

# Financial Performance of Pharmaceutical Companies Producing COVID-19 Vaccines: Before and After The Pandemic

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## Abstract

The purpose of the study was to determine the differences in the financial performance of companies producing COVID-19 vaccines, before and after the pandemic. The method using the company's financial statement data for 2017-2021, then analyzed with the parameters current ratio, debt to equity ratio, return on assets, return on equity, and net profit margin. The study found that the company's strategic decision to develop a COVID-19 vaccine did not guarantee an increase in the company's financial performance. Moderna has focused on developing treatment with mRNA technology, so there has been a drastic change from the worst financial performance company to the best in 2021. Meanwhile, AstraZeneca has been experiencing financial difficulties since before pandemic failed to restore its financial performance profile in 2021. Pfizer, Johnson & Johnson, and Sinopharm shows a stable financial performance profile both before and after the COVID-19 pandemic.

**Keywords:** financial performance, COVID-19 vaccine, current ratio, debt to equity, return on asset, return on equity, net profit margin

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## 1. Introduction

At the end of 2019 a pandemic emerged in China known as COVID-19. Not only in China, but the pandemic has also spread throughout the world, including Indonesia. COVID-19 is caused by Severe Acute Respiratory Syndrome Coronavirus-2 or abbreviated as SARS-CoV-2 which attacks the respiratory tract (Noor et al., 2022). SARS-CoV-2 is a positive chain RNA virus that belongs to the Betacoronavirus (BetaCoV). In addition to SARS-CoV-2, several other viruses are included in the Betacoronavirus, included SARS-CoV and MERS-CoV. All three are zoonoses related to the respiratory tract. SARS-CoV-2 is composed of 29,700 nucleotides and is about 79.5% similar to SARS-CoV. SARS-CoV-2 has ORF1ab at the 5' end of its genome that encodes 15-16 proteins. While the 3' end codes for 4 main structural proteins, namely S (spike), N (nucleocapsid), M (membrane), and E (envelope) proteins<sup>2</sup>. S protein glycosylation in SARS-CoV-2 acts as a major inducer of the host cell immune system. Protein S will bind to the angiotensin-converting enzyme 2 (ACE 2) receptor on the host cell which significantly initiates the infection process (Rashedi et al., 2022)

The COVID-19 pandemic has had a significant impact on the global economy. The policy of restricting public mobility carried out by almost all countries in the world has resulted in a decline in global economic activity, including Indonesia (Lowardi and Abdi, 2021). This has an impact on the disruption of the supply chain of important components for the industry, such as raw materials, raw materials, and capital goods from abroad, and subsequently becomes an obstacle for national industries, especially those that depend on imported materials (Kaye et al., 2021). The drug industry in Indonesia, which relies on raw materials from abroad, is the hardest hit, given the increasing demand for medicines during the pandemic, while the supply of raw materials is limited (Shiraki et al., 2022). In the tourism sector, restrictions on foreign tourist visits in almost all countries in the world have resulted in a significant decline in global tourism activities. On the consumption side, restrictions on people's economic mobility have led to a decline in domestic demand, which has further depressed economic performance (Putra, 2020). Not only manufacturing companies are affected by the financial crisis due to the COVID-19 pandemic, but public health facilities such as hospitals, clinics, medical centers are also experiencing difficulties due to the burden of unpaid medical expenses by the government and health insurance (Colenda et al., 2020).

The financial crisis of companies around the world due to the COVID-19 pandemic has forced companies to reduce or adjust production capacity, not even a few have stopped production (Broadstock et al., 2021). Parameters of a company's financial performance profile during a crisis are influenced by internal and external factors. The company's internal factors that affect financial performance are the ability of management to perform resource efficiency, product or service quality, specific and unique value of the products and services

produced, employee loyalty, and the company's ability to use available assets (Waddock and Graves, 1997 ; Sabate and Puente, 2003). While external factors that can affect financial performance are relationships with consumers, demographics and socio-cultural, economic factors, and competitors (Waworuntu et al., 2014; Roman et al., 1999). A company's financial performance is one indicator of the company's success in achieving its business goals (van Beurden and Gössling, 2008).

The impact on the health sector is an increase in morbidity and mortality in all countries as well as the burden of health costs borne by the state and insurance services (Abiad et al., 2020). WHO has declared COVID-19 as a global health emergency in 2020 because of the very rapid rate of spread of the disease and causing panic in people around the world. One of the possible ways to prevent the wider spread of this pandemic is by developing vaccines. Vaccines not only protect the people being vaccinated but also the wider community by reducing the spread of disease within a population. The SARS-CoV-2 virus spreads from human to human. This chain of human-to-human transmission can be broken, even if there is no 100% immunity or the term herd immunity or community protection. Herd immunity is the main goal of the government program in COVID-19 vaccination from the first dose to the third dose (Sari and Sriwido, 2020).

Since it is known that COVID-19 infection spreads very quickly with high morbidity and mortality in patients with comorbidities, every drug manufacturer, research and education institution, and various government organizations research to find drugs and vaccines that are effective against COVID-19. Research and development of drugs and vaccines for COVID-19 require no small amount of money. Research and development are routinely carried out by companies to gain future profits (Curtis et al., 2020). In the pharmaceutical sector, research and development activities will determine the persistence of profits as measured by return on assets and return on sales (Jaisinghani, 2016). Whereas according to Roper and Turner (2020) the research and development budget during a crisis will be reduced as much as possible to maintain current assets that determine the continuity of the company's operations.

The development of a safe and effective vaccine to control this pandemic is very important because it is hoped that it will slow its spread and prevent its recurrence in the future. From an economic point of view, the presence of vaccines will greatly help move financial cycles in various sectors because people's activities can gradually recover (Rababah et al., 2020). The main obstacle in the production of vaccines is the speed of the spread of pandemics and the speed of virus mutation, so it is necessary to have a vaccine that can be produced in a fairly short time because in general, the manufacture of vaccines takes years (Swanstrom and Schinazi, 2022). Technology platforms for producing vaccines have the potential to reduce the time and cost required to develop new vaccines to established levels of safety and immunogenicity.

The entire pharmaceutical industry in the world is trying to develop vaccine products that are effective, safe, and can be produced quickly. Drug control agencies in all countries participate in supervising the production of the vaccine because it is not possible to carry out safety tests as drugs in general because of the urgency of use for the community. Vaccine products that are deemed to have met the requirements for effectiveness and safety shall obtain an emergency use permit from the drug control agency in each country. To date, COVID-19 vaccine products that have received emergency use permits in most countries are products from Pfizer Inc., AstraZeneca Plc., Johnson & Johnson, Sinopharm Group Co.Ltd., and Moderna Inc. The cost of developing a vaccine product is not small, so it requires a large amount of capital from the company.

Investments in the research and development of large vaccine products can certainly have an impact on the company's financial performance, but if the vaccine product has obtained an emergency use permit, it can be sold in large quantities to countries that issued the emergency use permit. The company's profits could increase even more if its vaccine products were granted emergency use permits in more countries .

The problem to be studied is the effect of vaccine production on the financial performance profile of pharmaceutical companies producing COVID-19 vaccines before and after the pandemic. The expected objective of this research is to compare the performance of pharmaceutical companies producing COVID-19 vaccines before the pandemic with after the pandemic and to be able to determine the effect of investment in research and development of COVID-19 vaccines on the financial performance of the pharmaceutical companies.

## 2. Methods

Subjects of this research are pharmaceutical companies producing COVID-19 vaccines that have received recommendations for emergency use in most countries, namely Pfizer Inc., AstraZeneca Plc., Johnson & Johnson, Sinopharm Group Co.Ltd., and Moderna Inc. The research object that is measured is the company's financial performance based on data taken from the company's annual financial report.

A current ratio (CR) is a ratio to measure the company's ability to pay short-term obligations or debts that are due immediately when they are billed in their entirety. The current ratio position is said to be ideal if it is 2 times. Companies with an ideal current ratio value will be safe and able to meet their current obligations in the short term.

$$\text{Current ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

The debt to equity ratio (DER) is the ratio of debt to equity compared to the total debt and equity. The ideal DER is below 1 or below 100%, however, if you find a company with a DER above 1 or 100%, which means that its debt/liabilities are greater than its net capital, you should investigate further the causes of a high DER. in the company's financial statements.

$$\text{DER} = \frac{\text{Total Debt}}{\text{Shareholders' Equity}}$$

Return on Assets ratio (ROA) is a financial ratio that is used as an analytical tool to measure the performance of the company's management form in obtaining overall profits. The higher the value of a ROA in a company, the better and more effective the company is in using assets. A good standard ROA value must be above 5.98%, if the value is above 5.98%, it means that the ROA value can be categorized as good, and vice versa if the ROA value is below 5.98%, it means that the ROA value can be categorized as not good.

$$\text{ROA} = \frac{\text{Net income}}{\text{Total assets}} \times 100\%$$

Return of Equity (ROE) is the total return of net income on equity and is expressed as a percent. A good standard ROE value must be above 8.32%, if the value is above 8.32%, it means that the ROE value can be categorized as good, and vice versa if the ROE value is below 8.32%, it means that the ROE value can be categorized as not good.

$$\text{ROE} = \frac{\text{Net income}}{\text{Shareholders' equity}} \times 100\%$$

The net Profit Margin ratio (NPM) is the ratio used by the company to compare profits with the total money generated by the company. In addition, NPM is also used to analyze the company's financial stability. According to Sulistyanto, the NPM rate can be said to be good/healthy if > 5%. The NPM assessment > 5% means that the net profit value obtained from the sales value which includes production costs will further increase profits for the company (Azmi et al., 2016).

$$\text{NPM} = \frac{\text{Net income}}{\text{Sales}} \times 100\%$$

Financial performance indicators from the company's annual report are obtained through analysis of the company's annual report to get the ratio number of each parameter.

### 3. Result and Discussion

#### 3.1 Current Ratio

High current ratio indicates that the assets owned by the company are not used properly, so the company loses the opportunity to earn a profit. The company's inability to utilize assets to generate profits is evidenced by the return on assets (ROA). Based on current ratio data from five vaccine-producing companies, apart from Moderna Inc., other companies have a current ratio of no more than 2.00 every year.

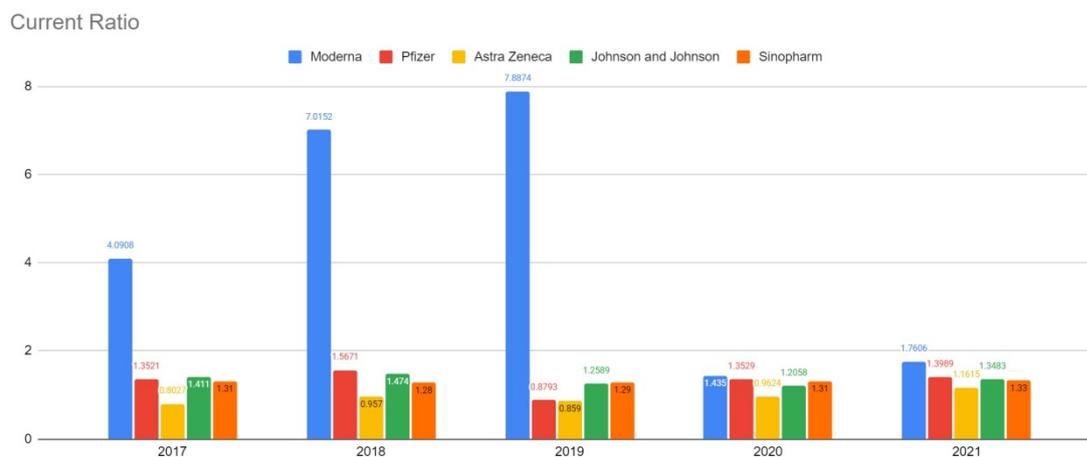


Figure 1. Current Ratio for 2017-2021

Since its establishment in 2010, Moderna Inc. have worked to build the industry's leading mRNA technology platform. The use of mRNA technology in the treatment of patients is the most appropriate treatment method for patients because it must be very precise according to the condition of the disease and the source of the disease, especially in infectious diseases. However, treatment methods using mRNA technology cannot develop as fast as the drug industry in general because of the constraints of high research costs and the impact on the cost of treatment paid by patients is very high compared to the cost of treatment using drugs. The affordability of patient treatment costs is what makes Moderna Inc's current ratio report. in 2017-2019 is very high. Moderna Inc. have the availability of assets that cannot be used to generate profits due to not having found a type of treatment that is acceptable and affordable to the market or patient. After the COVID-19 pandemic emerged, starting in 2020, Moderna Inc's current ratio was seen. fell to nearly the same number as other pharmaceutical companies as existing assets were used for research and development of the COVID-19 vaccine which to date has been used almost all over the world.

The current ratios of pharmaceutical companies from Sinopharm Group Co.Ltd., Pfizer Inc., AstraZeneca Plc., and Johnson & Johnson did not show any significant changes before and after the COVID-19 pandemic. The most prominent change in the current ratio of the four companies is Pfizer Inc. in the 2019 report. The decline in the current ratio that year was caused by a decrease in non-operational revenue. Pfizer Inc annual report. 2019 mentions the loss, expiration or invalidation of intellectual property rights, patent litigation settlements with manufacturers and the expiration of co-promotion and licensing rights can have a significant adverse effect on non-operational revenues. This indicates a change in the current ratio of Pfizer Inc. not caused by the COVID-19 pandemic. Pharmaceutical companies Sinopharm Group Co.Ltd., Pfizer Inc., AstraZeneca Plc., and Johnson & Johnson can be said to have stable current ratios and are able to maintain their ability to generate profits during the COVID-19 pandemic.

### 3.2 Debt to Equity Ratio

The higher the debt of equity, the higher the debt composition, which will result in the lower ability of the company to pay the Dividend Payout Ratio (DPR) to shareholders. A higher DER indicates a higher investor risk because the company is increasingly unable to pay dividends to shareholders. Based on data from the five vaccine producing companies, the lowest DER in the last five years is Moderna Inc. (below 0.1), while the other four pharmaceutical companies varied from 0.4 to 1.4.

Comparison of the DERs of the five companies producing COVID-19 vaccines before and after the pandemic showed mixed results. Moderna Inc. noted that the very small increase since 2019 was possible due to the costs of the vaccine R&D process.

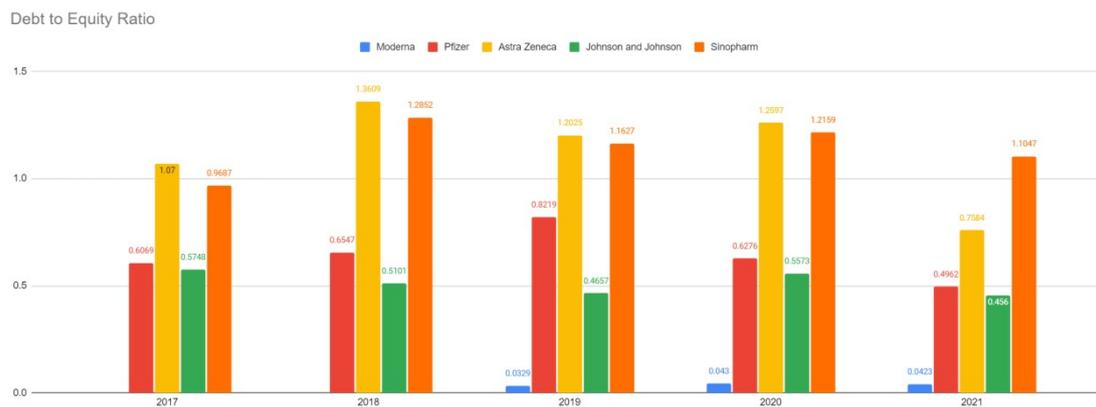


Figure 2. Debt to Equity Ratio for 2017-2021

Pfizer Inc. in 2019 experienced the highest DER even though it had not yet produced a COVID-19 vaccine so it can be said that the increase in DER was not caused by a pandemic, but in 2021 it recorded the lowest DER compared to the previous 4 years which according to financial reports was due to an increase in revenue of 95% and an increase in net cash flow 126% compared to the previous year due to sales of COVID-19 vaccine products, thereby reducing the company's debt.

AstraZeneca Plc. in 2017-2020 had the highest DER compared to 4 other pharmaceutical companies, the highest DER peak occurred in 2018 before the COVID-19 pandemic and in 2021 recorded a large decline in DER. The increase in DER in 2018 according to the company's financial statements was caused by a 16% decrease in product sales due to the emergence of new drugs and generic drugs from drug products whose patents have expired. 2021 AstraZeneca Plc. recorded the lowest DER for 5 years recorded in the company's annual financial statements due to a 36% increase in sales from the previous year where 38% of sales were COVID-19 vaccine products.

### 3.3 Return on Asset Ratio



Figure 3. Return on Asset for 2017-2021

The higher the return on assets, the higher the net profit generated from each rupiah of funds embedded in total assets. By knowing ROA we can assess whether the company has been efficient in using its assets in operating activities to generate profits. Based on data from the financial statements of companies producing COVID-19 vaccines, it is known that Moderna Inc. shows a very significant change between before and after the COVID-19 pandemic.

As a company whose mission is to deliver on the promise of mRNA science to create a new generation of transformative medicines for patients. Moderna Inc. has proven itself as the most competent company in producing COVID-19 vaccines so that in 2021 it managed to reverse the ROA from the previous minus to plus even the highest compared to the other four vaccine-producing pharmaceutical companies. As previously discussed, Moderna Inc. with the COVID-19 pandemic being able to take advantage of the assets owned so far to produce a COVID-19 vaccine that brings profit or profit for the company.

ROA from Pfizer Inc., AstraZeneca Plc., Johnson & Johnson, and Sinopharm Group Co.Ltd. it cannot be

said that there has been a change due to the production of the COVID-19 vaccine, because the ROA changes over the last 5 years do not have a certain pattern. More in-depth research is needed on Pfizer Inc's financial statements. from other management parameters to determine the cause of this company's ROA fluctuations.

### 3.4 Return on Equity Ratio

The higher the return on equity means the better the company's performance in generating net income after deducting taxes. ROE can show how much profit is generated by the company from every rupiah invested by shareholders. Based on annual report data from the five companies producing COVID-19 vaccines for the last 5 years, Moderna Inc. recorded the highest gain while AstraZeneca Plc, recorded the biggest decline.

As with other previous financial performance parameters that show the financial performance of Moderna Inc. in 2021 increased tremendously after the company produced a COVID-19 vaccine. While AstraZeneca Plc. in 2021 recorded the largest decline in the last 5 years, so it is necessary to conduct a thorough evaluation of all management aspects of AstraZeneca Plc. to determine the cause of this decline in ROE.

ROE from Pfizer Inc. Shows a decline in 2018 from the previous year, then until 2020 still struggling to get a profit, until then in 2021 it can return the ROE position as in 2017. Based on the financial statements of Pfizer Inc. In 2018-2019 this company experienced a loss, expiration or invalidation of intellectual property rights, patent litigation settlements with manufacturers and the expiration of co-promotion and licensing rights can have a significant adverse effect on our revenues. Meanwhile, in 2020 there was a setback due to the global macroeconomic impact at the beginning of the COVID-19 pandemic which caused problems in the production process and remote working system.



Figure 4. Return on Equity for 2017-2021

### 3.5 Net Profit Margin Ratio



Figure 5. Net profit margin for 2017-2021

The other four pharmaceutical companies producing COVID vaccines, Pfizer Inc., AstraZeneca Plc., Johnson & Johnson, and Sinopharm Group Co.Ltd. shows fluctuations in NPM data over the last 5 years. Only AstraZeneca Inc. companies. which shows a significant decline in NPM after the COVID-19 pandemic. NPM data from Pfizer Inc. and Johnson & Johnson showed an upward trend after producing the COVID-19 vaccine, while Sinopharm Group Co.Ltd. looks stable.

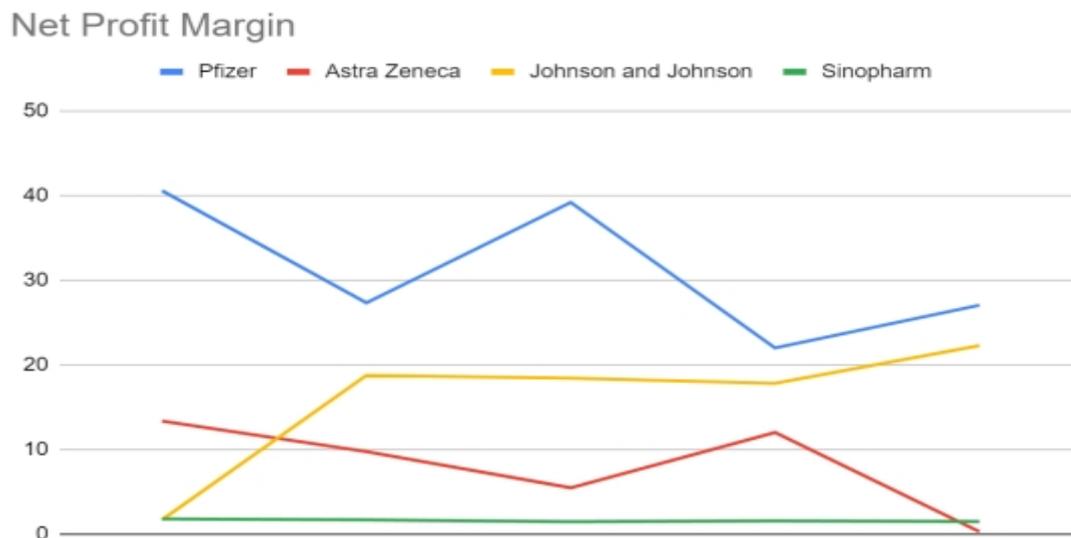


Figure 6. Net profit margin without Moderna Inc. for 2017-2021

#### 4. Limitation

The limitations of this research are that there is no comprehensive management analysis review of each company and only its financial performance profile, no evaluation of the impact of the COVID-19 pandemic on the macro economy and its impact on pharmaceutical company management has been carried out, and an evaluation of the financial performance profile can be carried out. this pharmaceutical company for 2022 in order to obtain more accurate data on the impact of the COVID-19 pandemic on company performance, namely 3 years before the pandemic (2017-2019) and 3 years after the pandemic (2020-2022).

#### 5. Conclusion

Research that produces an overview of the financial performance profile of companies producing COVID-19 vaccines for the last 5 years (2017-2021) shows different results. The company's strategic decision to carry out R&D to market the COVID-19 vaccine during the COVID-19 pandemic cannot guarantee an increase in the company's financial performance. Moderna Inc. which since its inception has focused on developing mRNA technology for medicine, has shown a drastic change from the company with the worst financial performance to the best in 2021. Meanwhile, AstraZeneca Plc. which experienced a financial downturn since before the pandemic in 2018 failed to restore its financial performance profile in 2021 by producing a COVID-19 vaccine. The other three companies, Pfizer Inc., Johnson & Johnson, and Sinopharm Group Co.Ltd. shows a stable financial performance profile both before and after the COVID-19 pandemic.

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