Pharma's Pandemic Profits

Pharma profits from COVID-19 vaccines

Esther de Haan & Albert ten Kate

February 2023

Colophon

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Authors: Esther de Haan and Albert ten Kate
Text corrections: Shiromi Pinto
Layout: Frans Schupp
Cover photo: LIgorko | iStock

This publication is made possible with financial assistance from the Dutch Ministry of Foreign Affairs. The content of this publication is the sole responsibility of SOMO and does not necessarily reflect the views of the Dutch Ministry of Foreign Affairs.

SOMO

Stichting Onderzoek Multinationale Ondernemingen
Centre for Research on Multinational Corporations

KNSM-laan 17
1019 LA, Amsterdam
The Netherlands
+31 (0)20 639 12 91
info@somo.nl
www.somo.nl

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Amsterdam, February 2023

Contents

Glossary of acronyms & terms

APAs	Advance Purchase Agreements are agreements to buy vaccines before the vaccines have been approved. This therefore removes any risk associated with developing and producing vaccines.
BARDA	US-based Biomedical Advanced Research and Development Authority
CDC	US Centers for Disease Control and Prevention
CEO	Chief Executive Officer
CEPI	Coalition for Epidemic Preparedness Innovations – a global partnership working towards vaccines against pandemics and epidemics
CFO	Chief Financial Officer
Covax	Set up by CEPI, Gavi and the WHO, Covax is the vaccine-arm of Act-A (Act-Accelerator partnership [of CEPI, FIND, Gavi, The Global Fund, UNICEF, Unitaid, Wellcome, WHO, the World Bank and The Bill & Melinda Gates Foundation] on diagnostics, therapeutics and vaccines) with the aim of developing and manufacturing COVID-19 vaccines.
COVID-19	Coronavirus disease 2019
EUR	Euros
GAAP	Generally Accepted Accounting Principles, a common set of accounting rules, standards and procedures. Public companies in the USA must follow GAAP
Gavi	A vaccine alliance created to increase equitable and sustainable use of vaccines and to vaccinate children. Its core partners are the WHO, UNICEF, the World Bank and the Bill & Melinda Gates Foundation.
IPR&D	In Process Research & Development which entails the intangible assets that are at the research and development phase.
M&A	Mergers and acquisitions
mRNA	messenger RNA
NEO	Named Executive Officer
OWS	Operation Warp Speed, a US government programme launched in May 2020. OWS was created "to accelerate the development, manufacturing, and distribution of a COVID-19 vaccine". OWS funded pharmaceutical companies through BARDA.
R&D	Research and development
UN	United Nations
USD	US dollars
WHO	World Health Organisation

Executive summary

COVID-19 vaccines and medicines have delivered USD 90 billion in profits to four of the seven researched pharmaceutical companies in 2021 and 2022. Companies have made these extraordinary gains thanks in large part to decades of research funded by public investment, billions in grants for development and production, and tens of billions in Advanced Purchase Agreements (APAs). Yet most of these profits are pocketed by the companies or have gone to private shareholders, rather than benefitting the public.

Extraordinary profits

Globally, the seven largest private COVID-19 vaccine producers are: Pfizer, BioNTech, Moderna, Sinovac, AstraZeneca, Johnson & Johnson, and Novavax. But only the companies Pfizer, BioNTech, Moderna, and Sinovac generated serious profits. These four companies are expected to make a total profit of around USD 90 billion from their COVID-19 related products during 2021 and 2022. Pfizer will generate USD 35 billion of net profits, BioNTech and Moderna will each earn USD 20 billion, and Sinovac's profit is USD 15 billion.

In 2021, COVID-19 vaccines sold by the seven largest private vaccine producers generated a revenue of USD 86 billion and a net profit of USD 50 billion. With a net profit margin of 57% in 2021, COVID-19 vaccines were beating business-as-usual high-profits, even for the lucrative pharmaceutical industry – which is among the world's most profitable business sectors. Looking at four of the seven companies that made extraordinary profits, Pfizer, BionTech, Moderna and Sinovac, the net profit margins for 2021 are even in the range from 62% to 76%.

By contrast, AstraZeneca and Johnson & Johnson noted that they would sell their vaccines on a not-for-profit basis. Analysis for this report shows that these companies have indeed made low profits, at most. Novavax's vaccine product sales have started in 2022 only, and so far the company has not made significant profits.

Government money

Governments have spent billions in funding and even more in APAs to support research and development as well as production of vaccines in the midst of the COVID-19 pandemic.

The seven producers received **government funding** totalling at least USD 5.8 billion for the development of the COVID-19 vaccines and medicines. The US government has been the largest public funder, providing USD 5 billion. As far as is known, there is no obligation for the companies to return the funds, not even when profits are made. However, given that several companies made enormous profits, agreements should have been made to reimburse the value of those grants to public funders. Companies also relied on earlier government-funded research when developing

the vaccines. As this research shows, extensive pre-work went into the creation of the final COVID-19 vaccines including, among others, decades of public sector work on developing mRNA technologies and HIV vaccines.

Pfizer claims it did not accept government money to develop its vaccine, yet it did indirectly benefit from USD 0.4 billion funding from the German government to develop the Pfizer/BioNTech vaccine. Pfizer was also heavily financed through **APAs**, which gave it billions up front for development and production.

Vaccine producers have greatly profited from APAs, which give upfront financing for development and production while at the same time transferring risk from suppliers to buyers. According to sources, the total amount of money that the companies received through APAs was USD 86.5 billion – a figure that is hard to pin down and could well be much higher because companies and governments have not been transparent. As far as can be established, APA contracts also did not require companies to return money used to develop and produce vaccines, even when development failed and the vaccine was never delivered.

Geographical spread of vaccines

Pfizer/BioNTech and Moderna's main markets have been the USA and the European Union. According to the website Our World in Data, figures for administered doses suggest that as of October 2022, Pfizer/BioNTech had a market share of 67% and Moderna of 26% for these two regions combined. Sinovac generated 56% of its 2021 sales in China, while Indonesia, Brazil, and Turkey were important export countries for Sinovac. AstraZeneca's vaccine has been dominant in India, with a market share of approximately 80%. Johnson & Johnson has declared that it shipped over 80% of the company's global COVID-19 vaccine supply to low- and middle-income countries.

High-income countries, ever higher vaccine prices

Even though the vaccines were developed with huge sums of publicly-funded grants and APAs, several of the companies made substantial profits from the outset. Still, Pfizer/BioNTech and Moderna have been increasing prices for the vaccines from 2020 to 2022. This is evident from the deals listed on the website of the US-based Biomedical Advanced Research and Development Authority (BARDA), and from leaked documents:

- For the US government, between July 2020 and July 2022, Pfizer/BioNTech's price increased from USD 19.9 - 24.4 to USD 30.5 per dose, and Moderna's price from USD 16.5 to USD 26.4.
- For the European Union, from late 2020 until May 2021, Pfizer/BioNTech's dose price went up from USD 18.9 to USD 23.7, and Moderna's from USD 22.6 to USD 25.5.

As fewer vaccines will be sold in the years to come, companies want to maintain their high profits by raising prices again. In September and October 2022, Pfizer/BioNTech and Moderna announced the commercial prices of their vaccines for the near future. Pfizer/BioNTech have set it at between

USD 110 and USD 130 per dose and Moderna at between USD 64 and USD 100. In January 2023, Moderna however stated that it also considered pricing between USD 110 and USD 130.

Worldwide sharing of vaccines and medicines

The United Nations (UN) and other organisations have pleaded for vaccine equity, which means that vaccines should be globally accessible based on needs and regardless of economic status. In September 2021 however, only 3% of the population in low-income countries had been vaccinated with at least one dose. By November 2022, this increased to 28%. In high-income countries, 60% of the population had their first dose by September 2021.

While the vaccines themselves have undoubtedly protected public health, it is thus still high-income countries that have benefited most by being the first to receive the vaccines before the rest of the world.

As the pandemic gripped populations worldwide, many of the pharmaceutical companies in this report promised to uphold the principle of vaccine equity. Ultimately companies choose to prioritise high-value sales of vaccines (and later medicines) to high-income countries over delivering vaccines at cost price to low-income countries. Ultimately, they put profit before public health, creating global disparities that remain today.

The low vaccination rate for low-income countries was also the result of high-income countries hoarding surplus vaccines that had been bought even though they weren't needed.

Vaccine equality also extends to medicines used to treat COVID-19 patients. Pfizer's COVID-19 medicine Paxlovid is presently the world's most used COVID-19 medicine. With regard to equity, it followed the same path as the vaccines. Just as the vaccines were distributed too late to low- and middle-income countries in 2021, Pfizer's Paxlovid did not reach many people in low-income countries in 2022.

Conclusion

It's clear that while companies may have had a moral obligation to prioritise public health over profit – which some did – the absence of contractual conditions that would have made this obligation binding gave them free rein to chase the bottom line. This led to global inequalities in terms of access to the COVID-19 vaccine which, in turn, exacerbated the pandemic even further. Governments, therefore, have a considerable role to play in guaranteeing vaccine equity – when drafting and agreeing grants, APAs and other contracts that involve public spending with pharmaceutical companies. Access to medicines is an essential component of the right to health and is a shared responsibility of governments and companies. In general, but especially in times such as the COVID-19 pandemic, pharmaceutical companies have to step up and accept that their role should not be profit seeking but developing and delivering medicines.

Introduction

When the COVID-19 pandemic closed down whole economies, pharmaceutical companies raced to develop, produce and distribute vaccines at the behest of governments everywhere. Never before had so much effort and money been so swiftly channelled into creating vaccines. Never before had so much public money been dedicated and promised to pharmaceutical companies. As a consequence, many pharmaceutical companies were incentivised to develop COVID-19 vaccines.

In this report, SOMO follows the money these pharmaceutical companies made during the COVID-19 pandemic. SOMO looks at the revenue and profit generated by the world's seven largest private COVID-19 vaccine producers, as well as the public funding they received from governments and international organisations. SOMO examines how these companies are spending the huge profits they made from their COVID-19 vaccines. We also assess whether companies have been fairly distributing the vaccines around the world given the global nature of the COVID-19 crisis.

Finally, SOMO considers what governments and international organisations, as well as companies, have done to ensure that public money spent on COVID-19 vaccines will lead to public return and to global equitable access to these vaccines.

SOMO has published several reports on the pharmaceutical industry, addressing the need for public return on public investments in drug development. The lack of transparency around the public money spent and the failure to attach conditions are issues SOMO will take forward in this report. As an unprecedented amount of public money went into vaccine development, in an unprecedented health crisis it is all the more important to look at how this money was spent and who profited. In the conclusion, SOMO draws lessons from the information gathered and give recommendations on how to take these lessons forward.

Data

The data we have used is taken from companies' yearly reports, research reports and (news) publications as indicated in the footnotes. For the year 2022, information is also taken from quarterly reports and based on forward looking statements and in some cases informed estimations and calculations.

Companies and governments have not been transparent about the prices of vaccines, the costs of research and development (R&D), how much different buyers have been paying for the vaccines, Advanced Purchase Agreements (APAs), etc. Several organisations such as UNICEF, the European Commission, the Global Health Centre, as well as many media sources, have collected data on this, which we used for this report.

Review

This report includes profiles of seven companies. Following SOMO's standard quality control procedure, all seven companies that are part of this research received a draft version of their company profile and the information stated on their company in this report for review. Only Johnson & Johnson and AstraZeneca responded. AstraZeneca had no comments. Johnson & Johnson provided comments, which we have incorporated.

1 Vaccine companies: extraordinary profits

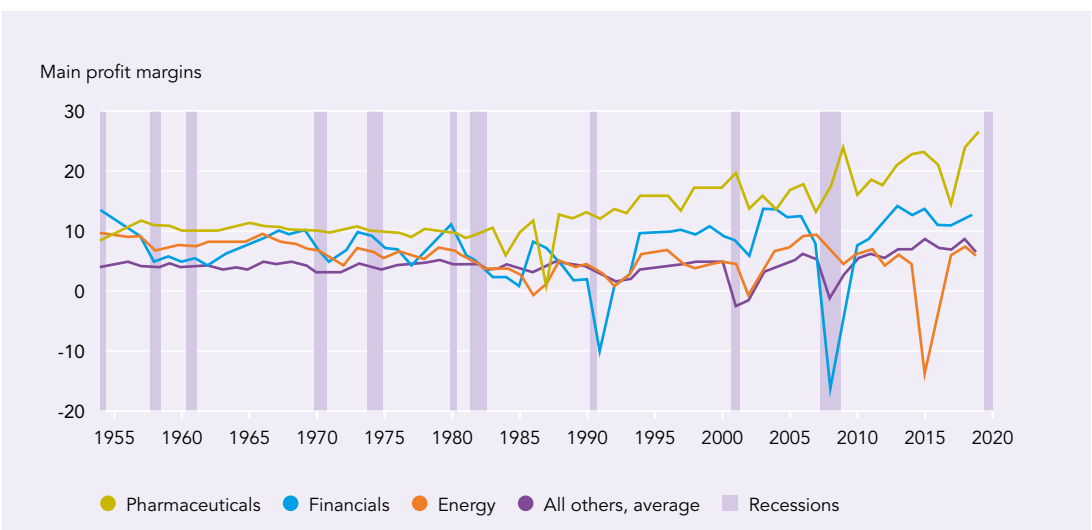
The pharmaceutical sector is highly profitable

The pharmaceutical sector is among the world's most profitable business sectors[1], even more profitable than the energy and financial sectors. Figure 1 shows the profit margins for Fortune 500 companies in the USA since 1955.[2] A recent analysis of the profit margins since 1995 of companies in Standard and Poor's 500 Index confirms this profitability.[3]

The wealth accumulated by pharmaceutical companies is evident from the growth of their financial reserves, and the proliferation of pay-outs to shareholders (both dividends and share repurchasing). Pharmaceutical companies also increasingly buy up other companies, for billions of dollars, to fill up the new drug pipeline, acquire patents, and to crowd out the competition.[4]

During the COVID-19 pandemic, governments ploughed an unprecedented amount of public money – in the form of grants and Advanced Purchase Agreements (APAs) – into private companies to develop vaccines. They saw it as a race against the virus and against its health, social and economic effects. Processes that would normally take 10 to 15 years[5] were now squeezed into less than one year. And processes that would normally be sequenced were now started at the same time. For example, US Operation Warp Speed financed increased manufacturing capacity of vaccines that were still in the development phase and thus might have been unsafe or ineffective.[6]

Figure 1 Fortune 500 sectoral profit margins per year



COVID-19 related revenues

For this report, we analysed the financial records of the seven largest private COVID-19 vaccine producers. These companies generated USD 86.5 billion in revenue from selling COVID-19 vaccines throughout 2021. Over 2022, the revenue for COVID-19 vaccines alone amounted to USD 65,6 billion (see table 2). When including COVID-19 treatment courses the revenue amounted to at least USD 86.7 billion in 2022 (see table 1).

Strikingly, four out of the seven COVID-19 vaccine producers (BioNTech, Moderna, Sinovac, and Novavax) were not profitable nor did they have sales before starting to sell their COVID-19 vaccines. Those that already had positive revenues in 2020 received grants from governments, multilateral agencies or strategic alliances for COVID-19 vaccine development, or received money for early sales of the vaccine. Out of the four companies, Sinovac is the only one that already had some products, not COVID-19 related, on the market.[7] In contrast to the four new pharma companies on the block, Pfizer, AstraZeneca and Johnson & Johnson have been among the world's largest pharmaceutical companies for years.

Table 1 COVID-19 related revenues of vaccine producers (USD billion)

Company	2022	2021	2020
Pfizer - Paxlovid	18.9	0.1	0.0
Pfizer/BioNTech - Comirnaty	40.1	39.4	0.2
Moderna	18.4	20.5	0.8
Sinovac	1.0 (first half 2022)	19.1	0.2
AstraZeneca	4.1	4.0	0.0
Johnson & Johnson	2.2	2.4	0.0
Novavax	2.0 (forecast)	1.1	0.5
Total	**86.7**	**86.6**	**1.7**

On 29 December 2022 Sinovac published its unaudited results for the first half of 2022. Its COVID-19 related revenue amounted to USD 1.0 billion in the first half of 2022. By lack of data it was not possible to make an estimation for the full year of 2022.[8]

The figures in the table were calculated from official company data, such as annual and quarterly reports. In some cases, estimates had to be made in the absence of public data. 2022 sales revenue from the Pfizer/BioNTech COVID-19 vaccine, Comirnaty, is estimated to be USD 40.1 billion. This is based on estimates of Comirnaty sales within its territory by Pfizer (USD 36.8 billion) and extrapolation of BioNTech's sales of USD 2.4 billion within its territory during the first nine months of 2022.[9]

This report focuses on the seven largest private COVID-19 vaccine producers globally. When it comes to COVID-related revenues, a broader picture arises when including other companies that sell medicines for COVID-19 treatment. The table below shows that, when including COVID-19 medicines, the COVID-related revenues were over USD 100 billion in 2021 as well as in 2022.[10]

Table 2 COVID-related revenues of companies selling vaccines and/or medicines (USD billion)

	2022		2021	
	Vaccine	Medicine	Vaccine	Medicine
Pfizer/BioNTech - Comirnaty	40.1		39.4	
Pfizer - Paxlovid		18.9		0.1
Moderna - Spikevax	18.4		20.5	
Sinovac	1.0		19.1	
AstraZeneca	1.9	2.2	4.0	
Johnson & Johnson	2.2		2.4	
Novavax vaccine	2.0		1.1	
Gilead Sciences - Veklury		3.9		5.6
Regeneron - REGEN-COV		1.8		7.6
Merck & Co - Lagevrio		5.7		1.0
Lilly - COVID-19 antibodies		2.0		2.2
GSK - Xevudy		2.8		1.3
Total	**65.6**	**37.3**	**86.5**	**17.8**
Total vaccines and medicines	**102.9**		**104.3**	

COVID-19 related profits

Together, Pfizer, BioNTech, Moderna and Sinovac's net profits from COVID-19 related sales (vaccines and non-vaccines) were more than USD 50 billion in 2021, and more than USD 30 billion in the first nine months of 2022. The COVID-19 related net profits of the seven companies over the year 2022 are likely to be around USD 40 billion (see table 3).

There are however notable differences between 2021 and 2022. All profits generated by the seven companies in 2021 comprised vaccines. In 2022, Pfizer generated USD 18.9 billion revenue from its highly profitable COVID-19 medicine Paxlovid (a non-vaccine)[11], while 2021 sales for Paxlovid were negligible, since it wasn't yet on the market. Another main difference is the profit generated by Sinovac. In 2021 it earned a COVID-19 related net profit of USD 14.6 billion, while the little information available for the first half of 2022 suggests a sharp decline.

When finishing this report, four companies (BioNTech, Moderna, Sinovac and Novavax) had not yet published their net profits over 2022. For BioNTech, Moderna, and Novavax the net profits for the first nine months of 2022 were used, and for Sinovac the net profits over the first half of 2022.

Of the seven largest private COVID-19 vaccine producers, AstraZeneca and Johnson & Johnson pledged to sell the majority of their vaccines on a not-for-profit basis. Figures in their annual and quarterly reports back this up, suggesting that the two companies have made low profits, at the most, from the sales of vaccines. For its COVID-19 treatment medicine (not vaccine), AstraZeneca reported in July 2022 that its gross margin from sales is expected to be lower than the company average.[12] In its reaction to this report, Johnson & Johnson stated: "Johnson & Johnson has made

no profit from the sale of its COVID-19 vaccine."[13] For both AstraZeneca and Johnson & Johnson, no estimates of the COVID-19 related profits could be made due to a lack of available data.

SOMO based the estimate of Pfizer's COVID-19 related net profits on the company's financial records, as the company does not report separate COVID-19 profits from its other businesses. To make this estimate, SOMO looked at Pfizer's 2020 net profit margins (still without COVID-19 related profits) and the vaccine gross profits of BioNTech (no other businesses than COVID-19 vaccines; sharing gross profits with Pfizer on Comirnaty sales). The estimate is substantiated in Annex 8 of this report. Pfizer's COVID-19 related profit over 2022 was estimated to be USD 21.8 billion.

On 1 November 2022, Pfizer's Chief Executive Officer (CEO) Albert Bourla said that it was a very bold and absolutely the right decision to price the Comirnaty vaccine at "a very, very low price" during the pandemic. "We did it and we maintained that for the years to come," he added.[14]
In reality Pfizer, as well as BioNTech, made huge profits from its COVID-19 vaccine sales.

Table 3 COVID-19 related net profits of vaccine producers (USD billion)

Company	Rough estimate 2021-2022	2022 Q1-Q3 unless stated otherwise	2021
Pfizer	35	17.0	12.3
BioNTech	20	7.6	12.2
Moderna	20	6.9	12.2
Sinovac	15	(first half) 0.7	14.6
Subtotal	**90**	**32.2**	**51.3**
AstraZeneca		low	low, at the most
Johnson & Johnson		low, at the most	low, at the most
Novavax		-0.5	-1.7
Total	**90**	**31.7**	**49.6**

Extraordinary profits

In November 2021, Oxfam International pointed out that together, Pfizer, BioNTech and Moderna made vaccine profits before tax of USD 1,000 per second.[15] This estimate was made before the release of the companies' 2021 annual reports. According to those reports, the net profits (after income tax) appear to have amounted to USD 1,160 per second. Adding a fourth company, Sinovac, the combined net profits were USD 1,630 per second.[16]

Net profit margins

The estimated net profit margins for Pfizer/BioNTech, Moderna and Sinovac are shown in the table below. Net profit is calculated by deducting all company costs from total revenue. The net profit margin measures how much profit is generated as a percentage of revenue.[17] Again, for Pfizer/BioNTech some extra estimates had to be made, which are explained in Annex 8 of this report.

Table 4 **Estimates of net profit and net profit margins on sales of COVID-19 vaccines and treatments by Pfizer/BioNTech, Moderna and Sinovac** in USD billion

	Treatment	Vaccines		
	Pfizer - Paxlovid	Pfizer/BioNTech	Moderna	Sinovac
2021				
Sales	0.1	39.4	18.5	19.1
Net profit	unknown	24.4	12.2	14.6
Net profit margin	**unknown**	**62%**	**66%**	**76%**
2022				
Sales	18.9	40.1	(2022 Q1-Q3) 14.2	sharp decline
Net profit	12.3	19.7	(2022 Q1-Q3) 6.9	sharp decline
Net profit margin	**65%**	**49%**	**49%**	**unknown**

The net profit margins from COVID-19 vaccines and treatments in 2021 and 2022 range from 49% to 76%, which is much higher than average margins in the pharmaceutical sector. For example, since 2010, US-based pharmaceutical companies on the Fortune 500 or Standard & Poor's 500 index reported profit margins of between 15% and 35%.[18] Profit margins derived from COVID-19 likely reflect the extraordinary life-threatening conditions during the pandemic, and the eagerness of Pfizer/BioNTech, Moderna and Sinovac to make extraordinary profits out of a desperate global situation. It also shows that in the early stages of the pandemic the companies had a lot of control over pricing, with little room for governments to negotiate.

However, the net profit margins for Pfizer/BioNTech and Moderna in Q1-Q3 of 2022 did decrease, compared to 2021. For Moderna, the cost of sales and to a lesser extent R&D expenses had gone up, which it blamed on write-downs for excessive and obsolete inventory, unutilized manufacturing capacity and losses on unused raw materials, driven by a shift in product demand.[19] For Pfizer/BioNTech, company reports gave little information as to why the vaccine's net profit margin decreased. It is only partly explained by write-offs reported by Pfizer of USD 500 million related to COVID-19 products that had exceeded or were expected to exceed their approved shelf-lives. BioNTech also reported that its cost of sales was impacted by USD 600 million expenses arising from inventory write-offs and other costs related to the switch from the BNT162b2 vaccine to an Omicron-adapted bivalent vaccine.[20]

Pfizer/BioNTech and Moderna increasing their prices for the USA and European Union

Available data shows the dominance of Pfizer/BioNTech and Moderna's vaccines and boosters within the USA and European Union. Our World in Data's figures on administered doses within the European Union and the USA suggest a market share of 67% for Pfizer/BioNTech and 26% for Moderna as of 12 October 2022, as shown in the table below.[21]

Table 5 Doses administered per vaccine type inside the European Union + USA as of 12 October 2022

Company	European Union + USA		European Union		USA	
	Amount administered million	% of total	Amount administered million	% of total	Amount administered million	% of total
Pfizer/BioNTech	1,006	67	634	72	372	59
Moderna	388	26	152	17	236	38
AstraZeneca	67	5	67	8	0	0
Johnson & Johnson	38	2	19	2	19	3
Other	4	0	4	1	0	0
Total	**1,503**	**100**	**876**	**100**	**627**	**100**

The European Union (31%), the USA (30%) and the remaining parts of Europe (8%) accounted for 69% of Moderna's product sales in 2021. During the first nine months of 2022, Europe (33%) and the US government (25%) accounted for 58% of Moderna's product sales.[22] According to Pfizer, 49% of its Comirnaty revenues were generated inside the USA and in "Developed Europe" during the first nine months of 2022, versus 47% over 2021.[23] The USA and "Developed Europe" combined generated 52% of the Comirnaty revenues during the whole year 2022.[24]

Pfizer/BioNTech and Moderna increased vaccine prices for the USA and European Union in 2021 as follows:

- Late 2020 and early 2021, the European Commission signed agreements with Pfizer/BioNTech to purchase 500 million vaccine doses, plus the option to acquire another 100 million doses. The agreed price per dose was EUR 15.50, according to leaked documents. In May 2021, the European Commission signed an agreement with Pfizer/BioNTech to purchase 900 million vaccine doses, with the option to acquire another 900 million doses. The agreed price per dose, according to leaked documents, was EUR 19.50, a 26% increase compared to the first deals.[25]

- For the USA, a similar price increase of Pfizer/BioNTech vaccine doses can be extracted from the agreements shown on the website of the US-based Biomedical Advanced Research and Development Authority (BARDA). Agreements made in the period between July 2020 and February 2021 for delivery of 300 million doses set the average price per dose at USD 19.90. Agreements made in July 2021 and October 2021 for a total delivery of 250 million doses had an average price per dose of USD 24.40 (equivalent to EUR 20.70), a 23% increase compared to the first deals. In June 2022, a USD 3.2 billion deal was made for vaccines, including an Omicron component, at USD 30.50 per dose.[26]

- In June 2021, the European Union made a deal to purchase 300 million doses from Moderna in 2021 and 2022. The agreed price per dose was USD 25.50, a reflection of price rises similar to Pfizer/BioNTech. By comparison in late 2020, the European Commission signed agreements with Moderna to purchase 160 million vaccine doses. The agreed price back then, according to an insider, was EUR 19 (equivalent to USD 22.60).[27]

Table 6 Pfizer/BioNTech and Moderna price increases for US government and European Union

Entities agreement	Average price USD	Date agreement	Doses to be delivered million	Price per dose USD
Pfizer/BioNTech ◄► US	19.9	21 July 2020	100	19.50
		22 December 2020	100	20.10
		11 February 2021	100	20.10
	24.4	21 July 2021	200	24.30
		22 October 2021	50	24.60
	30.5	29 June 2022	105	30.50
Moderna ◄► US	16.5	11 August 2020	100	15.30
		11 December 2020	100	16.70
		11 February 2021	100	17.50
		15 June 2021	200	16.50
	26.4	29 July 2022	66	26.40
Pfizer/BioNTech ◄► EU	18.9	Late 2020 and early 2021	500	18.90
	23.7	May 2021	900	23.70
Moderna ◄► EU	22.6	25 November 2020	80	22.60
		15 December 2020	80	22.60
	25.5	17 February 2021	90	25.50

Future commercial prices

Pfizer announced in their analyst and investor call of 20 October 2022 that they are preparing to transition to the commercial market in the USA. They stated that the vaccine will have to be sold for a commercial price to reflect increased costs, as the vaccine will be single dose instead of two doses, but also to reflect the value that the vaccine brings to patients and society. According to Pfizer, the vaccines saved the USA about USD 16 billion in hospital costs, for example. The commercial price per dose is set to be between USD 110 and USD 130.[28] Reinforcing the October announcement, Pfizer's CEO Albert Bourla said on 1 November 2022: "Now we are moving to single instead of mass vial, multi-dose vial, we are pricing the vaccine according to the cost effectiveness. And the cost effectiveness of the current vaccine, the way that CDC [the US-based Centers for Disease Control and Prevention] is pricing it, is way, way, way below than what the price that we have set at USD 110 and USD 130."[29]

Moderna has also stated that it wants to use cost effectiveness as a basis for its new prices: "(…) As we evolve from a pandemic setting to an endemic setting, the real focus for us is on ensuring that our vaccines are priced based on the value that they provide to the health care system and reflect the cost-effectiveness guidelines that are set by public health authorities around the world."[30] At their annual R&D day on 8 September 2022, Moderna anticipated a commercial price for their COVID-19 vaccine of between USD 64 and USD 100.[31] On 9 January 2023, however, Moderna's CEO Mr Stéphane Bancel stated that the company considered pricing its COVID-19 shot at USD 110 to USD 130 per dose in the USA, similar to Pfizer's intentions.[32]

The future commercial prices of Pfizer and Moderna exceed any reasonable compensation for their investment in the vaccines. In fact, their current and previous pricing has already delivered very high profit margins, calling into question the rationale put forward by both companies for their projected price hikes.

Large differences in the deals countries made with producers

UNICEF's COVID-19 Market Dashboard keeps track of prices paid for COVID-19 vaccines, through publicly available sources. As negotiation processes have not been transparent, the information comes from leaked reports and insiders, and only 93 deals between vaccine producers and countries appeared on the dashboard as of September 2022.[33] Nevertheless, the data provides some interesting information:

- AstraZeneca and Johnson & Johnson announced they would not make vaccine profits during the pandemic, yet apparently this does not mean that all their deals were the same. AstraZeneca's sales ranged from USD 2.19 to USD 6 per dose.[34] Johnson & Johnson's single-shot vaccine was sold for USD 10, but also for USD 8.50.[35]
- Pfizer decided in June 2020 to sell its vaccine through "tiered pricing". Wealthier nations were to pay "about the cost of a takeaway meal" for a vaccine dose. Middle-income countries would be "offered doses at roughly half that price", and low-income countries would be "offered doses at cost".[36] The UNICEF dashboard mentions prices paid per dose by the African Union (USD 6.75), Tunisia (USD 7), Brazil and South Africa (each USD 10), Argentina, Colombia, and Costa Rica (all USD 12), Lebanon (USD 18), and Israel (USD 28).[37] The UNICEF dashboard also mentions some prices paid by the European Union and the USA, yet prices varied over time for these wealthier nations. All in all, the UNICEF dashboard suggests that Pfizer roughly adhered to its plan of tiered pricing.
- The price per dose that countries reportedly agreed with Sinovac varied considerably: Cambodia (USD 10)[38], Brazil (USD 10.3), Indonesia (USD 13.6 and USD 17), Philippines (USD 14.5), Botswana (USD 15), Ukraine (USD 18), China (USD 29.75), Thailand private market (USD 32.52).[39]
- Botswana's health minister reported in July 2021 that the country had negotiated prices with three different companies in 2021: Sinovac (USD 15 per dose), Moderna (USD 29) and India's Bharat Biotech Covaxin vaccine (USD 16).[40]
- Kuwait paid USD 40 per dose, for 2 million doses of Moderna's vaccine in 2021 – the most expensive price on UNICEF's dashboard.[41] Gavi, the Vaccine Alliance, purchased 210 million doses of the Moderna vaccine for low-income countries in 2021. The price was just under USD 10 per dose.[42]
- Argentina's Ministry of Health provides transparency on its vaccine purchases, and shows the price variety: AstraZeneca (USD 4 to USD 4.10), Sputnik (USD 9.95 to USD 12.61), Sinopharm (USD 4.50 to USD 20), Pfizer/BioNTech (USD 12), Cansino (USD 15 to USD 17), Moderna (USD 21.5).[43]

For further discussion on the impact that price differentials have on vaccine equity, please see chapter 4.

2 Vaccine companies: government subsidies

Funding during the pandemic

During the pandemic, several companies received substantial funds to develop COVID-19 vaccines. The funding was mostly for clinical trials and expanding production capacities. The seven largest private COVID-19 vaccine producers received government funding totalling at least USD 5.8 billion to develop COVID-19 vaccines and medicines.[44]

Information on government grants provided to the seven vaccine producers was found in company annual reports, as well as other sources such as BARDA, the German Federal Ministry of Education and Research, the Geneva Graduate Institute, and Politico magazine.[45]

The US government was by far the biggest funder, granting USD 5 billion to the seven largest private COVID-19 vaccine producers. The funds were provided under Operation Warp Speed (OWS), a US government programme launched in May 2020. OWS was created "to accelerate the development, manufacturing, and distribution of a COVID-19 vaccine".[46] OWS funded pharmaceutical companies through BARDA.

Within OWS, six priority candidates for vaccines were picked. The selection cut across three different vaccine technologies: messenger RNA or mRNA (Pfizer/BioNTech and Moderna), viral vector (AstraZeneca and Johnson & Johnson), and protein (Novavax, Sanofi). The government calculated that funding six candidates in this way would yield a 75% probability of producing at least one safe and effective vaccine manufactured at scale and authorised by the US Food and Drug Administration by January 2021.[47] The introduction of Sanofi's vaccine was delayed, and according to UNICEF's COVID-19 Market Dashboard, it is still awaiting approval in the first country/region.[48] The other five vaccines were already authorised for use in many countries earlier, while Novavax was approved in late 2021.[49]

Pfizer did not take money in the context of OWS, or other donors. It did, however, benefit from tens of billions of advanced financing through APAs (see for example table 7, Pfizer/BioNTech and Moderna price increases for US government and European Union) which provided money upfront and thus took away financial risks. Pfizer's competitor Moderna accepted a total of USD 1.7 billion US governmental funds in the years 2020, 2021, and 2022 for development of its mRNA vaccine and profited as well from substantial upfront financing through APAs. A substantial part of the revenues recorded by these companies for 2021 was provided through APAs.

While Pfizer rejected US government money for vaccine development, it still benefited indirectly from USD 0.4 billion provided by the German government as a result of its collaboration with BioNTech on the Pfizer/BioNTech vaccine.[50]

Moderna made several grant agreements with BARDA in the USA. The last amendment to the agreement with BARDA took place in March 2022, for an extra USD 308 million for costs associated among others with clinical development for the adolescent and paediatric studies. Grant agreements between 2020 and 2022 totalled approximately USD 1.7 billion. As of 30 September 2022, Moderna reported that it still had USD 67 million of the BARDA money available.[51]

In addition to the USD 1.3 billion of OWS, Novavax received up to USD 0.4 billion from the Coalition for Epidemic Preparedness Innovations (CEPI) to develop NVX-COV2373 and supply it through the COVAX facility.[52] As of 30 September 2022 Novavax reported that USD 0.5 billion in funding remained under OWS (both grants and APAs).[53]

The figures on funding for AstraZeneca were difficult to find. In its annual reports 2020 and 2021, AstraZeneca booked a revenue from government grants for the development of vaccine and medicine for a total of USD 1.043 billion. Unfortunately, AstraZeneca's quarterly reports for 2022 do not reveal whether more government grants have been booked as revenue in 2022. Therefore, it remains unclear whether the USD 1.043 billion figure is the complete figure. AstraZeneca also does not reveal clearly which governments have provided grants. Most likely it is solely the US government, as agreements were made through BARDA, and no other sources of funding could be found. Further, the University of Oxford was heavily financed, already in the years before 2020 to develop the technology behind the vaccine. AstraZeneca originally made an agreement with the US government totalling USD 1.6 billion for the development of its vaccine, including large-scale delivery, yet its vaccine was never approved in the USA.[54]

Table 7 **Government grants to the seven vaccine producers for developing COVID-19 vaccines and medicines** in USD billion

Company	Total	US government	Other
Pfizer	None, but increased pricing	None	None
BioNTech	0.4	None	German government: 0.4
Moderna	1.7	1.7	Negligible
Sinovac	None	None	None
AstraZeneca	1.0	1.0	None
Johnson & Johnson	1.0	1.0	None
Novavax	1.7	1.3	CEPI: 0.4
Total	**5.8**	**5.0**	**0.8**

Government funds to develop COVID-19 vaccines went beyond the above seven companies. This greatly accelerated the development of a variety of vaccines. At the time of writing, around 51 vaccines from 35 vaccine developers had been approved for use.[55] These included the pharmaceutical companies Curevac, Merck, Sanofi and Innovio.

APAs

APAs provided a much larger source of financing than government grants. APA contracts were concluded by different governments, the European Union and COVAX, and gave upfront funding for vaccine development. Governments that were desperate to secure contracts for vaccines made deals with companies well in advance of knowing whether these vaccines would be effective. Through APAs, tens of billions of dollars were channelled to pharmaceutical companies, while the vaccines were still in development. APAs are agreements to buy vaccines prior to vaccine approval, thereby de-risking investments in developing and producing the vaccines. Most of the APA contracts are not publicly available. Those that are have been heavily redacted or have been leaked. To be clear, the amount of money gained through vaccine sales is much higher than through APAs, as sales also involve agreements after the vaccines have been approved. APAs however greatly incentivised and accelerated vaccine development and production. They pledged unprecedented sums of public money through confidential deals.

With no official record of all APAs, estimates of just how much money was paid vary. Research by the kENUP foundation in January 2021 calculated a total public investment of USD 93 billion to develop vaccines and medicines, of which USD 86.5 billion was financed through APAs.[56] By contrast, the Global Health Center estimated a total of USD 45 billion[57], although this figure was based on only 26 APAs – a figure well below the total number of APAs that were actually concluded (a combination of the information of the UNICEF dashboard, the Global Health Center, and the University of Sheffield, finds at least 85 APAs).[58] Looking at the amounts it is fair to assume that 86.5 billion USD might be even a low estimate. The European Court of Auditors for example mentioned in a report on the European Union vaccine procurement that the Commission signed 11 contracts, 8 of which were APAs, for an amount of EUR 71 billion. [59]

The lack of transparency around APAs and their contents made it challenging to track: whether public funds were well and fairly spent, the prices paid for the vaccines and whether there were agreements made on equitable distribution. Lack of transparency made it difficult for many countries to know price agreements and negotiate a fair price.

The opaque nature of these agreements was clearly evidenced in an analysis of several published APAs, commissioned by The Left in the European Parliament.[60] The analysis showed a number of APAs by the European Commission, which were published but were heavily redacted, making it difficult to assess public money spent, prices paid, and indemnification for liability.

The APAs de-risked investments by companies in vaccine development, both in terms of the money invested as well as liability. In most of the APAs analysed, upfront payments were made on signature which financed development and production costs. If the company failed to develop a working vaccine, the money already spent on development and production did not have to be re-paid. Equally, if the vaccine proved successful, the companies did not have to pay any money back despite making substantial profits. Several agreements failed to include sanctions for delayed delivery. Companies also had the security of being indemnified against liability by the buyers, however these clauses were heavily redacted, making it difficult to assess this in any detail.

The European Court of Auditors published a report on European Union COVID-19 vaccine procurement[61] which also mentioned the omission of provisions for supply disruptions. The report mentioned that the contracts that were later concluded with pharmaceutical companies did improve on issues such as delivery times but liability and indemnification stayed the same.

Government-funded research laid the groundwork for the vaccines

The common perception is that the COVID-19 vaccines were quickly developed by pharmaceutical companies within a very short timeframe. This is not the complete picture. Earlier research laid the groundwork for these vaccines. Several research articles pointed out that the technology used to speedily develop COVID-19 vaccines in the USA was available because the government funded basic research and the advancement of these technologies. One study mentions that "a robust body of published research on vaccine technologies" was supported by funds from the National Institutes of Health (NIH) totalling USD 17.2 billion from 2000–2019. The NIH is the US federal agency for conducting and supporting medical research.[62]

Other governments and international organisations have also funded research, such as the mRNA technology used by Moderna and Pfizer/BioNtech. For instance, the Bill & Melinda Gates Foundation funded Moderna to develop mRNA technology, both in 2016 and 2019, for a total amount of USD 21 million.[63] In fact, mRNA technology has a long history of development, dating as far back as 1961, funded through different universities.[64]

According to a study published in 2021 in the magazine BMJ Global Health, "public and charitable financing accounted for 97% - 99% of identifiable funding for the ChAdOx vaccine technology research at the University of Oxford" until autumn 2020. ChAdOx is the underlying technology for AstraZeneca's Vaxzevria COVID-19 vaccine. The researchers found that there was little transparency in the research funding reporting, and identified R&D funding from governments and charities equivalent to USD 134 million (following a Freedom of Information request) and USD 293 million (reconstructed from literature search). The main funders were the UK government, the European Commission, the US government, the Coalition for Epidemic Preparedness Innovations (CEPI), and Wellcome.[65] The figure of USD 134 million includes USD 42 million of funds provided during the pandemic.

International organisations that provided funding during the COVID-19 pandemic

Bill & Melinda Gates Foundation[66] is one of the biggest charitable foundations globally, and is working on poverty, disease and inequity. They mention that in January 2022, they donated more than USD 2 billion, among others to CEPI and Gavi.

Coalition for Epidemic Preparedness Innovations (CEPI)[67] is a global partnership working towards vaccines against pandemics and epidemics.

Covax[68] is set up by CEPI, Gavi and the WHO, and is the vaccine-arm of Act-A[69] (Act-Accelerator partnership [of CEPI, FIND, Gavi, The Global Fund, UNICEF, Unitaid, Wellcome, WHO, the World Bank and The Bill & Melinda Gates Foundation] on diagnostics, therapeutics and vaccines) with the aim of developing and manufacturing COVID-19 vaccines.

Gavi[70] is a vaccine alliance, to increase equitable and sustainable use of vaccines and to vaccinate children. Its core partners are the World Health Organization, UNICEF, the World Bank and the Bill & Melinda Gates Foundation.

Wellcome[71] s a UK research foundation. Besides own research institutes they also offer grants funded through the return on an investment portfolio.

3 Vaccine companies: profit spending

USD 90 billion of profits: how to spend it?

Pfizer, BioNTech, Moderna, and Sinovac will likely generate net profits of over USD 90 billion from their COVID-19 products over the period 2021-2022. Pfizer's profits will be around USD 35 billion, BioNTech and Moderna will each generate USD 20 billion, and Sinovac will cash in at least USD 15 billion.

This is the first time that BioNTech, Moderna, and Sinovac will make substantial profits. After paying their shareholders, the companies use the money for R&D, mergers and acquisitions (M&A), and sometimes also for their directors and managers' personal gain.

Table 8 COVID-19 related net profits of vaccine producers (USD billion)

Company	Rough estimate 2021-2022	2022 Q1-Q3 unless stated otherwise	2021
Pfizer	35	17.0	12.3
BioNTech	20	7.6	12.2
Moderna	20	6.9	12.2
Sinovac	15	(first half) 0.7	14.6
Subtotal	**90**	**32.2**	**51.3**
AstraZeneca		low	low, at the most
Johnson & Johnson		low, at the most	low, at the most
Novavax		-0.5	-1.7
Total	**90**	**31.7**	**49.6**

Satisfying shareholders

The four companies that made the most profit (Pfizer, BioNTech, Moderna, and Sinovac) are listed on stock exchanges. They have paid a substantial portion of those profits to their shareholders. Shareholders have made money from the COVID-19 pandemic, with (higher) dividend payments and through share repurchases by the companies.

> A share repurchase or buyback is when a public company buys its own shares from the marketplace. This increases the demand for its stock, and therefore also the share price. An increasing share price creates value for all shareholders.[72]

Moderna does not pay cash dividends, but it does repurchase shares. In August 2021, February 2022 and August 2022, it announced it would repurchase shares for the amounts of USD 1 billion, USD 3 billion and USD 3 billion respectively, putting the total at USD 7 billion for an estimated 1.5 years. Announcing the latest repurchase plan, Stéphane Bancel referred to it as "confirmation of the ability to return the capital if we cannot find good use in the company" and as "excess cash that we will return to shareholders".[73]

Pfizer's COVID-19 profits of around USD 35 billion for the period 2021-2022 represent more than half of the company's total profits. The extra profits from COVID-19 vaccines and medicines have not led to substantial extra dividends. Over each of the years 2019, 2020 and 2021, Pfizer paid between USD 8 billion and USD 9 billion in dividends to its common shareholders. In 2022 the payment was USD 9 billion. Pfizer did however repurchase shares. In the first quarter of 2022, it returned capital to shareholders through repurchasing shares for USD 2 billion. In 2020 and 2021 the company did not repurchase shares.[74]

In March 2022, **BioNTech** announced a special cash dividend and a share repurchase to enable "shareholders to participate in our strong 2021 performance". The dividend payment was USD 486 million and they repurchased shares for a total amount of USD 1 billion, ending 10 October 2022. A further repurchase of USD 0.5 billion takes place between 7 December 2022 and 17 March 2023.[75]

Of **Sinovac**'s 2021 net profit totalling USD 14.7 billion, around USD 6.1 billion was attributable to non-controlling interests of Sinovac and its subsidiaries. A profit of USD 8.6 billion remained attributable to Sinovac's shareholders, but the company did not report on dividend payments or share repurchases.[76]

R&D

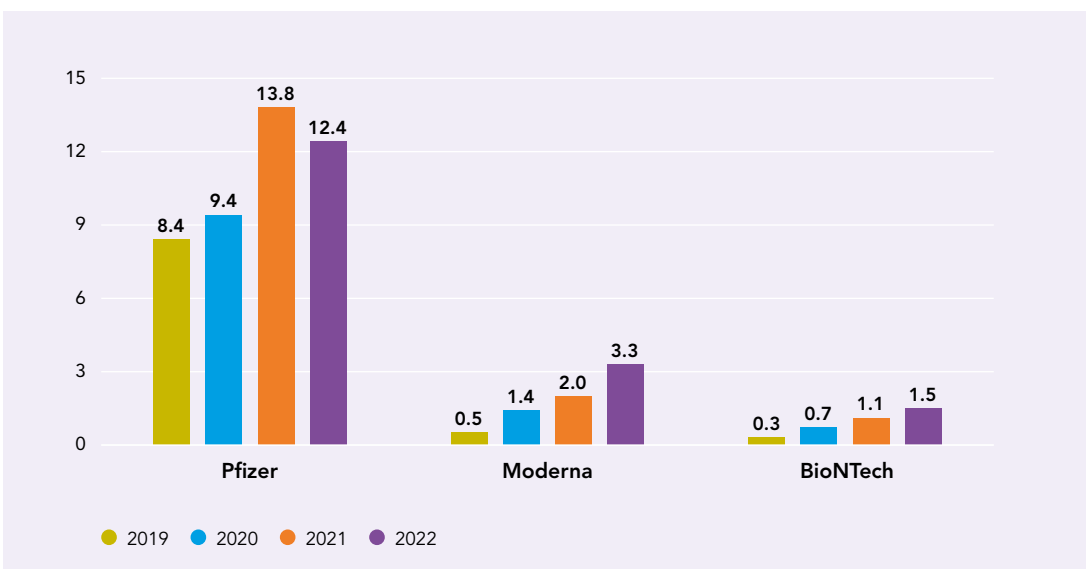
R&D is seen as the lifeline of pharmaceutical companies. The US Congressional Budget Office has stated in a recent report that the amount of money that pharma companies use for R&D is "determined by the amount of revenue they expect to earn from a new drug, the expected cost of developing that drug, and policies that influence the supply of and demand for drugs".[77] This is confirmed in a recent report, commissioned by the Dutch Ministry of Health. The report examined the financial ecosystem of pharmaceutical R&D and concluded that expected revenue is leading and the "overarching conclusion is that a drug's expected financial return ultimately determines whether it is developed up to launch". In this, factors to consider are commercial potential, investment costs, capital availability, but also "the potential for scientific and medical advancement, strategic fit and risk".[78] The same study also mentions a total amount of USD 300 billion invested in R&D in 2020, of which USD 195 billion (almost two-thirds) is spent by pharmaceutical companies and a quarter, USD 75 billion, by the public sector.

Pharmaceutical companies often refer to the "enormous costs" of R&D to emphasise the need for lengthening patents and the need for high prices for medicines. The R&D costs are presented as exorbitant, including failed medicines and the cost of capital. At the same time pharmaceutical companies do not give transparency around the R&D costs, how much they spent on developing the medicines and how much public money went into this development. The high costs of R&D are therefore a picture gladly sketched by the industry to justify the high prices they seek for these medicines. Pharmaceutical companies' corresponding call for high prices often ignores the huge profits generally made in this industry, the lucrative yields for investors and the amount of public funding going into the development of medicines.

The importance of accumulating money for new R&D was emphasised by Pfizer's Medical Director for the Netherlands, Marc Kaptein, who stated in an interview that COVID-19 profits are largely invested in R&D.[79] The figures, however, tell a different story. Although Pfizer more than doubled its profit, a corresponding investment in R&D did not follow.

Figure 2 details the R&D spending of Pfizer[80], Moderna[81] and BioNTech[82] since 2019, according to company statements and/or 2022 forecasts. Sinovac's R&D expenses were USD 155 million, USD 48.8 million and USD 24.3 million in 2021, 2020 and 2019, respectively. During the first half of 2022, its R&D expenses were USD 184 million. The company attributed the increase to investments in COVID-19 vaccines and overseas clinical trials of regular products.[83]

Figure 2 R&D spending by Pfizer, Moderna and BioNTech over the years
in USD billion



Pfizer actually spent less on R&D in 2022 than it did in 2021. In 2021, the R&D expenses were USD 4.4 billion higher than in 2020. The increase was due to an acquisition, payments on collaborative and licensing arrangements with other companies, and additional spending on the development of the COVID-19 medicine Paxlovid. One of the main reasons for the increase in Pfizer's expenses by USD 1 billion in 2020 versus 2019 were costs related to its COVID-19 vaccine collaboration agreement with BioNTech.[84]

Figure 2 shows that R&D spending for Moderna and BioNTech is gradually increasing. It is, however, not clear to what extent R&D spending is related to COVID-19 vaccines, and to what extent there is new R&D resulting from the profits made in 2021 and 2022, as these companies are extending their drug pipelines.

Moderna figures for 2020 and 2021 combined include approximately USD 1.5 billion of COVID-19 vaccine funding from the US government, while in 2022 this funding is significantly lower. Expenditure on COVID-19 vaccines, however, continues in 2022 to some extent. In its quarterly report for the period ending 30 September 2022, Moderna states: "As we continue to develop variant-specific and next-generation COVID-19 vaccine candidates, we expect to continue to incur significant additional expenses."[85] Between October 2021 and November 2022, Moderna also directed three non-COVID-19 vaccines to phase 3, the last of clinical trials. These three vaccines are also based on mRNA technology.[86]

BioNTech figures over 2020 and 2021 combined include USD 0.4 billion of funding from the German Federal Ministry of Education and Research to support its COVID-19 vaccine programme. In its quarterly report for the period ending 30 September 2022, BioNTech does not disclose the amount of the increased R&D spending that is related to COVID-19 vaccines.[87] It does have one non-COVID-19 vaccine in phase 3 of its clinical trials. The vaccine, against seasonal influenza, is also based on mRNA technology.[88]

M&A

Increasingly, large pharmaceutical companies do not spend most of their money on their own R&D processes but buy up smaller firms to replenish their pipelines. Pfizer, which will generate an estimated USD 35 billion of profit from its COVID-19 vaccine and medicine over the years 2021 and 2022, might use much of the extra money for M&A. In 2022 for example, Pfizer completed acquisitions of Biohaven (medicines against migraine), Arena Pharmaceuticals and Global Blood Therapeutics for USD 12.8 billion, USD 6.4 billion and USD 5.6 billion, respectively. The amounts include money paid for the common shares, employee stock awards and preferred shares, and thus benefit share-holders again.[89]

Pharmaceutical companies do not only look for new medicines in their own R&D departments. They can use collaboration agreements, for example, to access innovations. This usually takes place before the clinical stages. When there is clinical proof, there are more M&A deals and large pharmaceutical companies scoop up smaller firms to develop medicines further.

Personal gains

Shareholders were not the only people to benefit from the vast profits made by the pharmaceutical companies. Management also cashed in on the profits and/or the value of the company's shares of stock.

Pfizer decided to reward its CEO Mr Albert Bourla tens of millions "to reflect his exceptional performance and leadership in 2021". He got his salary of USD 1.7 million, plus 250% of his target award, which amounted to USD 8 million. Adding stock and option awards to this, the total pay package was over USD 24 million. The pay package for all of Pfizer's six Named Executive Officers (NEOs) combined was USD 71 million in 2021.[90]

The CEOs of **BioNTech** and **Moderna** became billionaires during the pandemic. BioNTech's CEO, Prof Uğur Şahin was listed #400 on Forbes' real-time billionaires list on 24 November 2022, with assets worth USD 6.1 billion. Moderna's CEO Mr Stéphane Bancel was listed #429, with assets worth USD 5.8 billion.[91] Between January 2020 and February 2022, Mr Stéphane Bancel sold some of his Moderna shares at a total value of approximately USD 408 million.[92]

Novavax was promised funds totalling USD 2.2 billion for the development of its COVID-19 vaccine, including large-scale delivery obligations. The vaccine did not come on the market until 2022, the company has not yet made profits, and as of 30 September 2022 the company had delivered just 94 million doses. The profit picture is different for the top executives of the company. According to insider trading reports filed at the US Securities and Exchange Commission, several of Novavax's top managers sold Novavax shares and profited from the rising share price in the period 2020-21. Novavax's CEO earned over USD 28 million in the period July-October 2021, and over USD 5 million in the period September-November 2020. The company's President of Research and Development also earned tens of millions of dollars in the period 2020-21, as did two Executive Vice Presidents of the company. The profiteering was discussed in a hearing by the US House of Representatives in September 2020, and in several media outlets, yet the top managers kept selling shares at profit in 2021.[93]

Vaccine companies: not the best taxpayers

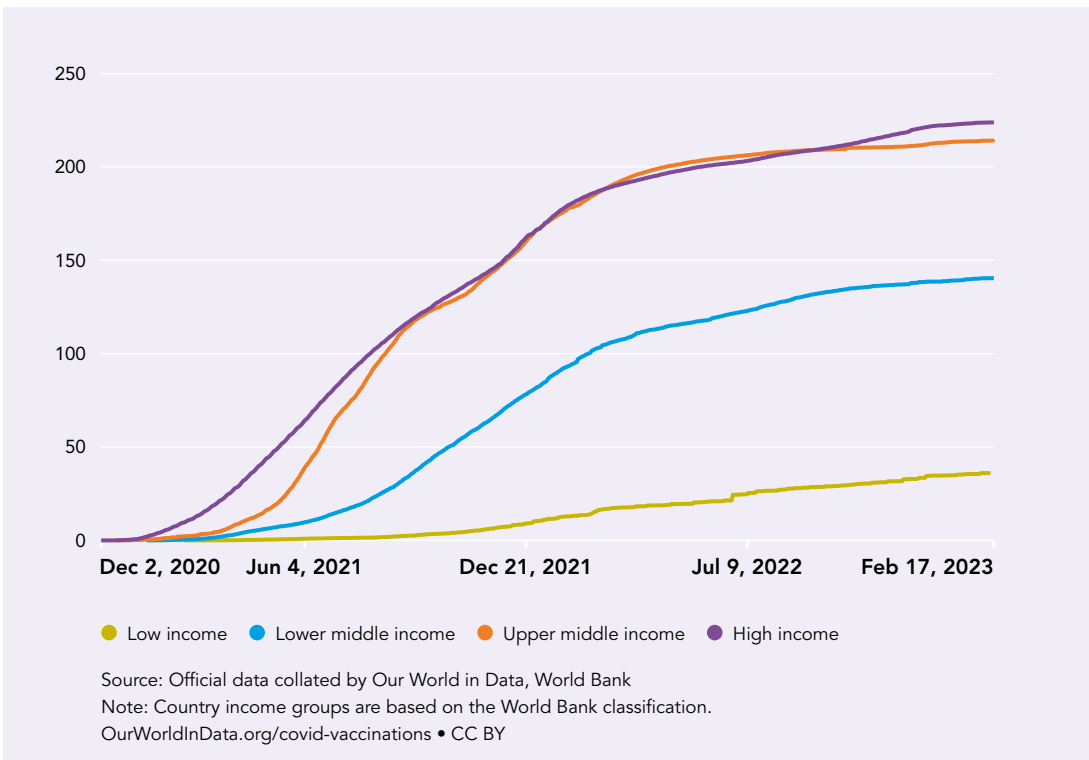
Preliminary research on tax avoidance by Moderna and Pfizer shows that the companies are not paying much tax on their profits. In 2021, SOMO researched tax avoidance by Moderna. Moderna has a considerable number of patent registrations in Delaware state, USA, which will mean untaxed royalties on its patents. The European Commission is invoiced by a Swiss subsidiary of Moderna, which offers low tax rates. SOMO's conclusion was that Moderna's profits were most likely ending up in tax havens in Delaware and Switzerland, where they are taxed at a much lower rate than in other jurisdictions.[94] The Dutch platform for independent investigative journalism Follow the Money published an article on Pfizer's tax avoidance in November 2022. Their research revealed that Pfizer paid a very low tax rate, only 9.3%. which is much lower than corporate tax rates in most countries which is between 18 and 35% (in the Netherlands 25.8%). Almost all of Pfizer's profits are booked in the Netherlands, USD 21.6 billion from a total of USD 22 billion, where no tax is paid. From the Netherlands the money is channelled to other jurisdictions, such as Delaware, where Pfizer pays a very low tax rate.[95]

4 Vaccine companies: vaccine equity

People in low-income countries get fewer vaccines

Vaccine equity means that vaccines should be allocated across all countries based on need and regardless of economic status. This is the definition used on the Global Dashboard for Vaccine Equity, a joint initiative of the United Nations Development Programme (UNDP), World Health Organization (WHO) and the University of Oxford. Although vaccine equity has been proclaimed as the route out of the COVID-19 crisis for countries everywhere, figures show a picture of deep disparity. According to the Global Dashboard for Vaccine Equity, by 30 November 2022 only 28% of people in low-income countries had been vaccinated with at least one dose, compared to 73% in high-income countries. Although this difference is substantial, the figures earlier in the pandemic are even starker. In September 2021, just 3% of people in low-income countries had been vaccinated with at least one dose, compared to 60% for high-income countries.[96] The graphic 3 from Our World in Data shows the difference in vaccine coverage per income group of countries from the moment that vaccines became available.[97]

Figure 3 COVID-19 vaccine doses administered per 100 people per income group
All doses, including boosters, are counted individually



At the end of 2021, an estimated 1.4 billion eligible people needed to be urgently immunised, many of whom were in the highest risk groups for death and serious illness.[98] The skewed distribution of vaccines had a serious impact on, for example, low-income countries in Africa, including Nigeria, Ethiopia, the Democratic Republic of the Congo and South Sudan. These countries lost an estimated USD 20 billion of their Gross Domestic Product (GDP) in 2021 because they had not been able to reach the 40% WHO target of full vaccination by December 2021.[99]

Challenges for vaccine equity

There are different challenges for reaching vaccine equity. One of them is financial constraints. With average annual spending on health care in low-income countries estimated at USD 41 per person, COVID-19 vaccines add a substantial financial burden.[100] Distribution complexities also have to be taken into account, especially when vaccines have to be consistently stored at low temperatures.

But another challenge from the start of vaccine development was that high-income countries were crowding out low- and middle-income countries, among others, through APAs. High-income countries bought their way to the front of the queue. Companies like Moderna and Pfizer favoured high-paying countries. This also caused enormous challenges for COVAX, the WHO-backed multi-lateral initiative for global access to vaccines. COVAX forecasted access to 0.5 billion doses of vaccine by September 2021 for low- and middle-income countries. This proved to be too challenging and only a part of the promised doses was delivered as figure 3 shows. Yet by July 2021, more than 0.8 billion doses had already been administered inside the USA and European Union, acquired through APAs.[101]

Company promises

The People's Vaccine Alliance is a coalition of more than 100 organisations and networks. In a report published in October 2021, it referred to promises made by pharmaceutical companies to strive for equitable and affordable distribution of the vaccines. The report mentioned that at the UN General Assembly in September 2020 16 pharmaceutical companies (which includes AstraZeneca, Pfizer, and Johnson & Johnson) promised to "support equitable and affordable distribution globally".[102] This has not materialised as noted in the report. Instead, most of the vaccines were sold to high-income countries, most with considerable profits, with only a small percentage going to low- and middle-income countries directly or through COVAX or the African Union. Promises made by companies to deliver vaccines to COVAX were not upheld. Countries that were not getting (enough) vaccines through COVAX felt forced to negotiate themselves and thus pay substantially higher prices. For example, Botswana negotiated and paid USD 15 for Sinovac vaccine doses and USD 29 for Moderna doses.[103]

From day one, Pfizer stated that equitable distribution was its North Star. Two conditions had to be met according to the company: a price that anyone can afford, and reliable manufacturing of enough vaccines for all. Pfizer decided in June 2020 that low-income countries would be "offered doses at cost".[104] This cost price was around USD 7 according to UNICEF's COVID-19 Market Dashboard, still

quite a challenge for low-income countries.[105] Most of Pfizer's doses however remained reserved for high-income countries, especially during the first three quarters of 2021 where only 39% of the 40 million promised doses were delivered (which was just 1.3% of its total deliveries).[106] Only later was the vaccine shipped in higher quantities to low-income countries. In September 2022, Pfizer and BioNTech wrote that they had shipped more than 3.8 billion vaccines around the world, including 1.5 billion doses to 112 low- and middle-income countries.[107]

In October 2021, the People's Alliance reported that Moderna had promised 34 million doses to COVAX of which none had been delivered, and that the only Moderna vaccines that were shipped to low-income countries, were donated through other countries. Also, Johnson & Johnson delivered none of the promised 200 million doses to COVAX and delivered only 11% of the doses it sold to the African Union.[108]

> Activist shareholders have proposed at shareholder meetings that companies should make their vaccines available in low-income countries and to transfer technology to other manufacturers. These proposals have not been accepted.[109]

According to the Geneva Graduate Institute in February 2022, the majority of doses from Pfizer/BioNTech and Moderna had been reserved by high-income countries. In comparison, AstraZeneca, Johnson & Johnson, Sinovac, and Novavax have a greater distribution among low- and middle-income countries.[110] In their response to this report, Johnson & Johnson stated that they shipped over 80% of their vaccine doses to low- and middle-income countries.[111]

One question is whether prices influenced equitable access to vaccines globally. The pharmaceutical companies Pfizer/BioNTech and Moderna promised to sell the vaccine at cost price in low-income countries. AstraZeneca and Johnson & Johnson announced that they would not make any profits at all during the pandemic. Without transparency on vaccine costs and without independent verification, it is hard to see how this has worked out. It is clear that the prices paid for AstraZeneca and Johnson & Johnson vaccines are generally much lower than those paid for Moderna and Pfizer/BioNTech. But what is evident, also in the examples in chapter 1 is that vaccines are being sold for different prices in different countries and that the price-range is wide. In the absence of transparency on negotiations and prices, countries have negotiated with pharmaceutical companies in a void. The same concerns around lack of transparency were raised by the WHO in April 2022 with regard to Pfizer's Paxlovid COVID-19 medicine: "However, availability, lack of price transparency in bilateral deals made by the producer, and the need for prompt and accurate testing before administering it, are turning this life-saving medicine into a major challenge for low- and middle-income countries."[112]

Pfizer's Paxlovid: a case of inequity

Pfizer's Paxlovid treatment course for COVID-19 offers a clear example of unequal distribution. As one lawyer at the Washington-based advocacy organisation Public Citizen said in February 2022: "The global community is sleepwalking into yet another great divergence when it comes to medical technologies. We have lived through more than a year of vaccine apartheid. And now we are poised at this moment to see huge inequalities in treatment access."[113]

Pfizer's CEO Albert Bourla stated his company's commitment to vaccine equity on 1 November 2022, saying: "[A]s part of Pfizer's commitment to providing equitable access to COVID-19 oral treatments, we agreed to supply at a not-for-profit price up to 6 million PAXLOVID treatment courses to the Global Fund for low and lower middle-income countries."[114] The Global Fund deal was made in September 2022. Earlier, in March 2022, Pfizer also made a deal with UNICEF for the supply of up to 4 million treatment courses at cost price to 137 low- and middle-income countries. The fulfilment of that order had however been delayed for months, according to a September 2022 article in Nature magazine.[115]

Pfizer also made deals with the US government in 2022, selling 20 million doses at USD 530 dollars each. Over the first three quarters of 2022, the USA generated 62% of Pfizer's Paxlovid revenue, followed by the categories "Developed rest of the world" (18%) and "Developed Europe" (13%). Pfizer's category "Emerging markets", largely comprising low- and lower-middle income countries, generated only 7% of Pfizer's Paxlovid revenue.[116]

On 23 November 2022, Pfizer and the European Union signed an agreement for the delivery of 3.4 million treatment courses to countries across Europe, supplementing the courses provided to 17 European Union member states under existing bilateral agreements. Price details were not disclosed, but it is likely that it was in the range of USD 530 per treatment course.[117]

In short, in 2022 Pfizer made a deal for 20 million treatment courses for the USA, 3.4 million treatment courses for the European Union, and separate deals with European Union member states. All these deals are likely at a price in the range of USD 530 per treatment course, reaping significant profits.

The provision of 10 million treatment courses at cost price to low- and middle-income countries is not only (partly) delayed but also seems a meagre effort to provide equitable access as the population of low- and middle-income countries is much larger than the USA and the European Union.

Pfizer has also made a license agreement with the Medicines Patent Pool (MPP) – a UN-backed organisation that pools intellectual property and supports manufacturing of generics – which gives permission to make Paxlovid generics for 95 low- and lower middle-income countries. A good initiative, but these generics will only be delivered from 2023 on.[118]

APAs caused vaccine inequity

As mentioned above (see chapter 2), APAs allow pharmaceutical companies to develop vaccines almost risk-free, and provide capital and a ready-made demand. For buyers, APAs guarantee supply when the demand is greater than what is available. They also accelerate vaccine development and production. When governments concluded APAs with several pharmaceutical companies they also spread the risk of getting a functioning vaccine.

The risks of having COVID-19 APAs, especially with multiple companies, is that countries were overbuying and/or paying too much. The perception of how many vaccines would be developed in the end was more negative than the reality, and many countries, especially high-income countries, were overbuying. This was however not only a risk for the buying countries, but also for the countries with limited access to the COVID-19 vaccine. During the COVID-19 pandemic, APAs intensified vaccine inequity, delaying access of low- and middle-income countries.[119] High income countries bought large supplies of different vaccines and stockpiled them to the point where they had an excess amount. Part of this stockpile went unused and expired, while low- and middle-income countries struggled to get any vaccines at all.

The European Commission made an agreement with its member states to promote the vaccine as a global public good in negotiations with pharmaceutical companies on APAs. This includes access for low- and middle-income countries, both in quantity and price. The agreement also included a commitment to promoting intellectual property sharing.[120] However, in negotiations with the companies, this agreement was not upheld and, as far as can be assessed, was not included in the contracts.

CEPI provided advanced payments to different institutes and pharmaceutical companies. Among others, USD 328 million to Clover Biopharmaceuticals for development, manufacturing and supply, USD 388 million to Novavax, which includes development but also supply of vaccines, USD 0.9 million to Moderna for development. All in all, in the first seven months of 2020, CEPI provided USD 1.158 billion. CEPI's conditions included equitable access to the vaccines. However, as far as can be assessed, this has not been put into practice.[121]

The contracts and agreements that were made with companies by the European Commission and individual countries as well as with CEPI are not public. Prices remain confidential, although some have been leaked on social media. More information on prices can be found in this report in chapter 1. Public health advocates and government officials have on numerous occasions called on countries and international organisations to do more on transparency and making contracts and prices public, with little effect.[122]

Conclusions and recommendations

The COVID-19 pandemic saw an unprecedented amount of public money being funnelled into the pharmaceutical industry to power vaccine development. The industry itself is highly profitable – more than even the financial and energy sectors. Vaccine-producing companies made even more profits during the COVID-19 pandemic. The pharmaceutical industry also hugely benefits from public money, not only in the early phases of medicine development and pre-clinical testing, but also in the latter stages.

Profiting from the public purse

This pattern was even more evident during the pandemic. Many COVID-19 vaccine producers profited heavily from public funds through grants from governments and international organisations, and through APAs. Several of these pharmaceutical companies (Pfizer, Moderna, BionTech, Sinovac) have made massive profits by selling COVID-19 vaccines for a relatively high price – compared to production costs – mostly to high income countries. In the cases of Moderna and Pfizer, profits have ended up in tax havens where they are taxed at a very low rate.

Only a small proportion of these lavish profits are invested in R&D to develop new medicines. Instead, companies are using the profits to pay dividends and repurchase shares, all to the benefit of shareholders. Companies have also sunk huge sums from their profits into mergers and acquisitions. For example, Moderna, which profited tremendously from public grants and APAs, made about USD 20 billion in 2021 and 2022. In those same years, they only invested USD 5.3 billion in R&D. They chose, however, to spend much more on investors: from August 2021 they repurchased shares for a total of USD 7 billion. Pfizer doubled its profit in 2021, mainly through its COVID-19 vaccine yet spent even less on R&D in 2022 than in 2021.

Given the billions in profits these companies have made, it is extraordinary that, for instance, Moderna still made an agreement with BARDA for a grant in 2022 and is still spending that public money when it can clearly afford to use its profits instead.

At the same time, several companies did promise not to profit from the pandemic with their COVID-19 vaccines. In this report, Johnson & Johnson as well as AstraZeneca's profits were, as far as can be established, very low to non-existent. AstraZeneca, however, did make a profit on its COVID-19 medicine (so non-vaccine) in 2022.

Governments pay out to jump the queue

In the scramble for vaccines, governments did not, as far as can be established, make agreements on equitable access, prices, patent waivers, patent pools and profits. While governments were giving grants to pharmaceutical companies and agreed to APAs worth tens of billions of US dollars, they

failed to use their donor and purchasing power to ensure any protections. Governments were too eager to get vaccines for their own populations, and were willing to pay excessively to be among the first to get them, as a means to lift their country out of the health, social and economic crisis. Meanwhile, the companies that received the grants and were paid in advance for development and production through APAs, made sure that that they kept total control over the patents and production, distribution and prices.

Principle of equitable access remains unfulfilled

From the outset, efforts to guarantee equitable access to COVID-19 vaccines were thwarted. Despite European governments agreeing with the European Commission that vaccines are a global public good, and that access to them for low- and middle-income countries must be affordable and in sufficient quantities, high-income countries put themselves first. Through APAs, they crowded out low- and middle-income countries, that as a consequence received very low numbers of vaccines, especially in the first year of production. Even two years after the first vaccines were approved, they still did not reach much of the world's population.

Vaccines that were approved in record time remain slow to reach low-income countries. Thus, the record time in which these vaccines were produced and approved made little difference to low-income countries that were effectively left behind.

As for the pharmaceutical companies, they paid lip service to the idea of vaccine equity while doing nothing to make sure this would become a reality. As companies such as Moderna, Pfizer, and BioNTech profited most from deliveries to high-income countries, this is where they shipped their vaccines first.

And so, although the vaccines of the seven companies discussed in this report were developed with USD 5.8 billion in grants, and while a total of probably more than USD 86.5 billion in APAs were spent on all vaccines thus removing any development and production risk, the enormous profits from this public spending ultimately ended up in the pockets of vaccine developers and shareholders.

Post-pandemic price hikes

Assuming that fewer vaccines will be sold in the coming years, companies are already looking for ways to keep their profits up by attaching a commercial, non-pandemic price to their vaccines. The pharmaceutical companies claim that the price of their vaccines should reflect their true value – and that they had been sold below value during the pandemic. The question remains whether medicines should be priced at value or whether they should reflect costs and a modest profit. Considering the amount of public money that went into the development and production of vaccines, and the lavish profits made so far through already above-cost prices, it is unclear how additional price rises can be justified.

The fact is that prices already rose during the pandemic, as has already been shown for Moderna and Pfizer in this report. Figures published in this report show that the COVID-19 pandemic had three clear winning pharmaceutical companies: Pfizer, BioNTech and Moderna. Not only did they make enormous profits in 2021, they also continued making profits in 2022, and are the companies that provide the most preferred COVID-19 vaccines. Pfizer more than doubled its profit as a company, BionTech and Moderna were new companies producing their first medicine and made immediate steep profits. Sinovac profited extensively in 2021, but as far as can be established, did not in 2022. Novavax just started delivering its vaccine at the end of 2021. It remains to be seen whether Novavax can still turn a profit from its vaccine.

Pharmaceutical companies are putting profits and shareholders before the production of medicines and in this case vaccines. Medicines with a high need but a low expected profit are rarely developed without public financing. Medicines are priced at what companies see as the value of a medicine, and what will bring high returns that please shareholders. They do this regardless of public investment, R&D costs, production costs, or whether there's a health crisis. These actions combined distort the affordability of and access to vaccines and other medicines.

COVID-19 vaccines have certainly helped to slow down the pandemic, and the value of this is of course enormous. The costs of the pandemic, including the amounts of public money channelled into the development and production of vaccines, have also been enormous. We need a better system than one where pharmaceutical companies can set their own prices – protected by patents – unchallenged. The pandemic affirmed an unsustainable and imbalanced power relationship, in which governments negotiated with their backs against the wall.

Future pandemics: recommendations

To governments

- As the threat of future pandemics looms large, governments must ensure that public spending is governed by values that promote the global public good. As such, governments are urged to attach clear and enforceable conditions to public investments in R&D and production costs. Because of the nature and urgency of pandemics, it is important that conditions do not only benefit certain nations or regions, but are directed to benefit the global population with specific attention to the most vulnerable. These conditions could include, but are not limited to:
  - Ensuring transparency on production costs, amount of public funding, pricing, R&D costs and on conditions of availability
  - Promoting and ensuring equitable access globally
  - In the case public money is invested, governments enforce a cost-plus model on the pricing of medical products used in pandemics. This price is based on the transparent R&D costs of the product plus a fair profit margin capped at a maximum percentage.
  - One possible route for profits resulting from "windfalls" could be to implement windfall taxes above a certain profit-ceiling.

Windfall taxes

A windfall tax would entail a higher tax rate on profits from companies, that come from an unexpected windfall, that the companies are not responsible for. The purpose would be to redistribute the sudden increase of wealth to the wider population. This type of tax is recently being used in the energy sector. In the Netherlands for example electricity companies are profiting from the high gas prices as the prices for gas and electricity are linked, even though the cost of electricity does not increase at the same rate. In 2022 these companies will have to pay an extra windfall tax above a certain unit-price. The UK is also taxing gas and oil companies extra because of their profits stemming from high oil and gas prices. In the case of the COVID-19 pandemic (and future pandemics), companies that make substantial profits could be subjected to higher windfall taxes. Additionally, for companies that profit from COVID-19 vaccines, a tax of 90% above cost-price may be appropriate, seeing the windfall of the pandemic and that so much public money is involved.

- Governments should embrace vaccine equity and avoid hoarding vaccines/medicines through initiating and respecting global initiatives. Vaccine stockpiling was a feature of many high-income countries' pandemic behaviour and must not be repeated.

- All governments should sign up to a strong pandemic accord. This means supporting the WHO in setting up an instrument that will "prevent, prepare for and respond to future pandemics".[123]

To companies

- Companies have to be transparent on R&D costs and the share of public financing, both on product level. They have to be transparent on the production costs of medicines and the profit share.

- Companies have to pay more than lip service to vaccine equity. When following a tiered-pricing strategy companies should make sure that they deliver the vaccines equally globally.

- Access to medicines is an essential component of the right to health and is a shared responsibility of governments and companies. Companies have to adapt their prices and profit to exceptional health crises that have global implications. In general, but especially in such times, pharmaceutical companies have to step up and accept that their role should not be profit seeking but developing and delivering medicines. This is indeed possible as shown during the COVID-19 pandemic where several companies, including AstraZeneca and Johnson & Johnson, announced they would not profit from vaccines.

To all

- Governments, companies and institutes should support knowledge transfer mechanisms, support removing Intellectual Property barriers, and enable the sharing or pooling of knowledge and intellectual property through initiatives such as the COVID-19 Technology Access Pool (C-TAP), the Medicines Patent Pool (MPP), mRNA hub, (TRIPS) waivers and other suitable initiatives.

Annex 1 Company profile Pfizer

Short description

Pfizer is one of the world's largest pharmaceutical companies. A US-based company, its headquarters are in New York. Pfizer's common stock trades on the New York Stock Exchange under the symbol PFE. Over 2021, the company generated a revenue of USD 81.3 billion, and a profit of USD 22 billion. Pfizer ranked 25th in the Fortune Global 500 of companies with the highest 2021 profits. For 2022, its revenue amounted to USD 100.3 billion, and its profit was USD 31 billion.[124]

Vaccine sales and profits

In 2021, sales of COVID-19 vaccines were USD 36.9 billion – 45% of Pfizer's revenue. Over 2022, COVID-related revenues amounted to USD 56.7 billion – 57% of the company's total revenue.

COVID-related revenues came from sales of the COVID-19 vaccine (Comirnaty or BNT162b2) and since 2022 also from sales of Pfizer's oral COVID-19 treatment (Paxlovid). Pfizer has been collaborating with the company BioNTech on the development of Comirnaty, and on the sales of the vaccine. Pfizer has global marketing and distribution rights, except for China, Germany and Turkey. Pfizer and BioNTech have agreed to equally share their gross profits from the sales. As Pfizer does not collaborate with another company on Paxlovid, it does not need to share the gross profits from Paxlovid sales.[125]

Available data shows the dominance of Pfizer/BioNTech's vaccines and boosters within the USA and European Union. According to the website Our World in Data, Pfizer/BioNTech have a combined market share of 67% of all administered doses in the European Union and USA as of 12 October 2022. Taken separately, market share of the European Union was 72% and of the USA, 59%.[126] In January 2023, Pfizer claimed that its market share was 64% in 2022 in the USA.[127]

Pfizer's profits and profit margins were much greater in 2021 and 2022 compared to the year 2020, mainly due to the sales of Comirnaty and Paxlovid. Over 2019, Pfizer's earnings were higher than average due to a USD 8 billion gain from partially selling its Consumer Healthcare Business.[128] In early 2021, a Pfizer executive said that the profit margins for the COVID-19 vaccine were in the high 20s as a percentage of the revenue. Pfizer has not revealed its margins since then, but assuming that Pfizer's non-COVID related business had the same margins in 2020 and 2021, the profit attributable to common shareholders was USD 12.3 billion, or 33% of the sales of COVID-19 vaccines in 2021. This higher margin is likely related to lower unit costs than expected, as early 2021 the executive also said: "The more volume we put through our factories, the lower unit cost will become." Another possibility is that Pfizer had been increasing its prices for deliveries in 2021. "Obviously, we're going to get more on price. (….) So clearly, there's a significant opportunity for those margins to improve once we get beyond the pandemic environment that we're in," the executive also said.[129]

In January 2023, Pfizer reported a 2022 revenue for Comirnaty of USD 38 billion, and for Paxlovid of USD 19 billion. The company's 2022 profit was USD 31 billion, larger than its 2021 profit of USD 22 billion. Pfizer's profit attributable per common share (diluted) rose from USD 1.63 in 2020 to USD 3.85 in 2021 to USD 5.47 over 2022.[130]

In December 2021, Pfizer planned to manufacture 80 million treatment courses of Paxlovid the following year. However, presenting the results of the third quarter of 2022, it announced an amount of USD 400 million spent buying excess raw materials for Paxlovid in the event of urgent need.[131] This means the company is unlikely to have produced 80 million treatment courses in 2022. In November 2021, it signed a USD 5.3 billion dollar contract with the US government for delivery of 10 million treatments. This contract included a clause allowing the US government to get a lower price if one of a handful of other wealthy countries received a better Paxlovid deal.[132] The US government bought another 10 million treatment courses in January 2022, to be delivered that year, likely at the same price of USD 530 per treatment course. These two contracts for a total of 20 million treatment courses likely explain the USD 10.5 billion Paxlovid revenue within the United States in 2022, which is 55% of Pfizer's total Paxlovid revenue of USD 18.9 billion over 2022.

In January 2023, the company reported that 12 million Paxlovid treatment courses were actually demanded in 2022. The company arrived at this estimate of 12 million through multiplying the estimated amount of symptomatic patients treated with oral therapy (14 million) with the estimated Paxlovid share of oral antiviral market (86%). The prognoses for 2023 are a demand of 17 million treatment courses.[133]

Researchers at Harvard University have estimated that the generic price of a 5-day Paxlovid treatment course amounts to USD 73.15. The generic price is made up of production costs, profit margin (10%) and tax on profit (26.6%).[134] This data as well as Pfizer's profit data over 2022 show that Pfizer's profit margin on Paxlovid is much higher than the margin for Comirnaty. This is largely explained by the fact that Pfizer needs to share the gross profits of Comirnaty sales with BioNTech, but even when eliminating this factor the margin seems higher. Pfizer's CFO mentioned late January 2023 that the profitability of Paxlovid was "probably a bit on the larger higher-margin side." The company also states that it sold its treatment courses at "pandemic prices" in 2022. In the second of half of 2023, Pfizer expects to start selling Paxlovid through commercial channels at commercial prices.[135]

On fair distribution of Paxlovid worldwide, Pfizer's CEO Albert Bourla said on 1 November 2022: "And as part of Pfizer's commitment to providing equitable access to COVID-19 oral treatments, we agreed to supply at a not-for-profit price up to six million PAXLOVID treatment courses to the Global Fund for low and lower middle-income countries."[136] Compared to the 20 million treatment courses delivered to the US government in 2022, these six million treatments amount to a meagre effort in providing equitable access.

In May 2021, the European Union signed a USD 35 billion agreement with Pfizer/BioNTech for 1.8 billion vaccine doses. The first 900 million doses would be supplied starting in December 2021, with an option for another 900 million doses to be delivered through 2023. The new price for a Pfizer shot was EUR 19.50. Former deliveries to the European Union were at a price of EUR 15.50. An official close to the negotiations between the European Union and Pfizer/BioNTech and

Moderna was quoted in the Financial Times stating that the companies had used the "usual pharma rhetoric. Vaccines work so they increased the 'value'".[137]

Table 9 Profit and COVID-related revenues by Pfizer in USD billion

	2022	2021	2020	*2019*
Comirnaty sales within Pfizer territory	36.8	<35.8	0.2	*0.0*
Comirnaty gross profit from BioNTech sales	est. 1.0	>1.0		
Paxlovid sales	18.9	0.1	0.0	*0.0*
Sales of COVID-19 vaccines and medicines	**56.7**	**36.9**	**0.2**	**0.0**
Non-COVID related revenue	43.6	44.4	41.5	*40.9*
Total revenue	**100.3**	**81.3**	**41.7**	**40.9**
% COVID-related of total revenue	**57**	**45**	**0.4**	**0**
Profit after income tax	31.4	22.0	9.2	16.0
Estimated COVID-19 profit after tax	21.8	12.3	0	0
Cash dividends declared (common shares)	9.0	8.8	8.6	8.2
Dividends per common share	1.60	1.57	1.53	1.46

Geographical distribution of COVID-19 related revenues

Pfizer's unaudited reports, filed at the US Securities and Exchange Commission, also provide some insight into the geographical distribution of COVID-19 related revenues. The geographical distribution of Paxlovid revenues in 2022 is particularly striking (see table 10). The category "Emerging markets" comprises low- and lower-middle income countries, and generated only 8% of Pfizer's Paxlovid revenue during 2022 while the USA generated 55% and "Developed Europe" 17%. The USA and "Developed Europe" combined generated 52% of the Comirnaty revenues during 2022, versus 47% over 2021.[138]

Table 10 Geographical distribution of COVID-19 related revenues

Region	Comirnaty				Paxlovid	
	2022		2021		2022	
	USD billion	%	USD billion	%	USD billion	%
USA	8.8	*23*	7.8	21	10.5	55
Developed Europe	10.8	29	9.4	26	3.2	17
Developed rest of world	8.3	22	8.2	22	3.7	20
Emerging markets	9.9	26	11.4	31	1.5	8
Total	**37.8**	**100**	**36.8**	**100**	**18.9**	**100**

Where do the profits go?

Pfizer has been or will be paying more than USD 8 billion in dividends to its common shareholders over each of the years 2019, 2020, 2021, and 2022. Even after deducting this dividend from the profit attributable to common shareholders, there still remained USD 7.8 billion and USD 13.2 billion, respectively, for the years 2019 and 2021.

In 2022, apart from paying dividends, Pfizer also repurchased shares to return capital to its shareholders. In March 2022, Pfizer spent USD 2 billion to repurchase 39.1 million shares, at an average cost of USD 51.10 per share. In the years 2020 and 2021, Pfizer had not repurchased shares.[139]

On 31 January 2023, Pfizer stated that during 2022 it had deployed its capital as follows:

- Internal R&D: USD 11.4 billion.
- Completed business development transactions, net of cash acquired, including approximately USD 12.7 billion for the acquisition of Biohaven, USD 6.4 billion for the acquisition of Arena Pharmaceuticals, and approximately USD 5.6 billion for the acquisition of Global Blood Therapeutics.
- Cash dividends: USD 9.0 billion.
- Share repurchases to return invested capital: USD 2.0 billion.[140]

Much of Pfizer's available money from COVID-19 profits are likely to be invested in M&A. In December 2021, SVB Securities analysts projected that Pfizer could have USD 175 billion in M&A firepower by the end of 2022. Included in this figure was Pfizer's plan to sell the remainder of its Consumer Healthcare business for an estimated USD 16 billion.[141]

Pfizer presented its outlook for 2030 revenues at the launch of its 2022 Q3 financial results. Compared to its 2025 baseline revenue, which was not specified, the company estimated the following revenue changes going into 2030:

- A decrease of USD 17 billion from losses of exclusivity to sell products.
- An increase of at least USD 25 billion of risk adjusted revenues. The company expects that one third of this increase will be provided by its done deals for Arena, Biohaven, Global Blood Therapeutics and ReViral. In addition, the company stated that it has "more than enough capital" to invest in "additional opportunities needed to meet or exceed this target".[142]
- An increase of approximately USD 20 billion through 15 in-house developed projects. Pfizer expects that in the next 1.5 years it will bring 19 new products to the market, of which over two thirds "have the potential to be blockbusters", according to the company.[143]

The expected revenue increases of USD 20 and USD 25 billion are non-COVID related. On Comirnaty and Paxlovid, Pfizer's CEO Albert Bourla stated that it is not "unreasonable to think" the company could have a USD 15 billion franchise in 2030. This would depend on how the virus will develop and whether it will be standard to vaccinate COVID-19 together with flu.[144]

Currently, a minimal amount of Pfizer's COVID-19 profits are invested in R&D. The company actually spent less on R&D in 2022 than it did in 2021. In 2021, the R&D expenses were USD 4.4 billion higher than in 2020. The increase was mainly due to:

- The acquisition of the company Trillium;
- Payments related to arrangements with the companies Arvinas and Beam;
- Additional spending on the development of the COVID-19 medicine Paxlovid.

One of the main reasons why Pfizer's expenses in 2020 increased by USD 1 billion compared to 2019 was costs related to its COVID-19 vaccine collaboration agreement with BioNTech.[145]

Table 11 Research and development expenses (USD billion)[146]

	2022	2021	2020	*2019*
Internal research and development expenses	11.4	10.4	N/A	*N/A*
Acquired in-process research and development expenses	1.0	3.4	N/A	*N/A*
Total	**12.4**	**13.8**	**9.4**	**8.4**

In November 2022, Follow the Money published an article on Pfizer's tax avoidance strategies. Their research revealed that Pfizer paid just 9.3% tax, which is a very low rate, compared to the corporate tax rates which in most countries are between 18 and 35% (in the Netherlands 25.8%). Almost all of Pfizer's profits – USD 21.6 billion out of a total of USD 22 billion – are booked in the Netherlands, USD 21.6 billion from a total of USD 22 billion, where no tax is paid. From the Netherlands the money is channelled to other jurisdictions, such as Delaware state, USA, where Pfizer pays a very low tax rate.[147]

Public funds used for development of the vaccine

In contrast to other companies, Pfizer did not participate in clinical trial coordination of the US government or receive grants in the context of OWS. According to an article in the Financial Times, Pfizer rejected US government money to develop its vaccine "so it could keep complete control of the vaccine, including the crucial issue of pricing." In July 2020, Pfizer's CEO responded angrily to executive orders by President Trump aimed at lowering the prices asked by drug companies.[148]

While rejecting governmental funds, according to Mr Paul Mango, the former Deputy Chief of US Health and Human Services, Pfizer still depended heavily on the assistance of the US government within OWS "with packaging, distribution, and administering its doses."[149]

Pfizer may have rejected US government money for vaccine development, through its collaboration partner BioNTech it did indirectly benefit from governmental funds for the development of the vaccine. BioNTech received up to EUR 375.0 million from the German government to support its COVID-19 vaccine programme. The German government granted the funding for vaccine development, including testing the COVID-19 vaccine in clinical trials, and upscaling manufacturing capabilities in Germany.[150]

The table below shows the delivery agreements on vaccines that Pfizer and Moderna made with the US government. These delivery agreements may also include development costs for vaccines, such as in 2022 an inclusion of the Omicron component. Therefore, in this report the delivery agreements

are not called APAs, as this might suggest deals for selling products only. The delivery agreements however included APAs, which by themselves already transfer risk from suppliers to buyers.[151]

Table 12 Agreements including deliveries between the US government and Pfizer

Company	Name medicine	Date agreement	Amount USD billion	Doses to be delivered million	Price per dose USD
Pfizer	Comirnaty	21 July 2020	2.0	100	19.5
Pfizer	Comirnaty	22 December 2020	2.0	100	20.1
Pfizer	Comirnaty	11 February 2021	2.0	100	20.1
Pfizer	Comirnaty	21 July 2021	4.9	200	24.3
Pfizer	Comirnaty	22 October 2021	1.2	50	24.6
Pfizer	Comirnaty	29 June 2022	3.2	105	30.5
Total Pfizer			**15.3**	**655**	**23.3**

Shareholders

Pfizer's common stock trades on the New York Stock Exchange under the symbol PFE. As of 31 December 2021, Pfizer's three largest shareholders accounted for 20.7% of the company's common stock. According to the Nasdaq stock exchange, institutional owners accounted for 69.24% of the outstanding Pfizer shares as of 30 June 2022.[152]

Table 13 Pfizer's main shareholders over the years

Shareholder	% of common stock		
	31 December 2021	31 December 2020	31 December 2019
The Vanguard Group	8.3	8.1	8.1
Blackrock	7.3	7.1	7.7
State Street Corporation	5.1	5.0	5.3
Total	**20.7**	**21.2**	**21.1**
Share price	**59.05**	**36.81**	**37.17**

Annex 2 Company profile BioNTech

Short description

BioNTech was founded in Germany. According to its Annual Report 2021: "BioNTech was founded by scientists and physicians to translate science into survival by combining fundamental research and operational excellence." BioNTech's common stock has traded on the Nasdaq stock exchange since October 2019. The company has incurred losses in the past of EUR 0.4 billion as of 31 December 2020. This changed in 2021, when BioNTech's profit after income tax soared to EUR 10 billion, due to COVID-19 vaccine sales. The two largest shareholders of the company are the German Strüngmann family, and the CEO of the company, Prof Uğur Şahin. Together, they own over 60% of the shares. [153]

Vaccine sales and profits

With Pfizer, BioNTech delivered approximately 2.6 billion doses of COVID-19 Comirnaty vaccines as of the end of 2021. BioNTech's COVID-19 vaccine revenues amounted to EUR 18.8 billion in 2021 (equivalent to USD 22.2 billion), and generated a profit after income tax of EUR 10.3 billion (equivalent to USD 12.2 billion). In the first nine months of 2022, COVID-19 vaccine revenues were EUR 12.9 billion (equivalent to USD 13.7 billion), with profit after income tax coming to EUR 7.2 billion (equivalent to USD 7.6 billion).[154]

BioNTech's COVID-19 vaccine revenues of EUR 12.9 billion over the first nine months of 2022 can be broken down into three categories:

- A revenue of EUR 9.1 billion came from a share of the gross profit generated by its collaboration partners, Pfizer and Fosun Pharma. Pfizer has worldwide marketing and distribution rights with the exception of China, Germany and Turkey. Fosun Pharma has marketing and distribution rights in China, Hong Kong, Macau, and Taiwan. Fosun Pharma's business was small, compared to the Pfizer/BioNtech partnership. It sold 8 million doses during the first half of 2022, while Pfizer/BioNTech invoiced for 1.2 billion doses.
- BioNTech has marketing and distribution rights in Germany and Turkey. Its vaccine sales amounted to EUR 2.3 billion. The share of gross profit that BioNTech owes Pfizer is recognized as cost of sales in BioNTech's bookkeeping.
- Sales of drug product batches manufactured by BioNTech for collaboration partners amounted to EUR 1.5 billion.[155]

In November 2022, BioNTech expected its 2022 revenue to be in the range of EUR 16 billion to EUR 17 billion.[156]

Table 14 COVID-19 profit and vaccine revenues by BioNTech (EUR billion)

	2022 Q1-Q3	2021	2020
Share of gross profit Pfizer and Fosun Pharma	9.1	14.8	
Vaccine sales by BioNTech in Germany and Turkey	2.3	3.0	
Sales to partners of products manufactured by BioNTech	1.5	1.0	
COVID-19 vaccine revenues	**12.9**	**18.8**	**0.3**
Profit after income tax	**7.2**	**10.3**	**0.0**

Where do the profits go?

The Annual General Meeting of shareholders, held on 1 June 2022, voted in favour of a special cash dividend of EUR 2 per share (including shares held in the form of American depositary shares, or ADS), which corresponds to a total amount of approximately EUR 486 million based on shares outstanding on 30 March 2022.[157]

In March 2022, BioNTech announced that it would repurchase shares to enable "shareholders to participate in our strong 2021 performance", next to its dividend offer. Between 2 May and 2 November 2022, the company intended to repurchase its own shares for up to USD 1 billion.[158]

BioNTech outlined two possible ways it was spending its lavish profits:

- Invest in R&D to build out its global development organization and to diversify its therapeutic area footprint. The company forecasted that it would spend between EUR 1.4 billion and EUR 1.5 billion on R&D in 2022. The company's main therapeutic areas are cancer and infectious diseases. In the first nine months of 2022, it spent EUR 1.0 billion on R&D. In 2020 and 2021, the company spent EUR 0.6 billion and EUR 0.9 billion on R&D, respectively.[159]
- Strengthening capacity through complementary acquisitions, technologies, infrastructure and manufacturing. With regard to acquisitions, Ryan Richardson, Chief Strategy Officer, said in August 2022 that BioNTech expects to pursue deals in the second half. "We are currently evaluating a wide range of opportunities, which can complement and expand both our pipeline and technology toolkit," he said.[160] In November 2022, BioNTech acquired a manufacturing site in Singapore to create an mRNA facility.[161] In January 2023, BioNTech announced that it will acquire InstaDeep, a technology company in the field of artificial intelligence and machine learning, for up to GBP 562 million (equivalent to USD 683 million).[162]

Public funds used for development of the vaccine

BioNTech received up to EUR 375 million from the German Federal Ministry of Education and Research, in September 2020, to support its COVID-19 vaccine programme. The German government granted the funding for vaccine development, including testing the COVID-19 vaccine in clinical trials, and upscaling manufacturing capabilities in Germany.[163] During 2021, the remaining amounts from the EUR 375 million were spent.[164]

BioNTech and its collaboration partner Pfizer did not participate in government clinical trial coordination, nor did it take federal dollars in the context of OWS.

Shareholders

BioNTech's common stock is traded on the US-based Nasdaq Stock Market under the ticker symbol BNTX. Members of the German families of Thomas and Andreas Strüngmann are the main shareholders of BioNTech. Another major shareholder of BioNTech is the company Medine GmbH. Prof. Uğur Şahin, the CEO of BioNTech, holds most of the shares of Medine GmbH. He is also the founder of BioNTech, together with his wife, Dr Özlem Türeci. She is Chief Medical Officer of BioNTech.[165]

Prof Uğur Şahin was listed #400 on Forbes' real-time billionaires list on 24 November 2022, with assets worth USD 6.1 billion.[166]

Table 15 Main shareholders of BioNTech over the years

Shareholder	% of common stock		
	31 December 2021	31 December 2020	14 February 2020
Shareholders owning more than 5% of the shares			
AT Impf GmbH/Athos Kg (families of Thomas and Andreas Strüngmann)	43.8	47.4	50.3
Medine GmbH (Prof Uğur Şahin)	17.1	17.3	18.4
MIG Verwaltungs AG	<5.0	<5.0	6.0
Entities affiliated with Fidelity Management & Research LLC	<5.0	<5.0	5.6
Total shareholders owning more than 5% of the shares	**60.9**	**65.0**	**80.3**
Some other shareholders			
Pfizer	2.5	2.5	0.1
Members supervisory or management board (other than Prof Uğur Şahin)	2.1	2.5	3.1
Percentage of total outstanding shares	**65.5**	**70.0**	**83.5**

Annex 3 Company profile Moderna

Short description

Moderna was founded in 2010, and its headquarters are in Cambridge, Massachusetts, USA. Its official name is Moderna, Inc. The company is incorporated in the US state of Delaware, which is a tax haven as well as a secrecy jurisdiction. Moderna works on medicines made of mRNA. Its common stock has traded on the US-based Nasdaq stock exchange since December 2018. As of 31 December 2021, the five largest shareholders owned 37.4% of the shares. Moderna's two CEOs, Mr Stéphane Bancel and Mr Afeyan Noubar, are among the five largest shareholders. The other three large shareholders are institutional owners. The company's only commercial product so far is its COVID-19 vaccine, marketed as Spikevax.[167]

Vaccine sales and profits

Moderna's product sales of COVID-19 vaccines over 2021 and 2022 were USD 17.7 billion and USD 18.4 billion, respectively.[168]

69% of Moderna's product sales in 2021 came from Europe (39%, mainly inside European Union) and the USA (30%). Moderna delivered approximately 807 million doses of its COVID-19 vaccine to governments in 2021, and it revealed that 332 million doses were delivered to the US government. Moderna did not reveal the amount of its 2021 deliveries to the European Union, but an estimate can be made based on European Union information on contracts (see table on contracts and prices below). There is a striking difference between the average prices paid by the US government and European Union for 2021 deliveries: USD 16.51 versus USD 23.64. The European Union paid 43% more per dose than the US government did.[169]

According to Moderna, it worked with the USA, the European Union and Norway to facilitate delivery of 138 million doses of its COVID-19 vaccine to COVAX and low- and middle-income countries in 2021. These, what Moderna calls "facilitated donations", are in addition to the sale of almost 70 million doses to COVAX and low- and middle-income countries.[170] It is unclear if and when these doses were delivered. Moderna was heavily criticised in October 2021 for not delivering any vaccine to low-income countries. According to an article published in Global Citizens in October 2021, of the 442 million doses that Moderna shipped at that time, 430 million were delivered to high-income countries, 6 million to upper-middle-income countries, 5.5 million to lower-middle-income countries and none to low-income countries. The 1 million Moderna vaccine doses that were delivered to low-income countries were donated by the US government. In May 2021, Moderna struck a deal with COVAX to supply 500 million doses, but only a small part would be delivered in 2021.[171]

The donations to low-income countries occurred mainly in the last three months of 2021, after people in Europe and the USA were already vaccinated. Moderna has stated that Gavi-eligible countries will get Moderna's lowest prices, and it agreed to have this commitment annual audited

by an independent third-party. Moderna has enabled Gavi to purchase up to 100 million doses of updated variant-specific COVID-19 vaccines in 2023 on behalf of the COVAX facility.[172]

Table 16 Contracts and prices behind Moderna's 2021 revenue for European Union and US government, estimated

Date agreement	Other party	Doses delivered million	Price per dose USD	Estimated revenue USD billion	Estimated 2021 revenue USD billion	Estimated average price per dose USD
11 Aug 2020	US	100	15.3	1.53	5.48	16.51
11 Dec 2020	US	100	16.7	1.67		
11 Feb 2021	US	100	17.5	1.75		
15 Jun 2021	US	32	16.5	0.53		
25 Nov 2020	EU	80	22.6	1.81	5.91	23.64
15 Dec 2020	EU	80	22.6	1.81		
17 Feb 2021	EU	90	25.5	2.29		

In November 2022, Moderna estimated that its full year 2022 product sales would be in the range of USD 18 and USD 19 billion. In November 2022, the company wrote that confirmed APAs currently represented USD 4.5 to USD 5.5 billion in anticipated product sales in 2023. The company expects additional sales in key markets, including the USA, European Union, Japan, Middle East, Latin America and Asia Pacific in 2023.[173]

Available data shows the prominent presence of Moderna's vaccines and boosters within the USA and European Union. During the first nine months of 2022, 58% of Moderna's product sales came from Europe (33%) and the US government (25%).[174] According to the website Our World in Data, the figures for administered doses within the European Union and the United States suggest a combined market share of 26% for Moderna as of 12 October 2022. Taken separately, the European Union and USA's individual market shares were 17% and 38%, respectively.[175]

The decrease of the net profit margin is notable: from 66% in 2021 to 49% in the period 2022 Q1-Q3. Comparing the data for these two periods shows that the cost of sales and to a lesser extent R&D expenses have gone up. Moderna provides some explanation in its quarterly report for the period ending 30 September 2022: "These increases [of cost of sales] were mainly due to write-downs for excess and obsolete inventory related to our COVID-19 vaccines, unutilized manufacturing capacity and losses on firm purchase commitments of raw materials, driven by a shift in product demand."[176]

When finishing this report, Moderna had not yet published its financial statements over the last quarter of 2022. In January 2023, the company mentioned that its product sales of COVID-19 vaccines were USD 18.4 billion in 2022.[177]

Table 17: Profit and COVID-related revenues of Moderna in USD billion

	2022 Q1-Q3	2021	2020	2019
Product sales COVID-19 vaccine	13.6	17.7	0.2	0.1
Grant and collaboration revenue	0.6	0.8	0.6	0.1
Total revenue	**14.2**	**18.5**	**0.8**	**0.1**
Profit after income tax	6.9	12.2	(0.7)	(0.5)
Net profit margin	**49%**	**66%**		

Similar to Pfizer/BioNTech, Moderna has been increasing its prices. In June 2021, Moderna concluded a deal with the European Union for the sale of 300 million doses in 2021 and 2022. The agreed price per dose of this deal was USD 25.50. In late 2020, the European Commission signed agreements with Moderna to purchase 160 million vaccine doses. The agreed price back then, according to leaked information, was EUR 19.0 (equivalent to USD 22.60). In July 2022, Moderna reached an agreement with the US government to deliver 66 million booster doses at USD 26.4 per dose, significantly higher than the initial price of USD 16.5 per dose of the original vaccine.[178]

Table 18 Moderna increasing its prices for US government and European Union

Entities agreement	Average price USD	Date agreement	Doses to be delivered million	Price per dose USD
Moderna ◄► US	16.5	11 August 2020	100	15.3
		11 December 2020	100	16.7
		11 February 2021	100	17.5
		15 June 2021	200	16.5
	26.4	29 July 2022	66	26.4
Moderna ◄► European Union	22.6	25 November 2020	80	22.6
		15 December 2020	80	22.6
	25.5	17 February 2021	90	25.5

With regard to global access to COVID-19 vaccines, Moderna committed to sell at its lowest price to low-income countries. Gavi, the Vaccine Alliance, purchased 210 million doses of the Moderna vaccine in 2021 for a price of just under USD 10.[179]

Where do the profits go?

In its 2021 annual report, Moderna states: "We have never declared or paid cash dividends on our common stock and do not expect to pay dividends on our common stock for the foreseeable future."[180] However, the company does execute share repurchase programmes to "return excess capital to shareholders." These programmes were announced in August 2021, February 2022, and August 2022, and amounted to USD 1 billion, USD 3 billion and USD 3 billion respectively. The first two programmes were completed in 2022.[181]

In 2022, Moderna spent USD 3.3 billion on research and development (R&D). R&D expenses over 2019, 2020, and 2021 were USD 0.5 billion, USD 1.4 billion, and USD 2.0 billion, respectively.[182] It is not clear to what extent the R&D spending is related to COVID-19 vaccines, and to what extent there is new R&D resulting from the profits made in 2021 and 2022. Moderna figures for 2020 and 2021 combined include approximately USD 1.5 billion of COVID-19 vaccine funding from the US government, while in 2022 this funding is significantly lower. Expenditure on COVID-19 vaccines, however, continues in 2022 to some extent. In its quarterly report for the period ending 30 September 2022, Moderna states: "As we continue to develop variant-specific and next-generation COVID-19 vaccine candidates, we expect to continue to incur significant additional expenses."[183]

In 2021, SOMO researched tax avoidance by Moderna. Moderna has a considerable amount of patent registrations in Delaware, which will mean untaxed royalties on its patents. The European Commission is invoiced by a Swiss subsidiary of Moderna, which offers low tax rates. The research concluded that Moderna's profits were most likely to end up in the tax havens of Delaware and Switzerland, where they are taxed at a very low rate.[184]

Public funds used for development of the vaccine

In its 2022 Q3 report, Moderna recognizes that it was awarded USD 1.7 billion by the US-based Biomedical Advanced Research and Development Authority (BARDA) to develop its COVID-19 vaccine(s). This total amount stemmed from agreements in 2020, 2021, and 2022. As of 30 September 2022, USD 67 million remained to be booked as grant revenue.[185]

Table 19 Moderna's grant revenues (USD million)

	Total	2022 Q1-Q3	2021	2020
BARDA mRNA-1273 programme	1,665	430	713	522
Other grant revenue	52	23	22	7
Total grant revenue	**1,717**	**453**	**735**	**529**

Shareholders

Moderna's common stock is traded on the US-based Nasdaq Stock Market under the ticker symbol MRNA. According to beneficial ownership reports filed at the US Securities and Exchange Commission, the five largest shareholders of Moderna owned 37.4% of the company's common stock as of 31 December 2021.[186] Two individuals are among the five largest shareholders. Mr Afeyan Noubar is Moderna's Co-founder, Chairman of the Board, and a CEO. Mr Stéphane Bancel is also CEO.[187]

Because of his shares in Moderna, Mr Stéphane Bancel was listed #429 on Forbes' real-time billionaires list on 24 November 2022, with assets worth USD 5.8 billion. Over 2021, he earned a salary of USD 1 million, a bonus of USD 1.5 million, and equity awards totalling USD 15 million. In March 2022, media reported that he had sold about 2.8 million shares since January 2020 (the beginning of the pandemic) for a total value of approximately USD 408 million. In May 2022, he announced

that he would be donating all the after-tax proceeds of his original stock options (not the 2.8 million shares sold) from when he joined Moderna in 2013. This would result in a charitable donation of around USD 355 million (assuming the stock trades at around USD 140/share).[188]

Table 20 Main shareholders of Moderna over the years

Shareholder	% of common stock		
	31 December 2021	31 December 2020	31 December 2019
Baillie Gifford & Co	11.3	6.1	1.0
Mr Stéphane Bancel (direct and indirect)	7.6	7.1	9.2
Blackrock	6.8	5.2	3.4
The Vanguard Group	6.8	5.9	5.2
Mr Afeyan Noubar (direct and indirect)	4.9	8.4	15.3
Five largest shareholders	**37.4**	**32.7**	**34.1**
Closing price (USD)	253.98	104.47	19.56

Annex 4 Company profile Sinovac

Short company profile

Sinovac Biotech Ltd. (Sinovac) is a biopharmaceutical company that develops and markets vaccines that protect against human infectious diseases. The company is incorporated in Antigua and Barbuda. Its headquarters are in Haidian district, Beijing, China. Sinovac's CEO is Mr Weidong Yin. The company has developed several vaccines. Its COVID-19 vaccine is called CoronaVac.[189]

Vaccine sales and profits

Although Sinovac does not specify exactly what proportion of its 2021 revenue can be attributed to its CoronaVac vaccine, it notes in its 2021 annual report that it is the majority. Sinovac had provided more than 2.5 billion doses of CoronaVac globally by late December 2021. It generated approximately 56.3% of its 2021 sales in China. Important export countries for CoronaVac include Brazil, Indonesia, and Turkey.[190]

Sinovac's net profit margin on its COVID-19 vaccines amounted to around 76% in 2021. This puts Sinovac alongside Moderna and Pfizer/BioNTech in terms of profits gained from its COVID-19 vaccine. Due to rounded figures for COVID-19 sales as well as COVID-19 profit, a net profit margin for the first half of 2022 could not be provided.

Table 21 Profit and COVID-related revenues of Sinovac in USD billion

	2022, first half	2021	2020	2019
COVID-related sales	1.0	19.1	0.3	0.2
Sales not related to COVID	0.2	0.3	0.2	0.2
Total sales	**1.2**	**19.4**	**0.5**	**0.4**
Profit after income tax	**0.7**	**14.7**	**0.1**	**0.1**
Estimated net profit on COVID-19 vaccines		14.6		
Net profit margins on COVID-19 vaccines	Not available	76	Not available	Not available

On 29 December 2022 Sinovac published its unaudited results for the first half of 2022. The company stated that over 2.9 billion doses of CoronaVac had been delivered globally. Its sales over the first half of 2022 amounted to USD 1.2 billion, of which USD 0.2 billion were non-pandemic vaccines. Its profit after income tax amounted to USD 0.8 billion, and it is assumed that the profit figures for COVID-19 and non-pandemic vaccines are in the same proportion as the revenue figures.[191]

Sinovac Life Sciences Co Ltd (Sinovac LS) is a subsidiary of Sinovac. Sinovac LS is the company that records the sales and profits for the CoronaVac vaccine. It recently developed a SA58 nasal spray to prevent COVID-19 infection.[192]

Reasons for the decrease in revenue (2022 versus 2021) seem to be, among others, that Chinese vaccines were less effective against the new Omicron subvariants. In addition, Indonesia and Brazil did not renew Sinovac orders from August/September 2021. The company itself stated that "initial two-dosage vaccination schedules were completed around the globe in 2021 and third booster shots were only administered in certain countries including China in 2022."[193]

Where do the profits go?

Of Sinovac's profit after income tax for 2021 totalling USD 14.7 billion, 41.5% (USD 6.1 billion) was attributable to non-controlling interests of Sinovac and its subsidiaries. The main non-controlling shareholder is the Chinese company Sino Biopharmaceutical Limited.

After providing non-controlling interests their share of the profit, a profit of USD 8.6 billion is attributable to shareholders of Sinovac.

Sinovac's R&D expenses were USD 155.0 million, USD 48.8 million and USD 24.3 million in 2021, 2020 and 2019, respectively. During the first half of 2022, Sinovac's R&D expenses were USD 184 million. The company attributed the increase to investments in COVID-19 vaccines and overseas clinical trials of regular products.[194]

Public funds used for development of the vaccine

No substantial funding from governments or other organisations for the development of the COVID-19 vaccine could be found in Sinovac's reports. In December 2020, the Chinese company Sino Biopharmaceutical Limited made a capital contribution to Sinovac LS amounting to USD 515 million. It became the owner of 15.03% of Sinovac LS's shares. The capital injection was used for further development, capacity expansion and manufacturing of the CoronaVac vaccine.[195]

Shareholders

Sinovac Biotech Ltd. (Sinovac) was listed on the US-based Nasdaq stock exchange under the ticker symbol SVA. In February 2019, however, Nasdaq halted trading in Sinovac due to conflicts over the company's management control. By the end of 2017, the company 1Globe Capital and its related parties had gathered nearly one-third of Sinovac's common stock and participated in an activist plan to replace four of the five directors at Sinovac's annual shareholder meeting in 2018. Court cases on this matter are still pending. A court in Antigua and Barbuda – Sinovac's country of incorporation – has restrained Sinovac from distributing its previously issued exchange shares, until the court has reached its final decision. Sinovac's 2021 annual report mentions shareholdings before as well as after the issuance of the exchange shares.[196]

Table 22 Shareholdings of Sinovac Biotech Ltd

Company	% before the issuance of exchange shares	% after the issuance of exchange shares
SAIF Partners IV	15.0	18.9
Mr Weidong Yin, CEO of Sinovac	8.9	11.0
Prime Success	8.2	10.3
Vivo Capital	8.2	10.3
CDH Utopia Limited	8.4	5.3
1Globe Capital LLC	4.7	3.0
Others	46.6	41.2
Total	**100.0**	**100.0**

As of 31 December 2020 and 2021, Sinovac owned 59.24% of Sinovac LS shares. As of 31 December 2020 and 2021, the Chinese company Sino Biopharmaceutical Limited owned 15.03% of Sinovac LS's shares. The companies Prime Success and Vivo Capital each hold a stake of approximately 6.3% in Sinovac LS, next to their shares in Sinovac.[197]

Annex 5 Company profile AstraZeneca

Short company profile

AstraZeneca PLC is among the world's 10 largest pharmaceutical companies by market capitalization. A British-Swedish company, it is the result of a merger in 1999 between the Swedish company Astra and UK-based Zeneca Group. The company's CEO is Mr Pascal Soriot. AstraZeneca's headquarters are in Cambridge, England. Shares of AstraZeneca are traded in the USA and Europe (London and Stockholm). The COVID-19 vaccine Vaxzevria was developed by the University of Oxford in the UK, in cooperation with the immunotherapy and vaccine company Vaccitech. The rights were licensed to AstraZeneca in 2020, and AstraZeneca has exclusive worldwide rights to market Vaxzevria.[198]

Vaccine sales and profits

AstraZeneca generated a revenue of USD 37.4 billion in 2021. Sales of its Vaxzevria COVID-19 vaccine (which also goes by the names ChAdOx1 nCoV-19 and AZD1222) accounted for 11.0% of the revenue. In 2022, AstraZeneca sold two COVID-19 medicines: Vaxzevria and Evusheld. Sales of COVID-19 medicines accounted for 9.2% of its USD 44.4 billion revenue in 2022.[199]

In 2021, about 2.5 billion COVID-19 Vaxzevria vaccine doses were supplied to more than 180 countries. Next to its Vaxzevria vaccine, AstraZeneca has developed Evusheld, a long-acting antibody (LAAB) combination against COVID-19. According to the company, Evusheld has demonstrated benefit in both preventing and treating COVID-19, and has the potential to make a significant difference for people most in need. Evusheld received Emergency Use Authorization from the US Food and Drug Administration (FDA) in December 2021, followed by similar authorisations in other countries.[200]

According to AstraZeneca, the majority of vaccine doses delivered in 2021 were subject to not-for-profit contracts. During the last quarter of the year AstraZeneca commenced supply of Vaxzevria on commercial terms as it transitioned its vaccine activities to business as usual, with moderate profitability. Product sales of USD 1.8 billion in the last quarter of 2021 came from a blend of early pandemic (not-for-profit) contracts and recent orders. The majority of Vaxzevria revenue in the first half of 2022 came from initial, not-for-profit contracts. In the first half of 2022 AstraZeneca's Vaxzevria revenue amounted to USD 1.6 billion. In the second half of 2022 the Vaxzevria revenue was USD 0.3 billion only.[201]

The US government accounted for almost half of the Evusheld revenue in 2022. AstraZeneca reported in its quarterly report for the period ending 31 December 2022 that it had fulfilled the US government's order for 1.7 million units of Evusheld during the year.[202] AstraZeneca expects that its revenue from COVID-19 medicines declines significantly in 2023, with minimal revenue from Vaxzevria. It refers to three COVID-19 medicines for 2023: Vaxzevria, Evusheld and AZD3152, a COVID-19 antibody currently in development.[203]

Table 23 Profit and COVID-related revenues of AstraZeneca in USD billion

	2022	2021	2020	2019
Sales of Vaxzevria vaccine	1.9	3.9	0.0	0.0
Sales of Evusheld medicine	2.2	0.1	0.0	0.0
COVID-related revenue	**4.1**	**4.0**	**0.0**	**0.0**
Not COVID-related revenue	40.3	32.5	26.6	24.4
Total revenue	**44.4**	**37.4**	**26.6**	**24.4**
Profit after tax	**3.3**	**0.1**	**3.1**	**1.2**

India has been the largest recipient of AstraZeneca's COVID-19 vaccine. The Serum Institute of India manufactured and supplied the vaccine under the name Covishield under a sub-license agreement with AstraZeneca. As of 8 September 2022, vaccinations with a dose of Covishield amounted to 1.7 billion in India, or 80% of all vaccinations in the country.[204] In July 2022, AstraZeneca wrote that, together with its global partners, it had "released over three billion vaccine doses to more than 180 countries, and approximately two-thirds of these doses have been delivered to low- and lower-middle income countries."[205]

The table below shows AstraZeneca's sales of Vaxzevria and Evusheld per region, according to annual and quarterly reports of the company. "Emerging markets" include India. "Established rest of world" includes, among others, Australia, Canada, Japan and New Zealand.[206]

Table 24 Vaxzevria and Evusheld revenue per region

Region	Vaxzevria		Evusheld	
	2021 and 2022 USD million	% of total	2021 and 2022 USD million	% of total
Emerging markets	3,045	*53*	432	19
USA	143	2	1,067	47
Europe	1,400	24	364	16
Established rest of world	1,203	21	407	18
Total	**5,791**	**100**	**2,270**	**100**

Where do the profits go?

Compared to Pfizer, BioNTech, Moderna and Sinovac, AstraZeneca made small profits from its COVID-19 medicines. The company's R&D expenses in 2022 were USD 9.8 billion, versus USD 9.7 billion in 2021.[207]

The company Vaccitech entered into an amended license agreement with Oxford University Innovation (OUI) in 2020, after a license agreement was signed between AstraZeneca and OUI. Revenue generated by Vaccitech from the amended license agreement amounted to USD 2.4 million in 2020, yet such revenue was negligible in 2021. Over the first nine months of 2022, however, Vaccitech reported revenues generated from OUI amounting to USD 38 million. OUI receives

milestone payments and royalties on commercial sales of Vaxzevria, beginning after the pandemic. Vaccitech receives about 24% of the payments that OUI receives from AstraZeneca.[208]

Public funds used for development of the vaccine

In its annual reports 2020 and 2021, AstraZeneca booked a revenue from government grants for the development of Vaxzevria (total of USD 760 million) and for the development of Evusheld (total of USD 283 million). Unfortunately, AstraZeneca's quarterly reports for 2022 do not reveal whether more government grants were booked as revenue in 2022. Therefore, it remains unclear whether the USD 1,043 million figure that appears in those reports is the complete one. AstraZeneca also does not reveal clearly which governments have provided grants. For Evusheld, it is clear that this is solely the US government. For Vaxzevria, it is most likely also solely the US government, as agreements were made, and no other sources of funding could be found. AstraZeneca originally made an agreement with the US government totalling USD 1.6 billion for the development of its vaccine including large-scale delivery, yet its vaccine was never approved in the USA.[209]

Table 25 **AstraZeneca's revenue from government grants for development of COVID-19 vaccines and medicines** in USD million

AstraZeneca	Total	2021	2020
Vaxzevria grants	760	599	161
Evusheld grants	283	222	61
Total grants	**1,043**	**821**	**222**

A study published in 2021 in the magazine BMJ Global Health approximated that public and charitable financing accounted for 97-99% of identifiable funding for the ChAdOx vaccine technology research at the University of Oxford until autumn 2020. ChAdOx vaccine technology underlies AstraZeneca's Vaxzevria COVID-19 vaccine. The researchers encountered a lack of transparency in research funding reporting, and identified R&D funding from governments and charities totalling GBP 104 million (following a Freedom of Information request) and GBP 228 million (reconstructed from literature search). The identified funding is equivalent to USD 134 million and USD 293 million, respectively. The main funders identified were the UK government, the European Commission, the US government, the Coalition for Epidemic Preparedness Innovations (CEPI), and Wellcome. The figure of GBP 104 million includes GBP 33 million of UK government funding for the development of the vaccine provided in 2020.[210]

AstraZeneca did receive funding from the US government to develop its Evusheld medicine. In October 2020, it was granted a sum of USD 486 million for the late-stage development and manufacturing of 100,000 doses. In February 2022, AstraZeneca announced an agreement with the US government to supply another 1 million doses, while stating that it had already supplied 700,000 doses. The table below shows the agreements on Evusheld between the US government and AstraZeneca, according to the BARDA-website.[211]

Table 26 Agreements on Evusheld between US government and AstraZeneca

Date	Description	USD million
2 Jun 2020	Phase I clinical development	23.7
9 Oct 2020	Late-stage development and manufacturing of 100,000 doses	486.0
8 Mar 2021	Procurement of up to 500,000 doses	205.0
4 Jan 2022	Costs of additional distribution requirements	6.9
11 Feb 2022	Manufacturing, distribution and storage of 1,000,000 doses	855.0
Total		**1,576.6**

Shareholders

The principal markets for trading in AstraZeneca shares are the London Stock Exchange, Nasdaq Stockholm and the US-based Nasdaq Global Select Market. Shares are listed on all three markets under the stock symbol AZN. According to AstraZeneca's Annual Report 2021 and beneficial ownership reports filed at the US Securities and Exchange Commission, the four largest shareholders of AstraZeneca owned over 20% of the company's common stock as of 31 December 2021.[212]

Table 27 Main shareholders of AstraZeneca over the years

Shareholder	% of common stock		
	31 December 2021	31 December 2020	31 December 2019
Blackrock	9.0	8.8	8.0
Wellington Management	4.2	5.2	5.9
The Capital Group Companies, Inc.	4.1	4.9	4.9
Investor AB	3.3	3.9	3.9
Four largest shareholders	**20.6**	**22.8**	**22.7**

Annex 6 Company profile Johnson & Johnson

Short company profile

The US-based company Johnson & Johnson is a pharmaceutical and consumer goods giant that generated a 2021 revenue of USD 93.8 billion, and a profit of USD 20.9 billion. Its 2022 revenue amounted to USD 94.9 billion, and its profit was USD 17.9 billion.

Johnson & Johnson has three business segments. The pharmaceutical segment is the largest, generating 55% of the company's 2022 revenue. The other segments are named Medical Devices and Consumer Health, and accounted for 29% and 16% of 2022 revenue, respectively. The company's common stock is traded on the New York Stock Exchange. Johnson & Johnson's CEO is Mr Joaquin Duato. The company has developed the Janssen COVID-19 vaccine, which also goes by the name Jcovden.[213]

Vaccine sales and profits

Sales of the Janssen COVID-19 vaccines amounted to USD 2.4 billion in 2021, or 4.6% of the revenues of Johnson & Johnson's pharmaceutical segment. In 2022, sales of the Janssen COVID-19 vaccines accounted for USD 2.2 billion, or 4.1% of the company's pharmaceutical revenue.[214]

In its 2021 annual report, Johnson & Johnson states that it has chosen to provide the Janssen COVID-19 vaccine "to the world on a not-for-profit basis for emergency pandemic use". Approximately 70% of the company's global COVID-19 vaccine supply in 2021 was made available to low- and middle-income countries.[215]

In January 2022, Johnson & Johnson expected 2022 sales from its COVID-19 vaccine to be around USD 3 billion to USD 3.5 billion. In April 2022, however, the company suspended 2022 guidance on its COVID-19 vaccine sales. In its quarterly report for the period ending 30 June 2022, Johnson & Johnson expected incremental costs for 2022 with regard to the company's USD 0.9 billion contract obligations with third parties on manufacturing vaccines. Because of lower demand than anticipated, likely costs will be made for vaccines that are not sold.[216]

Table 28 Profit and COVID-related revenues of pharmaceutical segment Johnson & Johnson
in USD billion

	2022	2021	2020	2019
Sales Janssen COVID-19 vaccine	2.2	2.4	0.0	0.0
Other revenue pharmaceutical segment	50.4	49.6	45.6	42.2
Revenue pharmaceutical segment	**52.6**	**52.1**	**45.6**	**42.2**
Income before tax of segment	**Not yet available**	**18.1**	**15.5**	**8.8**
Percent of segment sales	Not yet available	34.9	33.9	20.9

In its annual and quarterly reports, Johnson & Johnson makes a distinction per product on whether sales were within the US or international. The USA accounted for 17% of the Janssen COVID-19 vaccine sales over 2021 and 2022 combined.[217] The Advisory Committee on Immunization Practices (ACIP) expressed a clinical preference for the mRNA COVID-19 vaccine over Johnson & Johnson's COVID-19 vaccine for the prevention of COVID-19. This was endorsed by the CDC in the USA in December 2021.[218] In August 2020, Johnson & Johnson made an agreement with BARDA to deliver 100 million COVID-19 investigational vaccine doses. According to the website Our World in Data, by 6 September 2022 only 19 million doses had been used.[219]

Table 29 Sales of Janssen COVID-19 vaccine

Region	2021 and 2022 USD million	% of total
USA	754	17
International	3,810	83
Total	**4,564**	**100**

Where do the profits go?

Johnson & Johnson has not made large profits from its COVID-19 vaccine, so there is no need to elaborate on how profits are spent.

Public funds used for development of the vaccine

In its 2021 annual report, Johnson & Johnson states that it has entered into vaccine development cost-sharing arrangements with government-related organisations. The website of the US-based BARDA shows that Johnson & Johnson was granted USD 1.0 billion for development of its COVID-19 vaccine. Press releases by Johnson & Johnson on the two main grants obtained from BARDA to develop the COVID-19 vaccine indeed mention that Johnson & Johnson would contribute the same amounts from its own pocket.[220]

Table 30 Agreements on research and vaccine between US government and Johnson & Johnson

Date	Description	For development of vaccine?	USD million
11 Feb 2020	Speed the development and manufacturing of a vaccine	yes	20.6
14 Feb 2020	Early clinical evaluation	no	152.3
27 Mar 2020	Support clinical trials	yes	435.6
5 Aug 2020	100 million of COVID-19 investigational vaccine doses	no	1,001.7
21 Aug 2020	Support Phase 2 clinical trial and additional non-clinical studies	yes	85.3
13 Nov 2020	Support Phase 3 clinical trial in adults	yes	454.3
25 Mar 2021	Indication for a vaccine to prevent COVID-19 in adolescents	yes	32.0
Total		**1,027.8**	**2,181.8**

Shareholders

The company's common stock is traded on the New York Stock Exchange under the ticker symbol JNJ. According to beneficial ownership reports filed at the US Securities and Exchange Commission, the three largest shareholders of Johnson & Johnson owned 22% of the company's common stock as of 31 December 2021. According to the Nasdaq stock exchange, institutional owners accounted for 69.73% of the outstanding Johnson & Johnson shares as of 30 June 2022.[221]

Table 31 Main shareholders of Johnson & Johnson over the years

Shareholder	% of common stock		
	31 December 2021	31 December 2020	31 December 2019
The Vanguard Group	8.9	8.7	8.7
Blackrock	7.6	7.2	7.3
State Street Corporation	5.5	5.5	5.8
Three largest shareholders	**22.0**	**21.4**	**21.8**

Annex 7 Company profile Novavax

Short company profile

Novavax, Inc. is a pharmaceutical firm that develops vaccines to counter infectious diseases. The company's headquarters are in Gaithersburg, Maryland, USA. Its common stock is traded on the US-based Nasdaq stock exchange. The two largest shareholders of Novavax are the institutional owners Vanguard Group and Blackrock, together owning 15% of the company's common stock as of 31 December 2021. The company's CEO is Mr Stanley C Erck. During 2020, the company redirected its efforts to focus on development of its COVID-19 vaccine NVX-CoV2373 (branded under the names Nuvaxovid or Covovax). NVX-CoV2373 is a protein-based COVID-19 vaccine. As of 6 September 2022, Nuvaxovid or Covovax had been used to vaccinate people in South Korea (800,000 doses), the European Union (269,000 doses) and Japan (183,000 doses).[222]

Vaccine sales and profits

Revenue for 2020 and 2021 mainly comprised grants from the US government and CEPI. In August 2022, Novavax stated that it expected its 2022 revenue to be around USD 2 billion, a significant increase compared to 2021 due to NVX-CoV2373 product sales and royalties.[223] It repeated this estimate in January 2023.[224] In its quarterly report for the period ending 30 September 2022, the company stated that it had delivered over 94 million doses of NVX-CoV2373 globally to date.[225]

Table 32 Profit and COVID-related revenues of Novavax in USD billion

	2022 Q1-Q3	2021	2020	2019
Product sales	1.3	0.0	0.0	0.0
Grants	0.3	0.9	0.5	0.0
Royalties and other	0.0	0.2	0.0	0.0
Revenue	**1.6**	**1.1**	**0.5**	**0.0**
Profit after income tax	**-0.5**	**-1.7**	**-0.4**	**-0.1**

Where do the profits go?

The company has not yet made profits from the sale of COVID-19 vaccines, so there is no need to elaborate on how profits are spent.

According to Insider trading reports filed at the US Securities and Exchange Commission, several of Novavax's top managers sold Novavax shares and profited from the rising share price during 2020-2021. Novavax's CEO Mr Stanley C Erck earned more than USD 28 million in the period July-October 2021, and over USD 5 million in the period September-November 2020.

Mr Gregory M Glenn, the company's President of Research and Development, also earned tens of millions of dollars during 2020-2021, as did Mr John A Herrmann III and Mr John J Trizzino, both Executive Vice Presidents of the company. The profiteering was discussed in a hearing by the US House of Representatives in September 2020, and in several media outlets, yet the top managers kept on selling shares at profit in 2021.[226]

Public funds used for development of the vaccine

Funding for its NVX-CoV2373 clinical development programme comes to USD 2.2 billion from three sources:

- **US Government:** USD 1.8 billion to develop NVX-COV2373 and to manufacture and deliver 100 million doses of NVX-CoV2373 to the US government.
- **CEPI:** up to USD 0.4 billion to develop NVX-COV2373 and supply through the COVAX facility.
- **US Department of Defense (DoD):** up to USD 45.7 million to develop NVX-COV2373 and manufacture and deliver 10 million doses of NVX-CoV2373 to the US government.[227]

The grant revenues as recorded by Novavax are shown in the table below.[228] So far, the company has only delivered 3.2 million doses to the US government. Its agreements with the US government were modified in July 2022. Novavax and the US government will determine the timing, pricing, and amounts for delivery of any additional NVX-CoV2373 doses. The funding by CEPI includes USD 142.5 million in forgivable no-interest term loans. These loans are repayable depending on future orders to deliver vaccines to the COVAX facility. For this report, the grant revenues as logged by Novavax are seen as funds granted to Novavax.[229]

Table 33 Grant revenues reported by Novavax

	Total	2022 Q1-Q3	2021	2020
US government partnership (OWS)	1,305,103	311,423	788,953	204,727
Coalition for Epidemic Preparedness Innovations (CEPI)	358,603	-	135,445	223,158
US Department of Defense	36,127	1,925	21,683	12,519
Bill & Melinda Gates Foundation	15,434	-	2,628	12,806
Total grant revenue	**1,715,267**	**313,348**	**948,709**	**453,210**

Shareholders

The company's common stock is traded on the US-based Nasdaq stock exchange under the ticker symbol NVAX. According to beneficial ownership reports filed at the US Securities and Exchange Commission, the two largest shareholders of Novavax owned 14.9% of the company's common stock as of 31 December 2021.[230]

Table 34: Main shareholders of Novavax over the years

Shareholder	% of common stock		
	31 December 2021	31 December 2020	31 December 2019
Shareholders owning more than 5% of the shares			
Vanguard Group	9.1	8.8	4.6
Blackrock	5.8	8.1	7.0
RA Capital Management, L.P.	<5.0%	6.0	<5.0%
Total shareholders owning more than 5% of the shares	**14.9**	**22.9**	**11.6**

Annex 8 Estimated figures for the Pfizer/ BioNTech collaboration

To be able to calculate Pfizer/BioNTech's net profit margin with regard to Comirnaty, several estimates had to be made concerning the composition of the revenues and net profits of the companies. These estimates are substantiated in this section.

Table 35 **Breakdown of COVID-19 related revenue and net profits by Pfizer and BioNTech to eliminate double counting** in USD billion

	2022		2021		2020		
	Sales	**Net profit**	**Sales**	**Net profit**	**Sales**	**Net profit**	**Margin**
Pfizer							
Paxlovid	18.9	est. 12.3	0.1	est. 0.1	0.0		
Comirnaty: gross profit BioNtech	est. 1.0	0.6	est. 1	0.7	0.0		
Comirnaty: sales within territory	36.8	8.9	35.8	11.5	0.2		
COVID-19 related	56.7	21.8	*36.9*	*12.3*	0.2	0.1	
Not COVID-19 related	43.6	est. 9.6	*44.4*	*est. 9.7*	41.5	9.1	*22%*
Total in annual/quarterly report	**100.3**	**31.4**	**81.3**	**22.0**	**41.7**	**9.2**	
BioNTech							
Comirnaty: sales within territory	est. 3.3	est. 1.0	3.6	est. 1.1			
Comirnaty: gross profit Pfizer	est. 12.9	8.7	17.5	10.8			
Semi-finished products to partners	est. 2.1	est. 0.5	1.1	est. 0.3			
Total in annual/quarterly report (converted EUR)	**est. 18.3**	**10.2**	**22.2**	**12.2**			
Pfizer/BioNTech: without double counting							
Pfizer: Comirnaty	36.8	9.5	35.8	12.2			
BioNTech: Comirnaty	3.3	10.2	3.6	12.2			
Pfizer/BioNTech revenue Comirnaty	**40.1**	**19.7**	**39.4**	**24.4**			
Net profit margin Comirnaty Pfizer/BioNTech	**49%**	**62%**					

Pfizer/BioNTech: estimated revenue

When summing up the COVID-19 related revenues of Pfizer and BioNTech in their respective annual and quarterly reports, there is double counting. Pfizer and BioNTech are collaboration partners for the sales of Comirnaty. Both Pfizer and BioNTech have sales territories. Both companies report these sales as part of their revenue. Pfizer and BioNTech also have agreed to share the gross profits of the sales in their territory. Both companies record these gross profits, transferred by the other company, as revenue in their bookkeeping. Hence, there is double counting. There is also a second double counting. These are sales of semi-finished products from BioNTech to Pfizer. In the table above the double counting is eliminated. This was done through analysis of the annual and quarterly reports

of the companies. Half of the gross profits from sales of Comirnaty achieved by BioNTech appear as revenue in Pfizer's bookkeeping. Pfizer reported that over 2021 these were larger than USD 1 billion, although it is likely closer to USD 1 billion (knowing BioNTech's Comirnaty sales within its territory), so the estimate was USD 1 billion.[231]

Pfizer/BioNTech: estimated net profits

Pfizer's net profit out of COVID-19 related revenue had to be estimated, as the company does not specify this. This estimate was done by calculating the net profit margin of revenue not related to COVID-19 in 2020, and using the same net profit margin (22%) for 2021 and 2022. Analysis of Pfizer's annual and quarterly reports shows that Pfizer's portfolio that was not related to COVID-19 remained largely the same in 2021 and 2022, as compared to 2020. Net profit margins are also unlikely to have changed much. In addition, the company's gross profits from the sales of Comirnaty are equal to BioNTech's, as the two companies share their gross profits. BioNTech has no other businesses, so their figures were helpful for estimating Pfizer's net profits.[232]

Pfizer/BioNTech: estimated net profit margins

To calculate the net profit margins for Comirnaty of the Pfizer/BioNTech combination, further estimates had to be made:

- The net profit margins for Paxlovid sales during 2022 were estimated to be 65%.
- The net profit margin of BioNTech's sales of semi-finished products to partners was estimated to be 30%.
- BioNTech net profit margins on sales of Comirnaty within its territory were estimated to be 30%, as half of the gross profits had to be transferred to Pfizer.
- Pfizer's net profit of the gross profit received from BioNtech was estimated at 65% of this gross profit.
- When finishing this report, BioNTech had not yet published its financial statement over the last quarter of 2022. The figures used were extrapolated from the figures over the first three quarters.

All in all, the calculation of the net profit margin on Comirnaty of the Pfizer/BioNTech combination (62% in 2021 and 49% during 2022) should be seen as a rough estimate, due to the various estimates that had to be made.

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