within the next five years. In combination with the top 12 pharma companies expected to accumulate more than $290,000m in cash for investments by the end of 2022, exceeding the pre-COVID level twofold, inorganic growth is expected to continue to play a pivotal role in the pharmaceutical industry (McKinsey 2023).

4. Pfizer

This section focuses on a qualitative and quantitative analysis of Pfizer as a key player in the biopharmaceutical industry. It identifies cost and value drivers to develop a conclusion on the intrinsic value and fair valuation of the company. The qualitative analysis highlights company characteristics and strategic considerations in light of the COVID-19 pandemic to meet future growth aspirations.

4.1. Qualitative Analysis

4.1.1. Company Portrait

Starting with a brief overview of the company, Pfizer is a U.S.-based biopharmaceutical company founded in 1849 that is dedicated in the discovery, development, manufacturing, advertisement, sale, and distribution of products across different biomedical and clinical disciplines. The disciplines include cardiovascular, metabolic disease, infectious diseases including vaccines, chronic immune and inflammatory diseases, rare diseases, and anti-infectives. The company has an international footprint, with the U.S. accounting for 42.00%, Japan accounting for 8.00%, and the rest of the world accounting for 50.00% of revenues. During the almost 175 years of company history, Pfizer becomes publicly known for its most prominent drugs, including the antidepressant Zoloft, the erectile-dysfunction drug Viagra, the antianxiety drug Xanax, and most recently, the COVID-19 vaccine Comirnaty/BNT162b2 which is jointly developed and commercialized with German biotech company BioNTech. Despite the past success with the COVID-19 vaccine and several blockbuster drugs, “balancing current growth, investment for future growth, and the delivery of shareholder return remains a major challenge” (Pfizer 2023a, 20). As of February 28th, 2023, the company’s adjusted closing share price is $49.57, with 5,608,000 outstanding common shares yielding a market capitalization of $227.52bn. Over the past year, the stock performance is down -13.57%, with

a 52-week range of $40.57 to $50.17. The all-time high share price of $61.25 is reached on December 16th, 2021, and is driven by promising sales forecasts due to the COVID-19 vaccine Comirnaty (Refinitiv). However, with increasing global vaccination rates of 72.00% (The New York Times 2023) and a decreasing number of active cases, the most recent COVID-19 revenue projections are more conservative. Pfizer is now searching for alternative sources of revenue to make up for the decreasing COVID-19-related Comirnaty and Paxlovid revenues (Pfizer 2023b). Major shareholders, as of February 28th, 2023, constitute investment advisors like The Vanguard Group, Blackrock, and StateStreet with 8.23%, 4.85%, and 5.06% ownership shares, respectively. The ownership concentration amongst the ten largest shareholders totals 30.99%, with 9 out of ten being headquartered in the US. Individuals with the highest ownership shares are Frank A. D'Amelio (former Pfizer CEO), Doug Lankler (Pfizer General Counsel) and Chris Boshoff (Head of Oncology) (Refinitiv).

4.1.2. Effects of COVID-19 and Strategic Considerations Looking Forward

Over the past three years, Pfizer more than doubles its revenues, accounting for $100.330.00m in 2022 compared to $81.233.00m in 2021 and $41.651m in 2020. The main driver for the increase is revenues generated from the two COVID-19 related drugs Comirnaty and Paxlovid launched as a response to the global pandemic that emerges in March 2020. The combined revenues of the two drugs account for 45.34% and 56.55% of total revenues in 2021 and 2022, respectively. In contrast to the high growth of Comirnaty and Paxlovid, the remaining product portfolio grows by 0.79% in 2020, 7.07% in 2021 and -1.89% in 2022 (Figure 1.3.). Following their purpose, "Breakthroughs That Change Patients' Lives" (Pfizer 2023a, 8), Pfizer is committed to capitalizing on growth opportunities by investing in their development pipeline and performing business development transactions. In 2022 Pfizer invests 12.34% of revenues in R&D activities and performs five major acquisitions – Arena Pharmaceuticals, ReViral, ResApp Health, Bioheaven, Global Blood Therapeutics – at an announced total deal value of

$23,654.00m (Refinitiv). The unprecedented level of investments might be a sign that Pfizer uses the spike in revenues driven by COVID-19 to upscale and intensify investments in their pipeline and inorganic growth strategy to ultimately reduce dependence on the COVID-19 drugs Paxlovid and Comirnaty (Euronews 2023). According to a high-level analysis in the 2022 fourth quarter earnings presentation, the management team expects non-COVID-19 revenues in 2025 to reach approximately $52,000m, driven by the current product portfolio and new launches from the internal pipeline. Over the course of five years until 2030, Pfizer management expects non-COVID-19 revenues to increase to approximately $70,000m to $84,000m, which represents a CAGR of 6.00% to 10.00%. Whether the growth strategy turns out successful will mainly depend on three factors. The first is the loss of patent protection for several drugs that comprise a significant portion of the current revenue structure. Following the loss of exclusivity, the so called patent cliff, describing the loss of revenue due to the market entry of biosimilar and generic producers at lower prices, is expected to decrease revenues by approximately $17,000m. Secondly, Pfizer management expects to generate approximately $20,000m in revenues from internal pipeline launches and, thirdly, approximately $30,000m in additional revenue from inorganic growth acquisitions as part of their business development program. The analysis will thoroughly discuss each factor to reach a conclusion on the inherent assumptions included in the forecast and whether the ambitions are realistic (Pfizer 2023b).

4.1.3. Competition and Market Exposure of Product Portfolio

Due to the previously described differences between expected market CAGRs within the pharmaceutical industry, Pfizer's vast product portfolio and pipeline are exposed to different growth drivers and market dynamics. In 2022, Pfizer reports drug revenues in six biomedical and clinical disciplines (Pfizer 2023a). To better understand the growth dynamics of the current portfolio and pipeline items that will be launched, each market is analysed in terms of growth expectations and growth drivers. Figure 1.4. provides a brief overview of the expected market growth rate and number of pipeline items per therapeutic area, with the bubble size indicating

the relative portion of revenues in 2022.

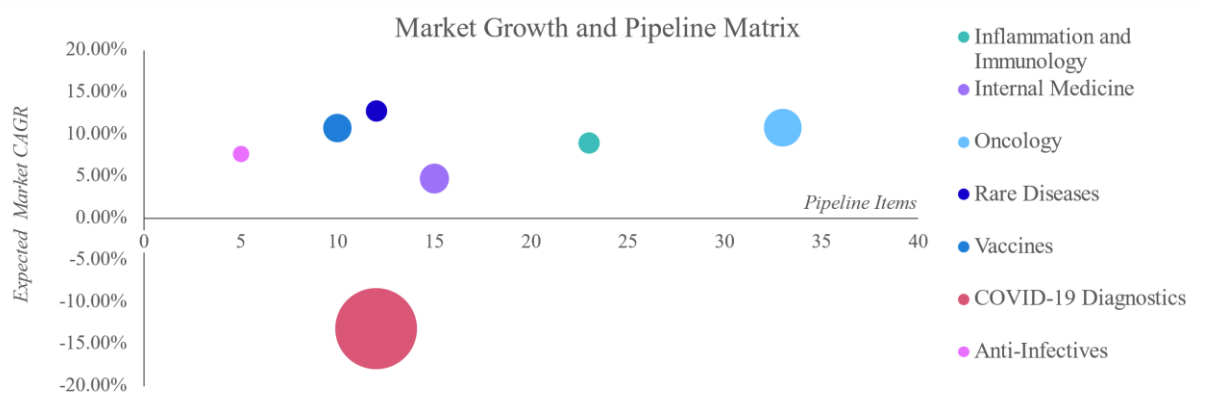

Figure 1.4. *Expected Market CAGR and Pipeline Items per Therapeutic Area (Size Indicates Revenues in 2022)*

Regarding non-COVID-19 revenues, the oncology market accounts for 27.83% (Figure 1.5.) of revenues in 2022 and, therefore, is the most relevant for Pfizer (Pfizer 2023a). The market demonstrates dynamic growth with the global oncology market reaching a size of $223,144.20m in 2022 and an expected CAGR of 10.85% from 2023 through 2026 (Business Wire 2022). Cancer is the second most common cause of death, according to the World Health Organization (WHO). However, survival rates can be significantly improved if detected early and treated effectively (WHO 2022a). Therefore, the multitude of government and organizational initiatives to raise cancer awareness and a growing number of diagnostic laboratories, especially in previously underserved developing countries, further propel the demand for cancer diagnosis and treatment (Global Market Insights 2023). In combination with ongoing launches of new drugs, the oncology market is expected to contribute significantly to the biopharmaceutical market growth (IQVIA 2023, 44-46). Pfizer's oncology revenues mirror this trend, with its share of total non-COVID-19 revenues increasing from 8.64% in 2016 to 12.09% in 2022. Pfizer's pipeline constitutes a total number of 33 oncology projects. However, future growth in the oncology market will be impacted by patent expirations (Pfizer 2023a).

The second most important market in relative size of non-COVID-19 revenues is the therapeutical area of internal medicine, now rebranded under primary care, representing 17.39% in 2022. The area includes brands directed at cardiovascular, metabolic diseases, and pain

(Pfizer 2022). Cardiovascular diseases as the main market of the therapeutic area of internal medicine, is a leading cause of death at 32.00% (WHO 2021). Most of these deaths are attributable to heart attack and stroke at 85.00%. The total cardiovascular drugs market is projected to grow at a CAGR of 7.60% from $153,600.00m in 2022 to $205,710.00m through 2026 (The Business Research Company 2022a). The growth is driven by increasing incidences of cardiovascular diseases, which are caused by lifestyle factors such as poor nutrition, lack of exercise, and high stress, particularly in younger demographics in developing countries. While the largest market is projected to be the United States, the highest growth figures are expected in China according to a Mordor Intelligence market report (2022), where prevalence is high, and the government is committed to the prevention and treatment as pointed out in the Healthy China 2030 plan (Bei, Yang, and Xiao 2018). Pfizer's ambition to grow further in the market is based on 15 active pipeline projects. However, upcoming patent expirations starting in 2027 will negatively impact revenue growth (Pfizer 2023a).

The therapeutic area vaccines (excluding COVID-19), now rebranded under primary care, include vaccines across all ages regarding pneumococcal disease, meningococcal disease and, tickborne encephalitis (Pfizer 2022). As a percentage of non-COVID-19 revenues in 2022, vaccines account for 15.89%. The overall market, excluding COVID-19 vaccines, demonstrates steady growth and is expected to grow at a CAGR of 10.80% (Fortune Business Insights 2022a) with a total size of $43,000.00m in 2021 (WHO 2022b). A main driver of the growth is advancements in the use of mRNA technology that demonstrates its potential in the development of COVID-19 vaccines in terms of efficacy, safety, and scalability. Pfizer has positioned itself to profit from future market growth dynamics with 11 pipeline projects focused on vaccines, excluding COVID-19 developments. From 2024 onwards, revenue dynamics will be negatively impacted by upcoming patent expiration (Pfizer 2023a).

Inflammation and immunology, now rebranded under specialty care, is the fourth largest therapeutical area in relative terms of non-COVID-19 revenues, accounting for 8.77% and

includes chronic immune and inflammatory diseases (Pfizer 2023a). The total immunology market is expected to grow at a CAGR of 8.70% from $88,850.00m in 2021 to $183.490.00m in 2030 (Insight Ace Analytic 2022). The global anti-inflammation market is expected to demonstrate a similar growth at a CAGR of 9.3% from $93,880.00m in 2019 to $191,420.00m in 2027 (Fortune Business Insights 2020b). The market growth is fuelled by the increasing prevalence of autoimmune disorders in the past combined with high public and private costs associated with the healthcare utilization. Yet, prevalence is expected to further increase in the future (Miller 2023). As a response, biopharmaceutical companies increase their efforts to address the high demand. This also holds for Pfizer with a total number of 23 pipeline projects. However, upcoming patent expirations starting in 2026 will have significant effects on future revenues. (Pfizer 2023a)

Rare disease, now rebranded under specialty care, is the fifth largest therapeutic area and constitutes 8.74% of non-COVID-19 revenues in 2022 (Pfizer 2023a). The revenues show a notable upward trajectory from 2016 through 2022 and grow at a CAGR of 7.03% from $2,278.00m to $3,812.00m. The dynamics align with the strong market momentum, which is expected to continue to grow at a CAGR of 13.10% from $119,600.00m in 2019 to $313,475.77m in 2030 (Grand View Research 2020). The global prevalence is estimated to be in the range from 264m up to 446m cases based on a database that identifies 6,172 rare diseases (Wakap et al. 2019). Rare disease, which are disease affecting less than one person in 2,000 according to the EU's definition, are seldomly addressed with approximately 5.00% having at least one approved treatment (EU Horizon 2022). However, looking forward, biopharmaceutical companies may increasingly focus on orphan indications. This trend, known as "orphanization", is based on the goal to face a market with less competition and unmet clinical needs, allowing them to gain significant market share and charge higher prices (Mingorance 2018). In line with the aspiration stated on Pfizer's rare disease website, "to be the world's leading innovator" in that field (Pfizer n.d.), the pipeline consists of 13 development

projects. Compared to the other therapeutical areas, upcoming patent expirations play a less pronounced role for rare diseases. The smallest therapeutical area relative to non-COVID-19 revenues is hospitals, now rebranded under specialty care, with 5.39%, which focuses on sterile injectable and anti-infective medicines. This includes drugs used in the daily operations of hospitals. A growth driver for the market will be the rising share of oncology treatments, which are more complex and expensive, next to an expected increase in hospital visits. The market is expected to grow at a CAGR of 7.70% from $36,075.74m in 2023 to $75,575.00m in 2030 (Future Market Insights 2022).

Besides the previously described therapeutical areas, Pfizer reports further revenues for COVID-19 related drugs Comirnaty and Paxlovid as well as revenues from uncategorized drugs in the section other revenues for which revenues and market expectations are discussed in more detail in chapter *4.2.2.2 Revenue Forecast*.

In conclusion, in 2022, Pfizer leads as the largest pharmaceutical company in terms of revenues (Evaluate Pharma 2022). However, competition is intense, with major players like AbbVie, Moderna, Roche, Johnson & Johnson, and Merck driving innovation with large investments in R&D and inorganic growth agendas. Therefore, Pfizer's future market position is determined by its ability to innovate and adapt strategically in a landscape marked by rapid R&D developments, shifting healthcare demands, and patent expirations.

4.2. Quantitative Analysis

The quantitative analysis includes a DCF analysis as well as a relative valuation using multiples. The underlying assumptions, methodologies, and results are presented and discussed in this chapter to derive a conclusion on the fair valuation of Pfizer and compare it to the market price as of the valuation date. The valuation date is the 28th of February 2023, since the ultimate goal of this analysis is to determine the volume, timing, and risk of synergies generated in the Pfizer acquisition of Seagen. Therefore, the unaffected closing prices and the last available financial

information are used to exclude any information or effects that might stem from the announcement of the deal and would distort the synergy as well as stand-alone valuations. The last financial publication is the annual report for the fiscal year 2022.

4.2.1. Historic Financials

The historic financials included in the analysis reach back to 2016 to include enough information prior to the COVID-19 pandemic. Besides the pandemic that significantly impacts business operations in 2021 and 2022, a further important influence on the historical financial statement is the spin-off of the Upjohn business on the 16th of November 2020. Pfizer publishes adjusted figures dating back to 2018, that exclude Upjohn effects. Therefore, financial information before 2018 including Upjohn effects, are excluded for forecasting purposes. Nevertheless, this financial information is used for other analysis, including single product revenues or revenue dynamics after patent expiration.

4.2.1.1. Historic Income Statement

The top line revenue of Pfizer more than doubles from $40,825.00m in 2018 to $100,300.00m in 2022. The main reason for the significant growth in revenues is stemming from the two COVID-19 related drugs Comirnaty and Paxlovid. Combined, the two drugs account for 45.34% and 56.55% of revenues in 2021 and 2022, respectively. In contrast, revenues of the remaining drug portfolio decrease by 1.89% in 2022.

The costs of goods sold (COGS) range from 19.54% to 22.57% of revenues in the period from 2016 to 2020. The cost structure changes significantly with the start of the COVID-19-Pandemic and the sale of Comirnaty and Paxlovid. In 2021, the COGS amount to $30,688.00m, which represents a YoY relative change of 265.12%. As a percentage of revenues, COGS make up 37.75% and 34.48% of revenues in 2021 and 2022, respectively, representing a significant increase compared to previous years. A main driver of this are royalty expenses related to the

sale of Comirnaty for which 50.00% of revenues need to be transferred to BioNTech. These expenses account for more than half of the overall COGS in both years. Further influences on the COGS are an increase in overall sales volume and unfavourable foreign exchange and hedging activities on intercompany inventories (Pfizer 2022). The gross profit demonstrates a similar evolution, with an increase of 52.20% in 2021 and 29.92% in 2022. However, looking at the average gross profit margin, the significant increase in COGS decreases the margin from pre-COVID-19 levels of 79.07% to 63.89% during the two COVID-19 years.

Next up, the operating expenses decrease as percentage of revenue from an average pre-COVID-19 level of 42.51% to 22.97% in 2022. Operating expenses include selling, general and administrative (SG&A) expenses, R&D expenses, advertising expenses, and other operating income. Looking at SG&A expenses, the number of active products and expenses per active product are used as cost drivers. The number of active products total 47 in 2022. Since 2016, the number varies between 44 and 53. The SG&A costs incurred per product amount to $213.83m in 2022, which represents an increase of 16.46% compared to average pre-COVID-19 levels of $183.61m in the period from 2018 to 2020. With increased costs per product and more active products, SG&A expenses increase by 7.24% in 2021 and by 14.66% in 2022. However, while revenues increase at a higher rate, SG&A expenses decrease as a percentage of revenue from a pre-COVID-19 average of 20.04% to an average of 10.40% in 2021 and 2022.

R&D expenses, as an essential part of the long-term revenue growth for biopharmaceutical companies, total $12,381.00m in 2022 and thus constitute the largest portion of operating expenses. The cost driver of R&D expenses is the number of projects included in the development pipeline and the average annual R&D expenses incurred per project. The number of pipeline items increases from 47 in 2016 to 94 in 2021 and experiences a further significant increase in 2022 of 18 projects totalling a pipeline size of 112. The costs per pipeline item also increases significantly from $77.91m in 2018 to $110.54m in 2022. This is in line with a study

by Deloitte identifying average costs to develop a drug significantly increasing over the past years (Deloitte 2023). Despite the yearly increase in total and per pipeline item R&D spendings as well as the size of the pipeline, expenses as percentage of revenue decrease from 20.03% pre-COVID-19 to 12.34% in 2022.

Advertising as the next SG&A item amounts to $2,800.00m in 2022. They are a powerful tool for pharmaceutical companies to manage their portfolio of active products, upcoming expirations, and new launches. Well-structured and effective advertising can reduce the loss in market share as generics and biosimilars enter the market upon patent expiration (Agrawal and Thakkar 1997) and accelerate the success of drug launches (Deloitte 2021). As percentage of revenue, the advertisement costs average 2.63% in 2022 and 2021 compared to 5.59% pre-COVID-19. Despite the absolute increase in advertisement expenses, the percentage of revenues might be lower due to the publicity Pfizer gains since the outbreak of the COVID-19-Pandemic and the launch of Comirnaty. The company is mentioned significantly more often than other players in the market, and attention on social media peaks in Q2 2021(Fultinavičiūtė 2022).

Other operating income includes various activities like gain or loss on asset disposals, equity securities, income from royalty and collaborations as well as net periodic benefits or costs related to pensions and post-retirement plans (Pfizer 2023a). In 2022, the position amounts to $2,184.00m and 2.18% of revenues. In 2021 the position peaks and reaches 5.52% of revenue due to one-off effects, including a change in accounting principles related to the measurement of pension and post-retirement plans as well as a gain from the completion of the Healthcare JV transaction, a joint venture with GlaxoSmithKline (GSK).

Earnings before interest, taxes, depreciation, and amortization (EBITDA) demonstrate a similar development as revenues, with an increase from pre-COVID-19 levels of approximately $15,000.00m to $37,628.00m in 2022. Similarly, the EBITDA margin improves from 36.51% in 2020 to 42.55% in 2022 due to the significant revenue increase while the cost structure

remained stable in absolute terms.

Depreciation charges amount to $1,455.00m in 2022 and are measured as percentage of capital expenditures of the previous year. While depreciation remains stable in absolute terms since 2018, the percentage of the previous year capital expenditures decreases from 74.33% to 53.67%. Amortization of intangible assets amounts to $3,609.00m in 2022, equalling 3.60% of revenue, which in relative and absolute terms represents a decrease from 2018 figures at $4,462.00m and 10.84% of revenues. The EBIT amounts to $37,628.00m in 2022, representing an EBIT margin of 37.50%. With rising gross profit, steady depreciation charges over the past years and declining amortization of intangible assets, the margin improves from an average of 23.11% pre-COVID-19 to 37.50% in 2022.

Non-operating income or expenses include the sale of fixed assets (0.00% of revenue), equity earnings or loss (0.43% of revenue), other income or expenses (0.00% of revenue), and financing result (0.98% of revenue). Financing result mainly consists of interest expenses accounting for 1.23% of revenues in 2022 related to $32,884.00m in long-term and $2,945.00m in short-term outstanding debt on which Pfizer pays on average 3.46% interest in 2022.

Non-recurring income or expenses include impairments on fixed assets amounting to 0.42% of revenues in 2022. In 2018, the position peaks at 7.63% of revenue totalling asset impairment charges of $3.115.00m, mainly due to Biopharma developed technology rights, licensing agreements, and in the process, acquired R&D that are subject to updated commercial forecasts and reflect a more commercial forecast updates, that reflect an increased competitive environment and higher manufacturing costs (Pfizer 2022). Restructuring and acquisition-related costs as the next position amount to 0.23% of revenue in 2022. Acquisition-related costs include transaction costs, integration costs and restructuring costs, and further depreciation costs for business combinations. In 2022, Pfizer closes five acquisitions – Arena Pharmaceuticals, ReViral, ResApp Health, Bioheaven, and Global Blood Therapeutics – at a total deal value of $23.654.00m in addition to four joint ventures or equity investments

(Refinitiv). The number of acquisitions or investments in joint venture and equity stakes is used as a cost driver.

Litigation expenses and settlements account for $230.00m in costs and 0.23% of revenue in 2022. Usually, litigations occur upon patent expiration when generic drug makers claim the patent to be invalid, their generic will not infringe the original patent (Federal Trade Commission 2001) or in case of side effects (Morningstar 2021). Therefore, the number of approvals and expirations is used as a cost driver.

Lastly, other income or expenses amount to 1.46% of revenue in 2022. In 2019, the position totals $7,221.00m due to an extraordinary effect from the completion of the Consumer Healthcare JV joint venture transaction with GSK for the difference in the fair value of the 32.00% equity stake in the new company and the carrying value of the previously held consumer healthcare business (Pfizer 2022). Consequently, the EBT of Pfizer amounts to $34,729.00m in 2022, which equals an EBT margin of 34.61% compared to 16.89% in 2020.

The statutory tax rate amounts to 21.00%. However, due to tax adjustments, the average effective tax rate is 7.97% since 2018. Tax adjustments include effects from the taxation of non-U.S. operations, settlement and resolution of certain tax positions, foreign-derived intangible income deductions, US R&D tax credits, interest, and others. Therefore, the effective tax rate in 2022 is 9.58%.

Net income normalized equals $31,372.00m in 2022 and $21,980.00m in 2021, representing a YoY change of 39.81% and 236.92%, respectively. Also, the net income margin shows a significant increase from 16.00% in 2018 to on 29.46% in 2021 and 2022.

Furthermore, after-tax income or deductions, including discontinued operations, extraordinary, items and minority interests, are considered. The major driver are discontinued operations where several divestitures are performed in the past years, such as the subsidiary sale of Meridian in 2021 for approximately $51.00m and a recognized loss of approximately $167.00m, spin-off transaction of Upjohn in 2020, and separation-related costs of $434.00m,

sale of Hospira Infusion Systems in 2018, divestiture of Neuroscience assets in 2018, sale of AMPA Receptor Potentiator for CIAS to Biogen Inc in 2018 and a contribution agreement between Pfizer and Allogene Therapeutics.

4.2.1.2. Historic Balance Sheet

The balance sheet historic financials analysis focuses on the relevant net working capital (NWC) items and the respective cash conversion cycle (CCC) calculation since these are crucial indicators of a company's operational efficiency in terms of cash generation capabilities and short-term financial health. From 2018 to 2022, the CCC declines from 89.73 days to 26.81 days due to following developments. First, the average collection period decreases from 71.75 to 39.84 mainly driven by the steep increase in revenues of 145.76% while receivables increase by only 36.47%. The reason might be upfront payments and government contracts for COVID-19 vaccines that significantly increase revenues while the receivables remain stable. Secondly, the average holding period for inventory decreases from 349.41 days in 2020 to 94.77 days in 2022, which may likely indicate an accelerated turnover of COVID-19 related products as inventory levels only increase by 19.62%. Thirdly, the average payable period decreases from 290.91 in 2018 to 107.80 days in 2022 with an increase in receivables of 44.48% and an increase in COGS of 289.89%. Overall, with the decrease in the CCC from 89.73 days in 2018 to 26.81 days in 2022, the operational efficiency increases and liquidity positions face less pressure. NWC increases in 2021 to $8,112.00m compared to $7,331.00m in 2020 as the production of COVID-19-related products ramps up and receivables as well as inventories increase, partially offset by an increase in deferred revenue and payables.

4.2.1.3. Historic Free Cash Flow to Firm

Having estimated the net income and the net working capital for the historic financials ranging from 2016 to 2022, further relevant adjustments can be performed to calculate the free cash

flows to firm (i.e. to equity and debt holders). The previously calculated depreciation and amortization expenses are added back on to the net income. Furthermore, capital expenditures are deducted that amount to $3,236.00m in 2022 and 2.23% of revenues compared to $2,791.00m in 2020 and a relative portion of revenues of 6.70%. After-tax interest income is deducted, and after-tax interest expenses are added back. At last, YoY changes in net working capital are deducted. In 2022 thus, a free cash flow of $35,627.00m results, representing an increase to 2021 figures of 43.44%. Compared to pre-COVID-19 figures, the 2021 free cash flow increases significantly by 100.12% compared to 2020.

4.2.2. Discounted Free Cash Flow Analysis

In order to estimate the equity value of Pfizer on a stand-alone basis and derive a conclusion on the fair valuation compared to the share price, a DCF analysis is performed which consists of the free cash flow and the terminal value discounted at the weighted average cost of capital.

4.2.2.1. WACC Calculation

Pfizer’s WACC is 6.07%. The cost of equity as one of two components, is calculated using the CAPM model, resulting in an estimated rate of 6.55% with a risk-free rate of 3.91% (ten-year U.S. Treasury as of 28.02.2023), a market risk premium of 3.55% derived from the S&P 500 and a re-levered Beta of 0.74, reflecting the systematic risk associated with the company. The beta, unlevered beta, and cost of debt are computed as weighted averages based on the enterprise value, considering data from 1378 international companies with an average market capitalization of $3,044.01m sourced from the Refinitiv database. This approach aims to minimize estimation errors in the beta calculation. Subsequently, the unlevered weighted average beta is adjusted using Pfizer’s target Debt-to-Value ratio and debt, forming the basis for calculating the WACC. Pfizer's target D/V ratio, identified from Damodaran's pharmaceutical industry database, stands at 11.73%, diverging from Pfizer’s current D/V ratio of 5.44%. This target is derived from the industry's average estimated D/V ratio, assuming

companies in the sector have selected an optimal debt level considering industry risks (insight known as "Wisdom of the Crowds"). Pfizer intends to boost its expected revenue by $25bn through inorganic growth acquisitions by 2030. It needs to increase its debt to align with this target, as outlined in the fourth-quarter presentation 2022 (Pfizer 2023b). This strategic move reflects Pfizer's effort to balance its capital structure in line with industry standards while facilitating its growth plans. The pre-tax cost of debt for the outstanding debt as of the valuation date is calculated by dividing the financing expenses by the total short-term and long-term outstanding yielding a pre-tax cost of debt of 3.46% for current outstanding debt. To align with the growth strategy, it is expected that Pfizer issues a bond in 2024 that will bring up the current D/V ratio to the target D/V ratio. As current cost of debt is based on bonds issued in a low-rate environment, the bond portfolio is analyzed in more depth. Doing so, a bond (PFE 1.750) issued in 2021 is identified with a yield of 5.28%. Calculating the updated weighted average of cost of debt yields pre-tax cost of debt of 4.00% and after-tax cost of debt of 3.16% using the statutory tax rate of 21.00%.

4.2.2.2. Revenue Forecast

The revenue forecast is split between A. The current portfolio, which is subject to several patent expiration, B. revenues generated through COVID-19-related products Comirnaty and Paxlovid and C. revenues generated by new launches from the R&D pipeline as presented in Figure 1.6.

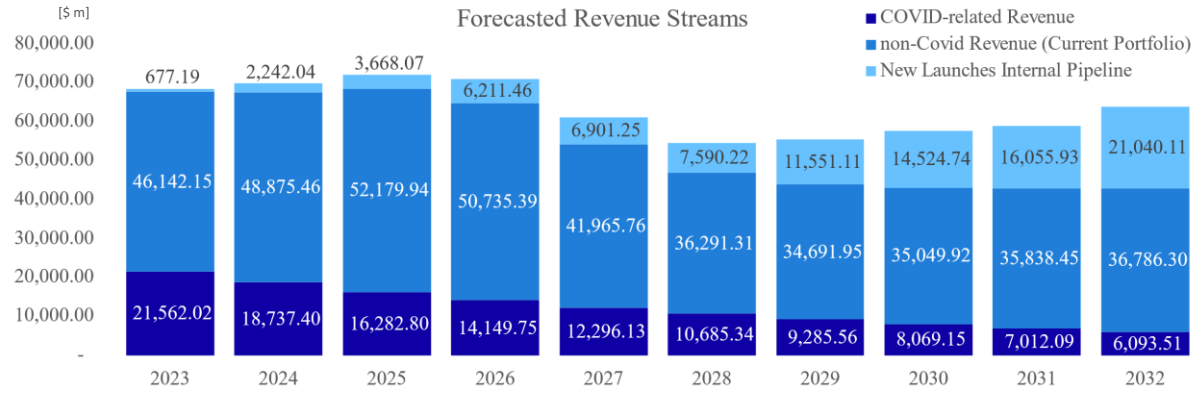

Figure 1.6. *Forecasted Revenue Streams Base Case ($ millions)*

A. Revenues generated by the current portfolio

The established product portfolio of Pfizer generates 43.45% of total revenues in 2022. Looking forward, the ability of the portfolio to generate further revenues is significantly influenced by upcoming patent expiration. As a result, generic and biosimilar producers that enter the market at lower prices can take up to 90.00% of market share. Therefore, the so called “patent-cliff” has the potential to significantly reduce revenues of the branded drug (DeRuiter and Holston 2012). The pharmaceuticals industry is expected to face approximately $200,000.00m in annual revenue at risk through 2030 (Evaluate Pharma 2022). Revenue at risk describes the difference between the revenue in the year before the patent expiration deducted by the first full year revenues post-expiration. To adapt the analysis to the specific circumstances of Pfizer, a historic analysis of 26 past patent expirations is performed to identify the effect of patent expiration on revenues. On average the annual revenue development is +30.55% in the first year after patent expiration, -44.89% in the second year, -28.66% in the third year and -12.03% in the fourth year. Therefore, key takeaways are that generic producers need a transitional period to launch their competing products before revenues of the branded drug are negatively affected. The patent cliff is not a one-off effect but takes up to three years before revenues of the branded drug stabilize again at the new level. To forecast the revenues of the current product portfolio, historic revenues on a product level are retrieved from the annual reports. The forecast uses the historic growth rates on a product level that slowly converge towards the respective market CAGRs presented earlier in chapter *4.1.3 Competition and Market Exposure of Product Portfolio*. During the forecasting period, more than 20 products will be subject to patent expiration. These products generate revenues of $29,624.00m in 2022 representing 67.96% of non-COVID-19 revenues. In the respective year of patent expiration, the result of the patent-cliff analysis is used as revenue growth rates starting from one year after the expiration date. For simplicity, the expiration year in the U.S. as largest market is used. Afterwards, as soon as the product revenues stabilize again in the fourth year after expiration, growth rates equal to the respective market CAGR are assumed. In 2026 and 2029 the portfolio faces the highest amount

of patent expirations with five respectively. Over the forecasting period, thus, the CAGR of current portfolio revenues amounts to -2.24% which is below the market growth expectations and consequently, market share for the current product portfolio, excluding COVID-19 and pipeline launches drops from 5.37% in 2022 to 1.81% in 2032. Also in absolute terms, the revenues decrease from $43,591.00m in 2022 to $35,777.00m in 2023. Nevertheless, the relative portion of total revenue increases from 43.45% to 53.41% due to the performance of the COVID-19 portfolio as discussed in the following.

B. Revenues from COVID-19 related products Comirnaty and Paxlovid

The portfolio of COVID-19-related products includes the drugs Comirnaty and Paxlovid, launched in 2020 and 2021, respectively. In sum, the two drugs generate $36,857.00m and $56,739.00m in revenues in 2021 and 2022, respectively, and thereby, accounting for 53,94% of total revenues in 2022. As the main source of revenue, the future forecasted COVID-19-related revenues have a major effect on the forecasted overall revenues, and ultimately the share price. A major influence on the forecast is the anticipated shift of Comirnaty distribution in the United States from government contracts to traditional commercial markets in the second half of 2023 as government contracts expire and stockpiles deplete. Internationally, sales are expected to gradually transition to commercial markets from 2024 onwards (Pfizer 2023a). With commercialisation, in the 2022 fourth quarter earnings call, Pfizer management revealed to expect setting private market prices per dose in the range of $110.00 to $130.00 (Pfizer 2023b), which exceeds prices negotiated with the United States government in previous years at $19.50 per dose in July 2020, $24.00 per dose in July 2021 and $30.48 per dose in June 2022 (Fierce Pharma 2022). While Angela Lukin, Pfizer's head of primary care, expects "anyone with commercial or government insurance which is eligible to be vaccinated should be able to access the vaccine without any out-of-pocket payments" (Pfizer 2023b), it is questionable how the price will affect the demand when already with state-funded campaigns, the booster uptake in the United States is low or "demoralizing" as Dr. Scott Roberts, a Yale Medicine infectious

disease specialist, says (NBC News 2022). Paxlovid is also expected to shift from significant government purchases to commercial channels in the second half of 2023. As published in the 2022 annual report, Pfizer forecasts approximately $13,610.00m in Comirnaty revenues for 2023, which is a 64.00% decrease compared to 2022. Similarly, Paxlovid revenues are forecasted to be approximately $7,952.00m for 2023, representing a 58.00% decrease from 2022. The main reason for the decline is that most of the demand in 2023 is expected to be met with existing supplies that were already delivered and accounted for in 2022. Beyond that, the COVID-19 diagnostics market, which is estimated to total $97,400.00m in 2021 (Grand View Research 2021), is expected to decline at a CAGR of -13.10% through 2029 (Fortune Business Insights 2022). The virus is expected to transition towards an endemic stage (restricted to a particular region or population) marked by a decline in cases and a rise in immunization rates. Assuming Comirnaty revenues to grow at the same rate as the overall COVID-19 vaccines market beyond 2023, the revenues will decline to $3,846.28m in 2023. Doing the same for Paxlovid, revenues will decrease to $2,247.23m. Combined revenue in 2032 amounts to $6,093.51m, accounting for 9.53% of total revenues compared to 56,739.00m and 56.55% in 2032.

C. Revenues generated by new launches from the R&D pipeline

Pfizer's pipeline from the 31st of January 2023 (Pfizer 2023d) is analysed under the assumption of no major changes end of February 2023. Pfizer's drug pipeline includes COVID-19 patents for drugs already on the market, Comirnaty/BNT162b2, and Paxlovid (Genetic Engineering & Biotechnology News 2021), as well as many patents covering the same indications. Forecasted revenues of the mentioned COVID-19 drugs are considered in the former revenue analysis and are not covered here. Suppose multiple patents address the same indication and are in the same development phase. In that case, only the first patent is recognized in terms of revenues, adjusting the data to allow for a more indication-/product-based perspective, moving away from a patent-based perspective. This allows for a more realistic use of assumptions when linking

the approved drug pipeline patents to market share figures connected to Pfizer's market shares within the respective indication areas. In line with the average time until final approval figures for patents given by the main pharma market report used for the analysis, it is assumed that future patent additions to the drug pipeline are covered by the applied terminal growth assumptions (BIO, Informa Pharma Intelligence, and QLS Advisors 2021). Likelihood of approval (LOA) and time until approval (TUA) are connected to the Pfizer pipeline items based on the therapeutic area and phase of development. TUAs of pipeline items is not adjusted due to a lack of information on fast-track patents and those entering a new phase for Pfizer's pipeline items. Due to the absence of a direct match between Pfizer's pipeline categories and the more detailed market report drug categories, research is conducted to determine the alignment of market report drug categories with Pfizer's. This effort aims to derive LOAs and time until the next phase figures for each Pfizer drug category in each phase of development (Pfizer 2023d; BIO, Informa Pharma Intelligence, and QLS Advisors 2021). Utilizing TUA phase figures across different development phases and drug categories, a table is created calculating the projected time until final approval for each phase and category (see Table 1.1.) These figures and the LOA are then aligned with their respective Pfizer pipeline items. This approach allows for a precise determination of the anticipated month when each pipeline item is expected to commence generating revenue in the future.

For each indication included in Pfizer's pipeline, market reports are consulted, summing up to roughly 60 distinct market reports in final use to derive market size and growth per indication. In a few cases, market sizes and growth rates from multiple market reports have to be combined to derive figures for specific Pfizer indications, e.g., drug PF-07038124, which can be used for Atopic Dermatitis as well as Psoriasis (Pfizer 2023d). Selected market data can be seen in Table 1.2. The research effort's combined calculations lead to market sizes for the year 2023 and CAGRs for subsequent years for the pipeline items. Lastly, Pfizer's market shares for the pipeline items are derived by connecting Pfizer's FY 2022 market share figures per overarching

therapeutic area – inflammation and immunology, internal medicine, oncology, rare diseases, vaccines, and anti-infectives – to the relevant pipeline items. It is assumed (McKinsey 2007) that Pfizer's future revenues as a big pharma company are more dependent on entering the right submarkets and growth areas with its pipeline than on market share changes, which, from a forecasting perspective, would be considerably more vague and less credible. Considering the mentioned factors – LOAs, first revenue month, market size 2023, CAGR, and market share – Pfizer pipeline revenues for 2023 to 2032 are calculated. The pipeline revenues range from $677.19m in 2023 to $21,040.11m in 2032 in the base case scenario. In the optimistic scenario, with a 3.00% increase in LOAs, a 10.00% reduction in the time until the next development phase, and a 10.00% boost in Pfizer's market share, the pipeline revenue expands from around $966.34m in 2023 to $25,243.30m in 2032. Conversely, the pessimistic scenario involves a 3.00% decrease in LOAs, a 10.00% extension in the time until the next phase, and a 10.00% reduction in Pfizer's market share, resulting in a pipeline revenue range from approximately $450.19m in 2023 to $18,038.58m in 2032.

4.2.2.3. Remaining Financial Statement Forecast

Having thoroughly analysed the revenues, the following will describe the forecast for the remaining items of the financial statement before presenting the estimated share price.

The cost of goods sold (COGS) can be divided into three sub-categories. First, regular COGS are recorded for the established product portfolio, estimated at the historical average percentage of revenue during the pre-COVID-19 period from 2018 to 2020 at 20.45%. Second, an increased COGS intensity during the first year for new pipeline launches is assumed to be 50.00% of first-year revenues. The underlying assumption is that economies of scale and efficiency gains are only realized after the product and the production have established and stabilized themselves. Beyond the first year, the COGS is then calculated in line with the first method at 20.45% of revenues. Third, additional Comirnaty royalty expenses are recorded,

amounting to 50.00% of Comirnaty sales that have to be paid to BioNTech. Thus, in 2023, COGS as a percentage of revenue amounted to 30.69%, which is significantly higher compared to pre-COVID-19 levels, mainly due to the royalty expenses included. Until 2032, the end of the detailed forecasting period, the COGS as a percentage of revenue continuously decreases to 25.00%, mainly driven by decreasing Comirnaty sales and, thus, lower royalty expenses. The percentage heavily fluctuates in some years, driven by new product launches and the higher percentage applied for the COGS estimation in the first year for pipeline launches. In line with this, the gross profit margin increases from 65.52% in 2022 to 75.00% in 2032 due to decreasing Comirnaty royalty expenses. Next, SG&A expenses are forecasted using the number of active products and the costs per active product per annum. The latter is based on the average between 2016 and 2020, which amounts to $190.83m per annum. Changes to the number of active products are derived from the product pipeline forecast, and hence, the number of active products increases from 47.00 in 2022 to 68.34 in 2032, while the SG&A as a percentage of revenue increases from 10.02% in 2022 to 20.40% in 2032 which is close to the pre-COVID-19 level of 20.04%. R&D expenses are calculated using the number of pipeline items and the costs per pipeline item as cost drivers. The number of pipeline items in 2022 is derived from the pipeline analysis, while the average costs per product are taken as the historic average since 2018. To account for the rising cost intensity of R&D activities, 2021 and 2022 are also considered in the estimation, resulting in annual costs per pipeline item of $94.91m (Congressional Budget Office 2021). The future pipeline size is estimated to grow steadily at 1.50 products per year until 2027, in line with the overall industry trend (NSF 2022). Thus, R&D expenses steadily increase yearly, accounting for 17.58% of revenues in 2032 compared to a pre-COVID-19 average of 20.03%. Advertising expenses are forecasted using the number of expirations, expected approvals as drivers, and the total number of active products. Advertising expenses are, thus, expected to increase to 3.34% of revenue in 2023 compared to 2.79% in 2022 and, on average, 5.59% pre-COVID-19. Other operating expenses or income are

forecasted at the historical average of the percentage of revenue.

Therefore, the EBITDA margin is observed to decrease from 42.55% in 2022 to 36.68% in 2032, mainly driven by decreasing revenues and steadily rising R&D, SG&A, and advertising expenses. This can also be seen when analysing the CAGR of operating expenses, which is 1.57% during the forecasting period, exceeding the 0.13% CAGR for gross profit. Thus, the forecast assumes the margin to slowly converge to the pre-COVID-19 average of 37.01%.

Depreciation is forecasted as the average percentage of the previous year CapEx over the pre-COVID-19 years, amounting to 66.64%. Thus, the depreciation expenses fall short of the capital expenditures to account for Pfizer's ambition to diversify and increase its non-COVID-19 revenues, which requires investments in the capital stock. Amortization is forecasted as the average percentage of revenue pre-COVID-19 at 10.16%, which represents an increase in 2023 amortization expenses compared to 2022 in absolute terms. This results in an EBIT margin of 23.23% in 2032, which aligns with the pre-COVID-19 average of 23.11%.

Non-operating income composed of the sale of fixed assets, equity earnings or loss, other income or expenses, financing expenses, and income is forecasted mainly using the average percentage of revenue over the pre-COVID-19 years. The only exception is financing expenses and income since a bond issuance in 2024 is assumed to fund the previously described business development strategy and to achieve the target D/V ratio of 11.73%. Thus, interest expenses are anticipated to increase since the bond to be issued is estimated at a yield of 5.28%, in line with a similar bond issued by Pfizer in 2021 and maturity of 2031. Additionally, there is an anticipated gain from interest income on cash reserves held before they allocate to the growth strategy at the risk-free rate.

Next up, non-recurring income or expenses include impairments on fixed assets, restructuring and acquisition-related costs, litigation and settlement expenses, as well as others. Restructuring and acquisition-related costs are assumed to be driven by the number of acquisitions performed each year. On average over the historic analysis period, annual acquisitions amount to 5.29 on

average, which is also assumed for the forecasting period and related costs per acquisition of $102.89m. The acquisitions are expected to be financed from the proceeds of the issued bond and cash reserves on hand. Besides, any effect from M&A activity is not considered as the model assumes that acquisitions are performed at fair value since assumptions on over- or underpaying are not feasible. Besides that, litigation and settlement expenses are assumed to be driven by the number of approvals and expirations. Other expenses and impairment on fixed assets are forecasted at the historical average percentage of revenue.

The EBT margin equals 16.18% at the end of the detailed forecasting period in 2032, which aligns with the pre-COVID-19 level of 16.89% in 2020, as demonstrated in Figure 1.7.

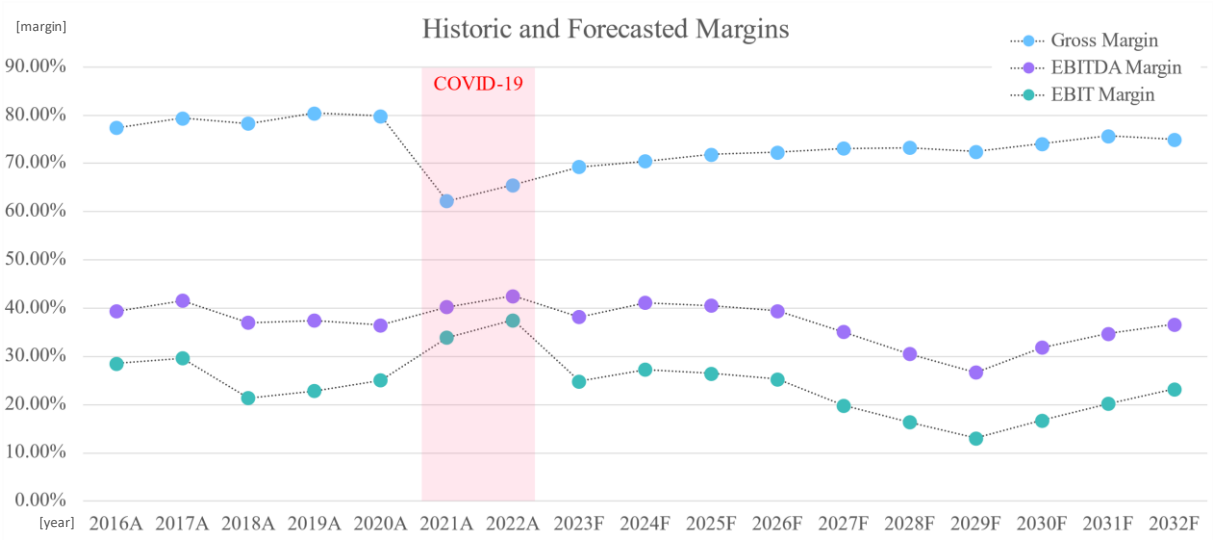

Figure 1.7. *Pfizer Historic and Forecasted Margins Base Case*

The effective tax rate is forecasted to be 15.00%, in line with the guidance for 2023 published by Pfizer (Pfizer 2023a). After tax, extraordinary items constitute one-off effects and, therefore, are assumed to be zero despite minority interest staying equal to the 2022 value. Having forecasted all items until the net income, the adjustments to get to the free cash flow to the firm are performed. The adjustments include adding back depreciation and amortization as well as after tax financing expenses. Deductions include the after-tax financing income, capital expenditures and changes in net working capital. CapEx is structured similarly to the COGS forecast, with one portion for regular CapEx forecasted at historical average percentage of revenues and a portion accounting for additional investment needs during the first year of the

product launched at 50.00% of the incremental revenue generated by the product in the first year. Changes in net working capital are forecasted, taking the inputs from the income statements forecast (revenue and COGS) and assuming that the cash conversion cycle and the three components slowly converge to the pre-COVID-19 level through 2026 and remain stable afterwards.

Overall, this results in a free cash flow of $13,382.34m in 2032, representing a CAGR during the forecasting period of -3.14%. The decrease is driven by decreasing revenues at a CAGR of -0.75% and a stable cost structure that causes margins to shrink. Similar to previous items, significant fluctuations occur due to patent expirations, new launches, and continuously decreasing COVID-19 revenues. However, in the last year of the detailed forecasting period, the free cash flow growth rate is 1.71% and, thus, aligns with the terminal growth rate of 2.00%. The forecasted financial statements are summarized in Table 1.3.

4.2.2.4. DCF Results and Scenario Analysis

Using a 2.00% terminal growth rate slightly below the long-term forecast for GDP growth of 1.36% (OECD), the model yields a share price for Pfizer of $32.05, which represents a discount to the share price as of 28th of February 2023 of 21.01%. The market may underestimate the significant effect of the upcoming patent expirations, over-estimate the success and revenue effect of pipeline launches, and may overestimate the revenue potential of the COVID-19 related products. The sensitivity analysis emphasizes the significant effect of the WACC and the terminal growth rate as a change by 0.25% and 0.10%, respectively causes the share price to vary between $38.59 (WACC: 5.57%, terminal growth rate: 2.20%) and $27.47 (WACC: 6.57%, terminal growth rate: 1.80%) as presented in Table 1.4.

A scenario analysis is performed to further account for the uncertainty connected to the assumptions inherent in the valuation. The optimistic scenario assumes a less severe decrease in 2023 COVID-19 revenues, an increased likelihood of approval and reduced development

times for pipeline items, a less severe drop in revenues after patent expirations, and a slightly more efficient cost structure in terms of SG&A per product, COGS as percentage of revenues, CapEx as a percentage of revenues and R&D per pipeline items while the total number of pipeline items and products are expected to increase. Changes to the revenue forecast are presented in Figures 1.8. and 1.9. Overall, this yields a share price of $49.63, representing an upside of 22.34%. Performing the same adjustments vice versa for the downside scenario, the share price is, $22.74 representing a downside of 43.95% (Table 1.5.). To sum up, already slight changes for pipeline and patent cliff assumptions cause large changes in estimated share prices, underlining the inherent strategic challenge for Pfizer management.

4.2.3. Relative Valuation

To evaluate Pfizer's value using multiples, we first consider the valuation of comparable companies, followed by the valuation of comparable transactions. The key to a comparable company's valuation is selecting firms similar to Pfizer in size, industry, and global presence. The selected comparable are Abbvie Inc, Amgen Inc, AstraZeneca PLC, Bristol-Myers Squibb Co, Gilead Sciences Inc, Johnson & Johnson Inc, Eli Lilly and Co, Merck & Co Inc, Novartis AG, and Roche Holding AG. To project Pfizer's value as of the end of February 2023, without financials available for that date, a four-year period, from 2018 to 2022, for data gathering. This timeframe allows for trend forecasting and mitigates the impact of one-off events, like the COVID-19 pandemic, on the pharmaceutical industry. It also avoids using financial data too far in the past, which may not reflect current business landscapes or be relevant for present-day analysis. The aim is to forecast multiples accurately for the end of February 2023, two months beyond Pfizer's last published financials (Pfizer 2023a). Using the data bank, Refinitiv financials for the relevant companies and years are gathered and multiples are calculated. Multiples for the comparable company valuation include P/E, EV/Revenue, and EV/EBITDA. The gathered, and calculated multiples for the relevant years serve to forecast the companies'

multiples for the valuation date at the end of February 2023. Firstly, the growth rates of the companies' multiples are calculated based on the changes between FY 2018 and FY 2022. The growth rates are then applied proportionally to the FY 2022 multiples to forecast the companies' multiples for the valuation date. Post outlier cleaning, the median is used to reach the respective multiple factors.

Regarding the comparable transaction valuation, Bloomberg is used to download a pharmaceutical deal list. To be considered, the deal must be an M&A deal completed between 2019 and the valuation date and must have an announced total value of over $10.00bn. Deals with little information, deals included in the Seagen valuation, see chapter *5.2.3.*, and not comparable deals, e.g., financial distress and early-stage company deals, are excluded. Therefore, the criteria of announced total deal value of over $10.00bn is used under the assumption that on average bigger targets have more "generalist" traits, are more diversified regarding comes to company structure, and product portfolio and are therefore more comparable to Pfizer. This rationale and the resulting criteria lead to M&A pharma deals completed between 2019 and the valuation date with volumes between $10.00bn and $90.00bn. Using the data provided by Bloomberg adjustments are made to create the multiples EV/Revenue and EV/EBITDA. Post outlier cleaning the median is used to reach the respective multiple factors. The implied trading valuations are $116.01 for P/E, $79.26 for EV/Revenue, $80.33 for EV/EBITDA, the transaction valuations are $55.09 for EV/Revenue and 117.50$ for EV/EBITDA as seen in Table 1.6.

4.2.4. Conclusion from the Pfizer Valuation

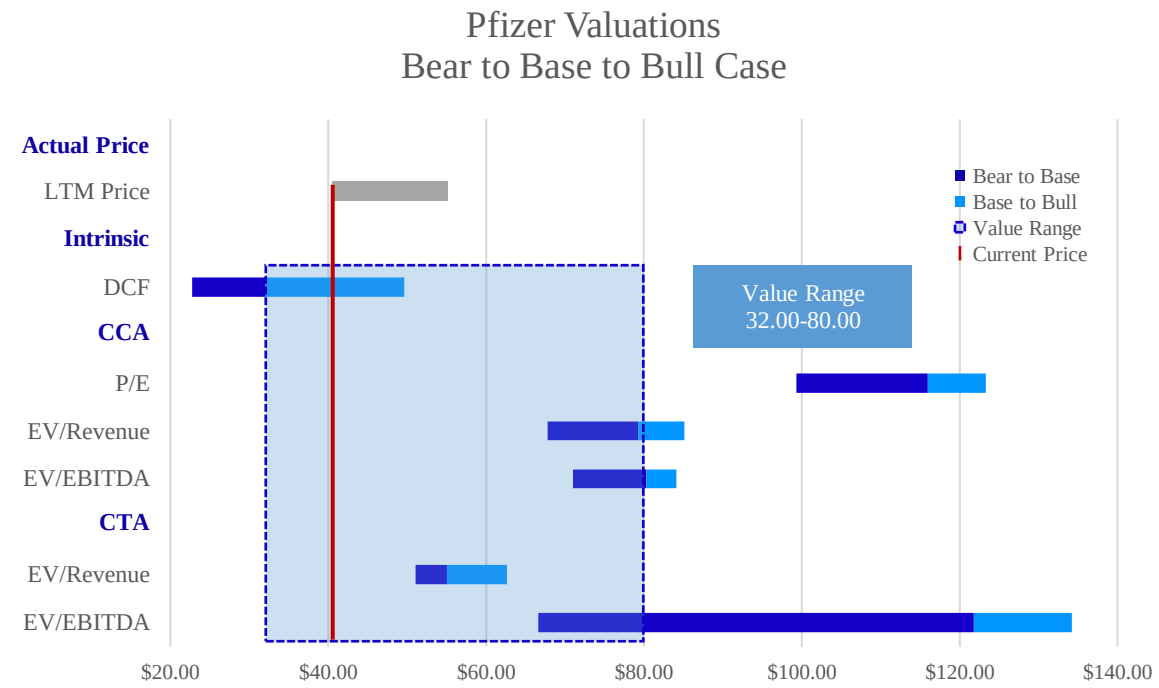

Figure 1.10. *Pfizer Valuation Summary*

The Discounted Cash Flow (DCF) analysis appears to align more closely with the actual 52-week high/low share price, which may reflect the market's anticipation of decreased COVID-19-related revenues and significant impact from patent expirations. The DCF has accounted for an expected decrease in COVID-19 revenues by a substantial percentage in 2023, as well as the impact of patent expirations on numerous drugs that currently contribute a significant portion of Pfizer's revenue. Relative valuation techniques, such as Comparable Company Analysis (CCA) and Price/Earnings (P/E) ratios, may offer limited insight into Pfizer's fair valuation. This is because these methods rely on comparable industry metrics that may only partially capture the unique challenges Pfizer faces, such as a more severe impact from patent expirations relative to its peers, with a large percentage of its revenues at risk in the next decade. Furthermore, transaction-based valuations may involve premiums that are not indicative of fair value, and transactions comparable in size to Pfizer are not common, making such comparisons less reliable. In summary, while relative valuation methods yield higher valuations than the DCF, the more conservative DCF approach may be more appropriate for Pfizer, considering the expected drop in COVID-19-related revenues and the impending patent cliffs. The variance

in valuation results from these methods underscores the importance of considering company-specific forecasts and industry context. Therefore, investors should be cautious, as the stock may face downward pressure shortly (Figure 1.10.).

5. Seagen

5.1. Qualitative Analysis

5.1.1. Company Portrait

Seagen is a U.S.-based biotechnology company founded in Bothell, Washington, in 1998. The company focuses on researching, developing, commercializing, manufacturing, and distributing targeted cancer therapies. The product portfolio includes four approved medicines: Adcetris for the treatment of Hodgkin and T-cell Lymhoma, Padcev for the treatment of urothelial cancer, Tukysa for the treatment of breast and colorectal cancer, Tivdak for the treatment of cervical cancer. Seagen set up collaborations with several pharmaceutical and biotechnology companies to facilitate the development and commercialization of its medicines. Collaboration and licence agreements were established with Takeda, Astellas, Merck, Genmab, and RemeGen in association with the four approved drugs, Ladiratuzumab Vedotin and Disitamab Vedotin. Most of the developments, comprising Adcetris, Padcev, and Tivdak, are established on Seagen's antibody-drug conjugate (ADC) technology. This technology uses monoclonal antibodies' targeting capabilities to transport cell-killing agents to cancer cells directly. Besides maintaining the current product portfolio, Seagen is working on expanding its pipeline. The product pipeline includes innovative therapies targeting solid tumours and haematological cancer to tackle unfulfilled medical needs and enhance the outcome of treatments (Seagen 2023).

As of 28th February 2023, Seagen had a market capitalization of $33,185m, with the adjusted closing share price amounting to $179.69 and the number of outstanding common shares being 184.68 million. Over the past year, the stock price increased by 39.44 % with a 52-week range

of $105.43 as of the 9th May 2022 to $183.00 of the 7th July 2022 (Refinitiv).

Major shareholders of Seagen, as of 28th February 2023 are institutional investors. Hedge funds and investment advisors, namely the Baker Bros Advisor, Capital International Investors, The Vanguard Group, and BlackRock hold 25.12%, 8.88%, and 6.90% of the total outstanding shares, respectively. The ten largest shareholders own 61.63% of the outstanding shares, signalling a high ownership concentration of these institutional investors (Refinitiv).

5.1.2. Effects of COVID-19 and Strategic Considerations Looking Forward

The company anticipates promising growth in net product sales for 2023, primarily driven by higher sales volumes supplemented by increasing selling prices. The key products, namely Adcetris and Padcev, are the major contributors to the company's financial growth. Adcetris is expected to further increase its expansion across its seven indications, with a particular focus on frontline Hodgkin lymphoma. Padcev is also projected to generate higher revenues, mainly attributable to its favourable market conditions connected to the use of checkpoint inhibitors. However, Tukysa faces potential sales challenges due to the increasing competition resulting from the recent approval and increasing usage of biosimilar medicines (Seagen 2023).

The COVID-19 pandemic affected the company's operation and continues to influence its outlook. During the pandemic, diagnosis rates for Adcetris frontline indications significantly decreased. However, current trends indicate a recovery to pre-pandemic levels. Additionally, the pandemic caused difficulties in clinical trials as certain Seagen's sites experienced closings, staffing shortages, and reduced capacity. This affected patient enrolment, monitoring activities, and data management, thus changing the timeline and outcome of clinical trials. Seagen is still working on mitigating the challenges caused by the COVID-19 pandemic (Seagen 2023).

5.1.3. Competition and Market Exposure of Product Portfolio

As it is mentioned earlier, Seagen develops and commercializes targeted cancer therapies,

meaning that the company operates within the oncology market. The oncology market size amounted to $223.21bn in 2022, and with a CAGR of 10.10%, it is projected to reach $584.23bn by 2032. The market expansion is driven by the rising number of patients diagnosed with cancer, the increasing support from governments and organizations to create cancer awareness, the growing number diagnostic centres, and general technological development (The Business Research Company 2022b). However, as stated above, Seagen has four approved medicines in its portfolio, focusing on the treatment of five different cancer types: lymphoma, urothelial, breast, colorectal, and cervical cancer. To understand the dynamics and trend within each therapeutic area better, the markets need to be analysed separately.

The lymphoma market, including Hodgkin and t-cell lymphoma, is valued at $12.20bn in 2022 and is expected to reach $28.88bn by 2032, exhibiting a CAGR of 9.00%. Several treatments, e.g., chemotherapy, immunotherapy, targeted and radiation therapy, are developed to treat lymphoma, a cancer that attacks the lymphatic system. The market growth is attributable to the rising incidence rate of lymphoma and the acceleration of R&D activities leading to a surge in clinical trials and pipeline products (International Market Analysis Research and Consulting Group 2022). Seagen's lymphoma drug, Adcetris, is a key player in the market, with its market share of 6.88% in 2022. However, the drug faces intensifying competition from Bristol-Myers Squibb's, Merck's, Acrotech Biopharma's, and Kyowa Kirin's similar therapies (Seagen 2023). The urothelial cancer – which is a type of bladder cancer – market size is estimated at $5.55bn in 2022 and is projected to hit $8.80bn by 2032 with a registered CAGR of 4.72 The rising prevalence rates drive the expansion of the market, the increasing awareness about bladder diseases in the population, and the higher healthcare costs and spending. Seagen has a significant share of the urothelial cancer market, amounting to 8.14% in 2022. Although, Padcev encounters moderate competition from Janssen's, Eli Lilly's, and Hoffman-La Roche's medicines (Verified Market Research 2022).

Tukysa is developed for the treatment of breast and colorectal cancer. Therefore, its addressable

market is the combined breast and colorectal cancer market. Together, the breast (Global Market Insights 2022) and colorectal cancer (Data Bridge Market Research 2023) market size is forecasted to grow at a CAGR of 6.53%, from $46.54bn in 2022 to $87.58bn by 2032. The submarkets' contributions amount to $27.54bn and $19.00bn in 2022, $59.46bn and $28.12bn in 2032, respectively. The presence of prominent pharmaceutical companies drives the combined market growth, the rising cancer incidence rate, the further development of advanced technologies, and the increasing attention to cancer screening. Seagen – presenting a market share of 0.76% in 2022 – operates in a fragmented market, with the major competitors being Daiichi Sankyo, AstraZeneca, MacroGenics, and Byondis (Seagen 2023).

The cervical cancer market is valued at $7.81bn in 2022 and is forecasted to achieve $13.47bn by 2032, yielding a CAGR of 5.60%. The increase is mainly attributable to the rising prevalence of cervical cancer, which is related to higher awareness and the development of new diagnostic technologies. The cervical cancer market lacks accurate screening tests, thus, developing screening programs is a significant opportunity for the market, along with proper HPV vaccination. The cervical cancer market has several prominent players – namely Pfizer, Bristol-Myers Squibb, and Novartis – which leads to moderate competition and a market share of 0.80% in 2022 (Future Market Insight 2021).

5.2. Quantitaive Analysis

5.2.1. Historical Financials

5.2.1.1. Income Statement

Total revenues can be divided into three categories: net product sales, royalty revenues, and collaboration and license agreement revenues (Figure 1.11.). On average, net product sales are responsible for 69.95% of total revenue, while the remaining amount is distributed between

royalty revenues (11.64%) and collaboration and license agreement revenues (18.41%). Seagen records product sales from Adcetris in the United States and Canada, Padcev in the United States, Canada, and Latin America, Tukysa in the United States, Europe and Canada, and Tivdak in the United States. In other countries, the drugs are commercialized by collaborators, and Seagen recognizes revenue among royalty, collaboration, and license agreement revenues in connection with these sales. Approximately 90.00% of total revenues is connected to US operations, and only 10.00% is related to other countries. Over the past seven years, Seagen increases its total revenue from $418.15m to $1,962.41m, representing a CAGR of 24.72%. The growth is mainly driven by net product sales, which gradually increases at a CAGR of 30.43% from $265.77m in 2016 to $1,706.52m in 2022 (Seagen 2023).

Net product sales include the disposal of Seagen's four approved medicines. Adcetris, Padcev, Tukysa, and Tivdak are sold through a few specialty distributors which disperse the drugs to healthcare providers. The three major distributors comprise 77.25% of the revenue in 2022, 80.12% in 2021, and 43.68% in 2020, meaning Seagen has a relatively high customer concentration. Net product sales demonstrate significant growth over the past years, mainly attributable to the launch of new drugs, higher selling prices, and increasing volumes. Seagen begins commercializing and generating revenues from the sales of Padcev in December 2019, Tukysa in April 2020, and Tivdak in September 2021, following FDA approvals. Rising prices are related to average inflation and favourable pricing conditions. Meanwhile, increasing volumes are connected to geographic expansion to other countries outside the US, higher diagnosis rates, additional eligible patients, and continued penetration in the currently approved indication of the drugs (Seagen 2023).

Collaboration and license agreement revenues related to Seagen's agreements with other pharmaceutical companies grow at a CAGR of 1.05% from $84.93m to $91.34m over the last seven years. The revenues include licence and maintenance fees, milestone payments, medicine sales to collaborator partners, payments received for R&D support and access to Seagen's

technology. In 2020, revenues skyrocket to $1,048.18m as Seagen receive $975.20m in licence revenues from Merck in connection with Tukysa and LV agreements (Seagen 2023).

Royalty revenues, including royalties from sales and milestones based on commercial sales, increase from $67.46m in 2016 to $164.55m in 2022, representing a CAGR of 13.59%. The growth is primarily driven by higher net sales of licensees, which pay a certain percentage of their revenue to Seagen as sales royalties. Most royalty revenues stem from the Adcetris collaboration with Takeda (Seagen 2023).

Cost of sales comprises expenses related to medicine manufacturing and distribution, profit sharing with collaborator partners, and royalties connected to product sales. COGS grow at a CAGR of 38.32% from $42.32m in 2016 to $410.06m in 2022, primarily due to increasing product sales leading to higher profit sharing with collaborators and higher expenses of medicines sold.

Selling, general, and administrative expenses are displayed without advertising, depreciation, and amortization expenses. Over the past seven years SG&A grew at a CAGR of 28.80% and represented approximately 29.33% of total revenue. Rising investments mainly drive the increase to facilitate new product launches, higher legal expenses, and headcount growth as the number of employees increased from 890 in 2016 to 3,256 in 2022 (Seagen 2023).

Advertising expenses grow from $12.90m in 2016 to $114.10m in 2022, representing a CAGR of 36.53%. These expenses are primarily associated with the commercialization of new medicines, along with the promotion of existing products (Seagen 2023).

R&D expenses are the most significant costs for Seagen, representing approximately 76.40% of total revenue over the past seven years. R&D expenses include costs of upfront technology, laboratory, personnel, occupancy, clinical trials, fees to access technologies, and studies. Seagen expands its R&D spending from $379.31m in 2016 to $1,344.36m in 2022 to support pipeline development and accelerate the launch of new medicines (Seagen 2023).

Over the past seven years, Seagen increases its gross profit from $375.83m to $1,552.35m,

maintaining an average gross margin of 87.10% as presented in. This outperforms the average gross margin in the biotechnology sector, amounting to 60.94% (Damodaran 2023). Despite this outstanding performance, Seagen struggles with negative EBITDA, EBIT, and net income due to high R&D and SG&A expenses. On average, Seagen operates with an EBIT margin of -26.33% and a net margin of -22.37%. The net margin exceeds the EBIT margin as the company had no interest expenses, received non-interest financing income, and paid income taxes. These figures are significantly lower than the biotechnology sector's margins of 12.02% and 0.65% (Damodaran 2023), indicating that Seagen faces higher operating expenses than an average biotechnology firm.

5.2.1.2. Balance Sheet

Seagen's net working capital primarily includes inventories, trade receivables, and trade payables. Net working capital experiences constant growth from $17.85m in 2018 to $245.50m in 2022, indicating Seagen's robust short-term liquidity as current assets can cover current liabilities and the company can fund its ongoing operations. However, Seagen maintains a positive cash conversion cycle (CCC), averaging 252 days over the last seven years. The positive CCC suggests that the company sells its inventories and collects cash from customers slower than it pays its suppliers, which is common in the industry due to the long research, development, and approval process for new medicines (Shah, Mandhana, and Verma 2019).

Over the past seven years, Seagen maintains a negative net debt position due to the absence of short-term and long-term debt and the inclusion of cash, cash equivalents, and investments. These financial instruments are recorded in bank accounts, equity securities, municipal bonds, money market accounts, and commercial papers. Seagen finances its operation without taking on any debt, relying on the three revenue streams mentioned above, equity issuance and investment income (Seagen 2023).

5.2.2. Discounted Free Cash Flow Analysis

To determine the fair value of Seagen's share price, the FCFF valuation method is implemented, including the forecast of cash flows available to all capital providers and terminal value and their discounting with the weighted average cost of capital. The valuation date is 28th February 2023, the last month end before the M&A announcement as of 13th March 2023. The assumption is that Seagen's financials need to be unaffected by the acquisition news, thus a standalone valuation can be conducted. Please refer to chapter *4.2.2.Discounted Free Cash Flow Analysis* for additional information on the DCF analysis, as the implemented methodology is similar for Pfizer and Seagen.

5.2.2.1. WACC Calculation

The weighted average cost of capital for Seagen is 6.29%. This equals the cost of equity, as Seagen is an all equity financed company without any outstanding debt. The cost of equity is determined using the risk-free rate of 3.91%, the market return of 7.47%, and the beta of 0.67. Please refer to chapter *4.2.2.1 WACC Calculation* for the detailed description as the cost of equity calculations are similar for Pfizer and Seagen. The only difference is the D/V ratio, as Pfizer targets the pharmaceutical industry's average D/V ratio, while Seagen has a target D/V ratio of 0.00%. The assumption is that Seagen will continue its operation without taking on any debt as no information in its annual reports, quarterly statements or press releases indicates the change of the capital structure.

5.2.2.2. Revenue Forecast

The first step of the income statement forecast is the projection of total revenues, which is split between revenues from the current portfolio and revenues generated by new launches, as presented in Figure 1.12.

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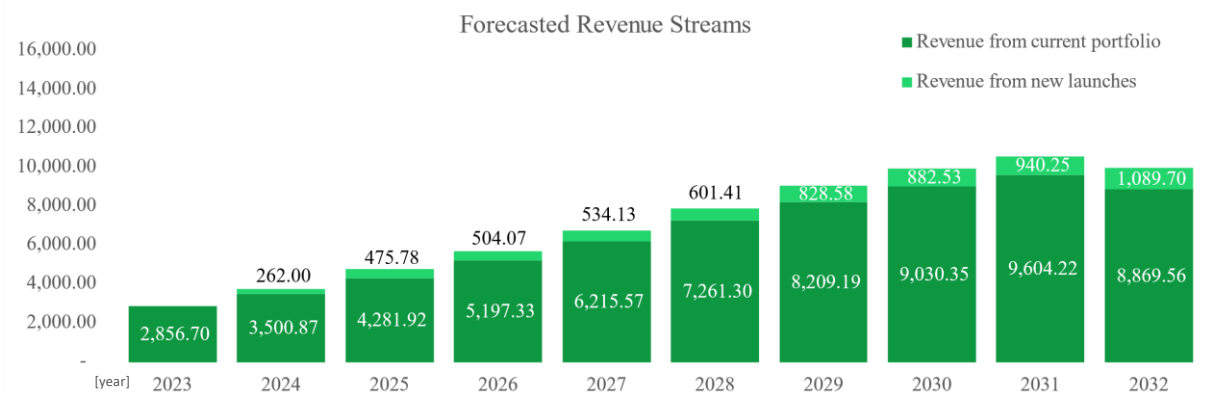

Figure 1.12. *Forecasted Revenue Streams Base Case ($ millions)*

A. Revenues from the current portfolio

Revenues from the current portfolio are divided into three subcategories. Net product sales consist of the revenue generated by approved medicines. The assumption is that each drug's sale start growing at its historical average, approaching its submarket CAGR using the linear approximation method and stabilizing at the submarket CAGR ten years after its approval. The approval refers to the year when the FDA approved the drug in the US, and it is assumed that approvals were granted in the same year in other countries outside the US. As Adcetris was approved in 2011, its revenue has already been growing at the lymphoma market CAGR of 9.00%, reaching $1,822.81m by 2031. However, Adcetris will experience a patent cliff around 2032 as the general term of a patent is twenty years from the filing date in the US (CDER Small Business and Industry Assistance 2015). The first year's expected revenue loss is computed with the patent expiration factor of -44.98%, stemming from the Pfizer patent cliff calculation discussed in chapter *4.2.2.2. Revenue Forecast*. The revenues of Padcev, Tukysa, and Tivdak are forecasted similarly as they grow at their historical average of 38.24%, 19.62%, and 99.19% until 2029, 2030, and 2031, respectively. After ten years of their approval, revenue growth stabilizes at the urothelial, combined breast and colorectal, cervical market CAGRs of 4.72%, 6.53%, and 5.60%, respectively. It is important to mention that historical averages are calculated from annualized quarterly growth rates as these three medicines were approved in recent years, thus, appropriate yearly data is unavailable. By 2032, the three medicines are

expected to reach annual sales of $1,964.63m, $1,064.67m, and $2,445.13m, respectively. Royalty, collaboration, and licence agreement revenues grow at the historical average of the percentage of net product sales, amounting to 17.08% and 19.85%, respectively. The historical average is calculated over the past seven years for royalty revenues and with the exclusion of 2020 for collaboration and licence agreement revenues due to the one-off income from Merck. These revenues reach $1,106.53m and $1,285.76m by 2032, respectively. Thus, total revenue amounts to $8,869.56m at the end of the forecast period.

B. Revenues generated by new launched from the R&D pipeline

Secondly, revenue from new launches is forecasted based on Seagen's pipeline as of the 1st of February 2023, assuming no changes in the pipeline until the 28th of February 2023. The pipeline consists of twenty-six patents connected to approved medicines and twelve patents related to product candidates. To transform this pipeline to revenues, data regarding the oncology market's likelihood of approval and time until approval, market size and CAGR, and Seagen's total and patent level market share are required. The forecast is similar to the calculation of Pfizer's revenue from new launches, please refer to chapter *4.2.2.2. Revenue Forecast* for a detailed explanation. Likelihood of approval is 5.30% for phase I, 10.80% for phase II, 43.90% for phase III, and 92.00% for registration products, while time until approval is 107 months for phase I, 69 months for phase II, 28 months for phase III, and 5 months for registration products with the assumption that drugs are in the middle of the respective phase (BIO, Informa Pharma Intelligence, and QLS Advisors 2021). The registration intent is not indicated in the pipeline. Thus, the assumption of phase III patents being between phase III and registration with 67.95% likelihood of approval and 17 months until final approval. Having this information, the date and likelihood of first revenues can be forecasted. Patents between phase III and registration generate their first revenue in June 2024, while patents in phase II and I generate their first revenue in November 2028 and January 2032, respectively. To further forecast the patent-level revenue from new launches, patents are grouped based on their

oncology submarket, lymphoma, urothelial, breast and colorectal, and cervical cancer, to derive market size and market CAGR per indication area. Using this information, the market size can be calculated for each forecasted year. Lastly, Seagen's patent level market shares are computed by dividing Seagen's submarket shares relying on current product sales with the number of patents connected to the currently approved drugs. Considering the mentioned factors, Seagen's revenues generated by new launches for the years 2023 to 2032 are computed. The revenues range from $262.00m in 2024 to $1,089.70m in 2032.

5.2.2.3. Remaining Financial Statement Forecast

The overall costs of goods sold can be divided into two sub-categories: general COGS and COGS for new launches. General COGS represent 12.90% of total revenue over the past years and is forecasted as the historical percentage of total revenue minus revenue from new launches. COGS for new launches are calculated separately due to the reasons mentioned in chapter *4.2.2.3. Remaining Financial Statement Forecast* are forecasted as 50.00% of first year revenue from new launches. Overall COGS amounts to $368.58m in 2023 and $1,317.51m in 2032, representing a CAGR of 13.59%.

R&D expenses are forecasted with two drivers: the number of pipeline items and R&D expense per pipeline item. Seagen had 41 patents in the pipeline at the end of 2022, which is expected to increase at its historical average growth rate of 8.08%, reaching 79 by 2032. Over the past seven years, the average R&D expense per pipeline item amounted to $27.95m. Multiplying the above-mentioned drivers, R&D expenses reach $1,208.48m in 2023 and $2,432.79m in 2032, representing 42.30% and 24.43% of total revenue, respectively.

Advertising expenses are projected with the number of approved patents and the average advertising expenses per approval. The number of approved patents amounted to 48 in 2022, which is expected to increase to 54 in 2024, 56 in 2028, and 57 in 2032. The advertising expenses per approvals yielded an average of $2.11m over the last seven years. Multiplying

these drivers, advertising expenses reach $101.45m in 2023 and $119.83m in 2032, representing 3.55% and 1.20% of total revenue, respectively. The remaining income statement items, such as SG&A, amortization expenses, and non-operating income, are forecasted as the average percentage of revenue over the last seven years. Meanwhile, depreciation is projected as the historical average percentage of CapEx, which is described in chapter *4.2.2.3. Remaining Financial Statement Forecast.* Non-recurring expenses occurred only in 2018, thus, are expected to be zero due to their one-off nature. The effective tax rate is expected to amount to 4.25%, with the statutory tax rate being 21.00% and the rate of tax adjustments being 16.75%. To obtain free cash flows from net income, a further forecast of net working capital change and CapEx is required. The components of net working capital are projected with the following drivers: inventories with average days inventory outstanding, trade receivables with average days payable outstanding, trade payables with days payable outstanding, and other items, such as prepaid expenses, accruals, deferred income, and average historical percentage of revenue. CapEx can be divided into two sub-categories: general CapEx and CapEx for new launches. Over the last seven years, general CapEx represented 4.95% of total revenue and is projected as the historical percentage of total revenue minus revenue from new launches. CapEx for new launches is calculated separately due to the reasons mentioned in chapter *4.2.2.3. Remaining Financial Statement Forecast* are forecasted as 50.00% of first year revenue from new launches. Historic and forecasted margins are presented in the Figure 1.13. and the forecasted financial statement is summarized in Table 1.7.

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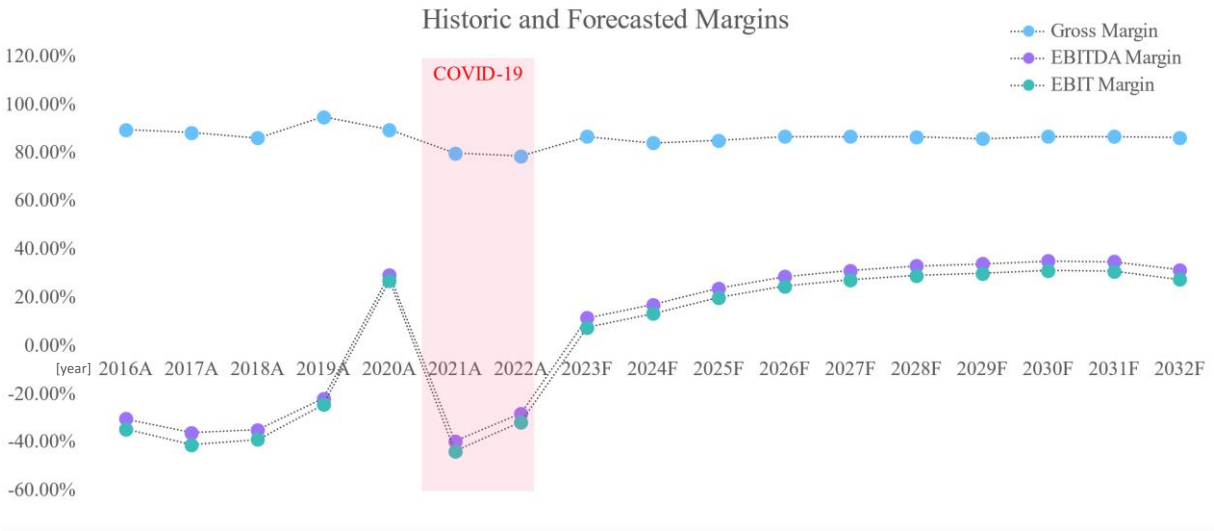

Figure 1.13. *Seagen Historic and Forecasted Margins Base Case*

5.2.2.4. DCF Results and Scenario Analysis

Seagen's enterprise value is estimated to be $32,544.06m, from which, deducting the net debt of -$1,735.07m, an equity value of $34,279.13m is reached. The equity value should be divided with 184.68 million, the number of shares outstanding, to obtain the estimated share price of $185.61, which represents a 3.30% upside to the actual share price as of the 28th of February 2023. The market may underestimate Seagen's potential success and revenue effect of new pipeline launches. The sensitivity analysis highlights the important effect of the WACC and the terminal growth rate as a change by 0.25% and 0.10%, respectively leads to share price variations between $171.75 (WACC: 6.54%, terminal growth rate: 1.90%) and $202.05 (WACC: 6.04%, terminal growth rate: 2.10%) as summarized in Table 1.8. A scenario analysis is conducted to address uncertainty associated with valuation assumptions. The optimistic scenario presumes a decreased time until approval for pipeline products, an increased likelihood of approval, a less severe drop in revenues after patent expirations, enhanced revenue growth for existing drugs, and a more efficient cost structure. The revenue streams per scenario over the forecasting period are presented in Figures 1.14 and 1.15. Overall, these assumptions lead to a share price of $219.75, representing an upside of 22.30%. Applying the same adjustments vice versa for the downside scenario, the share price is $160.79 indicating a downside of -10.52% as summarized in Table 1.9.

5.2.3. Relative Valuation

Trading and transaction comparable methods are implemented to determine Seagen's share price as of the 28th of February 2023 using relative valuation. The multiples' detailed introduction and the calculation method are discussed earlier in chapter *4.2.3. Relative valuation.*

Comparable company analysis includes firms similar to Seagen, meaning that a significant part of their product portfolio is developed for cancer treatment, and their operation is focused on the oncology market. The comparable companies chosen for Seagen are the following pharmaceutical and biotechnology firms: Blueprint Medicines Corporation, Exelixis Inc, Genmab A/S, Gilead Sciences Inc, ImmunoGen Inc, Incyte Corporation, MacroGenics Inc, Mirati Therapeutics Inc, Sutro Biopharma Inc, and Xencor Inc. As it is mentioned earlier, Seagen's EBITDA, EBIT, and net income were negative over the last years. Therefore, multiples consisting of these financial figures cannot be used as they would yield negative company values. To mitigate this problem, EV/Revenue, EV/Adjusted EBITDA, and P/B multiples are used. Among the multiples, EV/Adjusted EBITDA is specific to the pharmaceutical and biotechnology industry. The multiple represents the influence of daily operations on the share price by adding back R&D expenses to the EBITDA, which is related to future operations instead of current operations, as newly developed drugs and technologies will only affect future revenues and costs. Comparable transaction analysis is based on M&A deals completed between the 1st of January 2020 and the 28th of February 2023 from the pharmaceutical, biotechnology, and medical research industries. The targets in these M&A deals are the following companies: Livongo Health Inc, Alexion Pharmaceuticals Inc, PRA Health Sciences Inc, PPD Inc, Hill-Rom Holdings Inc, Acceleron Pharma Inc, Biohaven Pharmaceutical Holding Co Ltd, ABIOMED Inc, and Horizon Therapeutics Plc. To obtain the share price with the comparable transaction analysis, the EV/Revenue multiple is used. Other

multiples are unsuitable for the calculation due to the lack of data for all the above-mentioned M&A deals. The CCA leads to an equity value per share of $64.36 for EV/Revenue, $42.26 for EV/ Adj. EBITDA, and $69.16 for P/B, while CTA results in a share price of $50.26 for EV/Revenue as presented in Table 1.10.

5.2.4. Conclusion from the Seagen Valuation

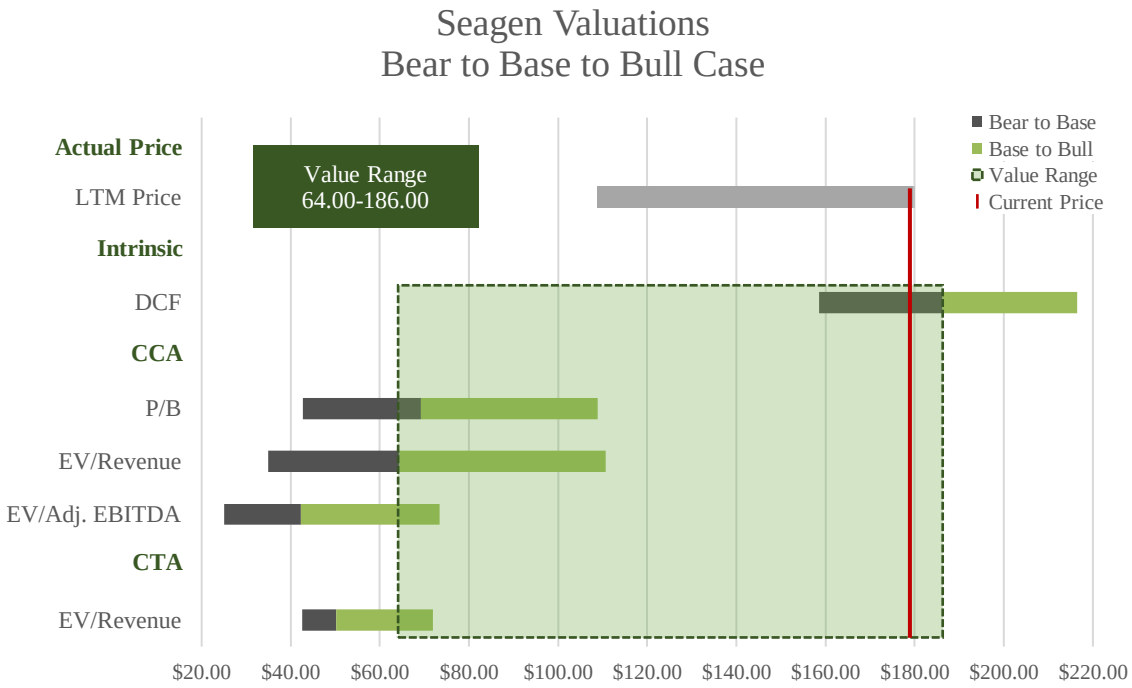

Figure 1.16. *Seagen Valuation Summary*

Throughout this work, several valuation methods are performed to calculate the value of Seagen as of 28th February 2023. As illustrated in Figure 1.16., the results of the intrinsic valuation, comparable company analysis, and comparable transaction analysis yield different implied share prices. The DCF valuation results in a share price of $185.61, slightly above the actual share price of $179.69. However, comparable company and transaction analysis lead to a significantly lower share price than the actual share price. The noteworthy difference can be explained by (1) the potential speculations (Hopkins and Rockoff 2023) about the M&A deal between Pfizer and Seagen, which usually causes a target stock price run-up (Tang and Xu 2016), (2) the press release about Seagen's financial results (Seagen 2023), mentioning positive

clinical trial results and appealing information regarding drug approvals, product pipeline, and future outlook, signalling future growth potentials to investors, and (3) the timing difference as comparable transaction analysis relies on historical market conditions between 2020 and 2022, which might differ from current market dynamics. To sum up, while DCF valuation slightly exceeds the current share price, CCA and CTA indicate a significant overvaluation, where influencing factors are the uncertainty of DCF, market speculations, positive signals from recent financial results, and limitations of historical data.

6. Combined Valuation

This section examines the synergies for Pfizer through the potential takeover of Seagen. A core motive for a company to buy another is the aim to realize synergies, which is the idea that two companies combined are worth more than the sum of the two companies operating on a stand-alone basis (DePamphilis 2019, 5-11; Feldman and Hernandez 2022). According to a CFO survey, taking advantage of synergies is listed as the top-ranked motive for M&As with 37.30% respondent agreement, followed by diversification, 29.30%, and ongoing restructuring program motives, 10.70%. (Mukherjee, Kiymaz, and Baker 2004). Damodaran (2008a) paints a similar picture mentioning synergies as a main M&A motive, besides the motive of target undervaluation and gaining control.

A clean way of categorizing synergies includes the differentiation of operating synergies and financial synergies. Operating synergies allow companies to increase growth, improve operating income through existing assets or both. This can be achieved through, e.g., economies of scale, greater pricing power, combination of different functional strengths and higher growth in new or existing markets. Financial synergies are connected to decreased cost of capital, increased cash flows or both. These synergies may arise through various mechanisms. For instance, when a firm with excess cash and lacking high-growth opportunities merges with a limited cash firm that possesses access to such high-growth opportunities. Additionally, the

combination can enhance debt capacity, leveraging more predictable and stable post-merger earnings and cash flows, a phenomenon referred to as the coinsurance effect (Lewellen 1971). Tax benefits, particularly related to net operating losses of one entity, can be realized, further contributing to financial synergies. The concept of diversification also plays a role, although its relevance is more contentious for public firms and tends to be more impactful for closely held or private firms. To value synergies it is possible to value the combined entity of the two companies and subtract the standalone values of the acquirer and the target using the respective entity discount rates or by calculating the present value of cash flow value sources and subtracting the cash flows of values destroyers. These mentioned approaches lead to identical valuations. Cash flow value sources can result from increased revenues or decreased costs (Damodaran 2005). Most companies face challenges in achieving their aspired revenue synergies, typically falling below their aspirations by 23.00%. Furthermore, realizing revenue synergies takes significantly longer than realizing cost synergies, often spanning around five years rather than two years for cost synergies (McKinsey 2018). Since revenue synergies typically are less certain they are therefore usually discounted with a higher discount rate. Cash flow value destroyers can result from cannibalization effects, productivity inefficiencies, and restructuring and integration costs connected to the combination of the two entities (Damodaran 2005). The existence of cash flow value destroyers implies the existence of negative synergies, potentially resulting in overall value destruction. This is not an exception, as out of 26 studies on M&As 14 reported an operating performance decline, while seven reported no significant changes and five reported performance increases (Martynova and Renneboog 2008). Regarding synergies in the pharma industry, it is noteworthy that smaller pharma companies can benefit from the chance to enhance value through strategic partnerships with larger firms possessing manufacturing and distribution strength required to navigate challenges associated with entering new markets (Kengelbach et al. 2013).

Another reason for M&As mentioned prior is “value of control” (Damodaran 2005, 7), which

must be differentiated from synergies, since for these to be realized a combination of two firms is not necessary. Value of control is the concept that value can be generated through a management team that can manage the target more efficiently than it is run in its current state. However, value of control will not be a focal point going forward, since it is assumed that in case of Seagen, an oncology specialist with a notable innovation track record, inefficient management is not an issue and not a reason to be targeted by Pfizer.

6.1. Synergy Calculation

The synergy valuation process involves assessing the standalone values of both the acquirer and target companies as previously presented. Thus, the combined value of the firms can be calculated by summing up the standalone enterprise values of acquirer and target. Beyond the value of the combined firm, the present value of expected synergies and dis-synergies are included to get to the combined value including synergies (NewCo). The economical feasible offer prices will lie in the range between the enterprise value of Seagen as lower boundary and the EV of Seagen including Synergies as upper bound.

A. WACC

Assuming the combined firm to maintain the same target Debt-to-Value (D/V) ratio as assumed for Pfizer standalone at 11.73%, the debt level of the NewCo increases to $56,508.46m as Seagen carries no debt before the acquisition. The newly issued debt is presumed to carry a higher yield than the existing debt and therefore, the after-tax cost of debt increases from 3.16% to 3.72%. Consequently, the Weighted Average Cost of Capital (WACC) for NewCo is 6.12%, as opposed to 6.07% for Pfizer stand-alone and 6.29% for Seagen stand-alone.

B. Revenue Forecast:

Pfizer's pipeline anticipates a rise in market share for the oncology industry, increasing from 5.44% to 6.32%, This growth is attributed to Pfizer benefiting from Seagen's expertise in oncology and their advanced technologies. Conversely, Seagen is expected to experience a

market share increase from 0.88% to 6.23%, leveraging Pfizer's robust manufacturing and distribution capabilities to explore new markets. The collaboration positions Seagen for global expansion by tapping into Pfizer's established infrastructure. Consequently, the NewCo is poised to command a 6.32% market share in the oncology sector in 2022, yielding revenue synergies totaling $9,716.98 million through 2032. The realization of revenue synergies, based on a McKinsey Study (2018) is expected to occur gradually post-closure, with capture rates of 33.00% in 2024, 66.00% in 2025, 82.00% in 2026, 90.00% in 2027, and a consistent 93.00% from 2028 onwards. Conversely, revenue dis-synergies are expected for Seagen's pipeline items SGN-ALPV, SGN-B6A, SGN-B7H4V, SGN-STNV, and SGN-PDL1V due to overlaps with Pfizer's pipeline projects, resulting in an anticipated reduction of $100.36m in Newco's expected revenues during the specific launch years of these products. The impact of this overlap on R&D costs will be discussed in subsequent sections.

C. COGS

The cost of goods sold as a percentage of revenue for Seagen is projected to decrease by 2pp over the forecasting period. This decline is primarily attributed to the potential combination of production facilities and an increase in output, leveraging economies of scale to lower per-unit production costs. Additionally, efficiency gains in the supply chain and consolidated purchasing power contribute to overall cost savings (Deloitte 2019). Any additional cost of goods sold associated with top-line revenue synergies is also accounted for at the NewCo cost of goods sold, with 25.00% on average.

D. SG&A

In the pharmaceutical sector, M&As offer the opportunity to significantly reduce SG&A costs through strategic initiatives. Streamlining administrative functions, eliminating redundancies, and leveraging technology enhance operational efficiency, directly contributing to cost savings. Operational efficiency post-mergers are achieved through streamlined administrative and

support functions. Additionally, consolidating redundant tasks ensures a more efficient resource allocation within the integrated entity. Ultimately, the optimized use of technology and shared infrastructure enhances the cost efficiency of the merged pharmaceutical company. These strategic considerations underscore the potential for a significant reduction in SG&A costs, projecting an expected decrease of Seagen's SG&A expenses as a percentage of revenue by 0.59pp or 2.00%.

E. R&D

The sharing of resources within the merged company not only improves the allocation of R&D personnel and infrastructure but also actively promotes the efficiency of the overall development process. This collaborative approach also extends to the elimination of duplicate R&D expenses and products through a careful review of the portfolios. For this reason, five Seagen pipeline products will be eliminated due to overlap with the Pfizer portfolio, resulting in significant cost savings. In addition, the rationalization of clinical trials and the integration of complementary technologies play a crucial role in cost synergies. By improving the efficiency of testing processes and minimizing the need for external collaborations, these measures contribute significantly to overall cost efficiency, which leads to an overall expected decrease in annual R&D expenses by 2.00% per pipeline item for Seagen’s products.

F. Advertising

Seagen's strategic expansion into global markets through Pfizer's established infrastructure is a significant move. However, this growth expansion entails an anticipated 100.00% increase in Seagen's advertising expenditure. This increased investment is crucial for effectively promoting and positioning Seagen's products in new international markets, utilizing the strength of Pfizer's infrastructure to establish a robust global presence.

G. Depreciation & Amortization

The combined depreciation and amortization patterns are influenced by the revenue dynamics, particularly the challenges associated with the patent cliff. Despite the overall rising trend in

depreciation, excluding and including synergies, there are fluctuations tied to revenue variations. These fluctuations, reflecting the patent cliff's impact on revenue, influence the shifting percentages of depreciation and amortization concerning revenue. The upward trajectory in combined depreciation indicates sustained capital expenditure, while the declining trends in amortization, excluding and including synergies, showcase efficiency gains in managing intangible assets.

H. Implementation Costs

The implementation costs in the years 2024 till 2026, a consistent annual amount of $500.00m was considered, representing in total 5.00% of the enterprise value of the target, aligning with EY research. Integration costs are observed to fluctuate from 1.00% to 7.00% of the deal value, with deals exceeding US$10 billion incurring comparatively lower costs than those below this threshold (EY, 2019).

I. Litigation

Seagen has not reported litigation costs in the past. Nevertheless, it is anticipated that with each new drug approval and patent expiration, legal challenges may emerge that will require Pfizer's robust capabilities in this area. The estimated cost for each lawsuit involving Seagens future products or patent expiration in the NewCo is $30.46 million. This strategic anticipation for legal challenges aligns with Pfizer's proficiency in constantly managing and engaging in litigation.

J. Income taxes

The acquisition marks a substantial change in Seagen's financial obligations, where the Earnings Before Taxes (EBT) it contributes to the Combined Firm is now subject to Pfizer's higher tax rate of 15.00%. Unlike Seagen, Pfizer cannot capitalize on the lower taxes previously associated with carry forwards. Over the forecasted period until 2032, a total of $2,247.09 million in additional tax costs accrue, reaching its peak in 2031 at $368.70 million (Pfizer 2023c).

K. Margins

The analysis of various financial margins, encompassing gross profit margin, EBITDA margin, EBIT margin, and EBT margin, both with and without synergies, reveals distinctive trends in the overall operational efficiency and profitability of the combined entity during the forecasting period. A notable increase in the margins in the early years indicates improved operational efficiency and profitability. However, the decline observed in the middle years, especially from 2025 to 2029, deserves attention. This decline is mainly due to the expiring patents, which are to be cushioned by the acquisition of Seagen. Due to the synergies, the low point of the margins in the forecasting period is reached in 2029 and is on average 2.00% higher with synergies. The subsequent recovery and the upward trend towards the end of the forecast period indicate the successful integration of Seagen into the NewCo, which will contribute to the higher profitability of NewCo.

6.2. Results

Considering all the detailed assumptions to derive synergies and dis-synergies from the previous subsection and discounting the Combined Free Cash Flow using the calculated Weighted Average Cost of Capital (WACC) at 6.12%, the total synergy value amounts to $20,720.22m. The total synergy value translates to a per share value of $112.20, representing the potential gains through an M&A deal between Pfizer and Seagen, as demonstrated in Figure 1.17. Furthermore, a detailed listing of the composition of the synergies as well as the synergy forecast for the optimistic and pessimistic case can be find in Table 1.11.-1.15. in the appendix.

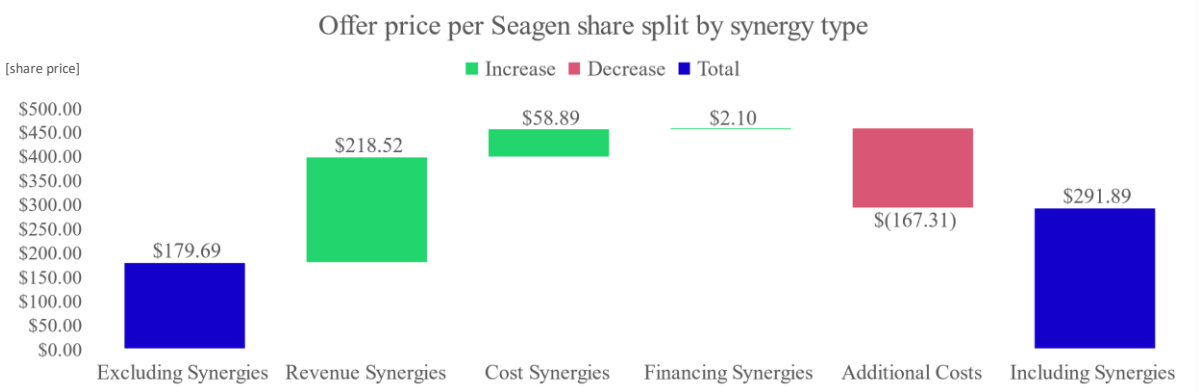

Figure 1.17. *Estimated Synergies and Costs per Seagen Share*

6.3. Strategic Implications

The economically feasible offer prices will fall within the range defined by the enterprise value of Seagen as the lower boundary and the EV of Seagen, including synergies, as the upper bound. In contrast to M&A cycles, the seller's share isn't tied to market fluctuations but is influenced by factors such as the negotiation dynamics between the buyer and seller, as well as the level of competition between potential acquirers bidding for the target. According to a study published in 2018, the average amount of synergies given to target shareholders in an acquisition through payment of premiums in the healthcare industry amounts to 0.51 (Kengelbach et al. 2013). This aligns with reports that a couple of companies, including Merck & Co, expressed interest in acquiring Seagen. The competitive landscape was evident as these companies negotiated an offer price above $200.00 per Seagen share in July 2022, establishing a baseline for subsequent negotiations (Davis 2022). Consequently, Seagen held a strong negotiating position in discussions with Pfizer. Applying this, the offer should not exceed $57.22 synergy value per share or $236.91 per Seagen share.

Academic research has persistently highlighted that approximately two-thirds of M&A among public companies fail to deliver value, at least in the short term. Despite this scepticism prevalent in capital markets, the overarching rationale for M&A—value creation—remains valid, as evidenced by a significant minority of successful acquisitions (Kengelbach et al. 2013). For Pfizer to capitalize on its acquisition of Seagen and generate sustainable value, several crucial factors must be considered to ensure long-term profitability. First and foremost, the

internationalization of Seagen's products emerges as a pivotal strategy. This is essential for expanding market share in the oncology sector and realizing the anticipated revenue synergies. The timely realization of revenue synergies becomes paramount, serving as a strategic buffer against the impending patent cliff. Additionally, cost optimization in Research and Development is of great importance. By reducing R&D costs, Pfizer can leverage shared research facilities, eliminate overlaps, and streamline focus areas, ultimately fostering efficiency. Considering Pfizer's need to offset the decline in expected sales of COVID-19-related products and upcoming patent expirations. Seagen's leading position in ADCs and the complexity of its drugs create high hurdles for competitors seeking to develop lower-cost biosimilar versions. Moreover, the ADC technology not only establishes barriers to entry but also facilitates the progress of new developments, contributing to a positive impact on launches. This complexity makes Seagen an essential asset in Pfizer's portfolio and represents a potential long-term value driver. Despite the positive outcomes, it's crucial to approach the outcomes with caution due to limitations. The analysis for the stand-alone and combined valuation relies on assumptions and faces uncertainties related to future macroeconomic conditions. Mitigating these limitations requires refining existing models and considering alternative financial metrics. The presented approach suggests the forecast of balance sheets and the computation of metrics like ROIC, RONIC, and RR. To enhance robustness, additional valuation methods like APV, FTE, EVA, or DDV can be employed to derive the most accurate share prices for the companies. The Pfizer and Seagen pipeline analysis, constrained by the challenge of predicting market share development, opts for an average market share approach. Future research could enhance reliability by employing more complex methods to capture the dynamic nature of market competition. However, it is crucial to be aware of the inherent challenge of predicting future decisions with absolute certainty. Continuous monitoring and the ongoing adjustment of assumptions in response to changing market environments are essential.

6.4. How the Deal turned out

Pfizer has successfully entered into a definitive merger agreement to acquire Seagen for $229 per share in cash, which equals an alpha of 27.44% compared to the share price as of 28.02.2023, totalling an enterprise value of approximately $43.00bn. Seagen is expected to contribute over $10.00bn in risk-adjusted revenues by 2030. The acquisition positions Pfizer as a leader in ADC technology, as Seagen is a pioneer in this field with four FDA-approved ADCs. The deal is anticipated to be completed in late 2023 or early 2024. Pfizer plans to finance the transaction through new long-term debt and expects nearly $1.00bn in cost efficiencies by the third full year after closing (Pfizer 2023c). In addition, Pfizer announced on December 12, 2023, that all necessary regulatory approvals have been granted to complete the acquisition of Seagen (Pfizer 2023e).

7. Influencing Factors on Abnormal Returns in R&D Intensive Industries for Non-U.S. Acquirers – Individual Part by Dora Gyorko

7.1. Introduction

One of the most prominent finance theories is the efficient market hypothesis, claiming that all available information on the market should be reflected in share prices (Fama 1970). Thereby, share prices should fully and quickly incorporate the effect of announcements related to M&A deals and additional profits cannot be earned through the analysis of the transactions. Instead, the market can experience a phenomenon of over- or under-reaction for both short and long run, meaning that M&A deals are examples of market anomalies (Celenza and Rossi 2012). The market reaction on M&A announcement can be measured through the presence and significance of abnormal returns (McWilliam and Siegel 1997). Abnormal returns are the difference of the expected returns that would be realized if the M&A announcement did not happen and the actual realized returns of the stocks (MacKinley 1997). The expected return can be the market return or the historical average stock return, and can be calculated with the market model or the capital asset pricing model developed by Sharpe (1964). Several academic literatures (Ma, Pagán, and Chu 2009; Sehgal, Banerjee, and Deisting 2012; Zaremba and Plotnicki 2016) suggest measuring the total impact of M&A announcements, thus CARs – the sum of individual abnormal returns – are calculated over a three-day event window, starting at the day before the announcement and ending at the day after the announcement. On the short-term, announcement period three-day CARs tend to be positive for target companies and negative for acquirer firms mainly attributable to overestimation and overpayment (Andrade, Mitchell, and Stafford 2001). Most of the prior academic studies focus on the acquirer's value creation and discover controversial findings regarding announcement returns. Acquirer CARs around the announcement are positive, e.g. 2.00% in India (Rani, Yadav, and Jain 2013), 4.73% in Japan (Higgins and Beckman 2006), and 1.18% in 18 European counties (Goergen and Renneboog 2004); however negative returns are also measured, e.g. -2.12% in OECD countries (Kuipers,

Miller, and Patel 2009), -2.37% in Sweden (Doukas, Holmén, and Travlos 2002), and -0.01% in developed and developing countries (Beitel, Schiereck, and Wahrenburg 2002). Moving on to R&D-heavy industries, Dutta and Kumar (2009) examine the effect of R&D intensity on bidding companies' abnormal returns by analysing 925 Canadian M&A transaction between 1993 and 2002. The findings suggest that R&D intensity significantly contributes to positive CARs for acquirers around the announcement date. This signals that market reaction tends to be favourable for M&A transactions involving R&D-intensive firms. Furthermore, Takechi (2011) finds that R&D intensity is negatively related to domestic M&A activities, suggesting that companies with lower levels of technology intensity exhibit a preference for engaging in domestic M&A. In the context of cross-border M&A deals, firm R&D activities have a positive and significant impact, suggesting that companies' own technology is important for integrating foreign technology and engaging in competition in oversea countries.

7.2. Literature Review

This chapter comprises a review of the existing academic literature on the influencing factors of the acquirer CARs for non-US M&A transactions. Four hypotheses (Table 5.1 in the appendix) are developed – based on acquirer size, method of payment, industry relatedness and geographical similarity – to answer the following research question: *What are the influencing factors on cumulative abnormal returns in R&D-intensive industries for non-US acquirers?*

The size of the acquirer company can have significant influence on the acquirer CARs. Zhao, Ma, and Hao (2019) analyse M&A deals from 2003 to 2014 in Chinese Stock Markets and derive a conclusion that large acquirers generate lower returns than small acquirers around the announcement date. Studying 1,900 Australian acquisition cases between 1993 and 2007, Humphery-Jenner and Powell (2011) find that small acquirers generate higher announcement returns than large ones. Several further literatures prove the existence of the acquirer size effect: Kraussl and Topper (2007) in the Netherlands, Byun and So-Rim (2007) in Korea, and Ma,

Chu, and Beaves (2020) in Asian emerging markets. The acquirer size effect can be explained by four phenomenas. Firstly, large acquirers tend to buy publicly listed companies, while small firms are more likely to buy private targets or subsidiaries. However, Fuller, Netter, and Stegemoller (2002) believe that the acquisitions of listed targets yield lower CARs for the acquirer. Secondly, managers of large firms suffer from hubris and tend to overpay the target (Roll 1986). Thirdly, internal growth opportunities have been exhausted, therefore the acquirer is looking for new growth potentials in target companies. This is a sign to the market of weak internal growth, leading to low abnormal returns. Fourthly, empire-building managements of large firms consider new acquisition rather than dividend payments to shareholders (Zhao, Ma, and Hao 2019). Based on the literature review on the acquirer size effect, the following hypothesis is derived:

H_1: The acquirer cumulative abnormal returns around the initial announcement date are inversely related to the size of the acquirer due to perceived large acquirer inefficiencies and incentive misalignments.

Empirical studies examine the relationship between the method of payment and the acquiring companies CARs in the announcement period. Myers and Majluf (1984) analyse the presence of asymmetric information in M&A deals and explain that only the acquirer knows the value of the company's stock, therefore choose the method of payment which is more appealing. Cash payment implies the undervaluation of the acquirer as it would be more expensive to pay by stocks and the acquirer's higher confidence in the deal. As a result, pure cash payment is likely to yield positive announcement returns for bidders (Ismail and Krause 2010). On the other hand, stock payment signals the overvaluation of the acquirer's stocks and the acquirer's uncertainty regarding the deal. Stock payment means that the acquirer can share the risk with the target's shareholders which can increase its confidence in the deal. Therefore, acquirers tend to earn negative abnormal returns when equity payment method is chosen (Martynova and Renneboog 2009). Isa and Lee (2010) analyse the market reaction in M&A deals between 2000 and 2005

in Malaysia. Their findings prove the presence of positive CARs of 1.43% (significant at 1%) around the announcement for pure cash payment. Martynova and Renneboog (2011) investigate 2,109 European M&A transactions for the period 1993 to 2001 and find that acquirers with pure cash payment earn significantly positive abnormal returns (1.03%) around announcements, whereas stock payment yields insignificant returns for the acquirers. Further literatures – focusing on the Indian (Rani, Yadav, and Jain 2014b) and Canadian (Dutta, Saadi, and Zhu 2013) markets – support the idea that pure cash payment yields higher acquirer CARs than pure stock or mixed payments, thus the subsequent hypothesis is established:

H_2: Pure cash payments are associated with higher acquirer cumulative abnormal returns around the initial announcement date driven by investors' perception of acquirer stock overvaluation and deal uncertainty when stock is used.

A further interesting topic in the literature is the influence of industry relatedness between acquirer and target on the acquirer CARs. The major motive to acquire a target from the same industry is the possibility to realise operating synergies. If the parties operate in the same industry, they are likely to have similar products, technologies, markets, routines, and distribution channels (Seth, Song, and Pettit 2000; Homberg, Rost, and Osterloh 2009). These similarities are great potential for a successful strategic fit, economies of scale and scope, diffusion of innovations, lower integration costs and lower managerial slack (Gregory and O'Donohoe 2014; Bertrand and Zitouna 2008). Additionally, supportive evidence is found by Goergen and Renneboog (2004) on the positive effect of industry relatedness in M&A transactions. The reasoning behind this is that acquirers should avoid creating diversified portfolios with unrelated companies, since investors possess superior skills in diversification. In other words, "diversification is easier and cheaper for the stockholder than for the corporation" (Brealey, Myers, and Allen 2011). The findings of Barai and Mohanty (2010) support the connection between industry relatedness and positive market reaction, as acquirer CARs are significantly positive in related transactions and insignificant in unrelated

acquisitions in India. Another supporting literature on same-industry M&A deals (Homberg, Rost, and Osterloh 2009) claims that business relatedness affects the acquirer's short-term performance, as the 6.7% increase of shareholder value in the five-day window is significant at 1% confidence level. Based on the similarity of prior academic literature, the following hypothesis is formulated:

H_3: The acquirer cumulative abnormal returns around the initial announcement date in same-industry M&A deals are higher due to higher synergy expectations and the avoidance of the conglomerate discount effect.

Existing literature is also rich in analyses with a focus on the international characteristic of the deal. The market might critically observe cross-border M&A deals as they are more complex, their execution is more costly and risky, compared to domestic acquisitions. Agency conflict between shareholders and managers can also be larger in cross-border transactions, thus bidders are anticipated to underperform in cross-border than in domestic deals (Gigante, Cerri, and Leone 2023; Danbolt and Maciver 2012). Additionally, major institutional differences in the countries of acquirer and target can cause complications in the integration process and the utilization of perceived synergies (Conn et al. 2005). Goergen and Renneboog (2004) analyse UK M&A deals and observe negative correlation between the internationality and the acquirer CARs. The finding is unexpected as foreign direct investment theories deem that acquirers can face new opportunities, exploit imperfections in capital markets, expand their business into new territories, and thus earn higher announcement returns (Gregory and O'Donohoe 2014; Moeller and Schlingemann 2005). Supporting these outcomes, Aw and Chatterjeen (2004) experience positive correlation between the cross-border characteristic and the acquirer CARs. The M&A transactions from the UK show that the opportunities of cross-border acquisitions overweigh the potential risks of going abroad. Despite the controversial findings in prior academic literatures, the following hypothesis is formed:

H_4: The acquirer cumulative abnormal returns around the initial announcement date in

domestic M&A deals are higher due to a higher level of risk and complexity associated with cross-border deals.

Existing academic literatures incorporate fixed effects analysis within their ordinary least squares regression models to account for fixed effects related to time and industry, contributing to a more comprehensive and nuanced analysis (Schiffbauer, Siedschlag, and Ruane 2017; Dong and Doukas 2021; Bertrand and Zuniga 2006).

7.3. Methodology and Sample Selection

The regression is performed on a sample of M&A transactions from non-US countries between 28th November 2003, to 28th November 2023. The analysis focuses on R&D-heavy industries, measured as R&D expenses as percentage of net sales in 2020. The sample includes the following industries with the highest R&D intensity: Pharmaceuticals & Medical Research at 12.4%, Software & IT services at 8.7%, Technology Equipment at 7.4%, Automobile & Auto Parts at 5.0% and Industrial Parts (consisting of aerospace and defence) at 4.0% (EFPIA 2022). The sample data is retrieved from Refinitiv and SDC Platinum database and includes M&A deals from non-US countries' R&D-intense industries. The primary data set comprises 11,742 observations. Due to a lack of data availability on observed variables, 11,447 M&A deals are excluded from the data set. The final sample used in the regression consists of 295 observations (Automobiles & Auto Parts 19, Industrial Goods 6, Pharmaceuticals & Medical Research 102, Software & IT Services 70, Technology Equipment 98).

To measure the market reaction upon the M&A announcement, the respective dependent variable of the regression is the acquirer cumulative abnormal return (CAR). The acquirer companies' daily returns are adjusted with the corresponding daily returns of the MSCI World Ex United States Price Index. The CARs are calculated on a three-day event window, from one day prior to one day after the announcement, as it is suggested by academic literatures (Ma, Pagán, and Chu 2009; Sehgal, Banerjee, and Deisting 2012; Zaremba and Plotnicki 2016). In

addition, the regression consists of seven independent variables (Table 5.2 in the appendix) which can be split into deal- and company-specific classifications. Deal-specific variables consist of the deal value (DV), a dummy variable for method of payment (Payment) set to one if the deal is fully paid in cash and zero otherwise, the percentage of target shares owned by the acquirer post-transaction (Share), a dummy variable for industry relatedness (Industry) set to one if the acquirer and target are operating in the same Thomson Reuters Business Classification (TRBC) business sector and zero otherwise, and a dummy variable for internationality (Domestic) set to one if the deal is domestic and zero otherwise. Company specific variables include target R&D expenses as percentage of net sales (TRD), and acquirer market value (AMV). The log transformation is performed for the variable deal value, target R&D intensity and acquirer market value to account for skewness and reach normal distribution (West 2021). Financial figures are derived from 12-month figures ending on the date of the most recent financial information prior to the announcement of the transaction. Summary statistics (Table 5.3, Table 5.4 in the appendix) provide further insights into the above-mentioned variables of the data set. Accordingly, the following regression model is tested to evaluate the four hypotheses established previously:

$$CAR = \beta_0 + \beta_1 \text{Payment} + \beta_2 Share + \beta_3 Industry + \beta_4 Domestic + \beta_5 \log(TRD) + \beta_6 \log(DV) + \beta_7 log(AMV) + \varepsilon_i \quad (8)$$

To eliminate the impact of outliers on the regression results, continuous variables are winsorized at the 10% level. The analysis relies on the six key Gauss-Markov assumptions, as this theorem is crucial for the validity of the ordinary least squares regression (Table 5.7, Table 5.8 in the appendix). Thereby, the OLS estimates become the best linear unbiased estimators and valid statistical inferences can be drawn. Linearity is tested to ensure a linear relationship between the independent and each dependent variable. Multicollinearity assesses the linear relationship between independent variables, which should not exist as independent variables

must not be a linear function of each other (Table 5.9, Table 5.10 in the appendix). Omitted variables bias is also checked to guarantee that the model has no omitted variables (Burton 2021). Other tests are not required as the data set is cross-sectional implying that autocorrelation is not a concern (Brooks 2008), and heteroscedasticity is already addressed with the application of robust standard errors. Year and industry fixed effects are included to mitigate biases arising from time and industry specific factors, thereby control for clustering in the M&A activity of non-U.S., R&D heavy companies (Table 5.5, Table 5.6 in the appendix).

7.4. Empirical Results

Table 5.11 presents the results of the regression models performed on the determinants of acquirer CARs in non-U.S. M&A transactions. Four regression analyses are conducted, featuring robust standard errors and industry and/or year fixed effects.

Variables	Robust OLS	Industry FE	Year FE	Industry / Year FE
Payment	0.024***	0.025***	0.022***	0.023***
	(0.006)	(0.006)	(0.006)	(0.007)
Share	0.013	0.016	0.012	0.014
	(0.020)	(0.020)	(0.020)	(0.020)
Industry	0.005	0.003	0.004	0.001
	(0.009)	(0.009)	(0.009)	(0.009)
Domestic	0.014*	0.019**	0.014*	0.018**
	(0.008)	(0.008)	(0.008)	(0.008)
log(Target R&D Intensity)	-0.000	-0.001	0.000	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
log(Deal Value)	0.001	0.000	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
log(Acquirer Market Value)	-0.004**	-0.003*	-0.003*	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	-0.008	-0.026	-0.008	-0.027
	(0.024)	(0.026)	(0.029)	(0.031)
Observations	295	295	295	295
R-Squared	0.0617	0.0860	0.1009	0.1230
Robust Standard Errors	Yes	Yes	Yes	Yes

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses

Table 5.11 Regression Results

Hypothesis one highlights the inverse relationship between the acquirer CARs around announcement and the acquirer size. The result of the regression supports the hypothesis as the

coefficient on acquirer market value amounts to -0.004, meaning that a 1% increase in the acquirer's market value would lead to a 0.004pp decrease in the acquirer CARs. The coefficient is significant at the 5% confidence level, thereby hypothesis one can be accepted. The findings are in line with existing academic literature of Zhao, Ma, and Hao (2019), Humphery-Jenner and Powell (2011), Kraussl and Topper (2008), Byun and Ahn (2007).

Hypothesis two on method of payment says that pure cash payment is associated with higher acquirer CARs. The OLS coefficient of 0.024 implies an expected rise in the acquirer CARs of 2.40pp when the payment method changes to pure cash from pure stock or mixed. The corresponding p-value amounts to 0.001, meaning that the coefficient is significant at the 1% confidence level. Therefore, hypothesis two can be accepted and aligns with previous research findings of Isa and Lee (2010), Martynova and Renneboog (2011), Rani, Yadav, and Jain (2014b).

Hypothesis three on industry relatedness declares that if the acquirer and target operate in the same industry, the acquirer CARs around the announcement are higher due to higher synergy expectations. The positive coefficient of 0.005 supports the hypothesis, suggesting that same industry M&A transactions lead to an increase in acquirer CARs or 0.5pp. However, the p-value of 0.561 signals the insignificance of industry relatedness, therefore hypothesis three cannot be accepted. Despite the insignificance, the findings of the OLS are consistent with the academic papers of Barai and Mohanty (2010), and Homberg, Rost, and Osterloh (2009).

Hypothesis four states that the acquirer CARs around the initial announcement date in domestic M&A deals are higher due to a higher level of risk and complexity associated with cross-border deals. The regression coefficient of 0.014 indicates a 1.4pp expected increase in the acquirer CARs when the deal is domestic rather than cross-border. The hypothesis on the internationality of M&A deals can be accepted at the 10% confidence level. Therefore, the findings are aligned with prior studies of Goergen and Renneboog (2004), Danbolt and Maciver (2012); however, inconsistent with academic literature of Gregory and O'Donohoe (2014), Moeller and

Schlingemann (2005).

After incorporating industry, year and their combined fixed effects, the results remain roughly the same. Although, the corresponding R-squares of the OLS regressions increase to 8.6%, 10.1%, and 12.3%, the value and significance of the coefficients are similar. In line with the robust OLS regression, method of payment, internationality and acquirer size have a statistically significant impact on abnormal returns, if the analysis accounts for the variability associated with the five R&D-heavy industries or the time period of twenty years.

7.5. Conclusion

This study analyses the primary determinants of acquirers CARs in M&A deals through a new approach with the focus on R&D-heavy industries and transactions comprising non-U.S. acquirers. The main influencing factors are payment method, internationality and acquirer size, as pure cash payment and domestic deals are associated with higher announcement returns, while acquirer size-effect leads to lower announcement returns. These empirical findings enhance the comprehension of the complex dynamics affecting acquirers' market reaction upon announcement in R&D-heavy industries.

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9. Appendix Common Part

Figure 1.2. Biopharma M&A Activity [$ billion]

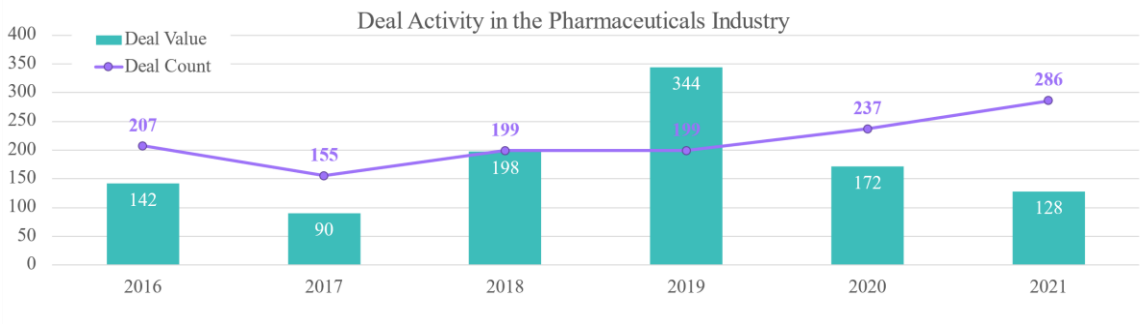

Figure 1.3. Pfizer Historic Revenues Split between non-COVID-19 and COVID-19 [$ million]

Figure 1.5. Pfizer relative Revenues Share per Therapeutic Area

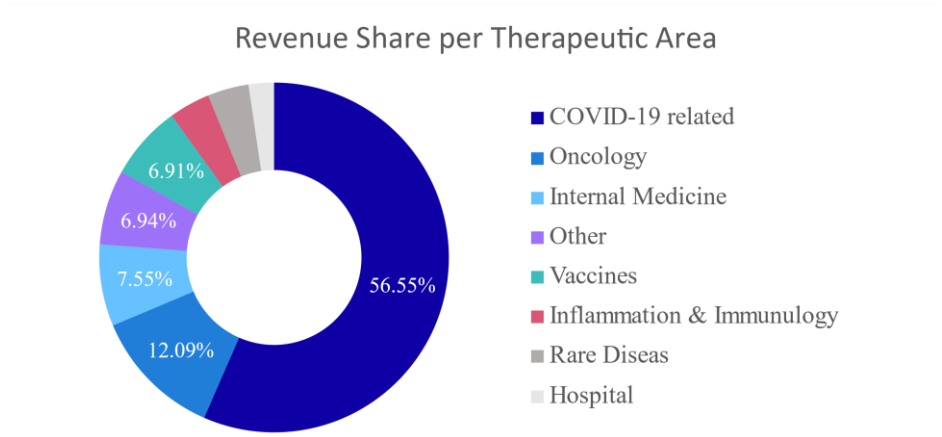

Figure 1.8. Pfizer Forecasted Revenue Streams (Optimistic Case) [$ million]

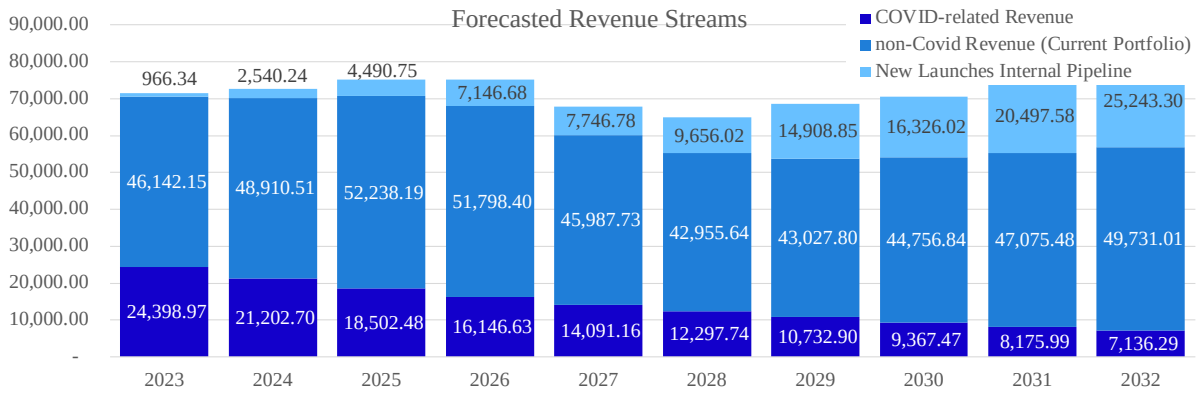

Figure 1.9. Pfizer Forecasted Revenue Streams (Pessimistic Case) [$ million]

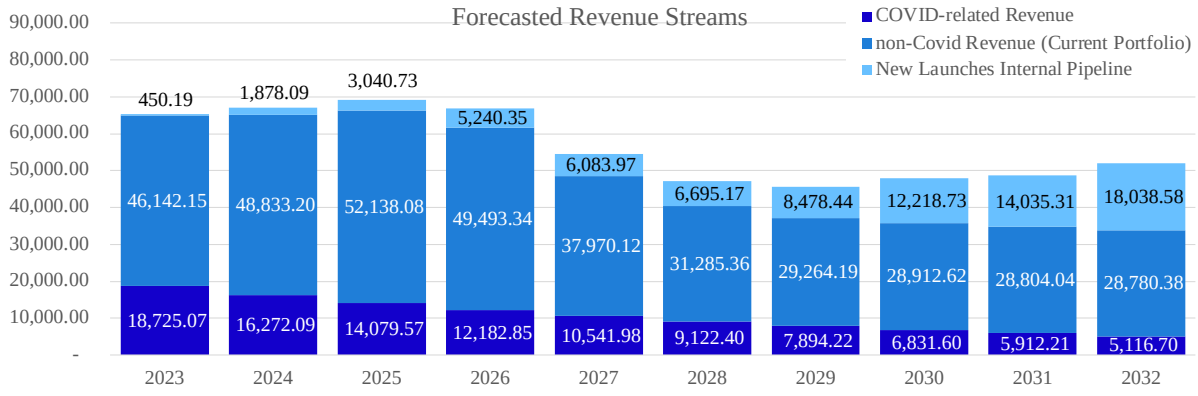

Figure 1.11. Seagen Historic Revenue Streams [$ million]

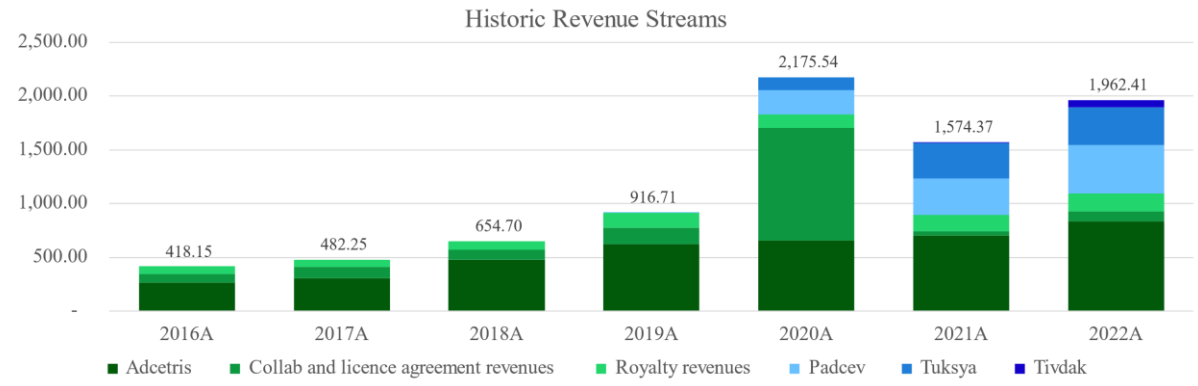

Figure 1.14. Seagen Forecasted Revenue Streams (Optimistic Case) [$ million]

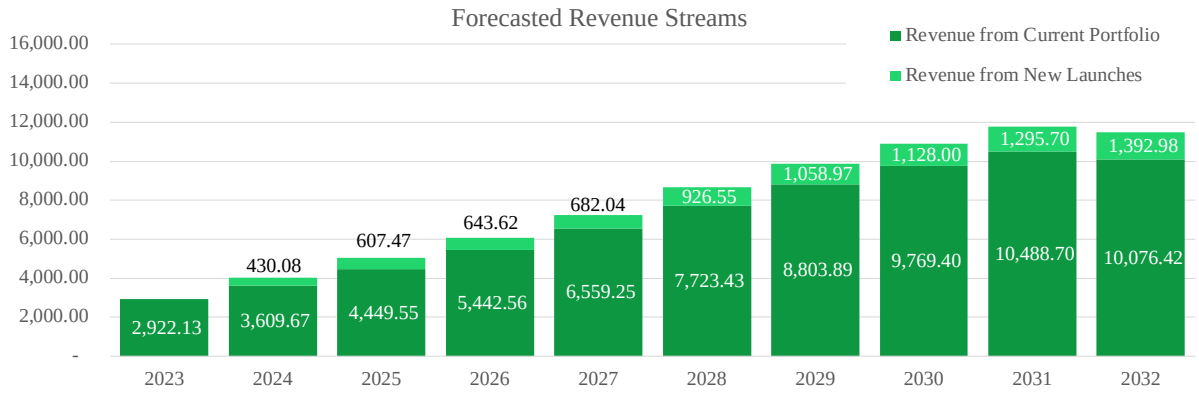

Figure 1.15. Seagen Forecasted Revenue Streams (Pessimistic Case) [$ million]

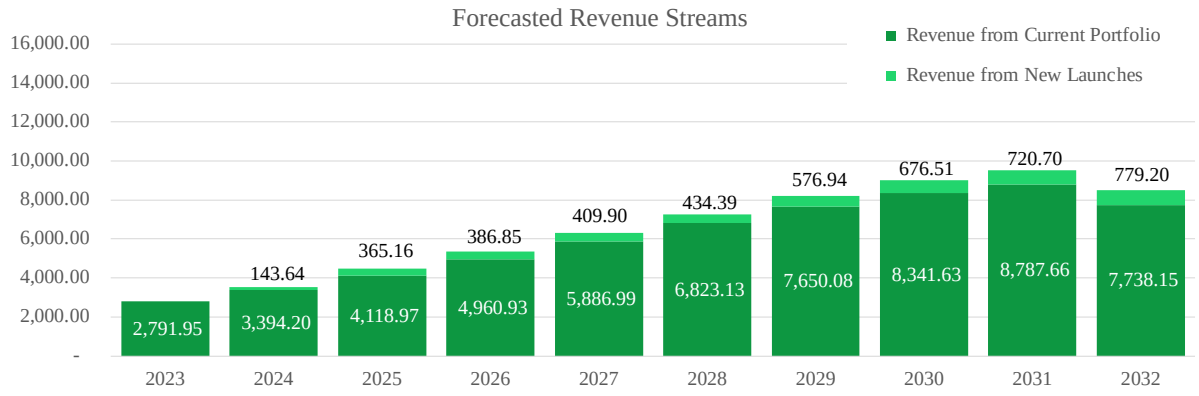

Table 1.1. Time until Approval per Phase and Drug Category in Years

Category	Phase I	Phase II	Phase III	Registration
Inflammation and Immunology	**8.8**	**6.0**	**2.6**	**0.6**
Allergy	8.6	5.9	2.6	0.6
Autoimmune	9.0	6.1	2.7	0.6
Internal Medicine	**9.3**	**6.6**	**3.1**	**0.7**
Autoimmune	9.0	6.1	2.7	0.6
Neurology	10.1	7.2	3.5	0.8
Gastroenterology	10.0	7.3	3.4	0.7
Endocrine	8.0	6.4	3.7	0.9
Cardiovascular	10.4	7.3	3.3	0.6
Oncology	9.0	5.8	2.4	0.4
Metabolic	8.5	5.9	2.8	0.6
Oncology	**9.0**	**5.8**	**2.4**	**0.4**
Rare Diseases	**9.2**	**6.7**	**3.3**	**0.8**
Endocrine	8.0	6.4	3.7	0.9
Hematology	9.6	6.8	3.3	0.8
Neurology	10.1	7.2	3.5	0.8
Gastroenterology	10.0	7.3	3.4	0.7
Metabolic	8.5	5.9	2.8	0.6
Vaccines	**8.8**	**6.1**	**2.8**	**0.6**
Infectious disease	8.8	6.1	2.8	0.6
Anti-Infectives	**8.8**	**6.1**	**2.8**	**0.6**
Infectious disease	8.8	6.1	2.8	0.6

Table 1.2. Selected Market Research Data for Pfizer Pipeline Forecast

Market	Year	Market Size	CAGR
Covid Market	2021	30,700,000,000.00	-8.30%
Antifungal Treatment Market	2022	18,900,000,000.00	6.40%
Respiratory Syncytial Virus Market	2020	609,200,000.00	30.90%
Complicated Urinary Tract Infections	2023	9,200,000,000.00	5.76%
Invasive Group B Streptococcus Infection	2022	42,680,000.00	4.41%
Global Influenza Vaccine Market	2023	6,224,684,049.00	7.20%
Influenza & Covid	2023	32,039,976,349.00	-5.29%
Focal Segmental Glomerulosclerosis	2021	20,250,000,000.00	8.90%
Wilson's Disease	2022	527,000,000.00	6.70%

Table 1.3. Pfizer Forecasted Income Statement and Free Cash Flow [$ million]

Pfizer [USD, million]	2023F	1.-2.2023F	3.-12.2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
COVID-related Revenue	**21,562.02**	**3,420.70**	**18,141.32**	**18,737.40**	**16,282.80**	**14,149.75**	**12,296.13**	**10,685.34**	**9,285.56**	**8,069.15**	**7,012.09**	**6,093.51**
YoY Change	*-62.00%*		*-13.10%*	*-13.10%*	*-13.10%*	*-13.10%*	*-13.10%*	*-13.10%*	*-13.10%*	*-13.10%*	*-13.10%*	*-13.10%*
% of Revenue	*31.53%*	*31.53%*	*31.53%*	*26.82%*	*22.57%*	*19.90%*	*20.10%*	*19.58%*	*16.72%*	*14.00%*	*11.90%*	*9.53%*
non-Covid Revenue (Current Portfol	**46,142.15**	**7,320.21**	**38,821.95**	**48,875.46**	**52,179.94**	**50,735.39**	**41,965.76**	**36,291.31**	**34,691.95**	**35,049.92**	**35,838.45**	**36,786.30**
YoY Change	*5.85%*		*5.92%*	*6.76%*	*-2.77%*	*-17.29%*	*-13.52%*	*-4.41%*	*1.03%*	*2.25%*	*2.64%*	
% of Revenue	*67.48%*	*67.48%*	*67.48%*	*69.97%*	*72.34%*	*71.36%*	*68.61%*	*66.51%*	*62.48%*	*60.80%*	*60.84%*	*57.55%*
New Launches Internal Pipeline	**677.19**	**107.43**	**569.76**	**2,242.04**	**3,668.07**	**6,211.46**	**6,901.25**	**7,590.22**	**11,551.11**	**14,524.74**	**16,055.93**	**21,040.11**
YoY Change				*231.08%*	*63.60%*	*69.34%*	*11.11%*	*9.98%*	*52.18%*	*25.74%*	*10.54%*	*31.04%*
% of Revenue	*0.99%*	*0.99%*	*0.99%*	*3.21%*	*5.09%*	*8.74%*	*11.28%*	*13.91%*	*20.80%*	*25.20%*	*27.26%*	*32.92%*
Total Revenue	**68,381.37**	**10,848.34**	**57,533.03**	**69,854.90**	**72,130.81**	**71,096.60**	**61,163.14**	**54,566.87**	**55,528.62**	**57,643.82**	**58,906.47**	**63,919.92**
% change	*-31.84%*			*2.15%*	*3.26%*	*-1.43%*	*-13.97%*	*-10.78%*	*1.76%*	*3.81%*	*2.19%*	*8.51%*
% Market Share	*7.10%*			*6.72%*	*6.40%*	*5.81%*	*4.60%*	*3.77%*	*3.52%*	*3.35%*	*3.13%*	*3.11%*
Costs of Good Sold (-)	**20,985.98**	**3,076.23**	**17,571.15**	**20,645.72**	**20,265.33**	**19,672.77**	**16,446.80**	**14,572.81**	**15,276.69**	**14,916.74**	**14,289.98**	**15,977.52**
% of Revenue	*30.69%*	*14.90%*	*85.10%*	*29.56%*	*28.10%*	*27.67%*	*26.89%*	*26.71%*	*27.51%*	*25.88%*	*24.26%*	*25.00%*
Gross Profit	**47,395.39**	**7,772.11**	**39,961.87**	**49,209.18**	**51,865.47**	**51,423.83**	**44,716.34**	**39,994.06**	**40,251.93**	**42,727.08**	**44,616.49**	**47,942.40**
% change	*-27.90%*			*3.83%*	*5.40%*	*-0.85%*	*-13.04%*	*-10.56%*	*0.64%*	*6.15%*	*4.42%*	*7.45%*
Gross Margin	*69.31%*	*71.64%*	*69.46%*	*70.44%*	*71.90%*	*72.33%*	*73.11%*	*73.29%*	*72.49%*	*74.12%*	*75.74%*	*75.00%*
Operating Expenses (-)	**21,298.09**	**4,305.21**	**18,243.29**	**20,464.76**	**22,593.54**	**23,363.76**	**23,255.33**	**23,322.12**	**25,411.71**	**24,366.28**	**24,155.74**	**24,496.13**
% of Revenue	*31.15%*	*6.30%*	*31.71%*	*29.30%*	*31.32%*	*32.86%*	*38.02%*	*42.74%*	*45.76%*	*42.27%*	*41.01%*	*38.32%*
EBITDA	**26,097.29**	**3,466.90**	**21,718.58**	**28,744.43**	**29,271.94**	**28,060.07**	**21,461.01**	**16,671.93**	**14,840.22**	**18,360.80**	**20,460.74**	**23,446.28**
% change	*20.16%*			*10.14%*	*1.84%*	*-4.14%*	*-23.52%*	*-22.32%*	*-10.99%*	*23.72%*	*11.44%*	*14.59%*
EBITDA Margin	*38.16%*	*31.96%*	*37.75%*	*41.15%*	*40.58%*	*39.47%*	*35.09%*	*30.55%*	*26.73%*	*31.85%*	*34.73%*	*36.68%*
Depreciation (-)	**2,156.42**	**355.25**	**1,801.17**	**2,583.79**	**2,859.46**	**2,875.88**	**3,101.12**	**2,205.44**	**1,958.27**	**2,842.10**	**2,550.59**	**2,101.22**
% of previous year CapEx	*66.64%*	*16.47%*	*83.53%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*
Amortization of intangible assets (-)	**6,946.73**	**1,166.91**	**5,779.82**	**7,096.42**	**7,327.63**	**7,222.57**	**6,213.44**	**5,543.34**	**5,641.05**	**5,855.92**	**5,984.19**	**6,493.50**
% of Revenue	*10.16%*	*16.80%*	*83.20%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*
EBIT	**16,994.14**	**1,944.74**	**14,137.60**	**19,064.21**	**19,084.85**	**17,961.62**	**12,146.44**	**8,923.15**	**7,240.90**	**9,662.78**	**11,925.96**	**14,851.56**
% change	*-54.84%*			*12.18%*	*0.11%*	*-5.89%*	*-32.38%*	*-26.54%*	*-18.85%*	*33.45%*	*23.42%*	*24.53%*
EBIT Margin	*24.85%*	*17.93%*	*24.57%*	*27.29%*	*26.46%*	*25.26%*	*19.86%*	*16.35%*	*13.04%*	*16.76%*	*20.25%*	*23.23%*
Non-Operating Inc. / Exp. (+)	**(726.98)**	**(141.67)**	**(585.30)**	**(923.13)**	**(970.58)**	**(1,045.28)**	**(1,189.11)**	**(1,310.73)**	**(1,378.70)**	**(1,440.98)**	**(1,512.70)**	**(1,559.56)**
% of Revenue	*-1.06%*	*-1.31%*	*-1.02%*	*-1.32%*	*-1.35%*	*-1.47%*	*-1.94%*	*-2.40%*	*-2.48%*	*-2.50%*	*-2.57%*	*-2.44%*
Non-Recurring Inc. / Exp (+)	**(3,267.88)**	**(254.61)**	**(3,013.27)**	**(3,123.55)**	**(3,417.34)**	**(3,376.69)**	**(2,897.75)**	**(2,609.26)**	**(2,870.82)**	**(2,738.86)**	**(2,733.60)**	**(2,952.29)**
% of Revenue	*-4.78%*	*-2.35%*	*-5.24%*	*-4.47%*	*-4.74%*	*-4.75%*	*-4.74%*	*-4.78%*	*-5.17%*	*-4.75%*	*-4.64%*	*-4.62%*
EBT	**12,999.29**	**1,548.45**	**10,539.03**	**15,017.53**	**14,696.93**	**13,539.65**	**8,059.58**	**5,003.16**	**2,991.38**	**5,482.94**	**7,679.66**	**10,339.71**
% change	*-62.57%*			*15.53%*	*-2.13%*	*-7.87%*	*-40.47%*	*-37.92%*	*-40.21%*	*83.29%*	*40.06%*	*34.64%*
EBT Margin	*19.01%*	*14.27%*	*18.32%*	*21.50%*	*20.38%*	*19.04%*	*13.18%*	*9.17%*	*5.39%*	*9.51%*	*13.04%*	*16.18%*
Income Taxes (-)	**1,949.89**	**584.97**	**2,924.84**	**2,252.63**	**2,204.54**	**2,030.95**	**1,208.94**	**750.47**	**448.71**	**822.44**	**1,151.95**	**1,550.96**
Effective Tax Rate	*15.00%*	*16.67%*	*83.33%*	*15.00%*	*15.00%*	*15.00%*	*15.00%*	*15.00%*	*15.00%*	*15.00%*	*15.00%*	*15.00%*
Net Income (normalized)	**11,049.40**	**963.48**	**7,614.19**	**12,764.90**	**12,492.39**	**11,508.70**	**6,850.64**	**4,252.69**	**2,542.68**	**4,660.50**	**6,527.71**	**8,788.75**
% change	*-64.81%*			*15.53%*	*-2.13%*	*-7.87%*	*-40.47%*	*-37.92%*	*-40.21%*	*83.29%*	*40.06%*	*34.64%*
Net Income Margin (normalized)	*0.16*	*0.09*	*0.13*	*0.18*	*0.17*	*0.16*	*0.11*	*0.08*	*0.05*	*0.08*	*0.11*	*0.14*
After Tax Income/Expense (+)	(47.22)	(7.87)	(6.56)	(48.24)	(49.81)	(49.10)	(42.24)	(37.68)	(38.35)	(39.81)	(40.68)	(44.14)
% of Revenue	*-0.07%*	*-0.07%*	*-0.01%*	*-0.07%*	*-0.07%*	*-0.07%*	*-0.07%*	*-0.07%*	*-0.07%*	*-0.07%*	*-0.07%*	*-0.07%*
Net Income (after extraordinary iten	**11,002.17**	**955.61**	**7,607.63**	**12,716.66**	**12,442.57**	**11,459.60**	**6,808.40**	**4,215.00**	**2,504.33**	**4,620.69**	**6,487.03**	**8,744.61**
% change	*-64.93%*			*15.58%*	*-2.16%*	*-7.90%*	*-40.59%*	*-38.09%*	*-40.59%*	*84.51%*	*40.39%*	*34.80%*
Net Income Margin (after extraord. I	*16.09%*	*8.81%*	*13.22%*	*18.20%*	*17.25%*	*16.12%*	*11.13%*	*7.72%*	*4.51%*	*8.02%*	*11.01%*	*13.68%*
Depreciation (+)	**2,156.42**	**355.25**	**1,801.17**	**2,583.79**	**2,859.46**	**2,875.88**	**3,101.12**	**2,205.44**	**1,958.27**	**2,842.10**	**2,550.59**	**2,101.22**
% of previous year CapEx	*66.64%*	*16.47%*	*83.53%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*	*66.64%*
Ammortization (+)	**6,946.73**	**1,166.91**	**5,779.82**	**7,096.42**	**7,327.63**	**7,222.57**	**6,213.44**	**5,543.34**	**5,641.05**	**5,855.92**	**5,984.19**	**6,493.50**
% of Revenue	*10.16%*	*16.80%*	*83.20%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*	*10.16%*
Total CapEx (-)	**3,877.32**	**473.67**	**3,403.66**	**4,291.00**	**4,315.65**	**4,653.65**	**3,309.56**	**2,938.66**	**4,264.96**	**3,827.51**	**3,153.17**	**4,697.83**
% of Revenue	*5.67%*	*4.37%*	*5.92%*	*6.14%*	*5.98%*	*6.55%*	*5.41%*	*5.39%*	*7.68%*	*6.64%*	*5.35%*	*7.35%*
Interest Expenses after tax (+)	**1,052.30**	**177.97**	**874.33**	**1,731.65**	**1,731.65**	**1,731.65**	**1,731.65**	**1,731.65**	**1,731.65**	**1,731.65**	**1,731.65**	**1,731.65**
% of Revenue	*1.54%*	*16.91%*	*83.09%*	*2.48%*	*2.40%*	*2.44%*	*2.83%*	*3.17%*	*3.12%*	*3.00%*	*2.94%*	*2.71%*
Interest Income after tax (-)	**287.78**	**40.28**	**247.50**	**797.24**	**752.03**	**690.75**	**589.79**	**500.55**	**440.72**	**383.24**	**319.58**	**269.00**
% of Revenue	*0.42%*	*14.00%*	*86.00%*	*1.14%*	*1.04%*	*0.97%*	*0.96%*	*0.92%*	*0.79%*	*0.66%*	*0.54%*	*0.42%*
Δ NWC (-)	**(847.97)**	**(141.33)**	**(706.64)**	**1,013.64**	**1,815.45**	**1,443.60**	**(1,423.69)**	**(930.63)**	**159.40**	**245.53**	**123.89**	**721.81**
% of Revenue	*-1.24%*	*-1.30%*	*-1.23%*	*1.45%*	*2.52%*	*2.03%*	*-2.33%*	*-1.71%*	*0.29%*	*0.43%*	*0.21%*	*1.13%*
Free Cash Flow	**17,840.49**	**2,283.13**	**13,118.43**	**18,026.65**	**17,478.19**	**16,501.70**	**15,378.97**	**11,186.86**	**6,970.23**	**10,594.08**	**13,156.83**	**13,382.34**
% change	*-49.92%*			*1.04%*	*-3.04%*	*-5.59%*	*-6.80%*	*-27.26%*	*-37.69%*	*51.99%*	*24.19%*	*1.71%*
Event Year			0.83	1.83	2.83	3.83	4.83	5.83	6.83	7.83	8.83	9.83
Discount Factor			1.06	1.14	1.23	1.32	1.42	1.53	1.64	1.77	1.90	2.04
Discounted Free Cash Flow			**12,348.76**	**15,781.42**	**14,230.41**	**12,495.09**	**10,829.98**	**7,326.53**	**4,245.48**	**6,001.13**	**6,931.24**	**6,556.64**

Table 1.4. Pfizer Share Price Sensitivity Analysis for Growth Rate and WACC [$]

WACC \ Terminal Growth Rate	1.5%	1.6%	1.7%	1.8%	1.9%	**2.0%**	2.1%	2.2%	2.3%	2.4%	2.5%
8.07%	19.85	19.98	20.12	20.26	20.40	20.55	20.71	20.87	21.03	21.20	21.38
7.82%	20.72	20.87	21.03	21.19	21.35	21.52	21.70	21.88	22.07	22.26	22.46
7.57%	21.68	21.85	22.02	22.20	22.39	22.58	22.78	22.99	23.21	23.43	23.67
7.32%	22.73	22.92	23.12	23.33	23.54	23.76	23.99	24.23	24.48	24.73	25.00
7.07%	23.88	24.10	24.33	24.56	24.81	25.06	25.33	25.60	25.89	26.19	26.50
6.82%	25.16	25.41	25.67	25.94	26.22	26.51	26.82	27.14	27.47	27.82	28.18
6.57%	26.57	26.86	27.16	27.47	27.80	28.14	28.50	28.87	29.26	29.67	30.09
6.32%	28.15	28.48	28.83	29.19	29.57	29.97	30.39	30.82	31.28	31.76	32.27
6.07%	29.91	30.30	30.71	31.13	31.58	32.05	32.54	33.06	33.60	34.17	34.78
5.82%	31.91	32.36	32.84	33.34	33.87	34.42	35.00	35.62	36.27	36.96	37.69
5.57%	34.17	34.70	35.27	35.86	36.49	37.15	37.85	38.59	39.38	40.21	41.10
5.32%	36.75	37.39	38.06	38.77	39.52	40.32	41.17	42.07	43.03	44.06	45.16
5.07%	39.73	40.49	41.30	42.16	43.07	44.05	45.09	46.20	47.39	48.67	50.05
4.82%	43.19	44.12	45.10	46.15	47.27	48.47	49.77	51.15	52.65	54.28	56.04
4.57%	47.26	48.39	49.60	50.91	52.30	53.81	55.44	57.21	59.13	61.23	63.54
4.32%	52.09	53.50	55.02	56.66	58.43	60.36	62.46	64.76	67.28	70.07	73.17
4.07%	57.92	59.71	61.64	63.74	66.04	68.56	71.33	74.40	77.82	81.64	85.96

Table 1.5. Pfizer Scenario Analysis Results

	Base Case	Optimistic Case	Pessimistic Case
Sum of PV(FCF)	102,770.48	124,726.98	87,342.30
Terminal Growth Rate	2.00%	2.00%	2.00%
Terminal Value	187,778.94	324,642.94	122,127.28
PV (TV)	105,177.65	181,837.12	68,405.23
EV	**207,948.13**	**306,564.10**	**155,747.53**
Total Debt	50,955.97	50,955.97	50,955.97
Highly liquid assets	22,732.00	22,732.00	22,732.00
Net Debt	**28,223.97**	**28,223.97**	**28,223.97**
Equity Value	179,724.16	278,340.13	127,523.56
Shares Oustanding (Basic)	5,608.00	5,608.00	5,608.00
Estimated Share Price (Basic)	**32.05**	**49.63**	**22.74**
Share Price as of 28.02.2023	40.57	40.57	40.57
Upside vs. Basic	-21.01%	22.34%	-43.95%

Table 1.6. Pfizer Share Price: CCA and CTA Results

	CCA			CTA	
	EV/Revenue	EV/EBITDA	P/E	EV/Revenue	EV/EBITDA
Bear	67.85	71.03	99.29	51.03	66.58
Base	79.26	80.33	116.01	55.09	117.50
Bull	85.13	84.13	123.37	62.64	134.21

Table 1.7. Seagen Forecasted Income Statement and Free Cash Flow [$ million]

in million $	2023F	01-02.2023F	03-12.2023F	2024F	2025F	2026F	2027F	2028F	2029F	2030F	2031F	2032F
Total Revenue	**2,856.70**	**367.47**	**2,489.23**	**3,762.87**	**4,757.69**	**5,701.39**	**6,749.70**	**7,862.72**	**9,037.77**	**9,912.87**	**10,544.47**	**9,959.26**
Costs of Good Sold	368.58	48.40	320.18	582.70	687.40	735.61	870.87	1,027.59	1,236.75	1,279.00	1,360.49	1,317.51
Gross Profit	**2,488.12**	**319.07**	**2,169.04**	**3,180.18**	**4,070.29**	**4,965.78**	**5,878.83**	**6,835.13**	**7,801.02**	**8,633.88**	**9,183.98**	**8,641.75**
SG&A excl. Adv.	837.84	124.64	713.20	1,103.61	1,395.38	1,672.16	1,979.62	2,306.06	2,650.69	2,907.35	3,092.59	2,920.95
R&D	1,208.48	181.62	1,026.86	1,306.18	1,411.78	1,525.91	1,649.27	1,782.60	1,926.71	2,082.48	2,250.83	2,432.79
Advertising	101.45	16.91	84.54	114.38	114.38	114.38	114.38	118.71	118.71	118.71	118.71	119.83
EBITDA	**340.34**	**(4.10)**	**344.44**	**656.01**	**1,148.76**	**1,653.33**	**2,135.56**	**2,627.76**	**3,104.91**	**3,525.34**	**3,721.85**	**3,168.17**
Depreciation	99.23	3.25	101.70	121.61	158.38	198.05	234.47	271.90	307.33	344.35	366.28	342.91
Amortization	13.85	1.68	12.17	18.25	23.07	27.65	32.73	38.13	43.82	48.07	51.13	48.29
EBIT	**227.26**	**(9.02)**	**230.57**	**516.15**	**967.31**	**1,427.64**	**1,868.37**	**2,317.73**	**2,753.75**	**3,132.93**	**3,304.44**	**2,776.97**
Non-Operating Inc. / Exp.	77.25	12.87	64.37	101.75	128.65	154.17	182.51	212.61	244.38	268.05	285.13	269.30
EBT	**304.50**	**3.85**	**294.94**	**617.90**	**1,095.96**	**1,581.80**	**2,050.88**	**2,530.34**	**2,998.14**	**3,400.98**	**3,589.56**	**3,046.27**
Income Taxes	12.95	2.16	10.80	26.29	46.63	67.30	87.25	107.65	127.55	144.69	152.72	129.60
Net Income	**291.55**	**1.69**	**284.15**	**591.61**	**1,049.33**	**1,514.51**	**1,963.63**	**2,422.69**	**2,870.58**	**3,256.28**	**3,436.85**	**2,916.67**
Depreciation	99.23	3.25	101.70	121.61	158.38	198.05	234.47	271.90	307.33	344.35	366.28	342.91
Ammortization	13.85	1.68	12.17	18.25	23.07	27.65	32.73	38.13	43.82	48.07	51.13	48.29
CapEx	141.31	22.05	119.26	304.17	324.65	282.02	333.87	404.85	532.86	490.34	521.58	532.13
Δ NWC	68.69	11.45	57.24	124.84	57.53	14.36	48.11	45.30	56.06	-41.29	39.45	-20.84
Free Cash Flow	**194.64**	**(26.88)**	**221.52**	**302.45**	**848.60**	**1443.82**	**1848.84**	**2282.56**	**2632.82**	**3199.65**	**3293.24**	**2796.58**
WACC			6.29%	6.29%	6.29%	6.29%	6.29%	6.29%	6.29%	6.29%	6.29%	6.29%
Discount Factor			1.05	1.12	1.19	1.26	1.34	1.43	1.52	1.61	1.71	1.82
Discounted Free Cash Flow	-	-	**210.54**	**270.46**	**713.95**	**1142.87**	**1376.88**	**1599.33**	**1735.62**	**1984.51**	**1921.72**	**1535.37**

Table 1.8. Seagen Share Price Sensitivity Analysis for Growth Rate and WACC [$]

	Terminal Growth Rate										
WACC	1.5%	1.6%	1.7%	1.8%	1.9%	2.0%	2.1%	2.2%	2.3%	2.4%	2.5%
8.29%	116.55	117.31	118.08	118.89	119.71	120.57	121.45	122.36	123.30	124.27	125.27
8.04%	121.55	122.40	123.28	124.18	125.12	126.08	127.08	128.11	129.18	130.29	131.43
7.79%	127.01	127.97	128.97	129.99	131.05	132.15	133.28	134.46	135.67	136.94	138.25
7.54%	133.00	134.08	135.21	136.37	137.58	138.83	140.12	141.47	142.86	144.31	145.82
7.29%	139.57	140.81	142.09	143.42	144.80	146.23	147.71	149.25	150.86	152.53	154.27
7.04%	146.82	148.24	149.70	151.23	152.81	154.45	156.16	157.94	159.80	161.73	163.76
6.79%	154.86	156.48	158.17	159.92	161.74	163.64	165.62	167.69	169.84	172.10	174.46
6.54%	163.80	165.67	167.61	169.64	171.75	173.96	176.26	178.68	181.20	183.85	186.63
6.29%	173.80	175.96	178.21	180.57	183.03	185.61	188.32	191.15	194.13	197.26	200.55
6.04%	185.03	187.55	190.18	192.94	195.83	198.86	202.05	205.41	208.94	212.67	216.61
5.79%	197.73	200.68	203.77	207.02	210.44	214.04	217.83	221.83	226.07	230.55	235.31
5.54%	212.17	215.65	219.31	223.17	227.25	231.55	236.10	240.93	246.05	251.50	257.31
5.29%	228.71	232.85	237.23	241.85	246.75	251.95	257.47	263.35	269.63	276.33	283.52
5.04%	247.82	252.79	258.07	263.67	269.62	275.97	282.75	290.01	297.79	306.17	315.21
4.79%	270.09	276.13	282.55	289.41	296.74	304.60	313.04	322.14	331.96	342.61	354.19
4.54%	296.33	303.74	311.67	320.19	329.34	339.22	349.92	361.52	374.17	387.99	403.18
4.29%	327.61	336.84	346.79	357.53	369.18	381.84	395.66	410.80	427.47	445.90	466.39

Table 1.9. Seagen Scenario Analysis Results

	Base	Optimistic	Pessimistic
Sum of PV(FCF)	12,491.25	14,114.23	11,181.12
Terminal Grwoth Rate	2.00%	2.00%	2.00%
Terminal Value	36,525.02	45,052.98	30,560.52
PV (TV)	20,052.81	24,734.79	16,778.21
EV	**32,544.06**	**38,849.02**	**27,959.32**
Total Debt	-	-	-
Highly Liquid Assets	1,735.07	1,735.07	1,735.07
Net Debt	**(1,735.07)**	**(1,735.07)**	**(1,735.07)**
Equity Value	34,279.13	40,584.09	29,694.39
Shares Outstanding (Basic)	184.68	184.68	184.68
Estimated Share Price	**185.61**	**219.75**	**160.79**
Share Price as of 28.02.2023	179.69	179.69	179.69
Upside/Downside	3.30%	22.30%	-10.52%

Table 1.10. Seagen Share Price: CCA and CTA Results

	CCA			CTA
	EV/Revenue	EV/Adj. EBITDA	P/B	EV/Revenue
Bear	34.98	25.03	42.78	42.55
Base	64.36	42.26	69.16	50.26
Bull	110.66	73.44	108.79	71.83

Table 1.11. Overview of the Combined Valuation with and without Synergy Effects

	Pfizer	Seagen	Combin excl. Synergies	Combin incl. Synergies	Synergy Value
Sum of PV(FCF)	103,399.28	12,491.25	115,163.53	119,983.25	
Terminal Growth Rate	2.00%	2.00%	2.00%	2.00%	
Terminal Value	187,778.94	36,525.02	223,070.61	251,596.05	
PV (TV)	105,177.65	20,052.81	124,342.91	140,243.42	
EV	208,576.94	32,544.06	239,506.44	260,226.67	20,720.22
Total Debt	50,955.97	-	50,955.97	50,955.97	
Highly liquid assets	22,732.00	1,735.07	24,467.07	24,467.07	
Net Debt	28,223.97	(1,735.07)	26,488.90	26,488.90	
Equity Value	180,352.97	34,279.13	213,017.54	233,737.77	
Shares Oustanding (Basic)	5,608.00	184.68	5,608.00	5,608.00	
Estimated Price (Basic)	32.16	185.61	37.98	41.68	3.69

Table 1.12. Composition of the Offer Price

Synergy Value	**20,720.22**
Shares Oustanding (Basic)	184.68
Synergy value per share	**112.20**
Share Price as of 28.02.2023	179.69
Maximum economical feasible price	**291.89**
Alpha from BCG Study	0.51
Alpha in $	57.22
Offer Price	**236.91**

Table 1.13. Synergy Forecast Base Case

Baseline		2024	2025	2026	2027	2028	2029	2030	2031	2032
Synergies from Pfizer and Seagen Oncology Pipeline		95.96	462.17	723.99	852.60	1,004.69	1,398.49	1,505.85	1,622.18	2,051.06
Timing of Realization		33%	66%	82%	90%	93%	93%	93%	93%	93%
Synergies from reduced COGS at Seagen		9.03	11.77	14.71	17.42	20.20	22.83	25.58	27.21	25.47
Additional COGS for Revenue Synergies		27.66	125.87	192.25	217.19	250.73	357.18	360.43	364.92	479.44
Synergies from Seagen Cost Efficiecny - SG&A		22.07	27.91	33.44	39.59	46.12	53.01	58.15	61.85	58.42
Synergies from Seagen Cost Efficiencies - R&D		163.09	176.27	190.53	205.93	222.58	240.57	260.02	281.04	303.76
Additional Costs - Advertising		114.38	114.38	114.38	114.38	118.71	118.71	118.71	118.71	119.83
Acquisition Costs		(500.00)	(500.00)	(500.00)	-	-	-	-	-	-
Additional Cost Litigation Expenses/Settlements		186.31	-	-	-	62.51	-	-	-	16.15
Additional Taxes		66.40	117.77	169.97	220.38	271.90	322.17	365.45	385.72	327.34
Discount Factor Combined		1.12	1.18	1.26	1.33	1.41	1.50	1.59	1.69	1.79
Combined EV	**260,226.67**									
Synergies	**20,720.22**									

Table 1.14. Synergy Forecast Optimistic Case

Optimistic		2024	2025	2026	2027	2028	2029	2030	2031	2032
Synergies from Pfizer and Seagen Oncology Pipeline		104.95	497.24	773.53	914.37	1,079.63	1,496.66	1,616.06	1,745.89	2,203.11
Timing of Realization		33%	66%	82%	90%	93%	93%	93%	93%	93%
Synergies from reduced COGS at Seagen		18.00	23.43	29.32	34.73	40.30	45.54	50.99	54.23	51.16
Additional COGS for Revenue Synergies		30.36	135.75	205.75	233.17	269.57	382.34	386.65	392.34	514.29
Synergies from Seagen Cost Efficiecny - SG&A		43.96	55.58	66.65	78.96	92.00	105.68	115.90	123.28	117.22
Synergies from Seagen Cost Efficiencies - R&D		186.52	202.59	220.04	238.99	259.58	281.94	306.22	332.60	361.24
Additional Costs - Advertising		114.38	114.38	114.38	114.38	118.71	118.71	118.71	118.71	119.83
Acquisition Costs		(300.00)	(300.00)	(300.00)	-	-	-	-	-	-
Additional Cost Litigation Expenses/Settlements		186.31	-	-	-	62.51	-	-	-	16.15
Additional Taxes		61.96	111.96	162.92	211.99	261.91	310.06	350.88	368.70	312.29
Discount Factor Combined		1.11	1.18	1.25	1.33	1.41	1.50	1.59	1.68	1.79
Combined EV	**256,106.20**									
Synergies	**24,044.26**									

Table 1.15. Synergy Forecast Pessimistic Case

Pessimistic		2024	2025	2026	2027	2028	2029	2030	2031	2032
Synergies from Pfizer and Seagen Oncology Pipeline		104.95	497.24	773.53	914.37	1,079.63	1,496.66	1,616.06	1,745.89	2,203.11
Timing of Realization		33%	66%	82%	90%	93%	93%	93%	93%	93%
Synergies from reduced COGS at Seagen		-	-	-	-	-	-	-	-	-
Additional COGS for Revenue Synergies		30.39	135.90	206.05	233.64	270.27	383.40	387.88	393.71	515.82
Synergies from Seagen Cost Efficiecny - SG&A		-	-	-	-	-	-	-	-	-
Synergies from Seagen Cost Efficiencies - R&D		138.48	150.41	163.36	177.43	192.72	209.32	227.35	246.93	268.20
Additional Costs - Advertising		114.38	114.38	114.38	114.38	118.71	118.71	118.71	118.71	119.83
Acquisition Costs		(700.00)	(700.00)	(700.00)	-	-	-	-	-	-
Additional Cost Litigation Expenses/Settlements		186.31	-	-	-	62.51	-	-	-	16.15
Additional Taxes		61.96	111.96	162.92	211.99	261.91	310.06	350.88	368.70	312.29
Discount Factor Combined		1.11	1.18	1.25	1.33	1.41	1.50	1.59	1.68	1.79
Combined EV	**251,828.60**									
Synergies	**19,766.66**									

10. Appendix Individual Part Dora Gyorko

Table 5.1: Hypothesis

Hypothesis	Variable	Variable Description	Expected Sign	Rational
H_1	AMV	acquirer market value of equity four weeks prior to announcement date	negative	The acquirer CARs around the initial announcement date are inversely related to the size of the acquirer due to perceived large acquirer inefficiencies and incentive misalignments.
H_2	Payment	dummy variable indicating whether deal is fully paid in cash	positive	Pure cash payments are associated with higher acquirer CARs around the initial announcement date driven by investors' perception of acquirer stock overvaluation and deal uncertainty when stock is used.
H_3	Industry	dummy variable indicating whether target and acquirer operate in the same industry	positive	The acquirer CARs around the initial announcement date in same-industry M&A deals are higher due to higher synergy expectations and the avoidance of the conglomerate discount effect.
H_4	Domestic	dummy variable indicating whether the deal is a domestic or a cross-border deal	positive	The acquirer cumulative abnormal returns around the initial announcement date in domestic M&A deals are higher due to a higher level of risk and complexity associated with cross-border deals.

Table 5.2: Variable Description

Variable Name	Variable Name Short	Log Transformed	Type	Description
Acquirer CAR	CAR	No	Continuous [Abs.]	Acquirer cumulative abnormal return for the [-1; +1] event window with respect to M&A announcement and adjusted using relevant stock market index.
Method of Payment	Payment	No	Binary	If the cash portion equals the deal value, the binary variable takes the value of one, otherwise zero.
Acquirer Ownership	Share	No	Continuous [Abs.]	The percentage of target shares owned by the acquirer post-transaction.
Same Industry	Industry	No	Binary	If the business sector of the acquirer and target are equal, the binary variable takes the value of one, otherwise zero.
Domestic	Domestic	No	Binary	If the nation of the acquirer and the target are equal, the binary variable takes the value of one, otherwise zero.
Target R&D Intensity	TRD	Yes	Continuous [Abs.]	Ratio of R&D expenses to net sales according to most current full year financial information prior to the announcement date.
Deal Value	DV	Yes	Continuous [$ m]	Total value of consideration paid by the acquiror, excluding fees and expenses.
Acquirer Market Value	AMV	Yes	Continuous [$ m]	Acquirer market value of equity 4 weeks prior to announcement.

Table 5.3: Summary Statistics Continuous Variables

Variable Name	N	Mean	Median	Std. Dev.	Min.	Max.
Acquirer CAR	295	0.0052	0.0017	0.0486	-0.0686	0.0889
Acquirer Ownership	295	0.95	1	0.13	0.25	1
Target R&D Intensity	295	0.14	0.10	0.13	0.00	0.39
Deal Value	295	673.42	167.41	942.58	10.58	2,676.32
Acquirer Market Value	295	10,942.35	3313.72	15,618.27	69.55	46,938.03

Data presented is winsorized at 90%

Table 5.4: Summary Statistics Binary Variables

Variable Name	N	Mean	0	1
Method of Payment	295	0.46	158	137
Same Industry	295	0.88	36	259
Domestic	295	0.51	144	151

Table 5.5: Summary Statistics for Acquirer CAR per Business Sector

Business Sector	N	Mean	Median	Std. Dev.	Min.	Max.
Automobiles & Auto Parts	19	-0.0046	-0.014	0.0453	-0.0690	0.0889
Industrial Goods	6	0.0169	0.0040	0.0607	-0.0548	0.0889
Pharmaceuticals & Medical Research	102	0.0091	0.0042	0.0521	-0.0686	0.0889
Software & IT Services	70	0.0104	0.0110	0.0493	-0.0686	0.0889
Technology Equipment	98	-0.0015	-0.0046	0.0440	-0.0686	0.0889

Data presented is winsorized at 90%

Table 5.6: Summary Statistics for Acquirer CAR per Year

Year	N	Mean	Median	Std. Dev.	Min.	Max.
2004	25	0.0019	-0.0003	0.0567	-0.0686	0.0889
2005	25	0.0072	-0.0019	0.0486	-0.0686	0.0889
2006	24	0.0067	0.0068	0.0362	-0.0686	0.0783
2007	18	-0.0079	0.0065	0.0396	-0.0686	0.0524
2008	22	0.0138	0.0189	0.0492	-0.0686	0.0889
2009	14	0.0058	-0.0047	0.0493	-0.0686	0.0889
2010	13	0.0147	-0.0047	0.0491	-0.0594	0.0889
2011	11	0.0022	0.0056	0.0430	-0.0670	0.0683
2012	6	0.0405	0.0566	0.0625	-0.0686	0.0889
2013	7	0.0210	0.0254	0.0445	-0.0350	0.0887
2014	11	-0.0013	-0.0050	0.0400	-0.0686	0.0889
2015	19	-0.0133	-0.0240	0.0527	-0.0686	0.0889
2016	17	0.0164	0.0212	0.0440	-0.0686	0.0889
2017	17	0.0078	0.0019	0.0517	-0.0686	0.0889
2018	13	-0.0077	-0.0049	0.0555	-0.0686	0.0889
2019	19	0.0172	0.0255	0.0504	-0.0686	0.0889
2020	11	-0.0154	-0.0123	0.0366	-0.0565	0.0498
2021	10	0.0104	0.0105	0.0585	-0.0686	0.0889
2022	9	0.0072	-0.0059	0.0655	-0.0686	0.0889
2023	4	-0.0217	-0.0162	0.0343	-0.0686	0.0140

Data presented is winsorized at 90%

Table 5.7: Assumptions for Ordinary Least Squares Regression

Assumption	N
Linearity	The relationship between the independent variables and the dependent variable is linear.
No perfect collinearity	None of the independent variables is a perfect linear function of any other independent variables.
Zero conditional mean of error terms	The expected value of the error terms, given any value of the independent variables, is zero.
Homoscedasticity	The variance of error terms is constant across all levels of the independent variables.
No Autocorrelation	The error terms are not correlated with each other (i.e., the error in one observation is not influenced by the error in any other observation).
Normal distribution of error terms	The error terms are normally distributed, typically assumed for hypothesis testing and confidence interval construction.

Table 5.8: Test Results

Test	Result
Analysis of partial regression plot for each variable to assess the relation between the respective independent variable and the dependent variable.	All relationships do not suggest other relationships than linearity.
Analysis of Pearson Correlation Matrix and Variation Inflation Analysis for Multicollinearity	The results (also shown in tables 5.9 and 5.10) do not suggest perfect collinearity.
Homoscedasticity	The OLS using robust standard errors already controls for any concerns of homoscedasticity.
No Autocorrelation	Not a concern in cross-sectional data sets.

Table 5.9: Pearson Correlation Matrix for OLS with Robust Standard Errors

Variable	CAR	Payment	Share	Industry	Domestic	Log(TRD)	Log(DV)	Log(AMV)
CAR	1.0000							
Payment	0.1300*	1.0000						
Share	-0.0098	-0.1923*	1.0000					
Industry	-0.0028	-0.0681	0.1244*	1.0000				
Domestic	0.0989	-0.3960*	-0.0323	-0.1362*	1.0000			
Log(TRD)	-0.0302	0.1797*	0.1532*	0.0709	-0.4493	1.0000		
Log(DV)	-0.0808	0.1128	0.1996*	0.1095	-0.4075*	0.2849*	1.0000	
Log(AMV)	-0.1160*	0.3323*	0.0257	0.0482	-0.4280*	0.1256*	0.5825*	1.0000

p<0.05*
Data presented is winsorized at 90%

Table 5.10: Variation Inflation Matrix for OLS with Robust Standard Errors

Variable	VIF	1/VIF
Log(AMV)	1.79	0.557427
Log(DV)	1.76	0.568337
Domestic	1.71	0.585701
Payment	1.35	0.740266
Log(TRD)	1.34	0.747934
Share	1.13	0.887533
Industry	1.05	0.953884
Mean VIF	1.45	

Data presented is winsorized at 90%