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The impact of external shocks on the performance and valuation of big pharmaceutical companies

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SCHOOL OF ECONOMICS, BUSINESS AND COMPUTER SCIENCE

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A case study of six major pharmaceutical companies during the Dot-com bubble and 9/11 crises of 2000-2001, the Global Financial Crisis of 2007-2008 and the Covid-19 pandemic of 2019-2021.

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Master's Dissertation

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DECLARATION

I, Maria Kyprianou, being fully aware of the consequences of plagiarism, declare responsibly that this paper entitled "**The impact of external shocks on the performance and valuation of big pharmaceutical companies**", is strictly a product of my own personal work and all sources used have been duly stated in the bibliographic citations and references. Where I have used ideas, text and/or sources of other authors, they are clearly mentioned in the text with the appropriate citation and the relevant reference is included in the bibliographic references section with a full description.

The Declarant

Maria Kyprianou

Summary

Ο εικοστός πρώτος αιώνας μπορεί να χαρακτηριστεί ως ένας αιώνας γεμάτος εκπλήξεις. Ένας θανατηφόρος ιός ονόματι, κορονοϊός ή αλλιώς Covid-19 έχει εμφανιστεί ο οποίος απειλεί την ανθρωπότητα και μαστίζει κάθε γωνιά του κόσμου. Με αφορμή λοιπόν αυτής της τρέχουσας κρίσης, τέθηκαν πολλά ερωτήματα όπως ποιος ήταν ο πραγματικός αντίκτυπος αυτής της πανδημίας και πώς οι φαρμακευτικές εταιρείες που βρίσκονται στην πρώτη γραμμή ενάντια σε αυτόν τον εχθρό βιώνουν αυτό το σοκ. Ωστόσο, κοιτάζοντας πίσω στο παρελθόν, μπορούμε να εντοπίσουμε άλλες εξωγενείς κρίσεις που εξέπληξαν τον επιχειρηματικό κόσμο και ξεχώρισαν, μεταξύ αυτών: η φούσκα Dot-com του 2000-2001 και η Τρομοκρατική Επίθεση της 11ης Σεπτεμβρίου (DC911) καθώς και η Παγκόσμια Οικονομική Κρίση (GFC) του 2007-2008. Με βάση την ανάλυση των οικονομικών καταστάσεων έξι μεγάλων φαρμακευτικών εταιρειών στην Ευρώπη και τις Ηνωμένες Πολιτείες και μέσω του υπολογισμού ορισμένων χρηματοοικονομικών δεικτών καθώς και μεθόδων εκτίμησης και αξιολόγησης που διεξήχθησαν στην παρούσα εργασία, συνάγεται το συμπέρασμα ότι: η πρώτη κρίση -DC911, δεν επηρέασε σε σημαντικό επίπεδο τη φαρμακευτική βιομηχανία σε σύγκριση με την Παγκόσμια Οικονομική κρίση, η οποία με τη σειρά της, επηρέασε σοβαρά τη ρευστότητα και τη φερεγγυότητα των υπό έρευνα φαρμακευτικών εταιρειών. Επιπλέον, η τρέχουσα πανδημία, ο Covid-19 (C-19) είχε τον μεγαλύτερο αντίκτυπο στον κλάδο, ειδικά τα πρώτα χρόνια της έξαρσής του. Το επόμενο έτος, το 2021, μπορεί να χαρακτηριστεί ως προσαρμοστικό έτος για τον κλάδο και ορόσημο για τη μελλοντική λειτουργία και ευημερία του, καθώς ο ιός θα συνεχίσει να υπάρχει ανάμεσά μας και είναι επιτακτική ανάγκη όλοι μας να μάθουμε πώς να ζούμε και να επιβιώνουμε μαζί του.

Abstract

The twenty first century was full of surprises. A deadly virus called Covid-19 has risen that threatens the humanity and plagues each corner of the world. By the occasion of this current crisis many questions were raised such as what the real impact of this pandemic was and how the pharmaceutical companies which stand at the front-line against this enemy, experience this shock. Looking back at the past however, we can identify other external crises that surprised the business world and stood out; the Dot-com bubble of 2000-2001 and the 9/11 Terrorist Attack (DC911) as well as the Global Financial Crisis (GFC) of 2007-2008. Based on the analysis of the financial statement of six large pharmaceutical companies in Europe and United States and through the calculation of certain financial ratios as well as valuation methods that were conducted in this paper, it can be concluded that: the first crisis -DC911, did not affect in a significant level the pharmaceutical industry as compared to the GFC which it has severely affected the liquidity and solvency of the pharmaceutical companies under investigation. Moreover, the current pandemic, Covid-19 (C-19) had the most impact on the industry especially during the first year of its outbreak. The following year, 2021, can be described as an adaptive year for the sector and a milestone for their future operation and prosperity as the virus will continue to exist among us and the world should learn how to live and survive along with it.

Table of Contents

List of figures

List of Abbreviations

The following abbreviations will be utilized in the analysis section.

AZN	Astra Zeneca PLC
PFE	Pfizer INC
JNJ	Johnson and Johnson
GSK	GlaxoSmithKline PLC
NOVN	Novartis AG
MRK	Merck & Co INC
CPV	Companies that Produced a Vaccine for coronavirus
CDPV	Companies that Did Not Produce a Vaccine for coronavirus
GFC	Global Financial Crisis of 2007-2008
C-19	Covid-19 Period (2019-2020)
DC911	Dot-com bubble and the terrorist attack of September 11th (2000-2001)

CHAPTER 1: INTRODUCTION

1.1 Background information

Historically, we can observe that the international economy has faced multiple abnormal shocks that challenged its growth, development and survival. Starting with the Dot-com bubble in the late 90s, it was a sudden rise in U.S. technology equity stock valuations fueled by investments in Internet-based companies during the bull market.(HAYES, 2019). Between 1995 and 2000, the value of equities markets expanded at an exponential rate, with the technology-dominated Nasdaq index growing from under 1,000 to over 5,000. Things began to shift in 2000, and the bubble burst between 2001 and 2002, resulting in a bear market in stocks. Following up on this crisis, on September 11, 2001, 19 al Qaeda-affiliated militants hijacked four planes and carried out suicide assaults on targets in the United States. Two aircraft struck the World Trade Center twin towers in New York City, a third plane struck the Pentagon in Arlington, Virginia, just outside Washington, D.C., and the fourth plane landed in a field near Shanksville, Pennsylvania.(Angerer, 2018). Shares of corporations in some industries were severely hit in foreign and local markets. Stocks in travel and entertainment decreased, while those in communications, pharmaceuticals, and military/defense increased. The shares of companies in the leisure sector were particularly hard hit as well. Not long after these events, a severe worldwide economic crisis broke out; the Global Financial Crisis (GFC) of 2007-2008. It was the worst economic downturn since the Great Depression. (Duffie, 2019) The "perfect storm" included predatory lending to low-income homebuyers, excessive risk-taking by global financial institutions, and the implosion of the US housing bubble. The value of mortgage-backed securities (MBS) related to American real estate, as well as a complex network of derivatives linked to those MBS, plummeted. Financial institutions all across the world were severely harmed, culminating in the collapse of Lehman Brothers on September 15, 2008, and an international banking crisis that followed. (Sarra and Wade, 2020) To avoid the global financial system from collapsing, governments used huge bailouts of banking institutions as well as other palliative monetary and fiscal policies. The crisis triggered the Great Recession, which resulted in higher unemployment and suicide rates, as well as lower

institutional trust, among other things. The European debt crisis of 2009 was triggered by the recession, which was a crucial prerequisite. The crisis quickly became a global economic shock, culminating in the bankruptcy of major banks. Credit tightened and international commerce dropped, causing economies throughout the world to stall. (Norris, 2008) Evictions and foreclosures were common as housing markets weakened and unemployment skyrocketed. Furthermore, several companies have gone bankrupt. Not long after, on the 30th of January 2020 the World Health Organizaiton (WHO) acknowledged the outbreak of coronavirus disease (COVID-19) a Public Health Emergency of International Concern, while on March 11th 2020 it was declared as a pandemic, originally initiated in the city of Wuhan, China (Severe acute respiratory syndrome coronavirus 2 - Wikipedia, 2021). This is not the first time that the world has faced this kind of crisis as the most severe one, the 'Black Death', which appeared back in 14th century, took the life of 200M people around the world and with the most recent one to be dated in 2015, 'MERS', another coronavirus disease ('About MERS', 2021), that cost almost 900 human lives.(Pitlik, 2020) This global pandemic has severely affected the economic activity around the world. WHO proposed major measures in order to protect the world against the infection such as social distancing, the use of masks/face- shields, use of gloves, frequent washing of hands and sanitization, non-essential staff to work from home – shift to teleworking, lockdowns and travel restrictions etc. (Barshikar, 2020a) All the sectors suffered and were forced to take emergency measures in order to tackle its impact and remain alive. One of the sectors that felt this pressure was the pharmaceutical industry, which stands in the front-line facing this invisible enemy. Many large pharmaceutical companies upon hearing the news, immediately initiated long research and studies in order to find a solution, a vaccine, that could furnish citizens with proper antibodies to mitigate the effect of the virus' symptoms. Pfizer Inc and BioNTech, AstraZeneca Plc, Janssen Pharmaceuticals (subsidiary of Johnson & Johnson) and Moderna Inc are the vaccine-producers' companies in EU and USA that got an emergency authorization by the WHO to dispose their vaccine for public use. (WHO.int, 2021a) (Who.int, 2021b) Other large pharmaceutical companies around the world are continuing their research and clinical trials in order to finalize a potential vaccine or are in collaboration with other Health care organizations, scientists and Research institutions in order to provide useful insights about

this new virus that is threatening the humanity. However, these sudden changes in their regular operation have caused serious implications on their financial performance and their overall valuation and capitalization.

1.2 Main Research Question

The main research question is what is the effect of abnormal shocks, like the coronavirus pandemic, the Global Financial Crisis and other shocks on the valuation and performance of large pharmaceutical companies.

1.3 Main objective

The main objective of this research is to analyse the effects of abnormal shocks like pandemics, financial crisis and stock market crashes on the pharmaceutical sector through financial statement review and analysis.

1.4 The need for this research

It is no secret that the covid pandemic is here to stay. It is also no surprise that many scientists expect a wave of pandemics to hit our planet in the future. This research is important as it examines not only how the pandemic may affect the financial performance of corporations in the pharmaceutical sector but also how other historical events that shook the economy affected this specific industry. The way a crisis may affect human activity has been experienced extensively during the last decades and especially now during the covid era. It is therefore time for the corporate world to include crises as one of the important risk factors when designing their strategies.

1.5 Summary layout of the thesis

Chapter 2 isa literature review regarding internal and external factors that may affect the performance and valuation of a listed company. Moreover, the effect of the Dot-com and 9/11 terrorist attack of 2000-2001 will be introduced as well as the Global Financial crisis

in 2007-2008. In chapter 3 the methodology used will be explained and in chapter 4 data collected will be analysed. Conclusions based on chapter 4 and a comparative analysis between these conclusions and those found in chapter 2 will be recorded in chapter 5. Finally, recommendations based on these conclusions will be proposed in this chapter.

CHAPTER 2: LITERATURE REVIEW

Several studies were materialized regarding the factors that can influence the performance and valuation of a listed company.

2.1 Internal Factors that can influence a firm's financial performance

A research concerning Pakistani corporate firms listed in Karachi stock exchange showed that firms having proper corporate governance and ownership structures and monitoring, capital structure, and proper risk management be likely to have a better financial performance if return on equity is reflected as a performance metric. (Mirza and Javed, 2013) In the same way, Xu (2014) found out that asset utilization and leverage are factors that have an impact on the financial performance of firms listed on Shanghai Stock Exchange 50 (SSE 50). For both forms of firm performance metric (ROA and ROE), his research results indicated a positive and significant relationship between assets utilization and firm performance and a negative and significant relationship between leverage and firm performance. A study regarding the influence factors affecting the performance of pharmaceutical companies, with a special focus on Romanian pharmaceutical firms, showed that the main influence factors over firm's financial performance expressed through ROE are the EarningPerShare (EPS) and the Net Profit Margin. Other factors include: Current Ratio, Quick Ratio, Leverage under the expression of Debt to Total Assets (DTTA), Book value (BV) and Ebit Margin. (BOLDEANU and PUGNA, 2014) Additionally, the study of Saad M and Zhengge (2015) around service companies, proved that factors including market share position, firm size and liquidity can be determinants of the financial performance of businesses. Their findings regarding the factors: leverage and asset utilization are in accordance with Xu's research results. Moreover, the authors mention that leverage is also an important organizational factor as it can both increase shareholder's return on their investment and if it is in high levels, can constitute a sign of risk for a company (e.g., bankruptcy). Finally, the authors emphasize that "the most important factor discussed is the effective and efficient management and the organization

of processes by managers to drive the business firm towards its goals and objectives i.e., financial performance". In addition, a research conducted by Khan, Nouman and Imran (2015) around listed financial sectors in Karachi Stock Exchange, showed that elements of financial sectors such as leverage, liquidity, size, risk and tangibility have significant impact on financial performance of financial sectors in Pakistan and they also recommend financial sectors to contemplate Enterprise Value Added (EVA) as a vital determinant of financial performance. Khan's et al. findings are in compliance with the above authors. In the same way, Pham, Tran and Nguyen (2018), after examining construction-material firms in Vietnam, figured that businesses' financial performance are positively influenced by the firms' size, capital structure, capitalization expenditure, and accounts receivable management. The research outcomes also showed positive relation between firms' financial performance and business risk. Gautam (2018) while examining the determinants of financial performance of commercial bank in Nepal found out also, that a positive relationship exists between return on assets and capital adequacy ratio, management efficiency and gross domestic product whereas a negative one occurred between assets quality and liquidity management. While investigating factors affecting the financial performance of the Jordanian manufacturing industrial firms, Matar and Eneizan (2018) discovered that the variables of liquidity, profitability, and revenues are positively associated with the return on assets (ROA). Conversely, the variables of leverage and firm size are negatively correlated with it, as the authors Saad M and Zhengge, Xu, Khan, Nouman and Imran discovered. Furthermore, their regression model showed that "all variables have significant impact on the financial performance". In another research concerning the risk factors that can affect a company's financial performance, the authors Bărbuță-Mișu, Madaleno and Ilie (2019), after collecting data from non-financial firms from European countries, revealed that liquidity, leverage and productivity positively a affect firm performance, whereas solvency and asset turnover are positive and statistically significant only in the case of return on equity. These results do not accord with the outcomes of the above authors. In addition, their study resulted that labour productivity induces those businesses to show greater efforts to keep financial performance in face of a crisis, bearing in mind that the crisis discloses a negative statistical impact over return on assets. Another research around the factors that influence a company's financial

performance of non-financial companies listed on the Indonesia Stock Exchange, and based on agency theory, revealed that all 5 independent variables (institutional ownership, insider ownership, board size, company size, and debt ratio) that were tested, simultaneously had a significant positive effect on the dependent variable (company's financial performance which was measured using Tobin's Q ratio) However, if the variables were tested individually, it was noticed that institutional ownership, insider ownership, and debt ratio had a significant positive influence on Tobin's Q, whereas firm size had a significant negative one on Tobin's Q ratio and board size had no significant effect. (Herlambang, Murhadi and Andriani, 2020) A study with the purpose of examining the impact of cash conversion cycle (CCC), Size, financial leverage (FL), Age, and exchange rate (ER) movement on firms' financial performance of all manufacturing sector in Pakistan, depicted that "CCC, ER, and Size have a contrary correlation with ROA and ROE, whereas FL and Age have a positive relationship with ROA and ROE. All variables are significant, except Age. Moreover, return on equity and return on assets are destructively associated with CCC, which means it has similar effect on the firm's profitability." (Hussain, Asan Ali, Bakhsh and Abdullah, 2020)

2.2 External Factors that can influence a firm's Financial Performance

Klassen and McLaughlin (1996) have examined the impact of environmental management on firm performance by using empirical tests, financial event methodology and archival data of firm-level environmental and financial performance. Large positive returns were assessed for effective environmental management, as evidenced by environmental performance awards, and significant negative returns were recorded for poor environmental management, as evidenced by environmental emergencies. These events' implied financial market value was also calculated. The authors stated further that this relationship between environmental management and financial performance may be utilized by both scholars and practitioners as a criterion for evaluating investment choices and as a measure of the opportunities created by industry leaders. Another research around SMEs by Banham (2010) suggested that changes in technology, customer expectations,

supplier requirements, the regulatory environment and increased competition are some external determinants that needed to be addressed by the SMEs in order to remain viable. Having a better look at the factors that are affecting business success of Small & Medium Enterprises (SMEs) in Thailand, the authors Chittithaworn *et al.* (2011) figured that SMEs characteristic, customer and market, the approach of doing business and cooperation, resources and finance, and external environment (strong social network and good government relationship) are the most significant determinants of Business Success of SMEs in Thailand. In addition, a paper regarding macroeconomic variables that influence the performance of stock market in India was released by Kumar (2013). In this paper, the author used data reduction technique-factor analysis in order to identify these factors and the results were that the industrial performance plays a significant role in affecting the stock market. Moreover, stock market reacts to performance of the company specific factors and unexpected events in the economy. Additionally, a paper regarding the effects of exchange rate, interest rate, inflation rate and GDP fluctuations on the performance of the manufacturing industry in Kenya, indicated that foreign exchange, interest rate and inflation rate have significant effects on the performance of the firms in the construction and manufacturing sectors. (Osoro and Ogeto, 2014) Furthermore, an analysis regarding the impact of macroeconomic factors that are affecting the financial performance of the 5 companies listed in the Energy and Petroleum sector of the NSE, made by Rao (2016), agreed with the above authors, that there was a significant relationship between the financial performance of those companies and the macroeconomic variables used in his research: inflation rate, interest rate, exchange rates, the GDP growth and oil price. Continuing, the author found out that the oil price and interest rates have a significant effect on the financial performance, with oil price having also a negative relationship with the financial performance of the firms under investigation. Musembi (2016), in turn, evaluated the effect of certain macroeconomic variables of financial performance of unit trusts listed and licensed in Kenya by the CMA, consisting of interest rate measured by the commercial bank lending rate, Inflation rate measured by the CPI, Money Supply-M3 and Real Gross Domestic Product. His study concluded that "firstly, a negative relationship existed between financial performance of unit trusts and interest rate represented by commercial bank lending rate in Kenya. Next, it concluded that inflation rate-CPI positively and

significantly affected financial performance of unit trusts. Moreover, another conclusion was that money Supply-M3 negatively influenced financial performance of unit trusts in Kenya. Finally, the study did not find any relationship between real GDP and financial performance of unit trusts in Kenya". Another investigation conducted by Matar *et al.* (2018) using a sample of Jordanian industrial and services firms, indicated that GDP and Inflation rate (INF) correspondingly are impactful towards corporate performance, while Interest Rate (IR) causes less effect. In comparison, only the accounting-based metric Return of Assets (ROA) has been affected by firm-specific elements such as firm size, financial leverage, investment, liquidity and sales growth; a conclusion which is in harmony with many aforementioned authors. Another research around the impact of macroeconomic factors on the performance of non-bank financial institutions in Bangladesh economy showed that, GDP was negatively correlated with the performance metric Return on Asset (ROA) and that it has a significant effect on it, which is contrary to the finding of Makau, while both Inflation and Interest rate have insignificant impact on ROA and with Interest Rate to be positively correlated with it. (Ahmed and Islam, 2018) While analyzing the factors affecting the financial performance of commercial banks in Kenya, the author Mujuka (2018) determined that inflation rate, credit risk, interest rate and technology all have a significant relationship between themselves and financial performance, with technology to be the driver which had the highest impact on financial performance trailed by credit risk, interest rates and inflation rates. It was also concluded that "commercial banks needed to embrace financial management practices in order to achieve financial performance". Hanggraeni *et al.* (2019) on the other hand, state that competition is an external factor that have a serious impact on the performance of MSMEs in securing market share and a superior level of profitability. Moreover, their study indicated that internal factors such as organization, marketing and technical and technological issues have a positive impact on MSMEs performance, which is triggered by the effect of efficiency and comparative advantage of companies' strategy. As for external factors, the positive influences of external variables on performance, have several reasons among the competition, efficiency, and alliances. Lastly, the risk management also has a positive effect on MSMEs' performance and describes some advantages for the enterprises if they perform Enterprises Risk Management (ERM). Looking at the insurance industry

now, results from a study conducted by Ishtiaq and Siddiqui (2019) revealed that tangibility, market share, net premium, insurance leverage and GDP is insignificantly or negatively correlated to the financial performance of Pakistani Life Insurance Company, while the other independent variables for instance liquidity, underwriting risk, debt to equity, equity capital, capital surplus and inflation are positively and significantly related. Continuing, an assessment of factors affecting the financial performance of Microfinance Institutions (MFIs) in Zimbabwe conducted by Kanyenda (2019) revealed that the Inflation rate and lending rate were significant prognosticators of financial performance of MFIs. On the other hand, operation self-sufficient and portfolio at risk were detected to be irrelevant in forecasting the financial performance of MFIs in Zimbabwe. Regarding the effect of financial crisis on non-financial companies in EU countries, Bărbuță-Mișu, Madaleno and Ilie (2019) figured that such factor exerts a significant positive influence over financial performance as well as liquidity, assets turnover, and labor productivity, meaning that firms tend to put in larger attempts to preserve financial performance in the face of a disaster. Moreover, the authors found out that, financial performance is significantly and negatively affected by leverage independently of the crisis impact, indicating return on assets to be lower than the average interest rate. Masoumi *et al.* (2019) concluded that between the variables observed in their study around Iranian pharmaceutical firms, market currency rate, money volume, pharmaceutical sector inflation, bank interest rate, GDP in the healthcare sector, healthcare costs, and collection period of quests have the most effect on explaining variations within the stock return of pharmaceutical companies. Furthermore, a study investigating the factors affecting the financial performance of insurance companies operating in Hawassa city Administration in Ethiopia, resulted that the variables of underwriting, premium growth, solvency ratio, growth rate of GDP, and inflation rate had significant effect on financial performance of the companies under examination, whereas, the reinsurance dependence, company size and interest rate had no significant impact. (Deyganto and Alemu, 2019) On the other hand, in a research conducted by Mugambi (2020) with the purpose of investigating the effect of macroeconomic factors such as inflation rates, interest rates and exchange rates on the financial performance (measured by the return on equity ratio) of listed manufacturing firms in Kenya, the following conclusions were revealed using explanatory design and by

developing a model along with regression analysis techniques: “The interest rate had a positive effect on financial performance and statistically significant effect on listed manufacturing firms. However, inflation rate and exchange rate had a negative and statistically insignificant effect on the financial performance of listed manufacturing firms”. Concerning sustainability, Jumita, Taufiq and Yusnaini (2020) study showed that it has a positive and significant effect on the financial performance of mining firms in Indonesia. Moreover, a case of Lalibela City micro and small enterprises in Ethiopia, examining the impact of external factors on industry performance, showed that marketing factors, financial factors, infrastructure, work premises factors, trade fair factors, and political-legal factors altogether have a positive effect on those enterprises’ performance. Furthermore, the study’s outcome displays that ‘financial factors, marketing factors, infrastructure, work premises factors, and trade fair factors have a positive significant effect on industry performance, but political-legal factors do not significantly affect the dependent variable industry performance’. From the forecasting variables, infrastructure has more impact on industry performance than the rest of variables in the study area. (Ebabu Engidaw, 2021) Looking at a different sector now, automotive & transportation , studies related to an Electric Vehicle company, Tesla Inc, showed that some internal and external determinants that influenced its value were product range, product efficiency, value-added auxiliary technology (FSD & Power Substitution/Superchargers), long-term investments, U.S government's financial supports, Climate change, regulation credits, reduced interest rates in public influence, inflation risks and the Covid-19 pandemic. (Le and Ho, 2021)

2.3 Internal and External Factors that can influence a firm’s Financial Performance

Another study aiming to examine the bank-specific and macroeconomic determinants of the banks profitability in Turkey, showed that asset size and non-interest income have a positive and significant impact on bank profitability which is, in turn, quantified by return on assets (ROA) and return on equity (ROE). Nevertheless, size of credit portfolio and loans under follow-up have a negative and significant effect on bank profitability.

Regarding the macroeconomic variables examined in this research, only the real interest rate affects the performance of banks positively. (Anbar and Alper, 2011) In the same way, Dragnić's (2014) study validates that all internal elements (business entity size, life cycle stages, technology and product innovation, organizational features of autonomy, centralization and formalization, market roles, and type/importance of goals) and most external (general state of the economy, sector, and customer type), contingent on the period (life cycle stage and general state of the economy), implement a more or less substantial effect on the Small and Medium Businesses' (SMBs) performance/ effectiveness (sales growth and goals achievement). Vartiak's (2016) study on internal and external factors that can affect a company's excellence, uncovered that the structure, strategy, people, technology and systems are among the internal factors, while social, economic, cultural, customer and partner forces are between the external variables. In the same way, Rizal, Mukhammad Kholid and Sudahak (2017), on their analysis regarding the influence of external and internal environmental on Micro Small and Medium Enterprises (MSMES) of Food and Beverage in Batu City, figured that the external environment has a positive effect on the business performance. Specifically, the more support from the government in the form of regulation/pro-business policy could make the access to external funding (in this case, the easiness in obtaining capital from financial institution/banks and capacity of skilled human resources) have an impact on the improvement of Food and Beverage business performance in Batu City. Additionally, the better the owners/managers of the businesses implement the management capacity, the product promoting, and the utilization and use of technology in improving production efficiency (internal factors), the more positive the impact on the development of Food and Beverage business performance in Batu City will be.

2.4 Factors that can influence the Valuation of a company

Hassani and Pakmaram (2017) after completing several hypothesis testing and classic regression tests between 102 companies in Tehran Stock Exchange during the years 2007 to 2014, have deduced that the criteria of profitability, firm size, tangible assets and business risk have significant and strong effects (as the company's independent variables)

on capital structure (as the dependent variable) which is the most noteworthy and effective parameter on the direction and valuation of a company in capital markets. Markauskas and Saboniene (2015) examined multiple economic factors such as gross profit margin, prime cost of purchased raw milk, productivity per employee, export, interest rates and market share in order to evaluate a company's value of Lithuanian Dairy Industry. Their results indicated that gross profit margin and interest rates had most significant impact on Economic Value Added, whilst variation in prime cost of purchased milk and productivity per employee did not change any of the four dairy company's economic value. Bakhshani's (2017) findings related to the relationship between Non-financial Factors, Capital Structure and the Performance of the Listed Companies on the Stock Exchange, indicated that the debt ratio and the fixed assets-to equity ratio are not related to the age of the institutions. Furthermore, his study disclosed that the industry type is not significantly related with any of the capital structure ratios whilst, the age of the institutions has a positive correlation with debt-to-equity ratio. Looking at the robust impact of macroeconomic factors towards market valuation among energy sector across countries, Saad's (2021) findings showed that there are positive relationships and effect of Gross Domestic Product (GDP) and Consumer Price Index (CPI) on the energy firms' market valuation proxy by Tobin's' Q ratio along with a substantial opposite relationship with interest rate factor across the countries. Additionally, the authors Suleimenova *et al.* (2021) after examining various regression models in order to identify which external factors influence the value of a company, with a focus on NAC Kazaromprom JSC, a producer and marketer of minerals and especially uranium, found out that the best model was a multiple regression model between the Sales of the company (dependent variable) and the independent variables of Exchange rate (USD/KZT), uranium price and Gross Domestic product of Kazakhstan.

2.5 The Dot-com bubble and 9/11 terrorist attack of 2000-2001

The Dotcom Bubble was an economic bubble that influenced the pricing of technology-related equities in the United States in the late 1990s and early 2000s. The incident was sparked by investors' speculations about dot-com revenues, media attention, and the

euphoria around the emerging Internet business.(Pureza, 2021) The author also mentions that, the value of Internet-based firms' stocks on the NASDAQ Composite Index increased by almost 400% between 1995 and 2000. The bubble, ultimately, burst in 2002, and stock values dropped by 78%. Many businesses did not survive the crisis, and it had a significant impact on the whole US economy. During the dot-com bubble of the 1990s, there was discussion about standard accounting and financial information losing its usefulness as a proxy for predicted future cash flow. Morris and Alam (2008) findings on their analysis of the Dot-com Bubble of the 1990s appear to support the claim that the market acted more irrationally during the dot-com bubble period than it had earlier or after as after the dot-com bubble burst, the Hi-Tech businesses experienced a greater decrease in value relevance, followed by a stronger rebound. Similarly, Morris and Alam (2012) on their study, examined "the relation between market valuation and traditional accounting/financial information before, during and after the dot-com bubble". Equity market valuation was a major topic among investors, financial analysts, and academics during the dot-com bubble of the 1990s. As equities traded at multiples of earnings much above previous levels, some questioned if standard accounting and financial information had lost its value relevance, prompting Alan Greenspan to warn against "irrational exuberance." The authors reconfigure prior research that shows a decrease in the relationship between market value and standard accounting data in the run-up to the bubble. However, they also show that when the market collapsed in 2000, this pattern reversed. Regarding the economic impact of the 9/11 terrorist attack on New York City, Howard (2005) on his book referred that this incident was an attack on the economy of New York City as the direct economic damages were astonishing. The losses were severely noticed on the travel and tourism sector while huge amount of people lost their jobs as an immediate consequence of the attack. The author additionally, mentions that Gross city product, which was the single most comprehensive measure of economic activity measure fell over $50 billion after the attack. Key financial services sector, restaurant, hotel and air transportation sector were severely affected by the attack as the author specified. In addition, Roberts (2009) mentioned that "the instant impact of the 9/11 attack was to decrease real GDP growth in 2001 by 0.5%, and to raise the unemployment rate by 0.11%". However, the author concluded that even though real GDP growth in 2002 was far lower than expected,

it quickly rebounded following the 9/11 attacks. The improvement in the projection might have been due to unanticipated reactions that diminished the impact of the strike, but it could also have been due to inaccurate forecasting and a lack of knowledge of how the attack would affect the economy, as the author mentions. The unemployment rate was expected to rise substantially following the 9/11 attacks in 2002, but unlike actual GDP growth, it never reverted to pre-9/11 levels. Furthermore, Jackson (2008) on her article regarding the Impact of the 9/11 Terrorist Attacks on the US Economy, stated that the US and the rest of the world were stunned as the events of that day were unlike any previous disaster in American history. In addition, the author mentioned that US financial markets were suspended for four business days, and equities dropped sharply on re-opening days, with the Dow Jones plunging 684.81 points on re-opening day; the 9/11 attacks just added to the turbulence, as the "dancing in the dollars" period was coming to an end by the end of 2000. However, the author concluded that the rapid reopening of markets allowed for a self-assessment and correction following the attack revealed the country's resilience. Finally, Sandler and Enders (2010) on their article regarding the Economic consequences of terrorism in developed and developing countries, emphasized that terrorism has an economic cost since it diverts foreign direct investment (FDI), destroys infrastructure, redirects public investment dollars to security, and restricts trade. If a developing nation loses enough FDI, which is a key source of savings, its economic growth suffers.

2.6 Global Financial crisis in 2007-2008

An external and unpredictable factor that can influence the overall performance and valuation of a company is a financial crisis. The credit crunch of 2007-2008 has severely affected all enterprises in the United States as two Bear Stearns hedge funds had collapsed, BNP Paribas was warning investors that they might not be able to withdraw money from two of its funds, and the British bank Northern Rock was about to seek emergency funding from the Bank of England. (*The 2007–2008 Financial Crisis in Review*, 2021) Zhang (2009) in his article regarding the impact of the financial crisis on the pharma and biotech industries mentions that many major pharma and biotech firms have been dynamically

reinforcing their capabilities and paying more attention to efficiency, cost-effectiveness, and productivity as demonstrated by many of the latest megamergers. In addition, the author added that for both industries, a joint consequence of the existed financial crisis was that a significant number of professionals have lost their jobs or are under the threat of restructuring measures. Another consequence mentioned by the author was that many R&D programs had been reprioritized or even cut, while the focus was only on those programs in development stages. Moreover, many businesses filed for bankruptcy protection or were seeking alternative business strategies including liquidating. Likewise, in Mintz's (2009) article concerning the way financial crisis reshaped the life sciences industry, it is mentioned that "the major challenge of these companies was getting sufficient return on investment from pipelines that contained riskier, expensive products in the face of downward pricing pressures and diminishing revenues from products nearing patent expiry." Additionally, the author stated that although big pharma's financial statements seemed to suggest that those companies, or at least their cash reserves, were in a good position, yet more layoffs were estimated at pharmaceutical companies by the year of 2010. Finally, it is mentioned that pharmaceuticals were starting to investigate mergers and acquisitions as a method of bolstering their flagging drug-development pipelines. Campello, Graham and Harvey (2010) while examining the real effects of financial constraints with evidence from the financial crisis of 2008, figured that constrained companies proposed deeper cuts in tech expenditure, employment, and capital spending. Constrained firms, in addition, burned through more cash, depended more heavily on lines of credit as they were worried that banks would restrict access in the future, and sold more assets to finance their operations. Finally, the authors revealed that the inability of many companies to borrow externally caused many firms to bypass attractive investment opportunities during the credit crunch of 2008. Leopold *et al.* (2014) on their research, aimed to" identify pharmaceutical policy changes during the economic recession in eight European countries and to determine whether policy measures resulted in lower sales of, and less expenditure on, pharmaceuticals". After gathering data and computed some indicators in order to compare economically stable countries such as Austria, Estonia and Finland, to those in economically fewer stable countries, Greece, Ireland, Portugal, Slovakia and Spain, figured that less economically stable countries implemented more

pharmaceutical policy changes during the recession than economically stable countries. Additionally, pharmaceutical sales volumes improved in almost all countries, while sales values dropped, especially in less stable countries. Moreover, the study of Lai, Aziz and Chan (2014), focused on characterizing the impact of the 2008 global financial crisis on the financial performance of public listed construction companies in Malaysia by using financial ratios in order to define the profitability, liquidity, activity, leverage and solvency of these companies during the years of 2005 to 2010. Their discoveries showed only a single direct effect in profitability of these companies was caused by the financial crisis. Total revenues and total assets of these companies maintained to increase due to higher demand for construction from year 2007 after two large capital investment plans introduced by the Malaysian Government to ease the potential impacts of the financial crisis. Net profits rallied back to 5 per cent by year 2010. These companies instantaneously reacted to the crisis with more cautious financial management; restricting expenses, cutting dividends, decreasing bank borrowings, expanding equity; and to the extent of disposing of assets to mitigate losses. Another study concerning the impact of global financial crisis (GFC) on the performance of Malaysian listed property companies, written by the author Ahmad (2015), revealed that the majority of the companies faced a recession during GFC period but retrieved quickly in post GFC by gaining better Sharpe ratio, improved return and lower risk in comparison to their performance in pre GFC period. The author realized an econometric analysis for the purpose of his research by using total return as dependent variable with 7 independent factors: GGFC, market value, cash flow, dividend, intangible asset, total debt, and book value per share. The results of his analysis disclosed also, that only market value, book value per share and GFC factor have significant results in the Dynamic Panel Regression estimation model that was carried out for this purpose. Continuing, Chan and Abdul-Aziz (2017) aimed to "characterise the financial performance and to identify the operating strategies of property development companies in Malaysia during the 2008 global financial crisis (GFC)" through the analysis of the financial statements and annual reports of 35 property development companies listed on the Kuala Lumpur stock exchange. Their findings showed an overall decrease in their net profit in 2008. After categorizing these companies into two distinct sets of distressed and non-distressed companies, their study revealed that poor financial performance and a high debt-

to-equity ratio pre-GFC preceded to persisting poor performance during the GFC period and beyond. Survival strategies implemented by distressed companies comprise the disposal of assets to enhance cash flow, refinancing loans, delaying the launch of new projects and lessening their workforce; strategies that previous authors also discovered through their analysis. Non-distressed companies implemented growth strategies such as acquiring land for development, concentrating their offerings towards high-end products, vertically integrating and diversification. Another research made by the authors Khan, Mustafa and Khursheed (2018) regarding the "impact of global financial crisis (2007 – 2008) on socially innovative microfinance institutions (MFIs) operating in Pakistan" showed that financial crisis severely affected the performance of all selected MFIs and deteriorated their operations.

2.7 The weaknesses of the pharmaceutical's operation exposed by COVID-19

The pharmaceutical industry is currently struggling to address the challenges posed by the COVID-19 pandemic. According to studies, there are now several unfavorable factors in the global pharmaceutical sector that, in theory, call into doubt the industry's ability to deal with the problems that the COVID-19 crisis poses today. In accordance with Klunko's (2021) recent study, pharmaceutical companies are facing a short adaptive ability to react to the conditions of the unpredictable spread of infection due to the fact that firstly, registering and documenting a vaccine under national standards is a complicated and long procedure and secondly, because of the limited understanding of the efficacy of vaccination and its potential side effects. Continuing, the author reveals that there is an unreasonable competition and an inefficient system of information communication between national developments and vaccine manufacturers which leads to questioning manufacturers of trademarks and brands. Another problem that the author has identified is the lack of adaptive capability of the pharmaceuticals to strengthen production actions throughout a pandemic. This is caused by the absence of logistic infrastructure (rapid delivery and high-quality storage), the absence of modern technologies that could boost the production of

vaccines and their effectiveness and finally the absence of the actual production capacity for the manufacturing of vaccines. Klunko points out that problems related to the minimal adaptive ability of the institutional requirements of the pharmaceutical sector are similarly a proof of its «vulnerability» to solve worldwide challenges. These are related to the unavailability of: operational contractual interaction scheme between nations in times of a pandemic, an established system of a rapid vaccination of the population and finally skills in the process of a pharmacy chain in a pandemic that considers price control and ensures a particular quality of antiviral drugs.

2.8 Short- and long-term impacts of the pandemic in the pharmaceutical industry

Barshikar (2020b) in his article regarding the impact and new normal for pharmaceutical industry, mentions that Active Pharmaceutical Ingredients (APIs) shipments to Indian clients have progressively restarted, with the Drug Controller General of India contacting firms to provide logistics help for airlifting essential APIs from China. Companies have seen interruptions in outbound logistics, as well as the transfer of raw materials and shipments, while manufacturing facilities continue to operate with minimum workforce and reduced utilization. Similarly, the impact on transportation and freight operations has caused significant delays in supply, resulting to a supply chain disruption. This crisis will cause serious effect on costing, as the author explains. API imports from Indian manufacturers have been a significant cost savings for worldwide pharmaceutical companies, but the outbreak in China and the spread of Covid-19 to the EU may limit supplies to global manufacturers, raising total costs for global manufacturers and importers, and affecting consumers. At the operational level, the author believes that there is definitely an impact in the form of operations being slowed significantly due to delays in activities, social distance, wearing face masks all the time, sanitization, and having less workforce, among other things. As a result of the above, productivity suffers. The virus outbreak, on the other hand, created potentials for US pharmaceutical firms in working on new vaccines

and drugs, as the author mentions. Several institutions across the world are striving to produce vaccines with the help of regulatory authorities, by investing a fair amount of money in order to accomplish it. Similarly, Ayati, Saiyarsarai and Nikfar (2020) are listing the short- and long-term impacts of this global crisis on the pharmaceutical industry. Changes in demand, regulatory reforms, research and development process modifications, and the transition to tele-communication and tele-medicine are all factors to consider in the short-term. Long-standing effects of COVID-19, however, might include industry growth slowing, approval delays, moving toward self-sufficiency in the pharmaceutical supply chain, and trend shifts in health-market product consumption, as well as ethical dilemmas. In the same way, Domanska (2020) mentions that local pharmaceutical production (LPP) in the long-term can assist poor communities in gaining access to high-quality medications, reducing reliance on foreign supplies and facilitating the control of counterfeit drugs entering emerging markets. Finally, according to Tokic (2020), over the long term, the COVID-19 pandemic will hasten the trends of de-globalization and de-dollarization, creating an extremely doubtful geopolitical and economic future.

CHAPTER 3: METHODOLOGY

3.1 Types of Research Methodology

There are different types of Research Methodology used while conducting research: the Qualitative research methodology, the Quantitative research methodology or the combination of them.

Starting with the Qualitative research methodology, “it is a descriptive and subjective irrespective of facts”. (Mehta, 2021) In this sort of methodology, observation and description are more essential. The major goal of this approach is to assess people's knowledge, attitudes, behaviors, and views on the research issue. Grounded research, case studies, action research, disclosure analysis, ethnography, and other techniques are used in this method. In qualitative methods, the size, volume, frequency, and intensity of data are irrelevant. It focuses on data inspection or measurement that isn't rigorous and it comprehends emotions, points of view, and perceptions.(Dr. Saul McLeod, 2019)

Continuing with the next method of research methodology, Quantitative method; it is a numerically based, methodical research approach that evaluates the significance of the study hypothesis. Laboratory experiments, econometric and mathematical calculations, surveys and simulations are all examples of quantitative research technique. This research technique relies heavily on measurement, quantity or amount. The analysis and measurement of data, as well as the connection between variables, are critical components of quantitative research technique. Moreover, it entails quantitative research that quantifies attitudes, behaviors, and performance. This approach simplifies the interpretation of data and visualizes them through graphs or charts. Additionally, it necessitates procedures that can be applied on a wider scale. (DeFranzo, 2010)

3.2 Data Collection

For my research analysis, Refinitiv and Orbit database will be utilized in order to collect the data which entails financial statements, general information and/or economic figures of

the companies under investigation. Also, the official websites of those companies will be used in order to obtain the annual reports and other related information for the companies like recent news, presentations or reports from the directors. Other financial websites may be employed in order to assist in data collection and explanation, for example Investopedia, Yahoo Finance, Bloomberg and Investing.com.

3.3 Selection of the Sample

The companies that are going to be assessed are based in EU and USA. AstraZeneca Plc, Novartis AG and GlaxoSmithKline Plc are among the biggest European pharmaceuticals, with AstraZeneca Plc to be the only European pharmaceutical that has already produced a Covid-19 vaccine and being approved by the FDA. Pfizer Inc., Merck & Co., Inc., Johnson and Johnson are the pharmaceutical companies listed in the USA which will be evaluated in my research with the majority of them (excluding Merck & Co., Inc.) to have successfully produced a Covid-19 vaccine, approved by the FDA. The company of Moderna Inc. which has also delivered a vaccine approved by the FDA could not be included in my research as there were not enough data available for the period time under investigation therefore it was decided to be excluded from the dataset. The financial statements of the years between 1998 to 2021 of the companies under investigation will be analyzed in a quantitative perspective (in the form of financial ratios, valuation techniques, graphs & charts, comparative analysis). The period of time (1998-2021) was selected in order to analyze and compare the performance and valuation of the pharmaceutical companies under investigation certain years before the DC911(2000-2001), within the GFC period (2007-2008) and until the current crisis of C19 pandemic (2019-2021).

3.4 Procedure and analysis tools

Statistical tools like Excel will be used in order to interpret the data collected from the financial statements, calculate the essential financial ratios in order to visualize the results through graphs, tables and charts. Regarding the valuation techniques that were going to be used in order to evaluate each company for every year; the Free Cash Flow to Equity Method (*Free Cash Flow Valuation | CFA Institude*) was chosen but then rejected as it resulted into negative values for the estimated share price which is not applicable. Dividend Growth Model(*Dividend theory | ACCA Global*), Price-Earnings Ratio as well as Price to Book Ratio was eventually used as the companies were evaluated for the shareholders interest and not for the business itself.

Financial Ratios:

1. **Liquidity Ratios:**
   - Current Ratio = $\frac{Current\ Assets}{Current\ Liabilities}$
   - Acid-Test Ratio = $\frac{Current\ Assets - Invetories}{Current\ Liabilities}$
   - Liquid Ratio = $\frac{Cash\ \&\ Cash\ Equivalents}{Current\ Liabilities}$
2. **Financing Ratios:**
   - Gearing Ratio = $\frac{Total\ Debt}{Total\ Debt + Shareholders\ Equity}$
   - Interest Cover Ratio = $\frac{Interest\ expense}{Operating\ Profit}$
3. **Performance Ratios:**
   - Return On Capital Employed Ratio (ROCE) = $\frac{Operating\ Profit * 100}{Total\ Debt + Shareholers\ Equity}$

- Return on Assets (ROA) = $\frac{Net\ Income*100}{Total\ Assets}$
- Return on Equity (ROE) = $\frac{Net\ Income*100}{Shareholders\ Equity}$
- Gross Profit Margin (GPM) = $\frac{Gross\ Profit\ *100}{Total\ Revenues}$
- Net Profit Margin (NPM) = $\frac{Net\ Income\ *100}{Total\ Revenues}$

4. **Investors Ratios:**

- Price Earnings Ratio (P/E Ratio) = $\frac{Number\ of\ shares*Share\ Price}{Net\ Income}$
- Price to Book Ratio (PBR) = $\frac{Number\ of\ shares*Share\ Price}{Shareholders\ Equity}$
- Dividend Yield Ratio = $\frac{Total\ Dividends\ paid*100}{Number\ of\ shares*Share\ Price}$
- Dividend Cover Ratio = $\frac{Net\ Income}{Total\ Dividends\ paid}$

Valuation methods:

1. **Dividend Growth Model:**

P0= $\frac{D0(1+g)}{(re-g)}$

Where,

- D0 are the dividends paid of each year
- g is the annualized growth of the dividends for the period of 1998-2021
- re is the cost of equity- Capital Asset Pricing Model (CAPM) that is calculated by the formula:

  re= rf +β*(rm-rf)

Where,

- rf- is the risk free factor and has be chosen to be the 30-year average return of the US government bonds (*United States Rates & Bonds - Bloomberg*)
- rm- is the return of the market and is selected to be the average annual return for the S&P 500 (*The Average Annual Return for the S&P 500 - Forex Education*)
- β- is the beta value which is a measure of a stock's volatility in relation to the overall market and is sourced by the Refinitiv Database for each of the company individually

➢ Finally in order to find the Value per share (the evaluated share price) we will divide P0 by the number of shares of each year accordingly.

2. Price - Earnings Ratio:

Estimated share Price= $\frac{P/E\ RATIO\ OF\ THE\ PHARMACEUTICAL\ INDUSTRY * Net\ Income}{number\ of\ shares}$

Where,

- P/E OF THE PHARMACEUTICAL INDUSTRY will be calculated after taking the average P/E Ratio of the six pharmaceutical companies under investigation for each of the 24 years and then by taking the average of all of the years so as to eliminate the effect of the three crises and to present a representative P/E metric for the industry.
- Net Income: Is the Net Income of each company for each year that is analyzed

- Number of shares: The number of shares of each company for each year that is analyzed

3. Price to Book Ratio:

$$\textbf{Estimated share Price} = \frac{PBR\ RATIO\ OF\ THE\ PHARMACEUTICAL\ INDUSTRY * Equity}{number\ of\ shares}$$

Where,

- PBR OF THE PHARMACEUTICAL INDUSTRY will be calculated after taking the average Price to Book Ratio of the six pharmaceutical companies under investigation for each of the 24 years and then by taking the average of all of the years so as to eliminate the effect of the three crises and to present a representative PBR metric for the industry.
- Equity: Is the Shareholders equity of each company for each year that is analyzed
- Number of shares: The number of shares of each company for each year that is analyzed

CHAPTER 4: ANALYSIS

This chapter will be separated into three subchapters. The first subchapter will be an overview of the pharmaceutical companies and how they were operating during the last 24 years. The next subchapter will focus on the resemblance or disparity between the three periods: The dot-com bubble and the 9/11 terrorist attack of 2000-2001, the Global Financial Crisis of 2007-2008 and the present outbreak of Coronavirus (2019-2021). The last subchapter will consist of the comparison between the real share price and the estimated share price of each company individually calculated through the various valuation techniques that were discussed earlier. The performance and valuation and in general the behavior of the six companies under investigation will be compared in order to identify the effect of each crisis. The figures regarding the year of 2021 in the first subchapter as well as the Net Income included in the P/E ratios were multiplied by the ratio of 12/9 in order to have forecasted values for the end of the year as currently the companies have announced only the 9M financials.

4.1 Companies' Overview

4.1.1 Astra Zeneca PLC

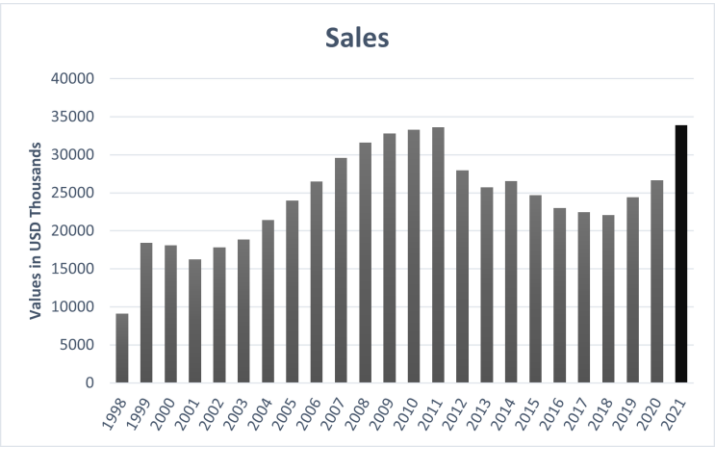

Figure 1 Sales of Astra Zeneca PLC

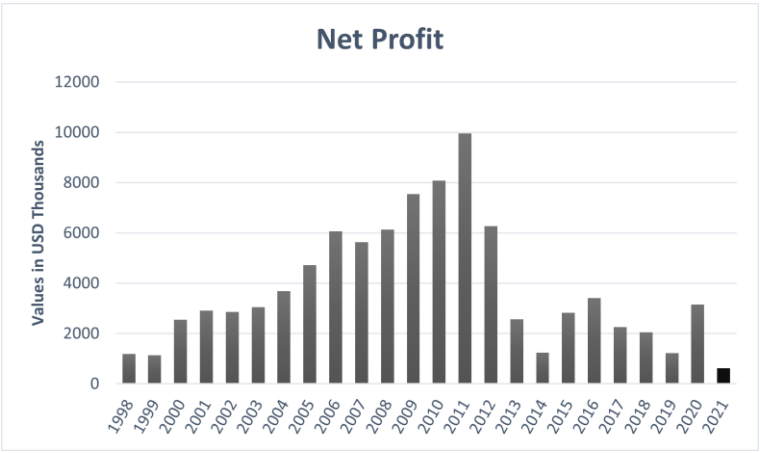

Figure 2 Net Profit of Astra Zeneca PLC

As can be seen from the above charts, AZN's revenues and Net Income were following an upward trend for the years 1998 until the year of 2000 as the company's had entered a joint venture with Merck Inc and therefore its revenue from US was increased. For the following years, the company has managed to retain the growth of its revenue and Net Profit, but this was interrupted on the year of 2012. That was due to the fact that the company's revenues are largely derived from sales of products which are covered by patents. However, it is significantly impacted by the expiry of those patents over the medium term. In addition, government price interventions in response to budgetary constraints were also adversely affecting revenues in many of their mature markets during that year. Moreover, the decline of Net Income reflects the $1.08 per share benefit in 2011 from the sale of Astra Tech and higher restructuring costs in 2012. In the year of 2014, the company has made its lowest Net Income due to large amounts spent on R&D investments and selling, general and administrative costs (resulting from changes in the fair value of the liabilities and new regulations regarding the Branded Pharmaceutical Fee). Following this year, the company continued to realise a reduced amount of sales and net profit until the years of 2019-2020 when the company divested several global commercial rights and launched new medicines that resulted in significant revenue growth. Furthermore, the company took the decision early in the pandemic to conclude its agreement with the University of Oxford to develop, manufacture and supply their potential vaccine to prevent COVID-19. The company committed to doing this at no profit during the pandemic by providing the broad equitable supply of billions of vaccine doses around the world. Eventually, the Lancet (the COVID-19 Vaccine of AstraZeneca) received its first approval for emergency use in the UK on 30 December 2020 and now has conditional marketing authorisation or emergency use approval in more than 50 countries. However, AstraZeneca faced a number of challenges arising from the pandemic. These consisted of:

- Reduced levels of patient screenings, diagnoses, testing and elective procedures.
- Less face-to-face engagement with HCPs for commercial field sales teams.
- Additional costs and procedures related to COVID-19, such as facilities cleaning, face masks and COVID-19 assessments.

- An increase in Distribution Expense.
- An impact on initiation, ongoing recruitment and follow-up in some clinical trials, primarily in the early stage.

In the year of 2021 the company has managed to increase its sales from its previous products and an extra revenue stream was initiated due to the Covid-19 vaccines of being sold worldwide, hence the sudden increase in the overall sales. However, the increased R&D, Selling, general and administrative costs associated with the COVID-19 activity, as well as other operating expenses in relation to consequent obligations under the license agreement with Oxford University Innovation (OUI), led to the reduction of the company's' Net Profit. Finally, it is important mentioning that many countries around the world have decided to suspend the use of the AZN's vaccinations over blood clot fears.(Meredith, 2021)

4.1.2 GlaxoSmithKline PLC

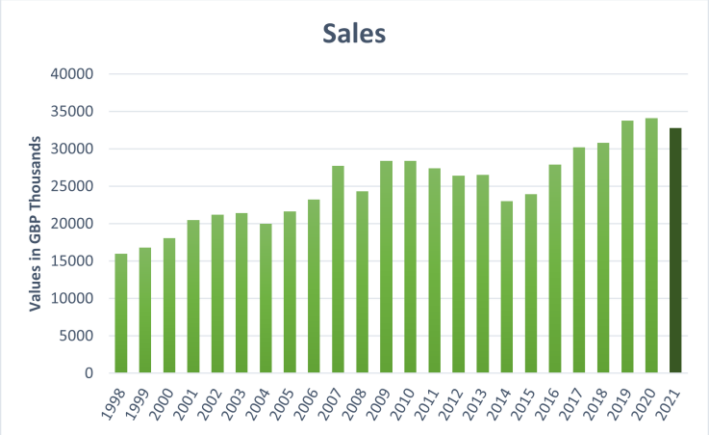

Figure 4 Sales of GlaxoSmithKline PLC

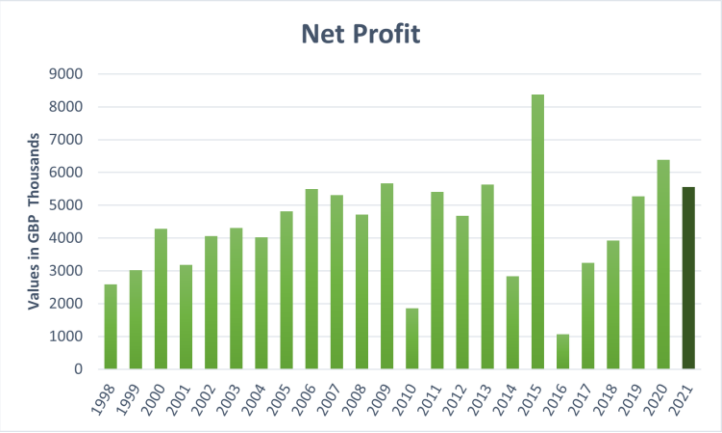

Figure 3 Net Profit of GlaxoSmithKline PLC

The company has managed to increase its sales since 1998 until the year of 2007. The sudden increase in Net Profit during the year of 2000 was due to the merger of Glaxo Wellcome and SmithKline Beecham and their agreed number of product divestments

recognition of the company realized only during that specific year. In 2007 Consumer Healthcare generated strong sales growth followed by a sudden drop in 2008 as an article in the New England Journal of Medicine related to a specific medicine of the company along with intense media coverage generated a big scandal that led to significant drop in its sales stream. In 2010 the company faced a tremendous drop in its Net Profit which was caused by a combination of factors such as: government pricing pressure, increased R&D expenditures and increased selling, distribution, general and administration costs. During the year of 2014 the company faced again a major drop in its sales due to high competition from manufacturers of proprietary and generic pharmaceutical products in all of their major markets that has also diversly affected the company's Net Income. Continuing, the dramatic increase of the company's Net Profit in the year of 2015 was mainly due to the disposal of some businesses and assets of the company to Novartis AG which was more or less discontinued in the following year hence the big drop shown in the chart. The following years the company has managed to improve its performance by having a steady growth in its revenues and therefore in its Net Income. In the year of 2020 the company established multiple partnerships to develop COVID-19 solutions, including: CureVac to develop next generation mRNA COVID vaccines, Vir Biotechnology for therapeutic antibody treatments Sanofi, Medicago and others. It has also formed partnerships to better prepare for future pandemics and ensure access to future COVID-19 treatments and vaccines including through the Trinity Challenge, the company's industry commitment with the Bill and Melinda Gates Foundation and its engagement with the COVAX facility. Finally, the company experienced an adverse impact from the reduction in sales in Vaccines as a result of the COVID-19 pandemic, investment in R&D, and investments in promotional product support, particularly for new launches in Vaccines, HIV and Respiratory. During the year of 2021 though, the company has realized a respective amount of revenue due to Covid-19 solutions that was engaged with. The decrease of the company's Net Income during this year was a result of operating expenses derived from the acquisitions of the former Shionogi-ViiV Healthcare joint venture and the former Novartis Vaccines business and the liabilities for the Pfizer put option and Pfizer and Shionogi preferential dividends in ViiV Healthcare.

4.1.3 Johnson and Johnson

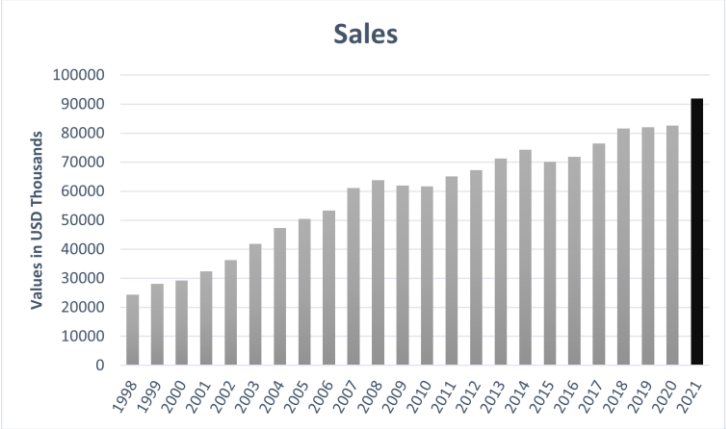

Figure 6 Sales of Johnson and Johnson

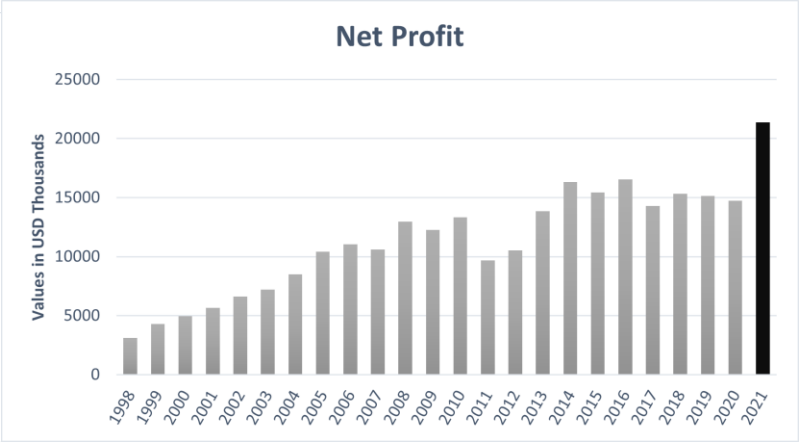

Figure 5 Net Profit of Johnson and Johnson

The company has been following an upward trend as regards to its revenue and Net Profit since 1998. In 2007 the interest expense increased due to a higher average debt balance that was due to the debt associated with the acquisition of the ConsumerHealthcare business of Pfizer Inc. and the Common Stock repurchase program in 2007. This has resulted in a minor drop in Net Income for the year but was interrupted in the following year as the company strengthened its core franchises, advanced its pipelines and introduced new products to sustain revenue growth. Moreover, the expanded sales in 2014 had a positive effect on the company's Net Income too. The sudden drop of Net Profit that was noticed in 2017 was due to increased depreciation and amortization of property and intangible fixed assets. During the year of 2020, the company successfully developped a single-dose COVID-19 vaccine which had received an Emergency Use Authorization from the U.S. Food and Drug Administration and immediately began shipping doses in the U.S. The COVID-19 pandemic has adversely impacted, and is expected to continue to adversely impact, certain aspects of the company's business, results of operations and financial conditions, including lower sales and reduced customer demand and usage of certain of its products. The spread of COVID-19 has caused the Company to modify its business practices (including instituting remote work for many of the company's employees), and the Company may take further actions as may be required by government authorities or as the company determines are in the best interests of its patients, customers, employees and

business partners. Furthermore, idle capacity costs associated with COVID-19 related production slow downs in fiscal 2020 and a negative impact of COVID-19 on sales was noticed during 2020. In addition, due to the ongoing impacts of the COVID-19 pandemic (lockdowns, supply disruption etc) certain trials have been rescheduled or delayed; hence the dramatic decrease of the company's revenues and Net Profit during the year of 2021. Research and Development expenses increased as a percent to sales driven by COVID-19 vaccine expenses, net of governmental reimbursements. Finally the company has considered various internal and external factors in assessing the potential impact of COVID-19 on its business and financial results based upon information available at this time, as follows:

- Operating Model: The Company offers a diverse business strategy in the healthcare industry, with manufacturing, research and development, clinical operations, and commercial capabilities all designed to be flexible..

- Supply Chain: To guarantee appropriate and effective distribution, the Company continues to use its worldwide production network and dual-source capabilities while continuously monitoring and keeping key inventories at major distribution centers away from high-risk locations.

- Business Continuity: The Company's network's extensive, active business continuity procedures have been critical in preparing the Company for occurrences like COVID-19, and the capacity to satisfy the bulk of patient and customer demands has remained unaffected.

- Workforce: The Company has put in place processes to secure its vital workers in manufacturing, distribution, commercial, and research activities, as well as ensuring that acceptable remote working practices for other employees have been developed.

- Liquidity: For the near future, the Company's strong credit rating gives it stronger access to the financial capital markets.

- Domestic and Foreign Legislation: The Company will continue to analyze and evaluate ongoing worldwide legislative initiatives to mitigate the impact of COVID-19 on economies and industries in which it operates. The latest legislative actions are not expected to have a major impact on the Company's activities at this time.

4.1.4 Merck & Co INC

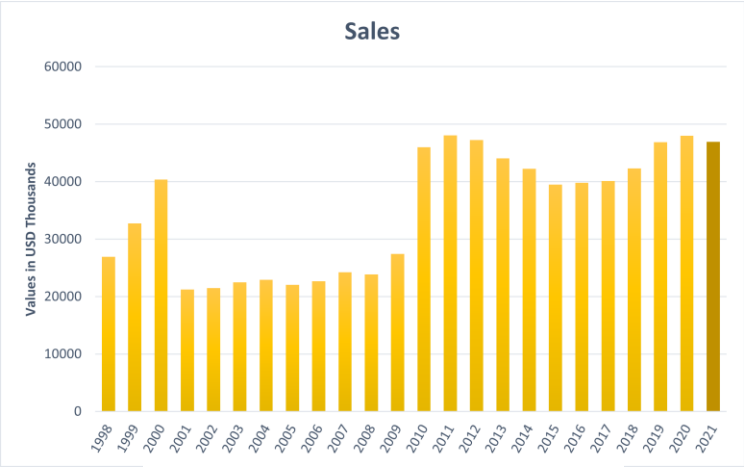

Figure 7 Sales of Merck & Co INC

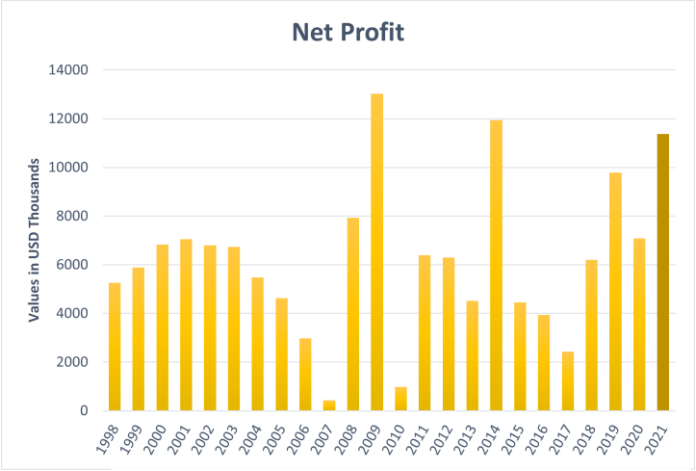

Figure 8 Net Profit of Merck & Co INC

As can be seen from the above chart, the company's revenue was following an increasing trend from 1998 to 2000 but was disrupted during the year of 2001. That was because several of its products faced expiration of product patents in the United States and other countries in the near term. However, the company was able to keep its Net Income in a respective stable level. Furthermore, despite the fact that the company has managed to maintain its revenue stable for the years between 2001 and 2009, this is inconsistent with its Net Profit that was following a declining trend from 2003 until the year of 2007 and then experienced a remarkable increase for the next 3 years. This behavior can be explained by various factors. In 2004 the company's investments in R&D and marketing of new products or new uses for existing ones that has led to the first decrease in its Net Profit. In addition, during this year the company came across with several lawsuits regarding one of its medicines, Vioxx, and faced the court numerous times. The unfavorable outcomes of this activity had a material adverse effect on the Company's financial position, liquidity

and results of operations for the next years as the company was forced to withdraw this specific medicine, it was charged with legal defense costs and restructuring actions. Following up, in 2005-2006 the company's cost of sales also increased significantly as well as its depreciation and amortizations expenses. In 2007 the company had faced its most severe drop in Net Income as a result of U.S. Vioxx Settlement Agreement charge that was between the law firms and concerned the lawsuits and charges it has faced with the courts in the U.S. This charge was settled during that year and hence the significant increase in Net Profit during the next year, 2008. One year after, the company entered into a Merger Program with Schering-Plough Corporation. In the Merger, Schering-Plough acquired all of the shares of Old Merck, which became a wholly owned subsidiary of Schering-Plough and was renamed Merck Sharp & Dohme Corp. Schering-Plough continued as the surviving public company and was renamed Merck & Co., Inc. Also, during 2009, Old Merck sold its 50% interest in Merial Limited ("Merial") to Sanofi-Aventis for $4 billion in cash. The gains from the above partnership and sale contract resulted in a major increase in the Net Profit during that year. In 2010 the company increased its sales revenue although its Net Profit decreased severely as a consequence of R&D, marketing, administrative and material and production costs that were realized during that specific year. In May 2014, Merck entered into an agreement to sell certain ophthalmic products to Santen Pharmaceutical Co., Ltd. ("Santen") in Japan and markets in Europe and Asia Pacific and additionally, divested its Sirna Therapeutics, Inc. ("Sirna") subsidiary to Alnylam Pharmaceuticals, Inc. ("Alnylam"). Furthermore, AstraZeneca exercised its option to purchase Merck's interest in KBI during that year. The above actions reflected as profitable streams for the company during the year of 2014 only and that explains the sudden increase in Net Profit between the years of 2013-2017. 2019's increased sales led again to a minor increase of the company's Net Income while in 2020 the company's human health business, revenue was negatively impacted by reduced access to health care providers given social distancing measures, which negatively affected vaccine and oncology sales in particular. Merck realised a net negative impact to operating expenses, as spending on the development of its COVID-19 antiviral programs exceeded the favorable impact of lower spending in other areas due to the COVID-19 pandemic. Moreover, the company acquired OncoImmune, a company developing a therapeutic candidate for the treatment of patients

hospitalized with COVID-19; and Themis Bioscience GmbH (Themis), a company focused on vaccines and immunemodulation therapies for infectious diseases, including a COVID-19 vaccine candidate. Additionally, the company entered into strategic collaborations with Ridgeback Biotherapeutics LP (Ridgeback Bio) to develop an orally available antiviral candidate in clinical development for the treatment of patients with COVID-19; and with the International AIDS Vaccine Initiative, Inc. (IAVI) to develop an investigational vaccine against SARS-CoV-2 being studied for the prevention of COVID-19. However, in 2021, the company announced it was discontinuing development of the COVID-19 vaccine candidates named MK-7110 due to the timeline and technical, clinical, and regulatory uncertainties, as well as the availability of a number of medicines for patients hospitalized with COVID-19 and the need to focus Merck's resources on fostering the growth and manufacture of the most viable therapeutics and vaccines. Furthermore, the company reported $207 million in costs in the first nine months of 2021 as a result of the discontinuance, which are represented in Cost of sales and relate to fixed-asset and materials write-offs, including the recognition of liabilities for purchase commitments. Merck and Ridgeback Biotherapeutics LP (Ridgeback Bio), a privately held biotechnology business, also signed a partnership agreement in July 2020 to develop molnupiravir (MK-4482/EIDD-2801), an orally accessible antiviral candidate in clinical development for COVID-19 patients. Molnupiravir and related compounds were given exclusive global rights by Merck to develop and market. Ridgeback Bio got an upfront payment and is entitled for future contingent payments based on the completion of specific developmental and regulatory approval milestones, according to the terms of the deal. Any earnings generated by the partnership will be distributed evenly among the parties. The company, additionally stated in January 2021 that it will stop developing V591 (the vaccine candidate developed by Themis Bioscience GmbH (Themis)). As a result, the Company recognized a $90 million IPR&D impairment charge within Research and development expenditures in the fourth quarter of 2020. Future predicated milestone payments have been reduced to $ 450 million in total, including up to $60 million for development milestones, up to $196 million for regulatory approval milestones, and up to $ 194 million for commercial milestones, resulting in a $45 million decline in research and development expenses. Despite the negative impact of COVID-19-related interruptions on the third quarter and

first nine months of 2021, Merck continues to see robust worldwide underlying demand across its business, hence the increased Net Income and sales in 2021. Investments in COVID-19-related research initiatives essentially offset the favorable impact of reducing spending in other areas attributable to the COVID-19 pandemic in the third quarter and first nine months of 2021, resulting in a minor positive outcome on operating expenses. Operating expenditures increased by roughly $100 million in the third quarter and $500 million in the first nine months of 2020, mainly to fewer promotional and marketing costs, as well as reduced research and development costs, as a result of the COVID-19 pandemic. Finally, MRK stated in March 2021 that it has signed a number of partnerships to significantly strengthen production capacity and supply of SARS-CoV-2/COVID-19 medicines and vaccines. BARDA, a section of the Office of the Assistant Secretary for Preparedness and Response, is in charge of biomedical advanced research and development within the U.S. Department of Health and Human Services, will fund Merck's adaptation and availability of a number of existing manufacturing facilities for the production of SARS-CoV-2/COVID-19 vaccines and treatments. Merck has also signed agreements to assist Johnson & Johnson's SARS-CoV-2/COVID-19 vaccine manufacture and delivery. Merck will synthesize drug material, formulate, and fill vials of Johnson & Johnson's vaccine at its facilities in the United States.

4.1.5 Novartis AG

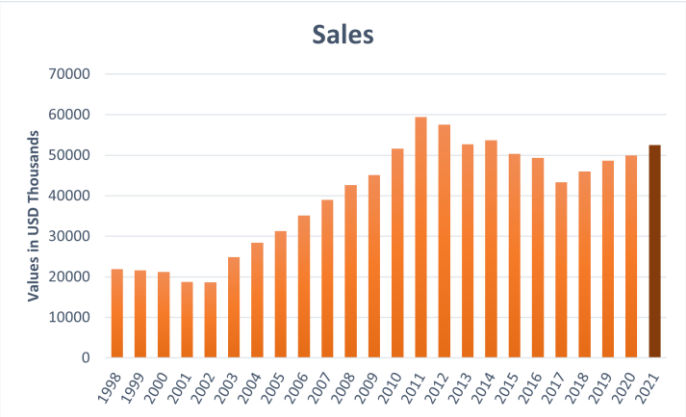

Figure 10 Sales of Novartis AG

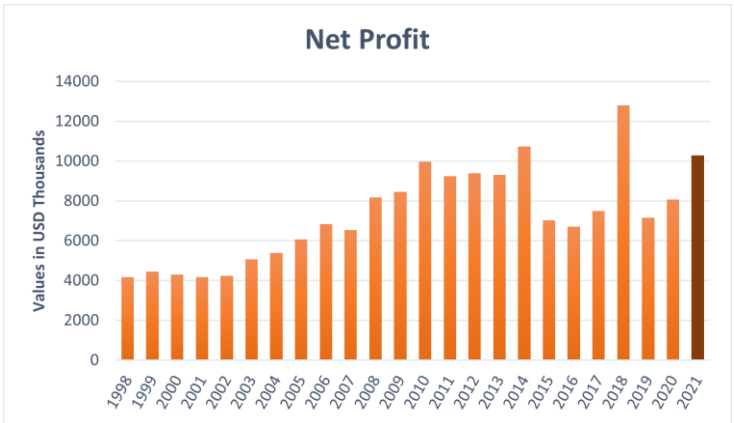

Figure 9 Net Profit of Novartis AG

Regarding the years between 1998 and 2000, the company's sales and Net Profit were almost stable. Following up, the company has been following an upward trend since 2002

as regards to its sales and Net Profit until the year of 2011. During that year the company's recent launched medicines drove its medicines to the highest level so far, making all the R&D expenses spent all those years to be really worth it. Increased depreciation and amortization expenses however, resulted in a minor drop of the Net Income of the company. The following years the company has recorded a declining movement of its sales that did not necessarily affect its Net Profit. In 2014 the company's Net sales and profit increased after allowing for the divestment of its blood transfusion diagnostics business. The next year, the company has faced a decrease on its sales as net sales from third parties of the discontinued operations decreased and because in general some economies cooled. This downfall was interrupted by the year of 2018 when the company has gained a significant income from its associated companies. More specifically, Novartis entered into an agreement with GlaxoSmithKline plc (GSK) to divest its 36.5% stake in GlaxoSmithKline Consumer Healthcare Holdings Ltd. to GSK that resulted into a profitable transaction for the company. In 2020, Novartis launched a first-of-its-kind not-for-profit portfolio of 15 medicines from the Sandoz Division for symptomatic treatment of COVID-19. The portfolio addresses urgent unmet needs and was sold at no profit to governments in up to 79 eligible low and lower middle-income countries. The company continued to work closely with third parties to fight the COVID-19 pandemic. In addition, the company undertook drug discovery efforts to develop the first oral medicines for COVID-19 and other coronaviruses and collaborated with Molecular Partners to develop, manufacture and commercialize Molecular Partners' anti-COVID-19 DARPin® program, potential medicines for the prevention and treatment of COVID-19. The coronavirus had an impact and caused ongoing disruptions to hospitals and HCP practices due to limited patient access to treatments for the company's retail business across regions. Many medicines and drugs of the company's also experienced a declining growth of sales as a consequence of the pandemic. Finally, Novartis made a number of commitments and donations to support communities impacted by the pandemic, collaborating with healthcare peers and other organizations on anti-COVID-19 programs, including the rollout of treatments to the developing world although it did not receive any government support. During the year of 2021, sales in Europe declined due to the impact of COVID-19 on the Retail Generics business. R&D expenses were increased driven by biopharmaceutical

pipeline investments. While the COVID-19 situation is normalizing during this year in most geographies and therapeutic areas, the company saw a slight impact on parts of its business, mainly in oncology and generics.

4.1.6 Pfizer INC

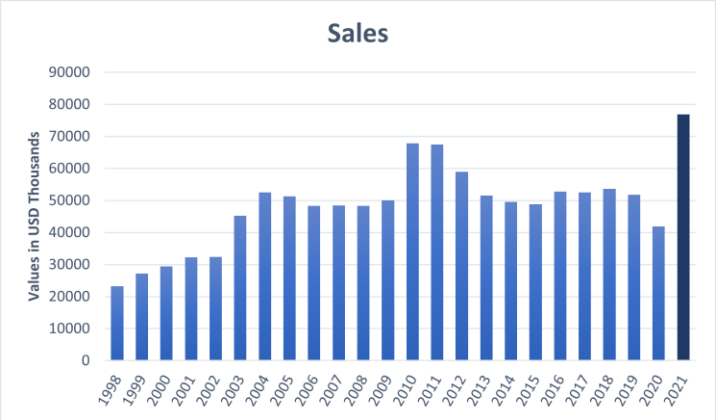

Figure 12 Sales of Pfizer INC

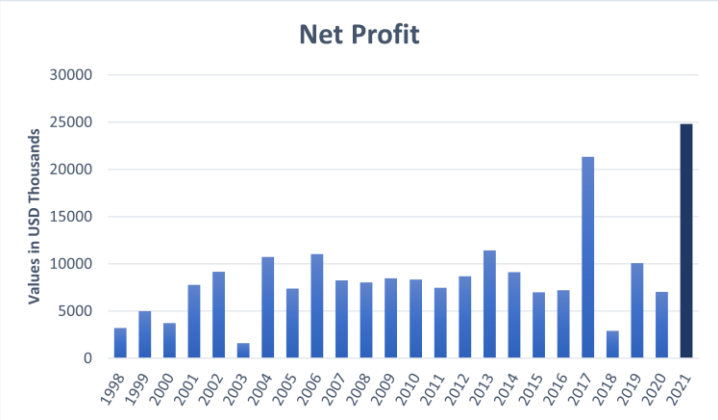

Figure 11 Net Profit of Pfizer INC

The company has achieved to increase its sales since 1998 while it suffered a major drop in its Net Profit in 2003. That was due to certain merger-related costs in connection with the company's acquisition of Pharmacia and the merger with Warner-Lambert, R&D and selling informational and administrative expenses in regard to the company's alliances and agreements of copromoting pharmaceutical products discovered by those companies. Following up, the company has kept its sales in a stable level until 2009 while its Net Income had some fluctuations. In 2005 the company experience increased costs of sales and expenses related to its merger in-process research and development as well as restructuring charges and merger-related costs but were reduced during the next year. From 2008 until 2012 the company's Net Profit remained almost stable whereas sales were significantly increased on both years 2010 and 2011 due to the inclusion of revenues from legacy Wyeth products (an acquisitioned company of Pfizer). The next years the company returned to its previous number of sales with the only exception to be the year of 2020. The decreased operating expenses in 2013 led the company's Net Income to rise while in 2015

we notice a decrease in Net Profit as a consequence of expenses relates to a collaboration of the company with Eli Lilly & Company (Lilly). In 2017, Provision/(benefit) for taxes on income was favorably impacted by approximately $10.7 billion, primarily reflecting the remeasurement of U.S. deferred tax liabilities, which includes the repatriation tax on deemed repatriated accumulated post-1986 earnings of foreign subsidiaries and was only occurred during that year. The next year's sudden increase of Net Profit was due to the contribution of the company's Consumer Healthcare business to the Consumer Healthcare joint venture with GlaxoSmithKline. Furthermore, in 2020 the company came to an agreement with BioNTech to develop, manufacture and commercialize an mRNA-based coronavirus vaccine program, BNT162, aimed at preventing COVID-19. The pandemic has presented a number of risks and challenges for this business, including, among others:

- Impacts due to travel limitations and mobility restrictions
- Manufacturing disruptions and delays
- Supply chain interruptions, including challenges related to reliance on hird-party suppliers
- Disruptions to pipeline development and clinical trials, including difficulties or delays in enrollment of certain clinical trials and in access to needed supplies
- Decreased product demand, due to reduced numbers of in-person meetings with prescribers, patient visits with physicians, vaccinations and elective surgeries, resulting in fewer new prescriptions or refills of existing prescriptions and reduced demand for products used in procedures
- Costs associated with the COVID-19 pandemic, including practices intended to reduce the risk of transmission, increased supply chain costs and additional R&D costs incurred in the company's efforts to develop a vaccine to help prevent COVID-19 and potential treatments for COVID-19

During the year of 2021, the company had significantly increased its revenue and net income as its developed vaccines against the coronavirus disease had received an emergency authorization by the FDA and were successfully sold and used globally.

Increased investments across multiple therapeutic areas, including additional spending related to the development and at-risk manufacturing of the COVID-19 anti-viral programs were also initiated during this year.

4.2 Comparison between DC911, GFC and C-19

4.2.1 Liquidity Ratios

The Liquidity Ratios gives us a good indication of the ability of a company to meet its short-term obligations.

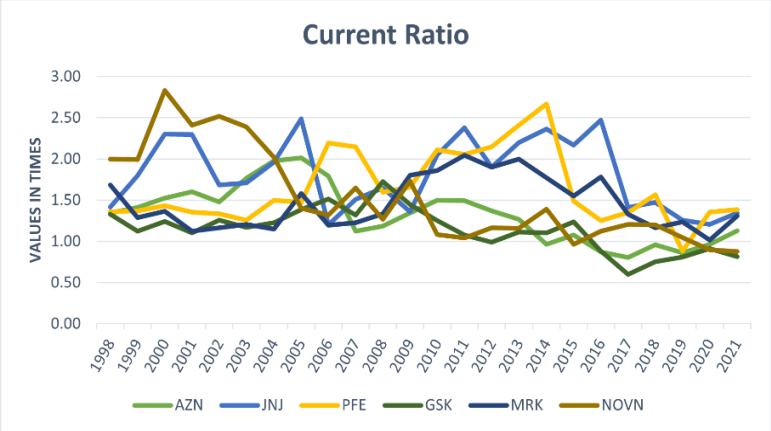

Figure 14 Current Ratio of the companies

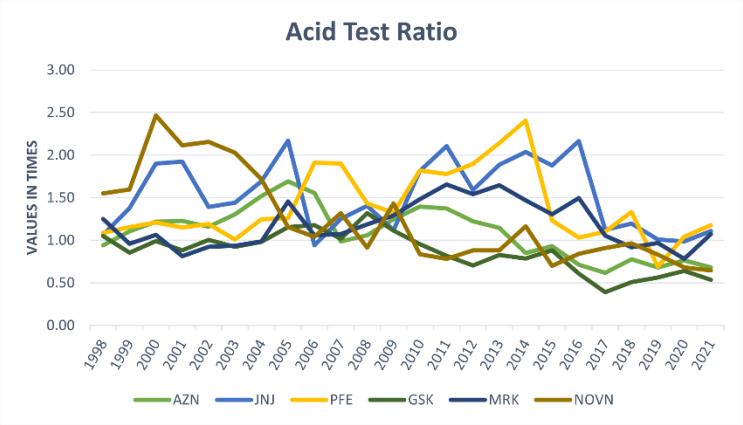

Figure 13 Acid test Ratio of the Companies

Looking at the Current Ratio graph from the last 24 years, it is notable that all the companies excluding AZN and GSK between the years of 2016-2020 had the financial resources to remain solvent and meet their short-term liabilities. The companies of AZN and GSK had a current ratio less than one time which means that these companies did not have the capital on hand to meet their short-term obligations if they were all due at once during that period. However, at the years of 2019-2021 when the outbreak of coronavirus was initiated, we can observe that the current ratio of all of the companies was fluctuating

around one, with the companies of PFE and JNJ to stand at the top of the rest of the companies and AZN and NOVN to be at the very bottom. In addition, it is unquestionably obvious the effect of GFC on these companies and their liquidity position as it is shown by the drop of the ratios' values during the years of 2007-2008. What is even noticeable is that the companies during the GFC period although the impact of the crisis globally, they had managed to keep their Current Ratio above the value of one which means they were able to cover their short-term obligation as compared to the C-19 period when some of the company's current ratio dropped below the level of one time. As for the years of 2000-2001 when the DC911 crisis was initiated, we can observe an increase of the current ratio during the first year, followed by a drop on the next two years more intensively for the companies of JNJ and NOVN.

The second graph illustrates the ability of the companies to meet their short-term obligations by not considering the inventories in the calculation of the current assets as they are too slow to liquidate. Although we notice a minor decrease of the values, the trend of the graph remained the same as the previous graph for all the companies under investigation.

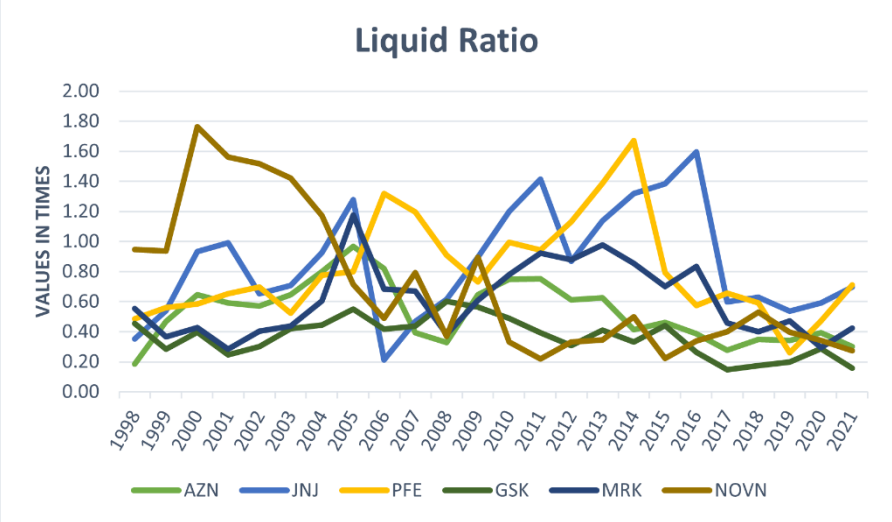

Figure 15 Liquid Ratio of the Companies

The last liquidity metric is the Liquid Ratio which calculates a company's ability to repay short-term debts by only using cash and cash equivalents as a source of fund. It is clear,

that most of the companies did not have sufficient cash on hand to pay off their short-term debts during the three periods when the crises burst as the ratio is below the value of one. However, JNJ and PFE are more efficient in the utilization of cash than the rest of the companies while GSK has the worst performance based on this metric. What is also notable here, is that almost all companies tend to have similar values for the years of 2019-2020 when the pandemic took place, indicating that all of them experienced similarly the effect of it and handled their cash and cash equivalents reserves in a similar way. From the above chart, it is again observable the tremendous effect of GFC on the companies' liquidity performance which is also analogous to the C-19 impact as all companies' Liquidity Ratios are ranging at extremely similar levels. On the other side, the DC911 crisis did not affect the companies' liquid reserves as it can be observed by the graph.

4.2.2 Solvency Ratios

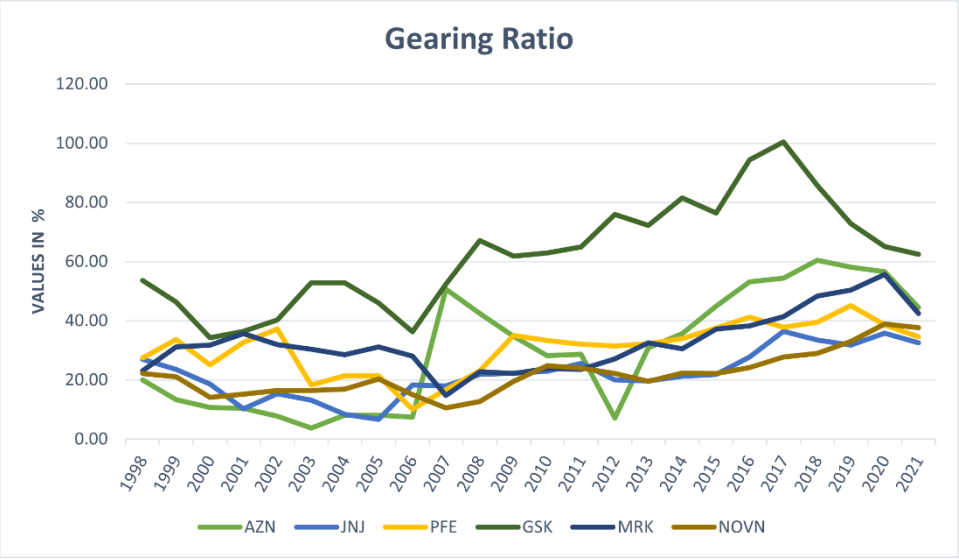

Figure 16 Gearing Ratio of the Companies

Gearing Ratio indicates how much of the financing of a company comes from borrowed funds and overall, it measures the dependance of a company on debt to finance its operations. In our case, we notice that all the companies except GSK have managed to keep their Gearing Ratio around 50% during the C-19 period which means that they were performing well and had more equity to rely on for financing. On the contrary, GSK has a

higher degree of financial leverage and is more susceptible to down forms in the economy as it relies more on debt to finance its activities rather than on equity. This reliance however was significantly decreased during the C-19 period when the company increased its equity as it completed the joint venture with Pfizer, creating a leading Consumer Healthcare business. In addition, it is visible that GSK and AZN had close values during the two comparative periods of C-19 and GFC while the rest of the companies maintained greater numbers during the C-19 period indicating that during that time the companies had a higher degree of financial leverage and were more dependent on debt to finance their operation activities rather the GFC and DC911 period. Finally, during the DC911 period we notice a minor drop of the ratio's values for most of the companies which signals that the companies were funding their financial obligations mostly though their equity reserves.

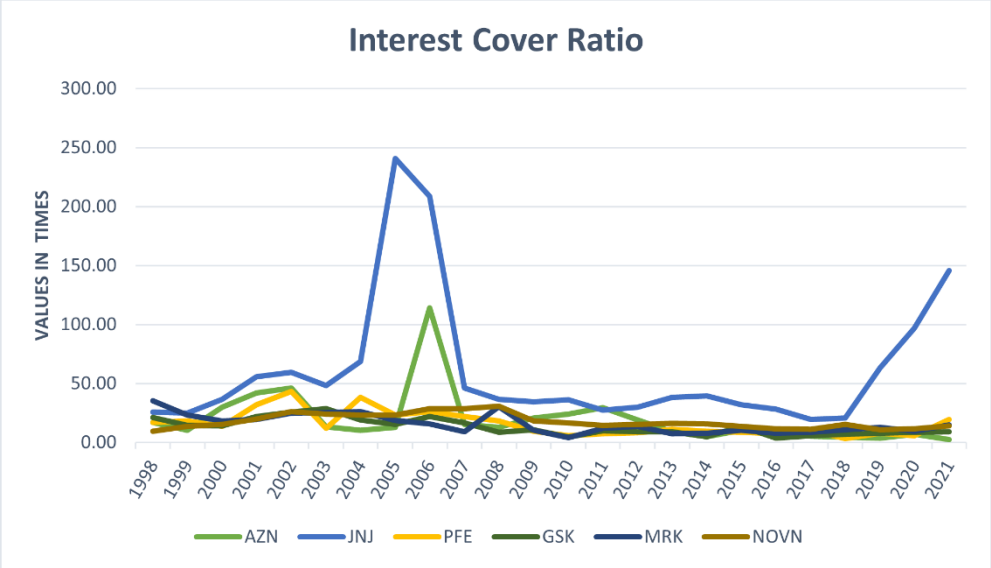

Figure 17 Interest Cover Ratio of the Companies

Interest Cover Ratio shows how secure a company is. More precisely, it indicates the ability of a company to pay its financial cost of debts. It is used to determine how easily a company can pay interest on outstanding debt and to determine a company's riskiness relative to its current debt of future borrowing. For this metric the higher the ratio the better for the company as companies need to have more than enough earnings to cover interest payments in order to survive future financial hardships that may arise. In our case, JNJ stands at the

top with the highest score especially in 2005-2006 and 2019-2020 when its interest expenses decreased significantly, while the rest of the companies although having lower values than JNJ, they follow the same trend and variate really close to each other. GSK and AZN which had the highest scores on Gearing Ratio, appear to have the lowest values for the Interest Cover Ratio which implies that not only they are heavily depending on debt to fund their activities, but also that they find some difficulties to pay off the interest bearing on those debts. Furthermore, during the DC911 crisis the companies' ratios appear to have increased values (around 23 times) which means the companies had sufficient earnings to pay off their interest-bearing obligations. The ratio during the GFC period, excluding the company of JNJ which had extreme values for this metric, was fluctuating around 15 times while during C-19 period, it was around 10 times which implies that the companies had less profits during the pandemic in order to cover their interest payments.

4.2.3 Profitability Ratios

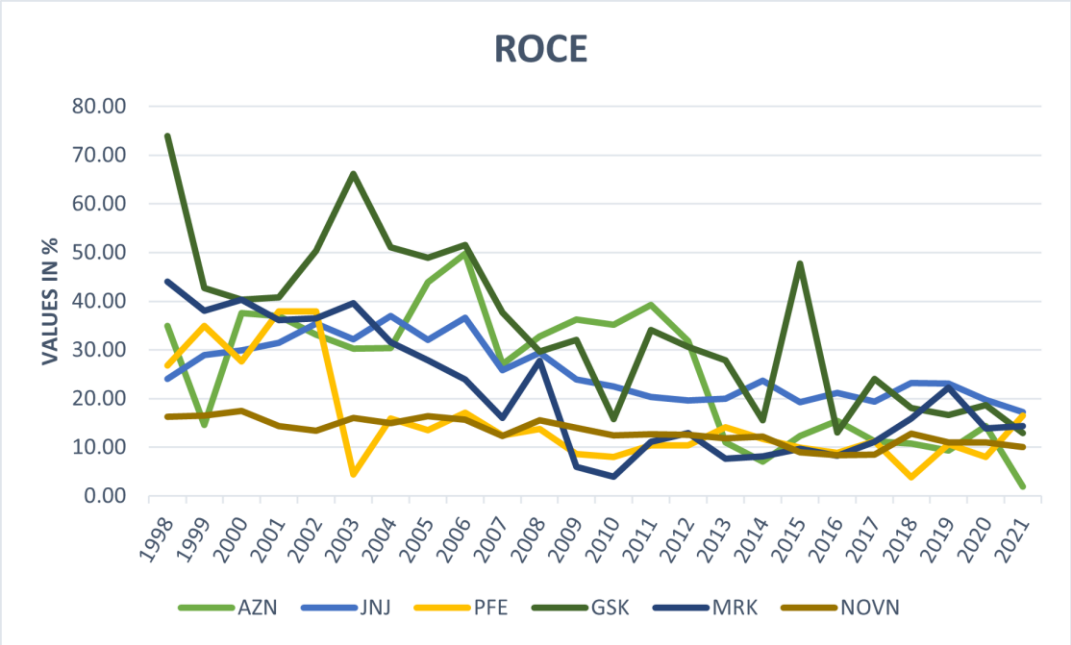

Figure 18 Return on Capital Employed Ratio of the Companies

Return on Capital Employed Ratio is a metric to determine the return on an investment. It takes long-term financing into considerations, and it is a better gauge for the performance or profitability of a company over a longer period. As we can see from the graph, most of

the companies are following a steady trend during the DC911 and C-19 period while during the GFC time they all faced a decrease in this ratio. This signals that they had lower profitability because of high cost of finance. Only GSK in the year of 2015 had a percentage more than the benchmark of 20% due to the disposal of some businesses and assets of the company to Novartis AG during that year that drove its operating profit at higher levels. Another observation is that during the C-19 period all the companies' have similar values for this metric which implies that they all experienced similar problems with their profitability.

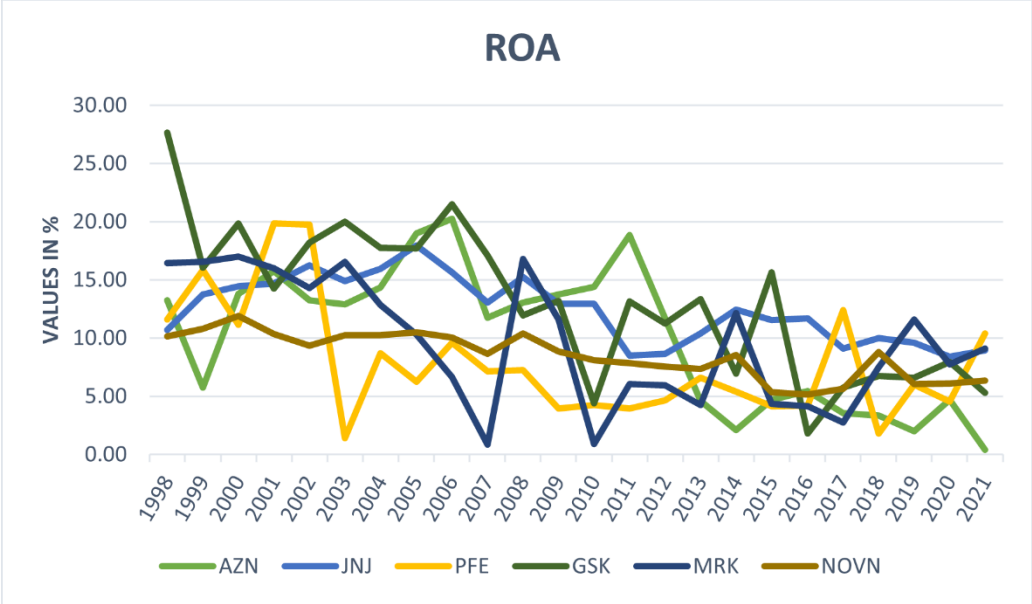

Figure 19 Return on Assets Ratio of the Companies

Return on Assets Ratio shows the return of the total assets as it is named. More specifically, it is a metric that shows how well the management of a company utilized the total assets in order to result in profit for the business After observing the above graph, it is noticeable a similar behavior between both crises, GFC and C-19. Specifically, the ROA metric decreased instantly in the first year of each crisis mentioned and then increased instantly in the following year. This behavior shows that the companies were shocked during the

first year of crisis and their management could not manage their total assets that efficiently but were improved in the next year. Although the similarity mentioned above, the ROA values were lower during the C-19 period rather than the GFC period. On the other hand, the companies' ROA ratio was not adversely affected during the DC911 period as it can be justified from the increasing trend of the ratio on the graph during that time.

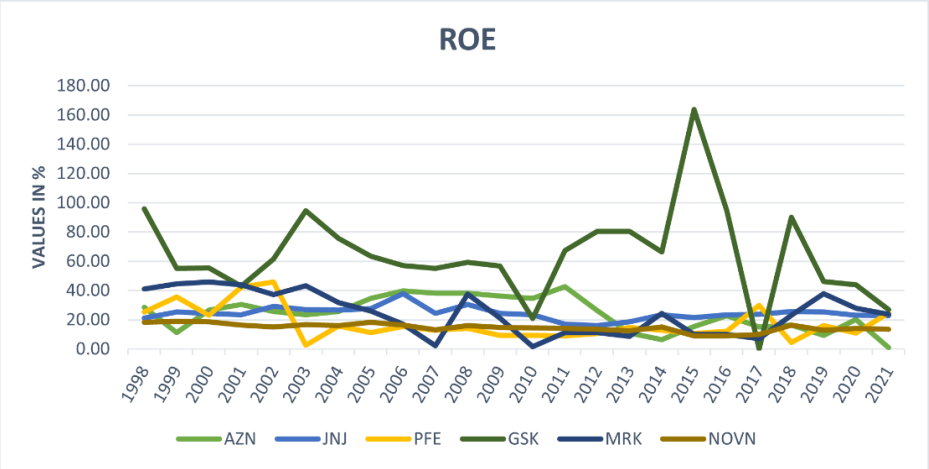

Figure 20 Return on Equity Ratio of the Companies

Looking at the Return on Equity Ratio we can track that most of the companies have kept their ROE metric considerably steady throughout the years with the exception of GSK. Low ROE indicates a low return for equity holders. We can notice a slight decrease in the values during both, GFC and C-19 period but it is not that significant. Therefore, ROE ratio of the companies was not really affected by the crises under investigation, indicating that management of the pharmaceutical businesses were controlling the net profit in an efficient way. In this case, most of the companies retained similar percentages of return during the three periods.

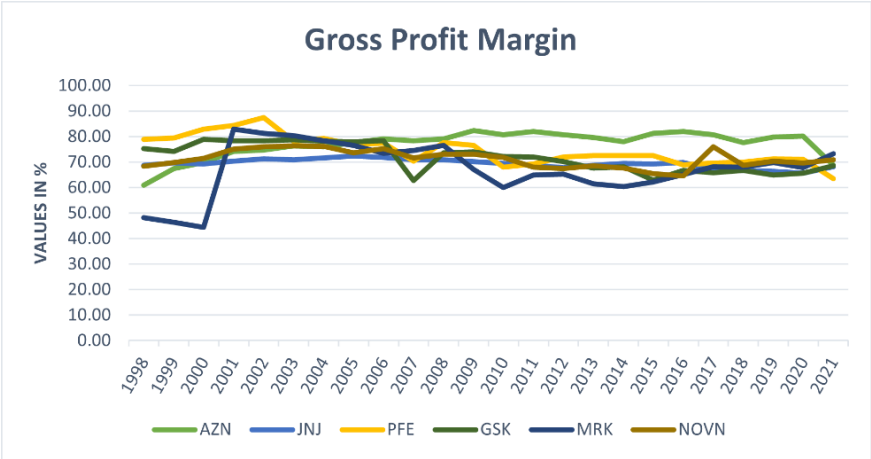

Figure 21 Gross Profit Margin Ratio of the Companies

Gross Profit Margin Ratio illustrates how good or efficient the managers of a company are selling the profucts/stock of the company. In addition, it measures how much profit generated by the sales is left after substracting all the cost of goods sold. In our case, AZN has a great management as it accomplishes to cover the cost of sales and at the same time to have much more funds to finance the rest of the operating activities. This possibly means that AZN's cost of sales are stable and predictable and that good management practices are in place; and that AZN produces profit over and above its costs. The rest of the companies are on the same level of managing their sales which is also a good indicator. Moreover, it is undoubtedly obvious that overall, all the pharmaceutical companies have managed to keep their GPM ratio steady throughout the years and around 60-80% We can notice though, a minor drop during the GFC period for the companies of MRK and PFE as well as a major increase in the DC911 period for the MRK company, however the effect was eliminated shortly after.

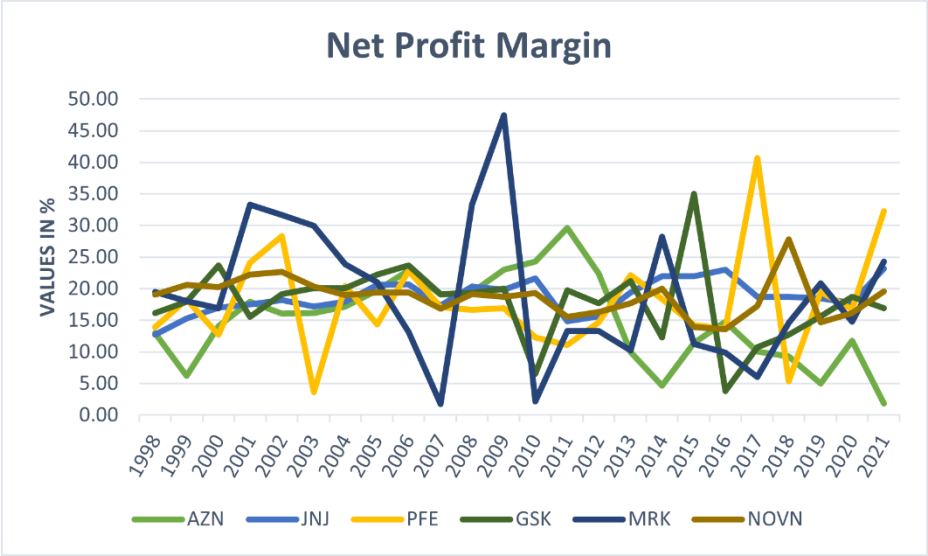

Figure 22 Net Profit Margin Ratio of the Companies

Net Profit Margin is a measure to compare the Net Profit generated by the end of all of the activities over the sales. Here the ratios' values are shifting very irregulary but what is more notable is that although AZN had a greater GPM, evetually has the lowest NPM which indicates that this company has greater operating costs that are causing a real damage to the final profit. We can additionally observe again a similar behavior during the two time periods, GFC amd C-19; on the first year there was a significant drop on the percentages of the metric while the year later on, it was mended back for most of the companies. In addition, the majority of the companies retained the same NPM value during the three crises with the exception of AZN which was more negatively affected by the C-19 pandemic.

4.2.4 Valuation Ratios

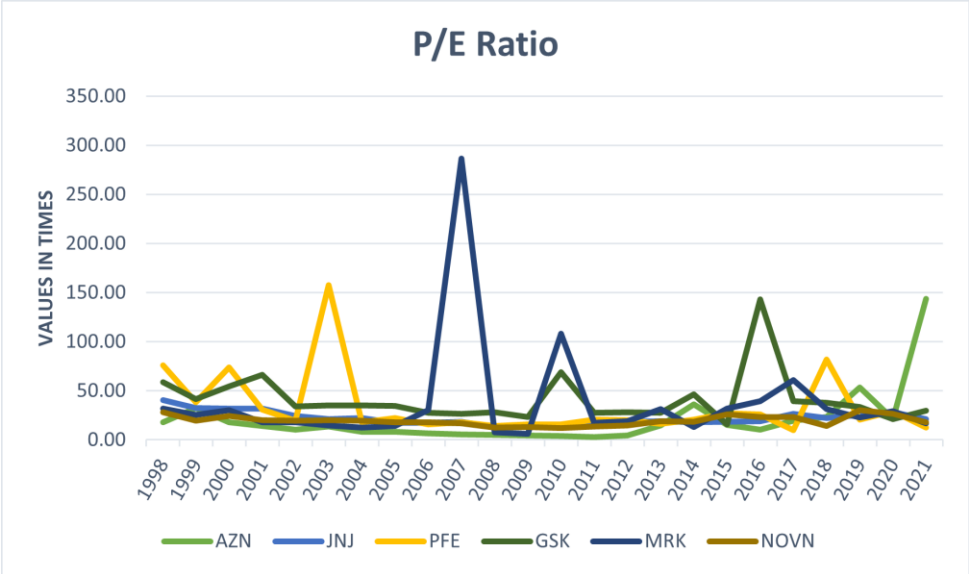

Figure 23 Price Earnings Ratio of the Companies

Price Earning Ratio relates a company's share price to its earning per share. It relies on past profits but brings together the profitability of a company and how the market sees the prospects of this company. Regarding the pharmaceutical companies that are being analyzed; there are multiple fluctuations which are resulted either on less net profit with the combination of an increased share price (e.g. PFE in 2018 , AZN in 2019, 2021 and GSK in 2016) or a decrease in net profit along with an increase in the number of shares (MRK in 2007) which is driving the value of the ratio upwards. Furthermore, P/E ratio between the two periods of DC911 and GFC was decreased as the companies were realizing less profit during that time. On the contrary, during C-19 period share price of most of the companies was increased, therefore P/E ratio also increased in a certain level, which can be explained by the fact that there was more demand than supply for these stocks due to the nature of the enterprises and their correlation with the pandemic.

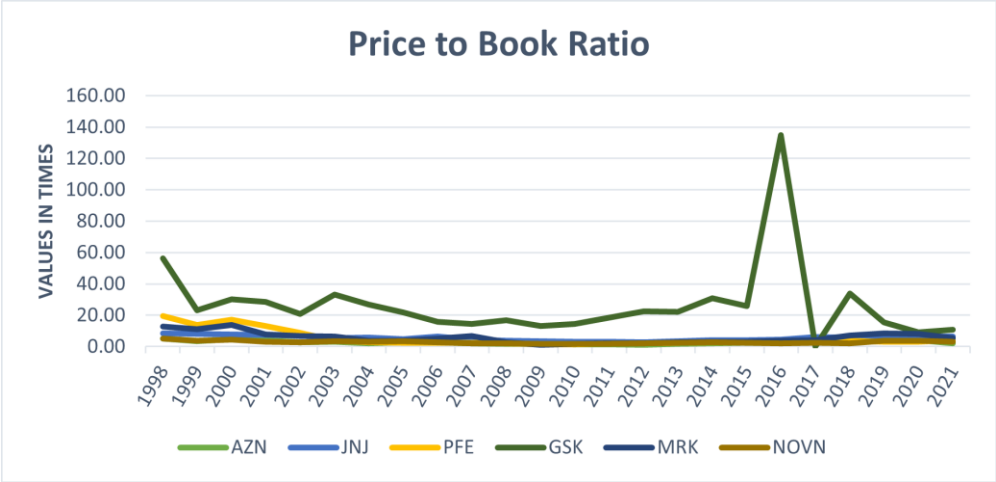

Figure 24 Price to Book Ratio of the Companies

Price to Book Ratio is used to compare a firm's market capitalization to its book value, and it measures the market valuation of a company relative to its book value. For the pharmaceutical companies that are being examined this metric is between 2 and 4 times with the exception of GSK which had a significant decrease on its Equity during the years of 2016-2018 that explains the tremendous increase of the value of ratio. PFE, AZN and NOVN have the lowest numbers while JNJ and MRK have PBR above the mean value of the companies' PBR. All the companies experienced a slight increase during the C-19 period due to the fact that the stock price of pharmaceutical company was increased as a result of increasing demand owing to the pandemic outbreak. Finally, during DC911 all the companies had greater PBR than the rest of the crises due to greater equity funding.

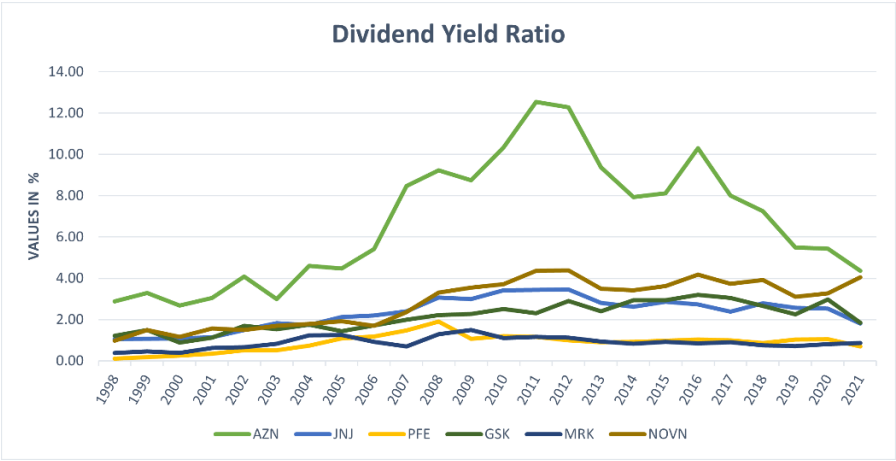

Figure 25 Dividend Yield Ratio of the Companies

Dividend Yield Ratio shows how much dividends shareholders take over the market capitalization. As it seems from the analysis, MRK and PFE do not give many dividends to their shareholders as compared to JNJ, GSK and NOVN, whereas AZN allocates the most dividends to its shareholders most possibly to keep them satisfied. Dividend Yield Ratio had greater values during the C-19 and GFC period than the DC911 period which means that the companies have offered more dividends on these years in order to keep their shareholders more pleased. A minor drop in the values has been noticed during the year of 2021 as a result of the C-19 crisis to the companies of AZN, GSK and JNJ while PFE and MRK have kept their dividends considerably stable throughout the years.

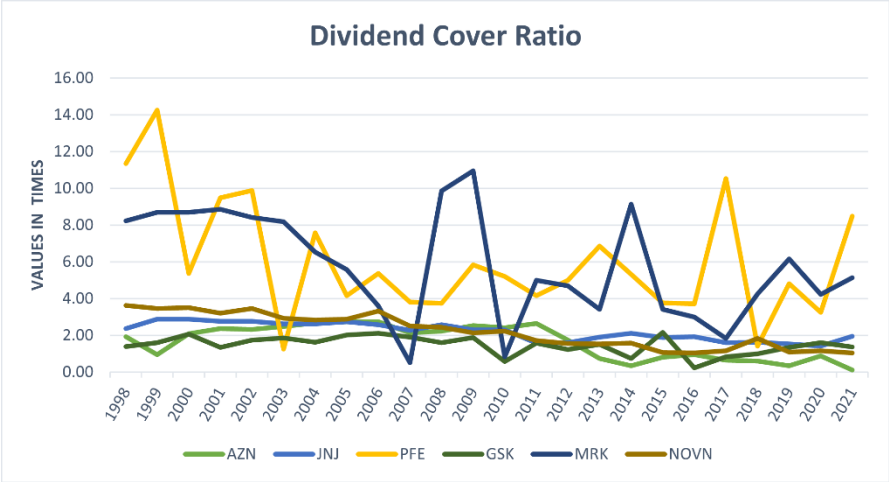

Figure 26 Dividend Cover Ratio of the Companies

Dividend Cover Ratio is an indicator of how prudent a company is. In our case, NVN, AZN and GSK are varied between 1-4 times which means that they are retaining enough earnings for future expansion or for a rainy day. Additionally, it is noticeable a declining trend for most of the companies throughout the years while in the case of MRK and PFE who are experiencing variations, a common behavior has been observed. During the first year of each crisis, the ratio's value fell significantly and then recovered in the following year.

4.3 Comparison between the Real Share Price and the Estimated Share Price

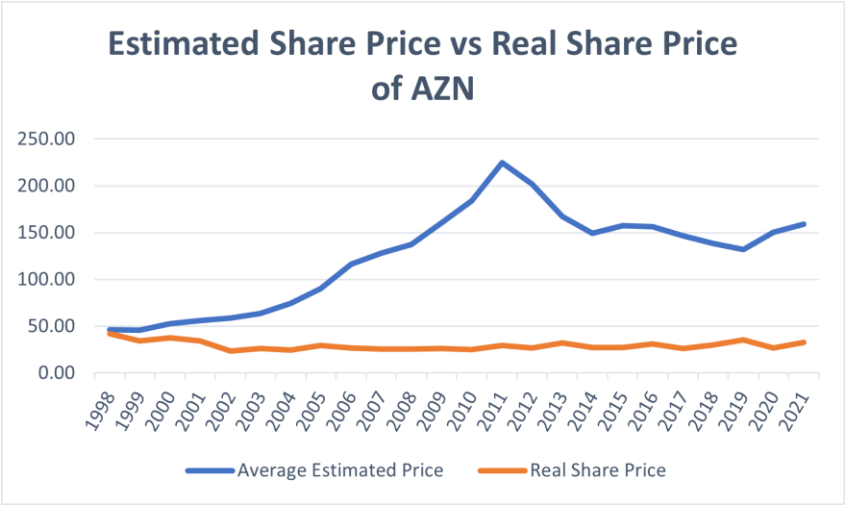

Figure 27 Estimated Share Price of Astra Zeneca PLC vs Real Share Price

After using the valuation techniques discussed in chapter 3, it appears that AZN is undervalued for the periods under investigation, and this is derived mostly by its β- value which is really small compared to the other companies and it implies that the company stock's volatility does not relate to a great extend with the overall market.

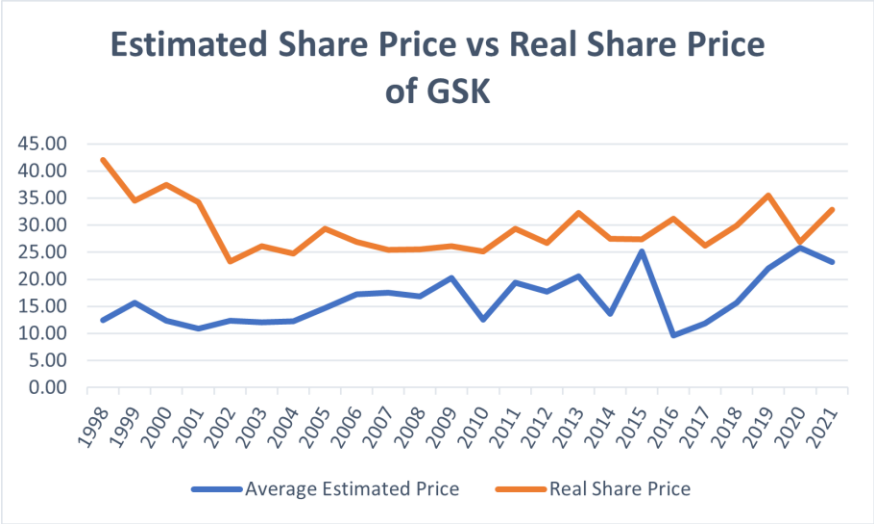

Figure 28 Estimated Share Price of GlaxoSmithKline PLC vs Real Share Price

GSK appears to be overvalued throughout the years. However, during the year of 2020, it is notable that the gap between the two lines has been eliminated, while the estimated value for the company's stock for the next year appears to decrease whereas the company's stock price increased in real life. This implies that the market sentiment was more positive and drove the share price of the company upwards.

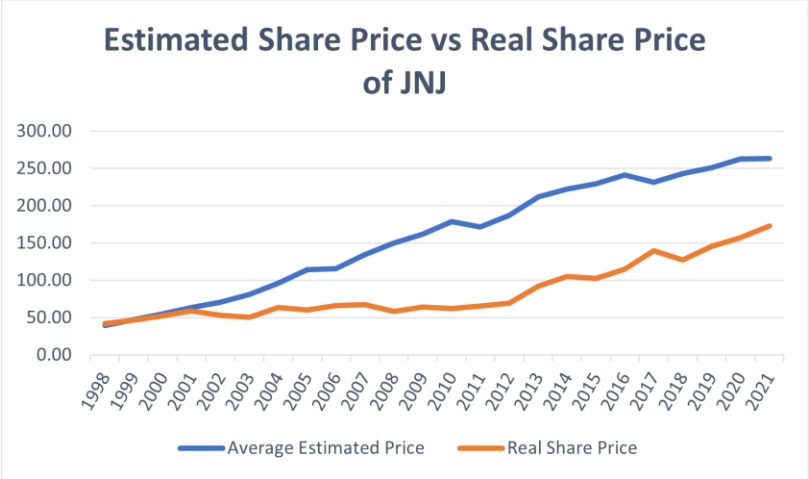

Figure 29 Estimated Share Price of Johnson and Johnson vs Real Share Price

The company seems to have the same estimated share price during the DC911 period with its real share price that it was trading with. However, the estimated share price has been following an upward trend with larger slope than the Real Share Price for the next years; with the gap between the 2 share prices to grow.

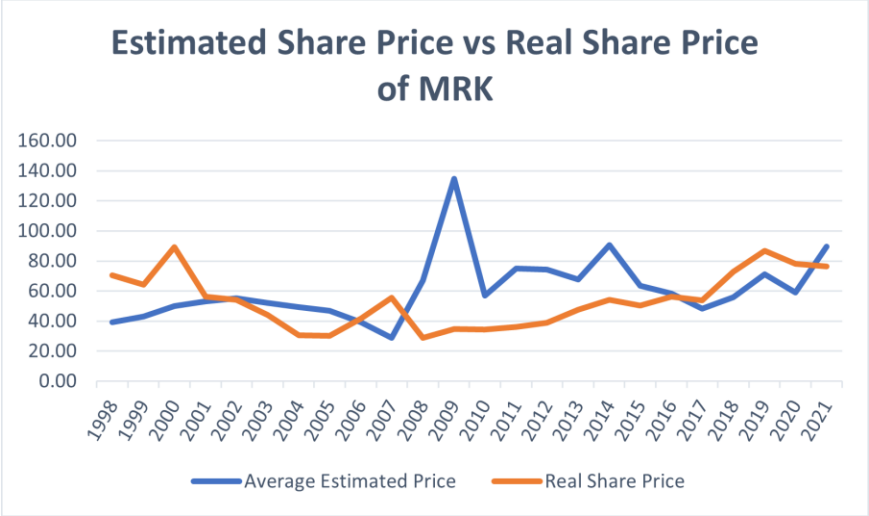

Figure 30 Estimated Share Price of Merck & Co INC vs Real Share Price

The company was overvalued during the DC911 and GFC period as can be seen from the chart, but it is also notable that both share values realized a decrease during the GFC period. On the other side, although the company's share price was overvalued during the first years of C-19 crisis, during 2021 this behavior was shifted, and the company's share price was eventually undervalued.

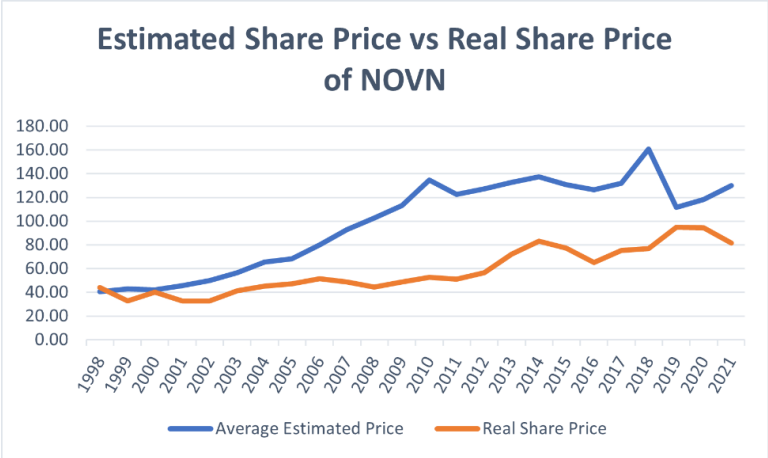

Figure 31 Estimated Share Price of Novartis AG vs Real Share Price

NOVN's share price was undervalued during the DC911 period and since then it has been following an increasing trend. It is notable that during the C-19 period the estimated share

price realized a major decrease, diminishing in a significant level its gap between the real share price. However, during 2021, it experienced an increase as compared to the real share price that was increased during the first year of C-19 and then decreased. This indicates that the market oversaw the effect of C-19 in a positive way when it was initially burst but later on changed its perspective.

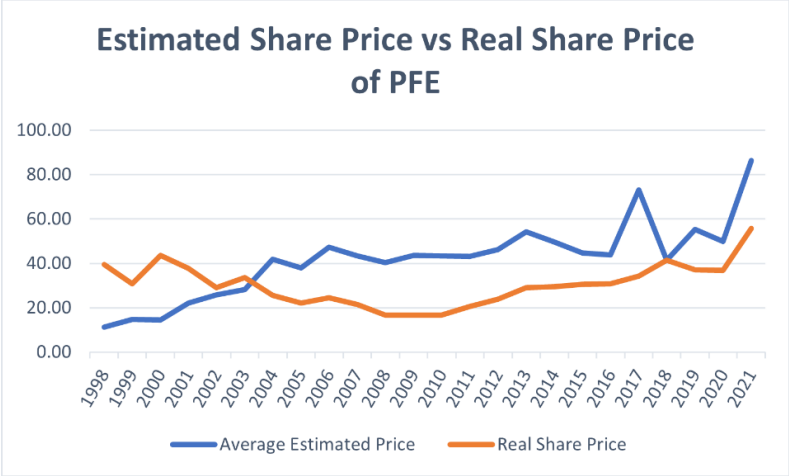

Figure 32 Estimated Share Price of Pfizer INC vs Real Share Price

As can be seen from the graph, PFE's share price during the DC911 crisis was overvalued but since 2003, the estimated share price was above the real share price which suggests that the market's sentiment was negatively influenced by the GFC and C-19 shocks. It is also notable a common trend of the two prices in relation with the GFC and C-19 period.

CHAPTER 5: CONCLUSIONS

It is no secret that the world has faced numerous shocks throughout history. For the last 24 years it has experienced three different crises that each of them had an impact on its own to the ordinary way of living. Each industry was more or less affected positively or adversely by these external shocks. Specifically, for the pharmaceutical sector, after the analysis that has been done through the financial ratios and valuation techniques, we can identify a minor impact by the DC911 crisis of 2000-2001, a moderate to strong impact by the GFC of 2007-2008 and a strong impact by the C-19 crisis.

The fact that DC911 did not significantly affect the pharmaceutical industry is consistent with Pureza's findings that during the Dot-com bubble only technology-related equities in the United States were mostly affected. In addition, Howard's and Jackson's findings that the 9/11 Terrorist attack' losses were severely noticed on the travel and tourism sector while the rapid reopening of markets allowed for a self-assessment and correction followed the attack, verifies the findings of our research. Based on the valuation and ratio analysis, the companies' share price was either equal or overvalued during this period, while the ratios were mostly stable indicating that there was no significant effect by this specific external shock to the company's performance and valuation.

On the other hand, GFC had a noticeable impact on the performance and valuation of the pharmaceutical companies. This can be explained by the sudden drop of the liquidity ratios' charts observed during the crisis period which implies that the companies experienced a certain level of liquidity problems. In addition, looking at the financing ratios, we can conclude that the companies faced difficulties with their debts and the payment of their interest during the crisis. Furthermore, the return metrics of the performance ratios again showed a significant impact during the first year of the crisis. Moreover, the valuation ratios did not signal any direct effect of the crisis. However, the valuation techniques showed that the companies' share price was undervalued during that period which implies negative market sentiment for the companies' share value during the period.

Finally, Covid-19 has significantly affected the pharmaceutical sector but in a very controversial way. Firstly, we can observe a dynamic decrease of the financial ratios during the first years of 2019-2020 as the companies had to deal with sudden changes in their ordinary way of operating which is consistent with Klunko's findings. The companies faced liquidity, financial and solvency problems as can be observed by their financial ratios and their share price was undervalued due to a negative market outlook. However, during the year of 2021, the companies started to react more drastic and managed to anticipate to this global crisis by collaborating with other enterprises or healthcare organizations and institutions to develop or assist in the production of vaccines against the virus. This resulted into a positive turn on their financial performance and valuation.

Contribution to knowledge and recommendations

Through this research, the impact of three major external shocks that the world has faced the last 24 years were investigated and their effect on the pharmaceutical industry was measured. We are currently facing a new reality as the coronavirus is here to stay. Therefore, it is recommended to all the companies to include these crises as major risk factors on their financial analysis and evaluation as it was concluded that they comprise a real "break" on their operation and development. Especially now, based on these historical events, it is extremely important and advised to continuously investigate the effect of these crises as they constitute a real threat for the companies and overall, to the world. There is no doubt that the health factor was, is and will be the number one concern of the humanity in order to survive. Therefore, a crisis related to this factor is considered the most severe one and it is crucial to anticipate and deal with it.

BIBLIOGRAPHY

1. 'About MERS' (2021) *Centers for Disease Control and Prevention*. Available at: https://www.cdc.gov/coronavirus/mers/about/index.html.
2. AHMAD, S. F. B. (2015) *THE IMPACT OF GLOBAL FINANCIAL CRISIS ON THE PERFORMANCE OF MALAYSIAN LISTED PROPERTY COMPANIES*. Universiti Teknologi Malaysia.
3. Ahmed, M. R. and Islam, M. S. (2018) 'MACROECONOMIC FACTORS AFFECTING PERFORMANCE OF NON-BANK FINANCIAL INSTITUTIONS PROFITABILITY IN BANGLADESH', *International Journal of Engineering Applied Sciences and Technology*, 3(9), pp. 7–10. Available at: http://www.ijeast.com (Accessed: 17 August 2021).
4. Anbar, A. and Alper, D. (2011) 'Bank Specific and Macroeconomic Determinants of Commercial Bank Profitability: Empirical Evidence from Turkey', *Business and Economics Research Journal*, 2(2), pp. 139–152. Available at: https://papers.ssrn.com/abstract=1831345 (Accessed: 17 August 2021).
5. Angerer, D. (2018) *September 11 Attacks: Facts, Background & Impact - HISTORY*. Available at: https://www.history.com/topics/21st-century/9-11-attacks (Accessed: 18 December 2021).
6. Ayati, N., Saiyarsarai, P. and Nikfar, S. (2020) 'Short and long term impacts of COVID-19 on the pharmaceutical sector', *DARU Journal of Pharmaceutical Sciences 2020 28:2*, 28(2), pp. 799–805. doi: 10.1007/S40199-020-00358-5.
7. Bakhshani, S. (2017) ' The Relationship between Non-financial Factors, Capital Structure and the Performance of the Listed Companies on the Stock Exchange', *International Journal of Economics and Financial Issues*, 7(3), pp. 542–547. Available at: http:www.econjournals.com (Accessed: 13 August 2021).
8. Banham, H. C. (2010) 'External Environmental Analysis For Small And Medium Enterprises (SMEs)', *Journal of Business & Economics Research (JBER)*, 8(10). doi: 10.19030/JBER.V8I10.770.
9. Bărbuță-Mișu, N., Madaleno, M. and Ilie, V. (2019) 'Analysis of Risk Factors

Affecting Firms' Financial Performance—Support for Managerial Decision-Making', *Sustainability 2019, Vol. 11, Page 4838*, 11(18), p. 4838. doi: 10.3390/SU11184838.

10. Barshikar, R. (2020a) 'Covid 19 – Impact and new normal for pharmaceutical industry (Part – I)':, *https://doi.org/10.1177/1741134320942275*, 16(3), pp. 112–119. doi: 10.1177/1741134320942275.
11. Barshikar, R. (2020b) 'Covid 19 – Impact and new normal for pharmaceutical industry (Part – I)':, *https://doi.org/10.1177/1741134320942275*, 16(3), pp. 112–119. doi: 10.1177/1741134320942275.
12. BOLDEANU, D.-M. and PUGNA, I.-B. (2014) 'The analysis of the influence factors affecting the performance of pharmaceutical companies', *Theoretical and Applied Economics*, XXI(7(596)), pp. 23–42. Available at: https://ideas.repec.org/a/agr/journl/vxxiy2014i7(596)p23-42.html (Accessed: 16 August 2021).
13. Burja, C. (2011) 'FACTORS INFLUENCING THE COMPANIES' PROFITABILITY', *Annales Universitatis Apulensis Series Oeconomica*, 13(2), pp. 215–224.
14. Campello, M., Graham, J. R. and Harvey, C. R. (2010) 'The real effects of financial constraints: Evidence from a financial crisis', *Journal of Financial Economics*, 97(3), pp. 470–487. doi: 10.1016/J.JFINECO.2010.02.009.
15. Chan, T. K. and Abdul-Aziz, A. R. (2017) 'Financial performance and operating strategies of Malaysian property development companies during the global financial crisis', *Journal of Financial Management of Property and Construction*, 22(2), pp. 174–191. doi: 10.1108/JFMPC-02-2016-0009.
16. Chittithaworn, C. *et al.* (2011) 'Factors affecting business success of small & medium enterprises (SMEs) in Thailand', *Asian Social Science*, 7(5), pp. 180–190. doi: 10.5539/ASS.V7N5P180.
17. DeFranzo, S. E. (2010) *Difference between qualitative and quantitative research.* Available at: https://www.snapsurveys.com/blog/qualitative-vs-quantitative-research/ (Accessed: 8 October 2021).
18. Devi, A. and Devi, S. (2014) 'Determinants of Firms' Profitability in Pakistan',

Research Journal of Finance and Accounting www.iiste.org ISSN, 5(19), pp. 87–92. Available at: www.iiste.org (Accessed: 13 August 2021).

19. Deyganto, K. O. and Alemu, A. A. (2019) 'Factors Affecting Financial Performance of Insurance Companies Operating in Hawassa City Administration, Ethiopia', *Universal Journal of Accounting and Finance*, 7(1), pp. 1–10. doi: 10.13189/UJAF.2019.070101.
20. Diaz, J. F. and Tjokro Hindro, M. C. (2017) 'Factors Affecting the Profitability of Indonesian Real Estate Publicly-listed Companies', *Asian Journal of Finance & Accounting*, 9(1), pp. 396–428. doi: 10.5296/ajfa.v9i1.11193.
21. *Dividend theory | ACCA Global* (no date). Available at: https://www.accaglobal.com/an/en/student/exam-support-resources/fundamentals-exams-study-resources/f9/technical-articles/dividend-theory.html (Accessed: 15 December 2021).
22. Domanska, A. (2020) *Pharmaceutical Supply Chain Disruptions Due To the Pandemic*. Available at: https://www.industryleadersmagazine.com/pharmaceutical-supply-chain-disruptions-due-to-the-pandemic/ (Accessed: 8 August 2021).
23. Dr. Saul McLeod (2019) *Qualitative vs Quantitative Research | Simply Psychology*. Available at: https://www.simplypsychology.org/qualitative-quantitative.html (Accessed: 8 October 2021).
24. Dragnić, D. (2014) 'Impact of internal and external factors on the performance of fast-growing small and medium businesses', *Management - Journal of Contemporary Management Issues*, 19(1), pp. 119–159.
25. Duffie, D. (2019) 'Prone to Fail: The Pre-crisis Financial System', *Journal of Economic Perspectives*, 33(1), pp. 81–106. doi: 10.1257/jep.33.1.81.
26. Ebabu Engidaw, A. (2021) 'The effect of external factors on industry performance: the case of Lalibela City micro and small enterprises, Ethiopia', *Journal of Innovation and Entrepreneurship 2021 10:1*, 10(1), pp. 1–14. doi: 10.1186/S13731-021-00147-7.
27. *Free Cash Flow Valuation* (no date). Available at: https://www.cfainstitute.org/en/membership/professional-development/refresher-

readings/free-cash-flow-valuation (Accessed: 15 December 2021).

28. Gautam, R. (2018) 'DETERMINANTS OF FINANCIAL PERFORMANCE: AN EVIDENCE FROM NEPALESE COMMERCIAL BANKS', *Amity Journal of Strategic Management*, 1(2), pp. 7–13.
29. Hanggraeni, D. *et al.* (2019) 'The Impact of Internal, External and Enterprise Risk Management on the Performance of Micro, Small and Medium Enterprises', *Sustainability*, 11(7), pp. 1–17. doi: 10.3390/SU11072172.
30. Hassan, S. M. R. and Muniyat, S. (2019) 'Factors Influencing the Profitability of Pharmaceutical Companies in Bangladesh', *International Conference on Business and Management*, pp. 770–773. Available at: https://www.academia.edu/39763926/Factors_Influencing_the_Profitability_of_Pharmaceutical_Companies_in_Bangladesh (Accessed: 16 August 2021).
31. Hassani, H. and Pakmaram, A. (2017) 'Factors influencing Capital Structure of Companies with Emphasis on the Business Cycle', *Financial Management Strategy*, 5(1), pp. 77–97. doi: 10.22051/JFM.2017.11631.1141.
32. HAYES, A. (2019) *Dotcom Bubble Definition*. Available at: https://www.investopedia.com/terms/d/dotcom-bubble.asp (Accessed: 17 December 2021).
33. Herijanto, E. V. (2016) *THE FACTORS THAT INFLUENCE FIRM'S CASH HOLDINGS*. Universitas Atma Jaya Yogyakarta.
34. Herlambang, A., Murhadi, W. R. and Andriani, T. (2020) 'Factors Affecting the Financial Performance of Companies Based on Agency Theory', pp. 110–114. doi: 10.2991/AEBMR.K.200127.022.
35. Herlambang, A., Murhadi, W. R. and Cendrati, D. C. (2019) 'Factors affecting company's cash holding'. Available at: https://www.atlantis-press.com/proceedings/insyma-19/55915417 (Accessed: 13 August 2021).
36. Howard, C. (2005) *Resilient City: The Economic Impact of 9/11*, *Russell Sage Foundation*. Available at: https://books.google.com.cy/books?hl=el&lr=&id=WfEWAwAAQBAJ&oi=fnd&pg=PR5&dq=IMPACT+OF+The+9/11+Recession+&ots=3WNQ4dcwaK&sig=tLr2ixrxkw11sRK5-hFBnt10NOA&redir_esc=y#v=onepage&q=IMPACT OF

The 9%2F11 Recession&f=false (Accessed: 15 December 2021).

37. Ishtiaq, N. and Siddiqui, D. A. (2019) 'Factors Affecting Financial Performance of Life Insurance Sector in Pakistan', *International Journal of Social and Administrative Sciences*, 4(2), pp. 178–199. Available at: https://ideas.repec.org/a/asi/ijosaa/2019p178-199.html (Accessed: 17 August 2021).
38. Jackson, O. A. (2008) 'The Impact of the 9/11 Terrorist Attacks on the US Economy'. Available at: http://www.imf.org/external/pubs/ft/wed/2001/03/index.htm. (Accessed: 15 December 2021).
39. Jumita, S., Taufiq, T. and Yusnaini, Y. (2020) 'Sustainability Reporting as Mediation of Factors Affecting Financial Performance: Case in the Mining Sector in Indonesia', *Accounting and Finance*, (4(90)), pp. 30–37. doi: 10.33146/2307-9878-2020-4(90)-30-37.
40. Kanyenda, T. (2019) *AN ASSESSMENT OF FACTORS AFFECTING THE FINANCIAL PERFORMANCE OF MICROFINANCE INSTITUTIONS IN ZIMBABWE*. Chinhoyi University of Technology. Available at: https://www.academia.edu/42241600/AN_ASSESSMENT_OF_FACTORS_AFFECTING_THE_FINANCIAL_PERFORMANCE_OF_MICROFINANCE_INSTITUTIONS_IN_ZIMBABWE20200317_119475_b776r7 (Accessed: 17 August 2021).
41. Khan, A. A., Mustafa, F. and Khursheed, A. (2018) 'Impact of Global Financial Crisis on Socially Innovative Microfinance Institutions in Pakistan', *Journal of Accounting, Finance and Auditing Studies*, 4, pp. 67–86.
42. Khan, M. K., Nouman, M. and Imran, M. (2015) 'Determinants of financial performance of financial sectors (An assessment through economic value added)', *MPRA Paper*. Available at: https://ideas.repec.org/p/pra/mprapa/81281.html (Accessed: 16 August 2021).
43. Klassen, R. D. and McLaughlin, C. P. (1996) 'The impact of environmental management on firm performance', *Management Science*, 42(8), pp. 1199–1214. doi: 10.1287/MNSC.42.8.1199.

44. Klunko, N. (2021) ‘Resource support of adaptation capabilities of the pharmaceutical industry under COVID-19 pandemic’, *Technology audit and production reserves*, 2(4(58)), pp. 6–11. doi: 10.15587/2706-5448.2021.230581.
45. Kumar, R. (2013) ‘The Effect of Macroeconomic Factors on Indian Stock Market Performance: A Factor Analysis Approach’, *IOSR Journal of Economics and Finance*, 1(3), pp. 14–21. doi: 10.9790/5933-0131421.
46. Lai, H. Y., Aziz, A. R. A. and Chan, T. K. (2014) ‘Effect of the global financial crisis on the financial performance of public listed construction companies in Malaysia’, *Journal of Financial Management of Property and Construction*, 19(3), pp. 246–263. doi: 10.1108/JFMPC-02-2014-0002.
47. Le, L. and Ho, Q. (2021) *Factors affecting the valuation of electric vehicle company in 2020 : case Tesla Inc.* LAB University of Applied Sciences. Available at: http://www.theseus.fi/handle/10024/497943 (Accessed: 17 August 2021).
48. Le, T. N., Mai, V. A. and Nguyen, V. C. (2020) ‘Determinants of profitability: Evidence from construction companies listed on Vietnam Securities Market’, *Management Science Letters*, 10(3), pp. 523–530. doi: 10.5267/J.MSL.2019.9.028.
49. Leopold, C. *et al.* (2014) ‘Effect of the economic recession on pharmaceutical policy and medicine sales in eight European countries’, *Bulletin of the World Health Organization*, 92(9), pp. 630–640. doi: 10.2471/BLT.13.129114.
50. LIMANTA, V. N. and Malelak, M. I. (2017) ‘Factors Affecting Corporate Cash Holding of FinanSector Companies (Non Bank) Listed in Indonesian Stock Exchange Period 2010 - 2015’. Available at: https://i-come.petra.ac.id/ (Accessed: 13 August 2021).
51. Makinen, G. (2002) ‘The Economic Effects of 9/11: A Retrospective Assessment’. Available at: https://apps.dtic.mil/sti/citations/ADA469198 (Accessed: 18 December 2021).
52. Markauskas, M. and Saboniene, A. (2015) ‘Evaluation of Factors Affecting Companies Value of Lithuanian Dairy Industry’, *Procedia - Social and Behavioral Sciences*, 213, pp. 61–66. doi: 10.1016/J.SBSPRO.2015.11.404.
53. Masoumi, M. *et al.* (2019) ‘Economic and non-economic determinants of Iranian pharmaceutical companies’ financial performance: an empirical study’, *BMC*

Health Services Research 2019 19:1, 19(1), pp. 1–13. doi: 10.1186/S12913-019-4735-4.

54. Matar, A. *et al.* (2018) 'FACTORS AFFECTING THE CORPORATE PERFORMANCE: PANEL DATA ANALYSIS FOR LISTED FIRMS IN JORDAN', *Academy of Accounting and Financial Studies Journal*, 22(6), pp. 1–10.
55. Matar, A. and Eneizan, B. (2018) 'Determinants of Financial Performance in the Industrial Firms: Evidence from Jordan', *Asian Journal of Agricultural Extension, Economics & Sociology*, 22(1), pp. 1–10. doi: 10.9734/AJAEES/2018/37476.
56. MEHTA, S. (2021) *Types of Research Methodology in Research | Eduvoice*. Available at: https://eduvoice.in/types-research-methodology/ (Accessed: 3 October 2021).
57. Meredith, S. (2021) *AstraZeneca Covid vaccine suspended in some countries over blood clot fears*. Available at: https://www.cnbc.com/2021/03/12/astrazeneca-covid-vaccine-suspended-in-some-countries-over-blood-clot-fears.html (Accessed: 20 December 2021).
58. Mintz, C. S. (2009) 'Financial Crisis Reshaping the Life Sciences Industry', *Science*. doi: 10.1126/SCIENCE.CAREDIT.A0900048.
59. Mirza, S. A. and Javed, A. (2013) 'Determinants of financial performance of a firm: Case of Pakistani stock market', *Journal of Economics and International Finance*, 5(2), pp. 43–52. doi: 10.5897/JEIF12.043.
60. Morris, J. J. and Alam, P. (2008) 'Analysis of the Dot-Com Bubble of the 1990s', *SSRN Electronic Journal*. doi: 10.2139/SSRN.1152412.
61. Morris, J. J. and Alam, P. (2012) 'Value relevance and the dot-com bubble of the 1990s', *The Quarterly Review of Economics and Finance*, 52(2), pp. 243–255. doi: 10.1016/J.QREF.2012.04.001.
62. Mugambi, Y. K. (2020) *EFFECTS OF MACROECONOMIC FACTORS ON FINANCIAL PERFORMANCE OF LISTED MANUFACTURING FIRMS IN KENYA*. United States International University-Africa.
63. Mujuka, D. A. (2018) 'Factors Affecting Financial Performance of Commercial Banks in Kenya', *INTERNATIONAL JOURNAL OF ACADEMICS & RESEARCH*

- *IJARKE (IJARKE Business & Management Journal)*, 1(1), pp. 20–37.

64. Musembi, M. M. (2016) 'Effect of macroeconomic variables on financial performance of unit trusts in Kenya', *Research Journal of Finance and Accounting*, 7(14), pp. 146–163. Available at: https://ir-library.ku.ac.ke/handle/123456789/14211 (Accessed: 17 August 2021).
65. Norris, F. (2008) 'United Panic', *The New York Times*. Available at: https://economix.blogs.nytimes.com//2008/10/24/united-panic (Accessed: 18 December 2021).
66. Osoro, C. and Ogeto, W. (2014) 'Macroeconomic fluctuations effects on the financial performance of listed manufacturing firms in Kenya', *The international Journal of Sciences*, 21(1), pp. 26–40.
67. Pham, C. D., Tran, Q. X. and Nguyen, L. T. N. (2018) 'Effects of Internal Factors on Financial Performance of Listed Construction-Material Companies: The Case of Vietnam', *SSRN Electronic Journal*. doi: 10.2139/SSRN.3291392.
68. Pitlik, S. D. (2020) 'COVID-19 Compared to Other Pandemic Diseases', *Rambam Maimonides Medical Journal*, 11(3). doi: 10.5041/RMMJ.10418.
69. Prijadi, D. and Prijadi, R. (2018) 'The Factors Affecting the Company\'s Cash Holding (Empirical Study of Listed Manufacturing Companies in Indonesia)', *International Journal of Business Management & Research*, 8(1), pp. 1–10. doi: 10.24247/IJBMRFEB20181.
70. Pureza, G. M. (2021) *Dotcom Bubble - Meaning, Causes, Effect on Economy*. Available at: https://www.wallstreetmojo.com/dotcom-bubble/ (Accessed: 18 December 2021).
71. Rao, D. T. (2016) *The relationship of macroeconomic factors and financial performance of the five firms listed in the energy and petroleum sector of the NSE*, *undefined*. Strathmore University.
72. Rizal, O., Mukhammad Kholid, M. and Sudahak (2017) 'ANALYSIS OF THE INFLUENCE OF EXTERNAL AND INTERNAL ENVIRONMENTAL FACTORS ON BUSINESS PERFORMANCE: A STUDY ON MICRO SMALL AND MEDIUM ENTERPRISES (MSMES) OF FOOD AND BEVERAGE', *RJOAS*, 6(66), pp. 47–56. doi: 10.18551/rjoas.2017-06.05.

73. Roberts, B. W. (2009) 'The macroeconomic impacts of the 9/11 attack: Evidence from real-time forecasting', *Peace Economics, Peace Science and Public Policy*, 15(2), pp. 341–367. doi: 10.2202/1554-8597.1166/MACHINEREADABLECITATION/RIS.
74. Saad M, A. S. and Zhengge, T. (2015) 'The Impact of Organizational Factors on Financial Performance: Building a Theoretical Model', *International Journal of Management Science and Business Administration*, 2(7), pp. 51–57. doi: 10.18775/IJMSBA.1849-5664-5419.2014.27.1005.
75. Saad, N. M. (2021) 'The Robust Impact of Macroeconomic Factors Towards Market Valuation Among Energy Sector Across Countries', *Journal of Contemporary Issues in Business and Government*, 27(2), pp. 4267–4272. doi: 10.47750/cibg.2021.27.02.451.
76. Sandler, T. and Enders, W. (2010) 'ECONOMIC CONSEQUENCES OF TERRORISM IN DEVELOPED AND DEVELOPING COUNTRIES: AN OVERVIEW'.
77. Sarra, J. and Wade, C. L. (2020) *Predatory Lending Practices Prior to the Global Financial Crisis, Predatory Lending and the Destruction of the African-American Dream*. Cambridge University Press. doi: 10.1017/9781108865715.004.
78. *Severe acute respiratory syndrome coronavirus 2 - Wikipedia* (2021) *En.wikipedia.org*. Available at: https://en.wikipedia.org/wiki/Severe_acute_respiratory_syndrome_coronavirus_2.
79. Simanjuntak, D. G. and Tjandrawinata, R. R. (2011) 'Factors Influencing Sales Revenue in the Multinational Pharmaceutical Companies', *SSRN Electronic Journal*, pp. 1–13. doi: 10.2139/SSRN.1898071.
80. Suleimenova, A. *et al.* (2021) *Analysis of the internal and external factors affecting the value of JSC, The case of NAC Kazatomprom*. HSE KAZGUU University.
81. *The 2007–2008 Financial Crisis in Review* (2021) *Investopedia*. Available at: https://www.investopedia.com/articles/economics/09/financial-crisis-review.asp (Accessed: 21 August 2021).
82. Tokic, D. (2020) 'Long-term consequences of the 2020 coronavirus pandemics: Historical global-macro context', *Journal of Corporate Accounting & Finance*,

31(3), pp. 9–14. doi: 10.1002/JCAF.22448.

83. *United States Rates & Bonds - Bloomberg* (no date). Available at: https://www.bloomberg.com/markets/rates-bonds/government-bonds/us (Accessed: 18 December 2021).
84. Vartiak, L. (2016) 'IDENTIFICATION OF INTERNAL AND EXTERNAL FACTORS AFFECTING BUSINESS EXCELLENCE', pp. 315–326.
85. *What Is the Average Annual Return for the S&P 500? - Forex Education* (no date). Available at: https://www.forex.in.rs/spx-average-return/ (Accessed: 18 December 2021).
86. Who.int (2021a) 'COVID-19 vaccine tracker and landscape'. Available at: https://www.who.int/publications/m/item/draft-landscape-of-covid-19-candidate-vaccines.
87. Who.int (2021b) 'Timeline: WHO's COVID-19 response'. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/interactive-timeline#.
88. Xu, M.-L. (2014) 'Factors Affecting Financial Performance of Firms Listed on Shanghai Stock Exchange 50 (SSE 50) Mr .', pp. 1–15.
89. Yeo, B. and Grant, D. (2017) 'Exploring the factors affecting global manufacturing performance*', *https://doi.org/10.1080/02681102.2017.1315354*, 25(1), pp. 92–121. doi: 10.1080/02681102.2017.1315354.
90. Zhang, J. (2009) 'The Impact Of The Financial Crisis On The Pharma And Biotech Industries', *Life Science Leader*. Available at: https://www.lifescienceleader.com/doc/the-impact-of-the-financial-crisis-on-the-pharma-and-biotech-0001 (Accessed: 21 August 2021).

APPENDICES

USD (Millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Current Assets	4447	9914	10515	10364	12126	11593	13025	13770	16936	17082	15869	23760
Inventories	1320	2156	2105	2402	2593	3022	3020	2206	2250	2119	1636	1750
Cash & Cash Equivalents	614	3288	4450	3823	4688	4240	5265	6603	7760	5958	4391	11402
Total Assets	8948	19816	18434	18496	21576	23561	25652	24840	29932	47957	46950	54920
Current Liabilities	3313	7019	6897	6480	8215	6558	6587	6839	9447	15187	13415	17640
Debt	1039	1581	1141	1108	935	503	1269	1201	1223	15156	11848	11063
Equity	4158	10302	9521	9586	11172	13086	14404	13597	15304	14778	16060	20821
Num of Shares	950	1775	1766	1745	1719	1693	1645	1581	1532	1457	1447	1451
Share Price	22.44	20.88	25.75	23.3	17.55	24.19	18.19	24.3	26.77	21.41	20.51	23.47
Dividends	613	1216	1220	1236	1234	1222	1378	1717	2220	2641	2739	2977
CAPEX	724	2725	1423	1538	1542	1537	1243	169	643	1825	4001	1179
Market Cap	21318	37062	45475	40659	30168	40954	29923	38418	41012	31194	29678	34055

Appendix 1: Consolidated Balance sheet of AZN

USD (Millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Current Assets	25131	23506	19048	20335	16697	16007	13262	13150	15591	15563	19544	26691
Inventories	1682	1852	2061	1909	1960	2143	2334	3035	2890	3193	4024	10528
Cash & Cash Equivalents	12550	11819	8524	10013	7155	6853	5902	4554	5680	6218	7992	7149
Total Assets	56127	52830	53534	55899	58595	60056	62526	63354	60651	61377	66729	107221
Current Liabilities	16787	15752	13903	16051	17330	14869	15256	16383	16292	18117	20307	23649
Debt	9222	9328	1841	10376	10843	15053	16808	17807	19113	18227	20380	31912
Equity	23410	23240	23731	23224	19627	18490	14854	14960	12468	13127	15622	39744
Num of Shares	1409	1292	1247	1257	1262	1264	1265	1266	1267	1312	1313	1549
Share Price[1]	23.09	23.15	23.64	29.68	35.19	33.95	27.32	34.7	37.98	49.86	49.99	57.09
Dividends	3361	3752	3619	3499	3521	3486	3561	3519	3484	3592	3572	3856
CAPEX	1894	1195	4420	1954	2594	1411	805	161	-979	347	1510	888
Market Cap	32534	29910	29479	37308	44410	42913	34560	43930	48121	65416	65637	88432

Appendix 1 cont.: Consolidated Balance sheet of AZN

1 https://finance.yahoo.com/quote/AZN/

USD (Millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	9130	18445	18103	16222	17841	18849	21426	23950	26475	29559	31601	32804
Gross Profit	5564	12445	12623	12024	13321	14380	16276	18594	20916	23140	25003	27029
Depreciation & Amortization	407	1069	880	860	960	1293	1268	1327	1345	1856	2620	2087
Operating Profit	1818	1733	4008	3954	4006	4111	4770	6502	8216	8094	9144	11543
Interest	108	170	134	94	87	311	454	500	72	522	714	560
NPBT	1732	1959	3847	4077	4037	4077	4844	6667	8543	7983	8681	10807
Tax	547	815	1299	1160	1177	1143	1254	1943	2480	2356	2551	3263
Net Profit	1185	1144	2548	2917	2860	3044	3683	4724	6063	5627	6130	7544

USD (Millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Sales	33269	33591	27973	25711	26547	24708	23002	22465	22090	24384	26617	25406
Gross Profit	26880	27565	22580	20450	20705	20062	18876	18147	17154	19463	21318	17469
Depreciation & Amortization	2741	2550	2518	4583	3282	2852	2357	3036	3753	3762	3149	6685
Operating Profit	11494	12795	8148	3712	2137	4114	4902	3677	3387	2924	5162	1348
Interest	479	433	426	413	418	392	617	664	741	772	736	522
NPBT	10977	12283	7646	3267	1246	3069	3552	2227	1993	1548	3916	371
Tax	2896	2333	1376	696	11	243	146	-641	-57	321	772	-90
Net Profit	8081	9950	6270	2571	1235	2826	3406	2252	2050	1227	3144	461

Appendix 2: Consolidated Statement of Comprehensive Income of AZ

GBP (Millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Current Assets	5509	9482	11268	10423	10280	10059	10998	13177	10992	13626	17269	17570
Inventories	1154	2243	2277	2090	2080	2109	2193	2177	2437	3062	4056	4064
Cash & Cash Equivalents	240	579	1283	716	1052	962	408	686	620	627	652	856
Total Assets	9346	18774	21590	22343	22327	21542	22650	27198	25553	31003	39393	42862
Current Liabilities	4145	8448	9084	9430	8167	8595	8980	9511	7265	10345	10017	12118
Debt	3121	4716	4032	4232	4450	5103	5963	6471	5490	10571	16187	16257
Equity	2702	5464	7711	7390	6581	4556	5308	7570	9648	9603	7931	10005
Num of Shares	3626	3641	6226	6173	5912	5806	5736	5674	5643	5524	5195	5069
Share Price	42.01	34.53	37.44	34.25	23.25	26.11	24.70	29.32	26.93	25.39	25.48	26.15
Dividends	1867	1883	2084	2363	2327	2333	2475	2390	2598	2793	2929	3003
CAPEX	1032	1128	1057	1240	182	316	255	57	49	618	461	99
Market Cap	152343.7	125739.5	233074.4	211439.6	137444	151579.62	141680.93	166389.9	151977.89	140236	132360.99	132552.6088
Share price in USD2	69.50	55.88	56.00	49.82	37.46	46.62	47.39	50.48	52.76	50.39	37.27	42.25
Rates of GBPUSD3	1.65	1.62	1.50	1.45	1.61	1.79	1.92	1.72	1.96	1.98	1.46	1.62
Share price in GBP	42.01	34.53	37.44	34.25	23.25	26.11	24.70	29.32	26.93	25.39	25.48	26.15

Appendix 3: Consolidated Balance sheet of GSK

GBP (Millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Current Assets	16036	16167	13692	15227	14678	16587	16711	15907	16927	19491	20247	18254
Inventories	3837	3873	3969	3900	4231	4716	5102	5557	5476	5947	5996	6244
Cash & Cash Equivalents	1027	841	1465	2549	1313	1114	1462	826	569	795	1762	3453
Total Assets	42230	41080	41475	42086	40651	53446	59081	56381	58066	79692	80431	78689
Current Liabilities	12794	15010	13815	13677	13295	13417	19001	26569	22491	24050	22148	22417
Debt	15100	14901	18302	18245	18784	16532	18790	17089	26064	30508	27150	25605
Equity	8887	8023	5810	6997	4263	5114	1124	-68	4360	11405	14587	15426
Num of Shares	5085	5028	4912	4831	4808	4831	4860	4886	4914	4947	4976	5032
Share Price	25.14	29.37	26.75	32.24	27.44	27.38	31.21	26.24	29.95	35.44	26.91	32.89
Dividends	3205	3406	3814	3751	3865	3874	4850	3906	3927	3953	3977	3048
CAPEX with intangible	495	168	-587	377	333	285	526	609	196	1664	916	1685
Market Cap	127826	147665	131375.52	155771.9	131938	132255	151693	128233	147185	175322	133926	165526
Share price in USD	39.22	45.63	43.47	53.39	42.74	40.35	38.51	35.47	38.21	46.99	36.80	43.75
Rates of GBPUSD	1.56	1.55	1.63	1.66	1.56	1.47	1.23	1.35	1.28	1.33	1.37	1.33
Share price in GBP	25.14	29.37	26.75	32.24	27.44	27.38	31.21	26.24	29.95	35.44	26.91	32.89

Appendix 3 cont.: Consolidated Balance sheet of GSK

GBP (Millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	16002	16796	18079	20489	21212	21441	19986	21660	23225	27716	24352	28368
Gross Profit	12034	12462	14268	16059	16606	16897	15626	16896	18215	17399	17937	20988
Depreciation & Amortization	626	678	762	801	824	847	859	904	958	1022	1231	1562
Operating Profit	4306	4343	4729	4734	5551	6392	5756	6874	7808	7593	7141	8425
Interest	202	300	340	217	214	222	305	451	352	453	843	783
NPBT	3564	4236	6029	4517	5524	5959	5779	6732	7799	7452	6659	7891
Tax	977	1218	1747	1333	1461	1739	1757	1916	2301	2142	1947	2222
Net Profit	2587	3018	4282	3184	4060	4308	4022	4816	5498	5310	4712	5669

GBP (Millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Sales	28392	27387	26431	26505	23006	23923	27889	30186	30821	33754	34099	24587
Gross Profit	20494	19739	18537	17920	15683	15070	18599	19844	20580	21891	22395	16835
Depreciation & Amortization	1679	1423	1445	1414	1484	1630	1774	1922	1856	2334	2351	2087
Operating Profit	3783	7807	7392	7028	3597	10322	2598	4087	5483	6961	7783	5306
Interest	831	799	808	767	727	757	736	734	798	912	892	593
NPBT	3157	7625	6600	6647	2968	10526	1939	3525	4800	6221	6968	4736
Tax	1304	2240	1948	1019	137	2154	877	1356	754	953	580	570
Net Profit	1853	5405	4678	5628	2831	8372	1062	3247	3921	5268	6388	4166

Appendix 4: Consolidated Statement of Comprehensive Income of GSK

USD (Millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Current Assets	11912	13633	16691	18473	19266	22995	27320	31394	22975	29945	34377	29541
Inventories	2953	3164	2905	2992	3303	3588	3744	3959	4889	5110	5052	5180
Cash & Cash Equivalents	2979	4096	6757	7972	7475	9523	12884	16138	4084	9315	12809	19425
Total Assets	28959	31016	34245	38488	40556	48263	53317	58025	70556	80954	84912	94682
Current Liabilities	8422	7589	7255	8044	11449	13448	13927	12635	19161	19837	20852	21731
Debt	5405	5203	4652	2782	4139	4094	2936	2685	6593	9537	11852	14541
Equity	14609	16905	20395	24233	22697	26869	31813	37871	29318	43319	42511	50588
Num of Shares	2975	2980	3015	3047	2998	2968	2968	2974	2936	2883	2803	2760
Share Price4	41.94	46.63	52.53	59.1	53.11	50.62	63.42	60.1	66.02	67.38	58.56	64.41
Dividends	1305	1479	1724	2047	2381	2746	3251	3793	4272	4670	5030	5326
CAPEX	1502	1767	1523	1568	1943	1927	1938	2478	2155	2485	2281	2211
Market Cap					159,224	150,240	188,231	178,737	193,835	194,257	164,144	177,772

Appendix 5: Consolidated Balance sheet of JNJ

4 https://finance.yahoo.com/quote/JNJ/

USD (Millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Current Assets	47307	54316	46166	56407	59311	60210	65,032	43,088	46,033	45,274	51,237	59889
Inventories	5378	6285	7495	7878	8184	8053	8,144	8,765	8,599	9,020	9,344	10387
Cash & Cash Equivalents	27658	32261	21089	29206	33089	38376	41,907	18,296	19,687	19,287	25,185	31001
Total Assets	102908	113644	121347	132683	131119	133411	141,208	157,303	152,954	157,728	174,894	179228
Current Liabilities	23072	22811	24262	25675	25085	27747	26,287	30,537	31,230	35,964	42,493	44561
Debt	16773	19627	16165	18180	18760	19861	27,126	34,581	29,981	27,696	35,266	33928
Equity	56579	57080	64826	74053	69752	71150	70,418	60,160	59,752	59,471	63,278	70272
Num of Shares	2751	2736	2753	2809	2815	2772	2737	2692	2682	2645	2632	2632
Share Price	61.85	65.58	69.48	92.35	105.06	102.72	115.2	139.7	127.3	145.8	157.4	172.98
Dividends	5805	6156	6608	7276	7768	8173	8,621	8,943	9,494	9,917	10,481	8,241
CAPEX	1860	1551	1425	3137	-917	-1	1,959	1,447	467	233	3,042	1,571
Market Cap	170,149	179,427	191,278	259,411	295,744	284,719	315,302	376,072	341,419	385,641	414,277	455,283

Appendix 5 cont.: Consolidated Balance sheet of JNJ

USD (Millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	24398	28007	29172	32317	36298	41862	47348	50514	53324	61095	63747	61897
Gross Profit	16752	19509	20215	22736	25851	29686	33926	36560	38267	43344	45236	43450
Depreciation & Amortization	1335	1510	1592	1605	1662	1869	2124	2093	2177	2777	2832	2774
Operating Profit	4821	6398	7501	8507	9489	9953	12845	13009	13150	13661	15988	15590
Interest	186	255	204	153	160	207	187	54	63	296	435	451
NPBT	4333	5877	6868	7898	9291	10308	12331	13116	14587	13283	16929	15755
Tax	1232	1604	1915	2230	2694	3111	4329	3245	3534	2707	3980	3489
Net Profit	3101	4273	4953	5668	6597	7197	8509	10411	11053	10576	12949	12266

USD (Millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Sales	61587	65030	67224	71312	74331	70074	71890	76450	81581	82059	82584	68971
Gross Profit	42795	44670	45566	48970	51585	48538	50,205	51,096	54,490	54,503	54,157	47071
Depreciation & Amortization	2939	3158	3666	4104	3895	3746	3,754	5,642	6,929	7,009	7,231	5547
Operating Profit	16527	15584	15869	18377	20959	17556	20,645	18,414	20,798	20,114	19,486	17940
Interest	455	571	532	482	533	552	726	934	1,005	318	201	123
NPBT	16947	12361	13775	15471	20563	19196	19803	17673	17999	17328	16497	17817
Tax	3613	2689	3261	1640	4240	3787	3,263	3,373	2,702	2,209	1,783	1798
Net Profit	13334	9672	10514	13831	16323	15409	16,540	14,300	15,297	15,119	14,714	16019

Appendix 6: Consolidated Statement of Comprehensive Income of JNJ

USD (Millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Current Assets	10229	11259	13598	12962	14386	11527	13475	21049	15230	15045	19113	28429
Inventories	2624	2847	3022	3579	2964	2555	1899	1658	1769	1881	2091	8055
Cash & Cash Equivalents	3356	3202	4255	3287	4971	4173	7090	15638	8713	8231	5486	9604
Total Assets	31853	35635	40155	44021	47561	40588	42573	44856	44570	48351	47196	112090
Current Liabilities	6069	8759	9954	11544	12375	9570	11744	13304	12723	12258	14319	15751
Debt	3845	6003	6920	8865	8549	6796	6873	8098	6836	3140	6240	17454
Equity	12802	13242	14832	16050	18201	15576	17288	17917	17560	18185	21167	61493
Num of Shares	2360	2329	2308	2273	2258	2236	2219	2197	2178	2171	2136	2268
Share Price[5]	70.37	64.11	89.34	56.11	54.02	44.08	30.67	30.35	41.6	55.45	29.01	34.87
Dividends	637	677	785	796	808	823	841	830	827	831	804	1189
CAPEX	-613	2561	2728	2402	2128	1916	1726	1403	980	1011	1298	1461
Market Cap	166073	149312	206197	127538	121977	98563	68057	42581	40768	120382	61965	79085

Appendix 7: Consolidated Balance sheet of MRK

5 https://finance.yahoo.com/quote/MRK/

USD (Millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Current Assets	29064	33181	34857	35685	32605	29764	30614	24766	25875	27483	27764	31058
Inventories	5868	6254	6535	6226	5571	4700	4866	5096	5440	5978	6310	5603
Cash & Cash Equivalents	12201	14972	16141	17486	15719	13427	14341	8498	8864	10450	8062	10016
Total Assets	105781	105128	106132	105645	98167	101,779	95377	87872	82637	84397	91588	93494
Current Liabilities	15641	16245	18348	17868	18397	19203	17204	18614	22206	22220	27327	23728
Debt	17882	17515	20569	25160	21403	26514	24842	24410	25114	26346	31791	26441
Equity	56805	56943	55463	52326	48647	44767	40088	34569	26882	25907	25317	35794
Num of Shares	3095	3071	3041	2963	2894	2816	2766	2730	2664	2565	2652	2525
Share Price	34.39	35.97	39.06	47.76	54.19	50.4	56.17	53.69	72.91	86.78	78.05	76.43
Dividends	1176	1281	1343	1321	1308	1309	1316	1320	1458	1587	1674	1660
CAPEX	1678	1723	1954	1548	1317	1283	1614	1888	2615	3473	4684	3240
Market Cap	106437	110464	118781	141513	156826	141926	155366	146574	194232	222591	206989	192986

Appendix 7 cont.: Consolidated Balance sheet of MRK

USD (Millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	26898	32714	40363	21199	21446	22486	22939	22012	22636	24198	23850	27428
Gross Profit	12973	15180	17920	17574	17441	18049	17979	16862	16635	18057	18267	18409
Depreciation & Amortization	1015	1145	1268	1133	1231	1314	1451	1708	2268	1988	1631	2576
Operating Profit	7322	7321	8780	8988	9757	8848	7630	7253	5839	3417	7613	4722
Interest	206	317	484	464	391	351	294	386	375	384	251	458
NPBT	8133	8620	9824	9948	9652	9052	8003	7364	6221	3492	9931	15290
Tax	2885	2729	3002	2895	2857	2462	2161	2733	1788	95	1999	2268
Net Profit	5248	5891	6822	7053	6795	6730	5483	4631	2975	420	7932	13024

USD (Millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Sales	45987	48047	47267	44033	42237	39498	39807	40122	42294	46840	47994	**35183**
Gross Profit	27591	31176	30821	27079	25469	24564	25916	27347	28785	32728	32509	25768
Depreciation & Amortization	7381	7427	6978	6988	6691	6375	5441	4637	4519	3652	3625	2379
Operating Profit	2957	8280	9855	5956	5670	6928	5379	6533	8299	11603	7905	8962
Interest	749	695	714	801	732	672	693	754	772	893	831	597
NPBT	1653	7334	8739	5545	17283	5401	4659	6521	8701	11464	8791	9970
Tax	671	942	2440	1028	5349	942	718	4103	2508	1687	1709	1436
Net Profit	982	6392	6299	4517	11934	4459	3941	2418	6193	9777	7082	8534

Appendix 8: Consolidated Statement of Comprehensive Income of MRK

USD (MILLIONS)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Current Assets	21808	21808	20459	20595	20910	22273	23920	21443	21404	27430	20881	33691
Inventories	4874	4331	2625	2478	2976	3346	3558	3725	4498	5455	5792	5830
Cash & Cash Equivalents	10317	10268	12747	13349	12599	13259	13892	10933	7955	13201	6117	17449
Total Assets	40936	41207	36147	40232	45231	49317	52488	57732	68008	75452	78299	95505
Current Liabilities	10914	10950	7230	8555	8310	9320	11849	15328	16234	16641	16504	19470
Debt	6490	6240	3765	4564	5570	5970	6855	8454	7299	5794	7364	13988
Equity	22858	23403	22896	25458	28269	30429	33783	33164	41294	49396	50437	57462
Num of Shares	2654	2625	2607	2548	2475	2468	2337	2336	2348	2264	2265	2274
Share Price	43.91	32.82	40.1	32.71	32.91	41.12	45.29	47.03	51.47	48.66	44.59	48.77
Dividends	1148	1287	1223	1301	1220	1724	1896	2107	2049	2598	3345	3941
CAPEX	816	466	317	299	679	1116	1137	1192	2034	2892	2089	2634
Market Cap	116,537	86,153	104,541	83,345	81,452	101,484	105,843	109,862	120,852	110,166	100,996	110,903

Appendix 9: Consolidated Balance sheet of NOVN

USD (MILLIONS)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Current Assets	26685	24084	28004	30542	37561	22845	24,931	28,208	35,563	29,504	29,673	26253
Inventories	6093	5930	6744	7267	6093	6226	6,255	6,867	6,956	5,982	7,131	6885
Cash & Cash Equivalents	8134	5075	7967	9096	13503	5302	7,546	9,347	15,718	11,234	11,293	8162
Total Assets	123318	117496	124191	126254	125387	131556	130,124	133,079	145,563	118,370	132,059	121209
Current Liabilities	24658	23148	24051	26368	26973	23708	22,209	23,403	29,607	28,264	33,059	29880
Debt	22987	20927	19726	18018	20411	21931	23,802	28,532	32148	27,384	36,044	34243
Equity	69769	65940	69219	74472	70844	77122	74,891	74,227	78,692	55,551	56,666	56771
Num of Shares	2289	2407	2421	2426	2399	2374	2374	2317	2311	2265	2257	2237
Share Price6	52.82	51.23	56.72	72.03	83.03	77.1	65.27	75.23	76.89	94.69	94.43	81.52
Dividends	4486	5368	6030	6100	6810	6643	6475	6495	6966	6645	6987	7368
CAPEX	1651	1683	2813	3234	3098	2647	1871	1562	1,723	427	2117	1164
Market Cap	120,905	123,311	137,319	174,745	199,189	183,035	154,951	174,308	177,693	214,473	213,129	182,360

Appendix 9 cont.: Consolidated Balance sheet of NOVN

6 https://finance.yahoo.com/quote/NOVN/

USD (millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	21878	21601	21216	18763	18629	24864	28401	31319	35105	38947	42584	45103
Gross Profit	14941	15066	15147	14087	14173	18970	21622	23060	26450	27915	31145	32924
Depreciation & Amortization	958	963	817	1038	1156	1283	1388	1679	1923	2858	2670	2301
Operating Profit	4776	4886	4671	4315	4544	5823	6086	6802	7642	6781	8964	9982
Interest	506	361	302	218	173	243	261	294	266	237	290	551
NPBT	5464	5668	5376	5030	5084	6068	6445	7162	7994	7487	9499	9922
Tax	1299	1220	1078	854	856	1008	1065	1090	1169	947	1336	1468
Net Profit	4166	4449	4297	4176	4228	5060	5380	6072	6825	6540	8163	8454

USD (millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Sales	**51561**	**59375**	**57561**	**52716**	**53634**	**50359**	49386	43361	46017	48624	49898	**39355**
Gross Profit	37073	40392	38805	36137	36289	32983	31916	32960	31589	34252	34777	27920
Depreciation & Amortization	3419	5788	4920	4405	4682	5471	6043	4736	5211	5826	6464	4404
Operating Profit	11526	10998	11193	10969	11089	8845	8275	8703	14193	9086	10152	9127
Interest	692	751	724	683	704	655	707	777	932	850	869	655
NPBT	11702	10773	10925	10807	12272	8134	7817	9102	14095	8940	9878	9186
Tax	1733	1528	1542	1498	1545	1106	1119	1603	1295	1793	1807	1474
Net Profit	9969	9245	9383	9309	10727	7028	6698	7499	12800	7147	8071	7712

Appendix 10: Consolidated Statement of Comprehensive Income of NOVN

USD (millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Current Assets	14181	16311	17187	18450	24781	29741	39694	41896	46949	46849	43076	61670
Inventories	2821	2588	2702	2741	2678	5837	6660	6039	6111	5302	4381	12403
Cash & Cash Equivalents	5067	6659	7003	8884	12950	12343	20546	22736	28227	26092	24555	27164
Total Assets	27823	31372	33510	39153	46356	116775	123684	117565	114837	115268	111148	212949
Current Liabilities	10435	11896	11981	13640	18555	23657	26458	28448	21389	21835	27009	37225
Debt	4787	7073	5412	8874	11809	14573	18545	17936	7980	13139	17283	48662
Equity	12691	13950	16076	18293	19950	65377	68278	65627	71358	65010	57556	90446
Num of Shares	6220	6218	6314	6277	6162	7629	7473	7361	7124	6761	6746	8070
Share Price	39.53	30.78	43.64	37.81	29	33.52	25.51	22.13	24.57	21.57	16.8	16.8
Dividends	285	349	696	819	926	1300	1418	1772	2055	2163	2159	1454
CAPEX	1951	2470	2063	2200	2014	3057	2922	2525	2200	1880	1701	1205
Market Cap	245,877	191,390	275,543	237,333	178,698	255,724	190,636	162,899	175,037	145,835	113,333	135,576

Appendix 11: Consolidated Balance sheet of PFE

USD (millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Current Assets	60468	57728	61415	56244	57702	43804	38,949	41,141	49,926	32,803	35,067	57900
Inventories	8405	7769	7063	6166	5663	7513	6,783	7,578	7,508	7,068	8,046	8640
Cash & Cash Equivalents	28479	26452	32399	32408	36122	23290	17,850	19,992	18,833	9,646	12,221	29696
Total Assets	195014	188002	185798	172101	169274	167460	171,615	171,797	159,422	167,594	154,229	179188
Current Liabilities	28609	28069	28619	23366	21631	29399	31,115	30,427	31,858	37,304	25,920	41803
Debt	44033	38949	37460	36489	36682	38978	42,086	43,491	41,740	52,150	39,836	39879
Equity	88265	82621	81678	76620	71622	64998	59,840	71,656	63,758	63,447	63,473	75692
Num of Shares	8012	7575	7276	6399	6291	6175	6070	5979	5717	5534	5567	5611
Share Price[7]	16.61	20.53	23.8	29.06	29.55	30.63	30.82	34.36	41.41	37.17	36.81	55.8
Dividends	1601	1796	1734	1663	1711	1852	1,944	2,029	2,047	2,104	2,162	2191
CAPEX	1513	1882	1419	1465	1583	1496	1,999	2,217	2,196	2,594	2,791	1718
Market Cap	133,079	155,515	173,169	185,955	185,899	189,140	187,077	205,438	236,741	205,699	204,921	313,094

Appendix 11 cont.: Consolidated Balance sheet of PFE

7 https://finance.yahoo.com/quote/PFE/

USD (millions)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Sales	23231	27166	29355	32259	**32373**	**45188**	**52516**	**51298**	**48371**	**48418**	**48296**	**50009**
Gross Profit	18324	21590	24348	27225	28328	35356	41611	39364	37470	34051	37516	38244
Depreciation & Amortization	797	905	879	972	1030	4025	5093	5576	5293	5200	5090	4516
Operating Profit	4673	7346	5928	10306	12045	3536	13762	11288	13545	9718	10256	11940
Interest	276	401	432	322	279	290	359	488	517	440	562	1233
NPBT	4397	6945	5781	10329	11766	3246	13403	10800	13028	9278	9694	10674
Tax	1163	1968	2049	2561	2609	1621	2665	3424	1992	1023	1645	2197
Net Profit	3234	4977	3732	7768	9157	1625	10738	7376	11036	8255	8049	8477

USD (millions)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 9M
Sales	**67809**	**67425**	**58986**	**51584**	**49605**	**48851**	52824	52546	53647	51750	41908	57653
Gross Profit	46126	46755	42477	37399	35989	35475	36439	36548	37506	36921	29780	36558
Depreciation & Amortization	8399	9026	7655	6410	5537	5157	5757	6269	6384	6010	4777	3914
Operating Profit	10625	12666	12395	15917	12726	10329	9004	12989	4062	12331	8272	19078
Interest	1799	1681	1524	1414	1360	1199	1186	1270	1316	1574	1449	977
NPBT	9471	11481	11242	15716	12238	8964	8351	12305	3594	11485	7497	20128
Tax	1124	4023	2562	4306	3120	1990	1123	-9049	706	1384	477	1517
Net Profit	8347	7458	8680	11410	9118	6974	7228	21354	2888	10101	7020	18611

Appendix 12: Consolidated Statement of Comprehensive Income of PFE

Current Ratio (times)	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
AZN	1.34	1.41	1.52	1.60	1.48	1.77	1.98	2.01	1.79	1.12	1.18	1.35
JNJ	1.41	1.80	2.30	2.30	1.68	1.71	1.96	2.48	1.20	1.51	1.65	1.36
PFE	1.36	1.37	1.43	1.35	1.34	1.26	1.50	1.47	2.20	2.15	1.59	1.66
GSK	1.33	1.12	1.24	1.11	1.26	1.17	1.22	1.39	1.51	1.32	1.72	1.45
MRK	1.69	1.29	1.37	1.12	1.16	1.20	1.15	1.58	1.20	1.23	1.33	1.80
NOVN	2.00	1.99	2.83	2.41	2.52	2.39	2.02	1.40	1.32	1.65	1.27	1.73

Current Ratio (times)	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
AZN	1.50	1.49	1.37	1.27	0.96	1.08	0.87	0.80	0.96	0.86	0.96	1.13
JNJ	2.05	2.38	1.90	2.20	2.36	2.17	2.47	1.41	1.47	1.26	1.21	1.34
PFE	2.11	2.06	2.15	2.41	2.67	1.49	1.25	1.35	1.57	0.88	1.35	1.39
GSK	1.25	1.08	0.99	1.11	1.10	1.24	0.88	0.60	0.75	0.81	0.91	0.81
MRK	1.86	2.04	1.90	2.00	1.77	1.55	1.78	1.33	1.17	1.24	1.02	1.31
NOVN	1.08	1.04	1.16	1.16	1.39	0.96	1.12	1.21	1.20	1.04	0.90	0.88

Appendix 13: Liquidity Ratios: Current Ratio

Acid Test Ratio (times)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	0.94	1.11	1.22	1.23	1.16	1.31	1.52	1.69	1.55	0.99	1.06	1.25
JNJ	1.06	1.38	1.90	1.92	1.39	1.44	1.69	2.17	0.94	1.25	1.41	1.12
PFE	1.09	1.15	1.21	1.15	1.19	1.01	1.25	1.26	1.91	1.90	1.43	1.32
GSK	1.05	0.86	0.99	0.88	1.00	0.92	0.98	1.16	1.18	1.02	1.32	1.11
MRK	1.25	0.96	1.06	0.81	0.92	0.94	0.99	1.46	1.06	1.07	1.19	1.29
NOVN	1.55	1.60	2.47	2.12	2.16	2.03	1.72	1.16	1.04	1.32	0.91	1.43

Acid Test Ratio (times)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	1.40	1.37	1.22	1.15	0.85	0.93	0.72	0.62	0.78	0.68	0.76	0.68
JNJ	1.82	2.11	1.59	1.89	2.04	1.88	2.16	1.12	1.20	1.01	0.99	1.11
PFE	1.82	1.78	1.90	2.14	2.41	1.23	1.03	1.10	1.33	0.69	1.04	1.18
GSK	0.95	0.82	0.70	0.83	0.79	0.88	0.61	0.39	0.51	0.56	0.64	0.54
MRK	1.48	1.66	1.54	1.65	1.47	1.31	1.50	1.06	0.92	0.97	0.79	1.07
NOVN	0.84	0.78	0.88	0.88	1.17	0.70	0.84	0.91	0.97	0.83	0.68	0.65

Appendix 14: Liquidity Ratios: Acid Test Ratio

Liquid Ratio (times)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	0.19	0.47	0.65	0.59	0.57	0.65	0.80	0.97	0.82	0.39	0.33	0.65
JNJ	0.35	0.54	0.93	0.99	0.65	0.71	0.93	1.28	0.21	0.47	0.61	0.89
PFE	0.49	0.56	0.58	0.65	0.70	0.52	0.78	0.80	1.32	1.19	0.91	0.73
GSK	0.45	0.29	0.40	0.25	0.30	0.42	0.44	0.55	0.42	0.44	0.60	0.56
MRK	0.55	0.37	0.43	0.28	0.40	0.44	0.60	1.18	0.68	0.67	0.38	0.61
NOVN	0.95	0.94	1.76	1.56	1.52	1.42	1.17	0.71	0.49	0.79	0.37	0.90

Liquid Ratio (times)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	0.75	0.75	0.61	0.62	0.41	0.46	0.39	0.28	0.35	0.34	0.39	0.30
JNJ	1.20	1.41	0.87	1.14	1.32	1.38	1.59	0.60	0.63	0.54	0.59	0.70
PFE	1.00	0.94	1.13	1.39	1.67	0.79	0.57	0.66	0.59	0.26	0.47	0.71
GSK	0.49	0.39	0.31	0.41	0.33	0.44	0.26	0.15	0.18	0.20	0.29	0.16
MRK	0.78	0.92	0.88	0.98	0.85	0.70	0.83	0.46	0.40	0.47	0.30	0.42
NOVN	0.33	0.22	0.33	0.34	0.50	0.22	0.34	0.40	0.53	0.40	0.34	0.27

Appendix 15: Liquidity Ratios: Liquid Ratio

Gearing Ratio (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	19.99	13.30	10.70	10.36	7.72	3.70	8.10	8.12	7.40	50.63	42.45	34.70
JNJ	27.01	23.53	18.57	10.30	15.42	13.22	8.45	6.62	18.36	18.04	21.80	22.33
PFE	27.39	33.64	25.19	32.66	37.18	18.23	21.36	21.46	10.06	16.81	23.09	34.98
GSK	53.60	46.33	34.34	36.41	40.34	52.83	52.91	46.09	36.27	52.40	67.12	61.90
MRK	23.10	31.19	31.81	35.58	31.96	30.38	28.45	31.13	28.02	14.72	22.77	22.11
NOVN	22.11	21.05	14.12	15.20	16.46	16.40	16.87	20.31	15.02	10.50	12.74	19.58

Gearing Ratio (%)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	28.26	28.64	7.20	30.88	35.59	44.88	53.09	54.34	60.52	58.13	56.61	44.54
JNJ	22.87	25.59	19.96	19.71	21.19	21.82	27.81	36.50	33.41	31.77	35.79	32.56
PFE	33.28	32.04	31.44	32.26	33.87	37.49	41.29	37.77	39.56	45.11	38.56	34.51
GSK	62.95	65.00	75.90	72.28	81.50	76.37	94.36	100.40	85.67	72.79	65.05	62.40
MRK	23.94	23.52	27.05	32.47	30.55	37.20	38.26	41.39	48.30	50.42	55.67	42.49
NOVN	24.78	24.09	22.18	19.48	22.37	22.14	24.12	27.77	29.00	33.02	38.88	37.62

Appendix 16: Financing Ratios: Gearing Ratio

Interest Cover Ratio (times)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	16.83	10.19	29.91	42.06	46.05	13.22	10.51	13.00	114.11	15.51	12.81	20.61
PFE	16.93	18.32	13.72	32.01	43.17	12.19	38.33	23.13	26.20	22.09	18.25	9.68
GSK	21.32	14.48	13.91	21.82	25.94	28.79	18.87	15.24	22.18	16.76	8.47	10.76
MRK	35.54	23.09	18.14	19.37	24.95	25.21	25.95	18.79	15.57	8.90	30.33	10.31
NOVN	9.44	13.53	15.47	19.79	26.27	23.96	23.32	23.14	28.73	28.61	30.91	18.12

Interest Cover Ratio (times)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	24.00	29.55	19.13	8.99	5.11	10.49	7.94	5.54	4.57	3.79	7.01	2.58
PFE	5.91	7.53	8.13	11.26	9.36	8.61	7.59	10.23	3.09	7.83	5.71	19.53
GSK	4.55	9.77	9.15	9.16	4.95	13.64	3.53	5.57	6.87	7.63	8.73	8.95
MRK	3.95	11.91	13.80	7.44	7.75	10.31	7.76	8.66	10.75	12.99	9.51	15.01
NOVN	16.66	14.64	15.46	16.06	15.75	13.50	11.70	11.20	15.23	10.69	11.68	13.93

Appendix 17: Financing Ratios: Interest Cover Ratio

ROCE (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	34.98	14.58	37.59	36.97	33.09	30.25	30.43	43.94	49.71	27.04	32.76	36.20
JNJ	24.09	28.94	29.95	31.49	35.36	32.14	36.97	32.08	36.62	25.85	29.41	23.94
PFE	26.74	34.94	27.59	37.94	37.93	4.42	15.85	13.51	17.07	12.44	13.70	8.58
GSK	73.95	42.66	40.27	40.73	50.32	66.18	51.07	48.96	51.58	37.64	29.61	32.08
MRK	43.98	38.04	40.36	36.07	36.47	39.55	31.58	27.88	23.93	16.02	27.78	5.98
NOVN	16.27	16.48	17.52	14.37	13.43	16.00	14.98	16.34	15.73	12.29	15.51	13.97

ROCE (%)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	35.22	39.29	31.86	11.05	7.01	12.26	15.48	11.22	10.72	9.33	14.34	1.88
JNJ	22.53	20.32	19.59	19.92	23.68	19.29	21.16	19.44	23.18	23.08	19.77	17.22
PFE	8.03	10.42	10.40	14.07	11.75	9.93	8.83	11.28	3.85	10.67	8.01	16.51
GSK	15.77	34.06	30.66	27.84	15.61	47.69	13.05	24.01	18.02	16.61	18.65	12.93
MRK	3.96	11.12	12.96	7.69	8.09	9.72	8.28	11.08	15.96	22.21	13.84	14.40
NOVN	12.43	12.66	12.58	11.86	12.15	8.93	8.38	8.47	12.80	10.96	10.95	10.03

Appendix 18: Performance Ratios: ROCE Ratio

ROA (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	13.24	5.77	13.82	15.77	13.26	12.92	14.36	19.02	20.26	11.73	13.06	13.74
JNJ	10.71	13.78	14.46	14.73	16.27	14.91	15.96	17.94	15.67	13.06	15.25	12.95
PFE	11.62	15.86	11.14	19.84	19.75	1.39	8.68	6.27	9.61	7.16	7.24	3.98
GSK	27.68	16.08	19.83	14.25	18.18	20.00	17.76	17.71	21.52	17.13	11.96	13.23
MRK	16.48	16.53	16.99	16.02	14.29	16.58	12.88	10.32	6.67	0.87	16.81	11.62
NOVN	10.18	10.80	11.89	10.38	9.35	10.26	10.25	10.52	10.04	8.67	10.43	8.85

ROA (%)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	14.40	18.83	11.71	4.60	2.11	4.71	5.45	3.55	3.38	2.00	4.71	0.43
JNJ	12.96	8.51	8.66	10.42	12.45	11.55	11.71	9.09	10.00	9.59	8.41	8.94
PFE	4.28	3.97	4.67	6.63	5.39	4.16	4.21	12.43	1.81	6.03	4.55	10.39
GSK	4.39	13.16	11.28	13.37	6.96	15.66	1.80	5.76	6.75	6.61	7.94	5.29
MRK	0.93	6.08	5.94	4.28	12.16	4.38	4.13	2.75	7.49	11.58	7.73	9.13
NOVN	8.08	7.87	7.56	7.37	8.56	5.34	5.15	5.63	8.79	6.04	6.11	6.36

Appendix 19: Performance Ratios: ROA Ratio

ROE (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	28.50	11.10	26.76	30.43	25.60	23.26	25.57	34.74	39.62	38.08	38.17	36.23
JNJ	21.23	25.28	24.29	23.39	29.07	26.79	26.75	27.49	37.70	24.41	30.46	24.25
PFE	25.48	35.68	23.21	42.46	45.90	2.49	15.73	11.24	15.47	12.70	13.98	9.37
GSK	95.74	55.23	55.53	43.09	61.69	94.56	75.77	63.62	56.99	55.30	59.41	56.66
MRK	40.99	44.49	46.00	43.94	37.33	43.21	31.72	25.85	16.94	2.31	37.47	21.18
NOVN	18.23	19.01	18.77	16.40	14.96	16.63	15.93	18.31	16.53	13.24	16.18	14.71

ROE (%)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	34.52	42.81	26.42	11.07	6.29	15.28	22.93	15.05	16.44	9.35	20.13	1.16
JNJ	23.57	16.94	16.22	18.68	23.40	21.66	23.49	23.77	25.60	25.42	23.25	22.80
PFE	9.46	9.03	10.63	14.89	12.73	10.73	12.08	29.80	4.53	15.92	11.06	24.59
GSK	20.85	67.37	80.52	80.43	66.41	163.71	94.48	0.00	89.93	46.19	43.79	27.01
MRK	1.73	11.23	11.36	8.63	24.53	9.96	9.83	6.99	23.04	37.74	27.97	23.84
NOVN	14.29	14.02	13.56	12.50	15.14	9.11	8.94	10.10	16.27	12.87	14.24	13.58

Appendix 20: Performance Ratios: ROE Ratio

Gross Profit Margin (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	60.94	67.47	69.73	74.12	74.67	76.29	75.96	77.64	79.00	78.28	79.12	82.40
JNJ	68.66	69.66	69.30	70.35	71.22	70.91	71.65	72.38	71.76	70.95	70.96	70.20
PFE	78.88	79.47	82.94	84.40	87.51	78.24	79.23	76.74	77.46	70.33	77.68	76.47
GSK	75.20	74.20	78.92	78.38	78.29	78.81	78.18	78.01	78.43	62.78	73.66	73.98
MRK	48.23	46.40	44.40	82.90	81.33	80.27	78.38	76.60	73.49	74.62	76.59	67.12
NOVN	68.29	69.75	71.39	75.08	76.08	76.30	76.13	73.63	75.35	71.67	73.14	73.00

Gross Profit Margin (%)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	80.80	82.06	80.72	79.54	77.99	81.20	82.06	80.78	77.66	79.82	80.09	68.76
JNJ	69.49	68.69	67.78	68.67	69.40	69.27	69.84	66.84	66.79	66.42	65.58	68.25
PFE	68.02	69.34	72.01	72.50	72.55	72.62	68.98	69.55	69.91	71.34	71.06	63.41
GSK	72.18	72.07	70.13	67.61	68.17	62.99	66.69	65.74	66.77	64.85	65.68	68.47
MRK	60.00	64.89	65.21	61.50	60.30	62.19	65.10	68.16	68.06	69.87	67.74	73.24
NOVN	71.90	68.03	67.42	68.55	67.66	65.50	64.63	76.01	68.65	70.44	69.70	70.94

Appendix 21: Performance Ratios: Gross Profit Margin Ratio

Net Profit Margin (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	12.98	6.20	14.08	17.98	16.03	16.15	17.19	19.72	22.90	19.04	19.40	23.00
JNJ	12.71	15.26	16.98	17.54	18.17	17.19	17.97	20.61	20.73	17.31	20.31	19.82
PFE	13.92	18.32	12.71	24.08	28.29	3.60	20.45	14.38	22.82	17.05	16.67	16.95
GSK	16.17	17.97	23.68	15.54	19.14	20.09	20.12	22.23	23.67	19.16	19.35	19.98
MRK	19.51	18.01	16.90	33.27	31.68	29.93	23.90	21.04	13.14	1.74	33.26	47.48
NOVN	19.04	20.60	20.25	22.26	22.70	20.35	18.94	19.39	19.44	16.79	19.17	18.74

Net Profit Margin (%)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	24.29	29.62	22.41	10.00	4.65	11.44	14.81	10.02	9.28	5.03	11.81	1.81
JNJ	21.65	14.87	15.64	19.40	21.96	21.99	23.01	18.71	18.75	18.42	17.82	23.23
PFE	12.31	11.06	14.72	22.12	18.38	14.28	13.68	40.64	5.38	19.52	16.75	32.28
GSK	6.53	19.74	17.70	21.23	12.31	35.00	3.81	10.76	12.72	15.61	18.73	16.94
MRK	2.14	13.30	13.33	10.26	28.25	11.29	9.90	6.03	14.64	20.87	14.76	24.26
NOVN	19.33	15.57	16.30	17.66	20.00	13.96	13.56	17.29	27.82	14.70	16.17	19.60

Appendix 22: Performance Ratios: Net Profit Margin Ratio

P/E Ratio (times)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	17.99	32.40	17.85	13.94	10.55	13.45	8.12	8.13	6.76	5.54	4.84	4.51
JNJ	40.24	32.52	31.98	31.77	24.14	20.88	22.12	17.17	17.54	18.37	12.68	14.49
PFE	76.03	38.45	73.83	30.55	19.51	157.37	17.75	22.08	15.86	17.67	14.08	15.99
GSK	58.89	41.66	54.43	66.41	33.85	35.19	35.23	34.55	27.64	26.41	28.09	23.38
MRK	31.65	25.35	30.23	18.08	17.95	14.65	12.41	14.40	30.46	286.62	7.81	6.07
NOVN	27.97	19.36	24.33	19.96	19.26	20.06	19.67	18.09	17.71	16.84	12.37	13.12

P/E Ratio (times)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	4.03	3.01	4.70	14.51	35.96	15.18	10.15	19.51	23.47	53.31	20.88	143.87
JNJ	12.76	18.55	18.19	18.76	18.12	18.48	19.06	26.30	22.32	25.51	28.16	21.32
PFE	15.94	20.85	19.95	16.30	20.39	27.12	25.88	9.62	81.97	20.36	29.19	12.62
GSK	68.98	27.32	28.08	27.68	46.60	15.80	142.84	39.49	37.54	33.28	20.97	29.80
MRK	108.39	17.28	18.86	31.33	13.14	31.83	39.42	60.62	31.36	22.77	29.23	16.96
NOVN	12.13	13.34	14.63	18.77	18.57	26.04	23.13	23.24	13.88	30.01	26.41	17.73

Appendix 23: Investing Ratios: P/E Ratio

Price to Book Ratio (times)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	5.13	3.60	4.78	4.24	2.70	3.13	2.08	2.83	2.68	2.11	1.85	1.64
JNJ	8.54	8.22	7.77	7.43	7.02	5.59	5.92	4.72	6.61	4.48	3.86	3.51
PFE	19.37	13.72	17.14	12.97	8.95	3.70	2.81	2.48	2.49	2.30	1.96	1.30
GSK	56.38	23.01	30.23	28.61	20.88	33.27	26.69	21.98	15.75	14.60	16.69	13.25
MRK	12.97	11.28	13.90	7.95	6.70	6.33	3.94	3.72	5.16	6.62	2.93	1.29
NOVN	5.10	3.68	4.57	3.27	2.88	3.34	3.13	3.31	2.93	2.23	2.00	1.93

Price to Book Ratio (times)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	1.39	1.29	1.24	1.61	2.26	2.32	2.33	2.94	3.86	4.98	4.20	2.23
JNJ	3.01	3.14	2.95	3.50	4.24	4.00	4.48	6.25	5.71	6.48	6.55	6.48
PFE	1.51	1.94	2.17	2.58	2.62	2.91	3.14	2.86	3.81	3.26	3.22	4.14
GSK	14.38	18.41	22.61	22.26	30.95	25.86	134.96	0.00	33.76	15.37	9.18	10.73
MRK	1.87	1.94	2.14	2.70	3.22	3.17	3.88	4.24	7.23	8.59	8.18	5.39
NOVN	1.73	1.87	1.98	2.35	2.81	2.37	2.07	2.35	2.26	3.86	3.76	3.21

Appendix 24: Investing Ratios: Price to Book Ratio

Dividend Yield Ratio (%)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	2.88	3.28	2.68	3.04	4.09	2.98	4.61	4.47	5.41	8.47	9.23	8.74
JNJ	1.05	1.06	1.09	1.14	1.50	1.83	1.73	2.12	2.20	2.40	3.06	3.00
PFE	0.12	0.18	0.25	0.35	0.52	0.51	0.74	1.09	1.17	1.48	1.91	1.07
GSK	1.23	1.50	0.89	1.12	1.69	1.54	1.75	1.44	1.71	1.99	2.21	2.27
MRK	0.38	0.45	0.38	0.62	0.66	0.83	1.24	1.24	0.91	0.69	1.30	1.50
NOVN	0.99	1.49	1.17	1.56	1.50	1.70	1.79	1.92	1.70	2.36	3.31	3.55

Dividend Yield Ratio (%)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	10.33	12.54	12.28	9.38	7.93	8.12	10.30	8.01	7.24	5.49	5.44	4.36
JNJ	3.41	3.43	3.45	2.80	2.63	2.87	2.73	2.38	2.78	2.57	2.53	1.81
PFE	1.20	1.15	1.00	0.89	0.92	0.98	1.04	0.99	0.86	1.02	1.06	0.70
GSK	2.51	2.31	2.90	2.41	2.93	2.93	3.20	3.05	2.67	2.25	2.97	1.84
MRK	1.10	1.16	1.13	0.93	0.83	0.92	0.85	0.90	0.75	0.71	0.81	0.86
NOVN	3.71	4.35	4.39	3.49	3.42	3.63	4.18	3.73	3.92	3.10	3.28	4.04

Appendix 25: Investing Ratios: Dividend Yield Ratio

Dividend Cover Ratio (times)	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AZN	1.93	0.94	2.09	2.36	2.32	2.49	2.67	2.75	2.73	2.13	2.24	2.53
JNJ	2.38	2.89	2.87	2.77	2.77	2.62	2.62	2.74	2.59	2.26	2.57	2.30
PFE	11.35	14.26	5.36	9.48	9.89	1.25	7.57	4.16	5.37	3.82	3.73	5.83
GSK	1.39	1.60	2.05	1.35	1.74	1.85	1.63	2.02	2.12	1.90	1.61	1.89
MRK	8.24	8.70	8.69	8.86	8.41	8.18	6.52	5.58	3.60	0.51	9.87	10.95
NOVN	3.63	3.46	3.51	3.21	3.47	2.94	2.84	2.88	3.33	2.52	2.44	2.15

Dividend Cover Ratio (times)	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AZN	2.40	2.65	1.73	0.73	0.35	0.81	0.96	0.64	0.59	0.34	0.88	0.12
JNJ	2.30	1.57	1.59	1.90	2.10	1.89	1.92	1.60	1.61	1.52	1.40	1.94
PFE	5.21	4.15	5.01	6.86	5.33	3.77	3.72	10.52	1.41	4.80	3.25	8.49
GSK	0.58	1.59	1.23	1.50	0.73	2.16	0.22	0.83	1.00	1.33	1.61	1.37
MRK	0.84	4.99	4.69	3.42	9.12	3.41	2.99	1.83	4.25	6.16	4.23	5.14
NOVN	2.22	1.72	1.56	1.53	1.58	1.06	1.03	1.15	1.84	1.08	1.16	1.05

Appendix 26: Investing Ratios: Dividend Cover Ratio

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	950	1775	1766	1745	1719	1693	1645	1581	1532	1457	1447	1451
Net Income	1185	1144	2548	2917	2860	3044	3683	4724	6063	5627	6130	7544
Estimated share price	**36.30**	**18.76**	**41.99**	**48.65**	**48.42**	**52.33**	**65.16**	**86.96**	**115.18**	**112.40**	**123.30**	**151.32**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	1409	1292	1247	1257	1262	1264	1265	1266	1267	1312	1313	1549
Net Income	8081	9950	6270	2571	1235	2826	3406	2252	2050	1227	3144	461
Estimated share price	**166.92**	**224.14**	**146.34**	**59.53**	**28.48**	**65.07**	**78.36**	**51.77**	**47.09**	**27.22**	**69.69**	**8.66**

Appendix 27: Estimated Share Price of AZN through P/E Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	950	1775	1766	1745	1719	1693	1645	1581	1532	1457	1447	1451
Equity	4158	10302	9521	9586	11172	13086	14404	13597	15304	14778	16060	20821
Estimated share price	**35.42**	**46.97**	**43.63**	**44.45**	**52.59**	**62.55**	**70.86**	**69.60**	**80.84**	**82.08**	**89.81**	**116.12**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	1409	1292	1247	1257	1262	1264	1265	1266	1267	1312	1313	1549
Equity	23410	23240	23731	23224	19627	18490	14854	14960	12468	13127	15622	39744
Estimated share price	**134.45**	**145.56**	**154.00**	**149.51**	**125.85**	**118.38**	**95.02**	**95.62**	**79.63**	**80.97**	**96.28**	**207.63**

Appendix 28: Estimated Share Price of AZN through PBR Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dividend Growth Method	**67.75**	**71.93**	**72.54**	**74.37**	**75.38**	**75.79**	**87.96**	**114.03**	**152.15**	**190.33**	**198.75**	**215.43**
Real share price	22.44	20.88	25.75	23.3	17.55	24.19	18.19	24.3	26.77	21.41	20.51	23.47

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dividend Growth Method	**250.46**	**304.92**	**304.73**	**292.28**	**292.95**	**289.58**	**295.58**	**291.86**	**288.73**	**287.47**	**285.65**	**261.38**
Real share price	23.09	23.15	23.64	29.68	35.19	33.95	27.32	34.7	37.98	49.86	49.99	57.09

Appendix 29: Estimated Share Price of AZN through Dividend Growth Method/Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Average Estimated Price	46.49	45.89	52.72	55.83	58.80	63.56	74.66	90.20	116.06	128.27	137.29	160.96
Real Share Price	42.01	34.53	37.44	34.25	23.25	26.11	24.70	29.32	26.93	25.39	25.48	26.15

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Average Estimated Price	183.95	224.88	201.69	167.11	149.10	157.68	156.32	146.42	138.48	131.88	150.54	159.22
Real Share Price	25.14	29.37	26.75	32.24	27.44	27.38	31.21	26.24	29.95	35.44	26.91	32.89

Appendix 30: Average Estimated Share Price of AZN vs Real Share Price

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	3626	3641	6226	6173	5912	5806	5736	5674	5643	5524	5195	5069
Net Income	2587	3018	4282	3184	4060	4308	4022	4816	5498	5310	4712	5669
Estimated share price	**20.76**	**24.12**	**20.02**	**15.01**	**19.99**	**21.60**	**20.41**	**24.70**	**28.36**	**27.98**	**26.40**	**32.55**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	5085	5028	4912	4831	4808	4831	4860	4886	4914	4947	4976	5032
Net Income	1853	5405	4678	5628	2831	8372	1062	3247	3921	5268	6388	5555
Estimated share price	**10.61**	**31.29**	**27.72**	**33.91**	**17.14**	**50.44**	**6.36**	**19.34**	**23.22**	**30.99**	**37.36**	**32.13**

Appendix 31: Estimated Share Price of GSK through P/E Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	3626	3641	6226	6173	5912	5806	5736	5674	5643	5524	5195	5069
Equity	2702	5464	7711	7390	6581	4556	5308	7570	9648	9603	7931	10005
Estimated share price	**6.03**	**12.14**	**10.02**	**9.69**	**9.01**	**6.35**	**7.49**	**10.80**	**13.84**	**14.07**	**12.35**	**15.97**

Column1	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	5085	5028	4912	4831	4808	4831	4860	4886	4914	4947	4976	5032
Equity	8887	8023	5810	6997	4263	5114	1124	-68	4360	11405	14587	15426
Estimated share price	**14.14**	**12.91**	**9.57**	**11.72**	**7.18**	**8.57**	**1.87**	**-0.11**	**7.18**	**18.66**	**23.72**	**24.81**

Appendix 32: Estimated Share Price of GSK through PBR Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dividend Growth Method	**10.61**	**10.65**	**6.90**	**7.89**	**8.11**	**8.28**	**8.89**	**8.68**	**9.48**	**10.42**	**11.61**	**12.20**
Real share price	42.01	34.53	37.44	34.25	23.25	26.11	24.70	29.32	26.93	25.39	25.48	26.15

Column1	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dividend Growth Method	**12.98**	**13.95**	**16.00**	**15.99**	**16.56**	**16.52**	**20.56**	**16.47**	**16.46**	**16.46**	**16.46**	**12.48**
Real share price	25.14	29.37	26.75	32.24	27.44	27.38	31.21	26.24	29.95	35.44	26.91	32.89

Appendix 33: Estimated Share Price of GSK through Dividend Growth Method/ Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Average Estimated Price	12.47	15.64	12.31	10.86	12.37	12.07	12.26	14.73	17.23	17.49	16.79	20.24
Real Share Price	42.01	34.53	37.44	34.25	23.25	26.11	24.70	29.32	26.93	25.39	25.48	26.15

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Average Estimated Price	12.58	19.38	17.76	20.54	13.62	25.17	9.60	11.90	15.62	22.04	25.85	23.14
Real Share Price	25.14	29.37	26.75	32.24	27.44	27.38	31.21	26.24	29.95	35.44	26.91	32.89

Appendix 34: Average Estimated Share Price of GSK vs Real Share Price

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	2975	2980	3015	3047	2998	2968	2968	2974	2936	2883	2803	2760
Net Income	3101	4273	4953	5668	6597	7197	8509	10411	11053	10576	12949	12266
Estimated share price	**30.34**	**41.73**	**47.81**	**54.14**	**64.04**	**70.57**	**83.44**	**101.89**	**109.57**	**106.77**	**134.45**	**129.35**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	2751	2736	2753	2809	2815	2771.8	2737	2692	2682	2645	2632	2632
Net Income	13334	9672	10514	13831	16323	15409	16540	14300	15297	15119	14714	21358.67
Estimated share price	**141.07**	**102.89**	**111.15**	**143.31**	**168.77**	**161.80**	**175.88**	**154.61**	**166.00**	**166.36**	**162.71**	**236.18**

Appendix 35: Estimated Share Price of JNJ through P/E Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	2975	2980	3015	3047	2998	2968	2968	2974	2936	2883	2803	2760
Equity	14609	16905	20395	24233	22697	26869	31813	37871	29318	43319	42511	50588
Estimated share price	**39.74**	**45.91**	**54.74**	**64.36**	**61.26**	**73.26**	**86.74**	**103.05**	**80.81**	**121.59**	**122.73**	**148.32**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	2751	2736	2753	2809	2815	2771.8	2737	2692	2682	2645	2632	2632
Equity	56579	57080	64826	74053	69752	71150	70418	60160	59752	59471	63278	70272
Estimated share price	**166.43**	**168.83**	**190.55**	**213.34**	**200.52**	**207.72**	**208.20**	**180.84**	**180.29**	**181.95**	**194.55**	**216.06**

Appendix 36: Estimated Share Price of JNJ through PBR Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dividend Growth Method	**47.37**	**53.60**	**61.76**	**72.56**	**85.77**	**99.92**	**118.30**	**137.74**	**157.14**	**174.94**	**193.81**	**208.41**
Real share price	41.94	46.63	52.53	59.10	53.11	50.62	63.42	60.10	66.02	67.38	58.56	64.41

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dividend Growth Method	**227.90**	**243.00**	**259.23**	**279.75**	**298.03**	**318.45**	**340.18**	**358.78**	**382.31**	**404.93**	**430.07**	**338.16**
Real share price	61.85	65.58	69.48	92.35	105.06	102.72	115.20	139.70	127.30	145.80	157.40	172.98

Appendix 37: Estimated Share Price of JNJ through Dividend Growth Method/ Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Average Estimated Price	39.15	47.08	54.77	63.68	70.36	81.25	96.16	114.23	115.84	134.43	150.33	162.03
Real Share Price	41.94	46.63	52.53	59.10	53.11	50.62	63.42	60.10	66.02	67.38	58.56	64.41

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Average Estimated Price	178.47	171.57	186.98	212.13	222.44	229.32	241.42	231.41	242.87	251.08	262.44	263.47
Real Share Price	61.85	65.58	69.48	92.35	105.06	102.72	115.20	139.70	127.30	145.80	157.40	172.98

Appendix 38: Average Estimated Share Price of JNJ vs Real Share Price

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	2360	2329	2308	2273	2258	2236	2219	2197	2178	2171	2136	2268
Net Income	5248	5891	6822	7053	6795	6730	5483	4631	2975	420	7932	13024
Estimated share price	**64.72**	**73.62**	**86.03**	**90.31**	**87.58**	**87.60**	**71.92**	**61.35**	**39.75**	**5.63**	**108.08**	**167.13**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	3095	3071	3041	2963	2894	2816	2766	2730	2664	2565	2652	2525
Net Income	982	6392	6299	4517	11934	4459	3941	2418	6193	9777	7082	11378.67
Estimated share price	**9.23**	**60.58**	**60.29**	**44.37**	**120.02**	**46.09**	**41.47**	**25.78**	**67.66**	**110.94**	**77.72**	**131.16**

Appendix 39: Estimated Share Price of MRK through P/E Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	2360	2329	2308	2273	2258	2236	2219	2197	2178	2171	2136	2268
Equity	12802	13242	14832	16050	18201	15576	17288	17917	17560	18185	21167	61493
Estimated share price	**43.90**	**46.01**	**52.00**	**57.14**	**65.23**	**56.37**	**63.05**	**65.99**	**65.24**	**67.78**	**80.19**	**219.41**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	3095	3071	3041	2963	2894	2816	2766	2730	2664	2565	2652	2525
Equity	56805	56943	55463	52326	48647	44767	40088	34569	26882	25907	25317	35794
Estimated share price	**148.52**	**150.05**	**147.59**	**142.91**	**136.03**	**128.65**	**117.28**	**102.47**	**81.66**	**81.73**	**77.25**	**114.72**

Appendix 40: Estimated Share Price of MRK through PBR Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dividend Growth Method	**9.36**	**10.08**	**11.79**	**12.14**	**12.41**	**12.76**	**13.14**	**13.10**	**13.16**	**13.27**	**13.05**	**18.17**
Real share price	70.37	64.11	89.34	56.11	54.02	44.08	30.67	30.35	41.60	55.45	29.01	34.87

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dividend Growth Method	**13.17**	**14.46**	**15.31**	**15.46**	**15.67**	**16.11**	**16.49**	**16.76**	**18.97**	**21.45**	**21.88**	**22.79**
Real share price	34.39	35.97	39.06	47.76	54.19	50.40	56.17	53.69	72.91	86.78	78.05	76.43

Appendix 41: Estimated Share Price of MRK through Dividend Growth Method/ Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Average Estimated Price	39.33	43.24	49.94	53.20	55.07	52.24	49.37	46.81	39.39	28.89	67.11	134.91
Real Share Price	70.37	64.11	89.34	56.11	54.02	44.08	30.67	30.35	41.60	55.45	29.01	34.87

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Average Estimated Price	56.98	75.03	74.40	67.58	90.57	63.62	58.41	48.34	56.10	71.37	58.95	89.55
Real Share Price	34.39	35.97	39.06	47.76	54.19	50.40	56.17	53.69	72.91	86.78	78.05	76.43

Appendix 42: Average Estimated Share Price of MRK vs Real Share Price

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	2654	2625	2607	2548	2475	2468	2337	2336	2348	2264	2265	2274
Net Income	4166	4449	4297	4176	4228	5060	5380	6072	6825	6540	8163	8454
Estimated share price	**45.69**	**49.33**	**47.97**	**47.70**	**49.72**	**59.67**	**67.00**	**75.65**	**84.60**	**84.07**	**104.89**	**108.20**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	2289	2407	2421	2426	2399	2374	2374	2317	2311	2265	2257	2237
Net Income	9969	9245	9383	9309	10727	7028	6698	7499	12800	7147	8071	10282.67
Estimated share price	**126.76**	**111.79**	**112.80**	**111.68**	**130.14**	**86.16**	**82.12**	**94.20**	**161.20**	**91.84**	**104.08**	**133.78**

Appendix 43: Estimated Share Price of NOVN through P/E Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	2654	2625	2607	2548	2475	2468	2337	2336	2348	2264	2265	2274
Equity	22858	23403	22896	25458	28269	30429	33783	33164	41294	49396	50437	57462
Estimated share price	**69.70**	**72.15**	**71.07**	**80.85**	**92.43**	**99.77**	**116.98**	**114.89**	**142.32**	**176.56**	**180.20**	**204.49**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	2289	2407	2421	2426	2399	2374	2374	2317	2311	2265	2257	2237
Equity	69769	65940	69219	74472	70844	77122	74891	74227	78692	55551	56666	56771
Estimated share price	**246.65**	**221.69**	**231.37**	**248.41**	**238.97**	**262.89**	**255.28**	**259.24**	**275.55**	**198.47**	**203.17**	**205.37**

Appendix 44: Estimated Share Price of NOVN through PBR Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dividend Growth Method	**6.61**	**7.49**	**7.17**	**7.80**	**7.53**	**10.68**	**12.40**	**13.79**	**13.34**	**17.54**	**22.57**	**26.49**
Real share price	43.91	32.82	40.10	32.71	32.91	41.12	45.29	47.03	51.47	48.66	44.59	48.77

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dividend Growth Method	**29.96**	**34.09**	**38.07**	**38.43**	**43.39**	**42.77**	**41.69**	**42.85**	**46.08**	**44.84**	**47.32**	**50.35**
Real share price	52.82	51.23	56.72	72.03	83.03	77.10	65.27	75.23	76.89	94.69	94.43	81.52

Appendix 45: Estimated Share Price of NOVN through Dividend Growth Method/ Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Average Estimated Price	40.66	42.99	42.07	45.45	49.89	56.71	65.46	68.11	80.09	92.72	102.56	113.06
Real Share Price	43.91	32.82	40.10	32.71	32.91	41.12	45.29	47.03	51.47	48.66	44.59	48.77

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Average Estimated Price	134.46	122.52	127.41	132.84	137.50	130.61	126.36	132.10	160.94	111.72	118.19	129.83
Real Share Price	52.82	51.23	56.72	72.03	83.03	77.10	65.27	75.23	76.89	94.69	94.43	81.52

Appendix 46: Average Estimated Share Price of NOVN vs Real Share Price

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	6220	6218	6314	6277	6162	7629	7473	7361	7124	6761	6746	8070
Net Income	3234	4977	3732	7768	9157	1625	10738	7376	11036	8255	8049	8477
Estimated share price	**15.13**	**23.30**	**17.20**	**36.02**	**43.25**	**6.20**	**41.82**	**29.16**	**45.09**	**35.54**	**34.73**	**30.57**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average P/E	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10	29.10
Num of shares	8012	7575	7276	6399	6291	6175	6070	5979	5717	5534	5567	5611
Net Income	8347	7458	8680	11410	9118	6974	7228	21354	2888	10101	7020	24814.67
Estimated share price	**30.32**	**28.66**	**34.72**	**51.90**	**42.18**	**32.87**	**34.66**	**103.95**	**14.70**	**53.12**	**36.70**	**128.72**

Appendix 47: Estimated Share Price of PFE through P/E Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	6220	6218	6314	6277	6162	7629	7473	7361	7124	6761	6746	8070
Equity	12691	13950	16076	18293	19950	65377	68278	65627	71358	65010	57556	90446
Estimated share price	**16.51**	**18.15**	**20.60**	**23.58**	**26.20**	**69.35**	**73.94**	**72.15**	**81.06**	**77.81**	**69.04**	**90.70**

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Industry Average PBR	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09	8.09
Num of shares	8012	7575	7276	6399	6291	6175	6070	5979	5717	5534	5567	5611
Equity	88265	82621	81678	76620	71622	64998	59840	71656	63758	63447	63473	75692
Estimated share price	**89.15**	**88.26**	**90.84**	**96.90**	**92.13**	**85.18**	**79.78**	**96.98**	**90.25**	**92.78**	**92.27**	**109.16**

Appendix 48: Estimated Share Price of PFE through PBR Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Dividend Growth Method	**2.45**	**3.00**	**5.90**	**6.98**	**8.04**	**9.12**	**10.15**	**12.88**	**15.43**	**17.12**	**17.12**	**9.64**
Real share price	39.53	30.78	43.64	37.81	29.00	33.52	25.51	22.13	24.57	21.57	16.80	16.80

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Dividend Growth Method	**10.69**	**12.68**	**12.75**	**13.90**	**14.55**	**16.05**	**17.13**	**18.16**	**19.16**	**20.34**	**20.78**	**20.89**
Real share price	16.61	20.53	23.80	29.06	29.55	30.63	30.82	34.36	41.41	37.17	36.81	55.80

Appendix 49: Estimated Share Price of PFE through Dividend Growth Method/ Valuation technique

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Average Estimated Price	11.37	14.82	14.57	22.19	25.83	28.22	41.97	38.06	47.19	43.49	40.30	43.64
Real Share Price	39.53	30.78	43.64	37.81	29.00	33.52	25.51	22.13	24.57	21.57	16.80	16.80

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Average Estimated Price	43.39	43.20	46.10	54.23	49.62	44.70	43.86	73.03	41.37	55.41	49.91	86.26
Real Share Price	16.61	20.53	23.80	29.06	29.55	30.63	30.82	34.36	41.41	37.17	36.81	55.80

Appendix 50: Average Estimated Share Price of PFE vs Real Share Price

Valuation	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
PFE P/E	76.03	38.45	73.83	30.55	19.51	157.37	17.75	22.08	15.86	17.67	14.08	15.99
NOVN P/E	27.97	19.36	24.33	19.96	19.26	20.06	19.67	18.09	17.71	16.84	12.37	13.12
MRK P/E	31.65	25.35	30.23	18.08	17.95	14.65	12.41	14.40	30.46	286.62	7.81	6.07
JNJ P/E	40.24	32.52	31.98	31.77	24.14	20.88	22.12	17.17	17.54	18.37	12.68	14.49
GSK P/E	58.89	41.66	54.43	66.41	33.85	35.19	35.23	34.55	27.64	26.41	28.09	23.38
AZN P/E	17.99	32.40	17.85	13.94	10.55	13.45	8.12	8.13	6.76	5.54	4.84	4.51
Average P/E	42.13	31.62	38.77	30.12	20.88	43.60	19.22	19.07	19.33	61.91	13.31	12.93

Valuation	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
PFE P/E	15.94	20.85	19.95	16.30	20.39	27.12	25.88	9.62	81.97	20.36	29.19	12.62
NOVN P/E	12.13	13.34	14.63	18.77	18.57	26.04	23.13	23.24	13.88	30.01	26.41	17.73
MRK P/E	108.39	17.28	18.86	31.33	13.14	31.83	39.42	60.62	31.36	22.77	29.23	16.96
JNJ P/E	12.76	18.55	18.19	18.76	18.12	18.48	19.06	26.30	22.32	25.51	28.16	21.32
GSK P/E	68.98	27.32	28.08	27.68	46.60	15.80	142.84	39.49	37.54	33.28	20.97	29.80
AZN P/E	4.03	3.01	4.70	14.51	35.96	15.18	10.15	19.51	23.47	53.31	20.88	143.87
Average P/E	37.04	16.72	17.40	21.22	25.46	22.41	43.41	29.80	35.09	30.87	25.80	40.38

Industry average* 29.10

**Industry Average is calculated by the 24-year average of the average P/E Ratio of the six companies under investigation*

Appendix 51: Industry Average P/E Ratio

Valuation	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
PFE PBR	19.37	13.72	17.14	12.97	8.96	3.91	2.79	2.48	2.45	2.24	1.97	1.50
NOVN PBR	5.10	3.68	4.57	3.27	2.88	3.34	3.13	3.31	2.93	2.23	2.00	1.93
MRK PBR	12.97	11.28	13.90	7.95	6.70	6.33	3.94	3.72	5.16	6.62	2.93	1.29
JNJ PBR	8.54	8.22	7.77	7.43	7.02	5.59	5.92	4.72	6.61	4.48	3.86	3.51
GSK PBR	56.38	23.01	30.23	28.61	20.88	33.27	26.69	21.98	15.75	14.60	16.69	13.25
AZN PBR	5.13	3.60	4.78	4.24	2.70	3.13	2.08	2.83	2.68	2.11	1.85	1.64
Average PBR	17.92	10.58	13.06	10.75	8.19	9.26	7.42	6.51	5.93	5.38	4.88	3.85

Valuation	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
PFE PBR	1.51	1.88	2.12	2.43	2.60	2.91	3.13	2.87	3.71	3.24	3.23	4.14
NOVN PBR	1.73	1.87	1.98	2.35	2.81	2.37	2.07	2.35	2.26	3.86	3.76	3.21
MRK PBR	1.87	1.94	2.14	2.70	3.22	3.17	3.88	4.24	7.23	8.59	8.18	5.39
JNJ PBR	3.01	3.14	2.95	3.50	4.24	4.00	4.48	6.25	5.71	6.48	6.55	6.48
GSK PBR	14.38	18.41	22.61	22.26	30.95	25.86	134.96	0.00	33.76	15.37	9.18	10.73
AZN PBR	1.39	1.29	1.24	1.61	2.26	2.32	2.33	2.94	3.86	4.98	4.20	2.23
Average PBR	3.98	4.75	5.51	5.81	7.68	6.77	25.14	3.11	9.42	7.09	5.85	5.36

Industry average* 8.09

**Industry Average is calculated by the 24-year average of the average Price to Book Ratio of the six companies under investigation*

Appendix 52: Industry Average Price to Book Ratio