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## ABSTRACT

In the context of a health emergency like the COVID-19 pandemic, the global availability of and access to vaccines are imperative. This research paper provides an analysis from the perspective of international political economy, of the financing of COVID-19 vaccines and of the market strategies adopted by some of the companies that developed them. It notes that the development of vaccines was supported by substantial public funding from countries that later received preferential access to those vaccines through advance purchases. Despite such public support, the vaccines were not deemed as public goods but remained under the control of their developers.

*En el contexto de una emergencia sanitaria como la que representa la pandemia de COVID-19, la disponibilidad mundial de las vacunas y el acceso a ellas son imperativos. En este documento de investigación se facilita un análisis, desde la perspectiva de la economía política internacional, de la financiación de las vacunas contra la COVID-19 y de las estrategias de mercado adoptadas por algunas de las empresas que las desarrollan. Se señala que el desarrollo de las vacunas estuvo respaldado por una importante financiación pública procedente de países que posteriormente gozaron de un acceso preferente a esas vacunas a través de acuerdos de adquisición anticipada. Pese a ese apoyo público, las vacunas no se consideraron bienes públicos, sino que permanecieron bajo el control de quienes las desarrollaron.*

*En cas d'urgence sanitaire comme la pandémie de COVID-19, la disponibilité et l'accès aux vaccins à l'échelle mondiale sont impératifs. Le présent document de recherche propose une analyse, du point de vue de l'économie politique internationale, de la manière dont les vaccins contre la COVID-19 ont été financés et des stratégies de marché adoptées par certaines des entreprises qui les ont développés. Il relève que ce développement a été rendu possible grâce à un financement public important de la part de pays qui ont par la suite bénéficié d'un accès préférentiel à ces vaccins grâce à des achats anticipés. Malgré ce financement public, les vaccins n'étaient pas considérés comme des biens publics, mais comme des biens privés placés sous le contrôle de leurs développeurs.*

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# 1. INTRODUCTION

The coronavirus has disrupted social and economic dynamics around the world. A tension has been created between public health (and its aim of preventing the saturation of hospitals and deaths) and the pressure to preserve economic activity affected by confinements. In an effort to resolve the tension, a race took place to ensure the rapid supply of vaccines to immunize populations. To accomplish this, the governments of wealthier countries promoted research and development (R&D) by using public resources to be able to rapidly immunize their populations.

The result was the fast development of a number of vaccines, whose doses were massively pre-ordered by wealthier countries[3], with the well-known outcome of an inequitable distribution around the world. Despite the public resources used, the technologies (including patents) remained in the hands of vaccine developers.

Although the vaccine R&D process was faster than usual, access to the new developed vaccines in the Global South was mediated by several factors: the hoarding of vaccines by wealthier countries, asymmetric negotiations with vaccine suppliers, reluctance to share technologies and, in some countries, budgetary difficulties. Timely and adequate access to vaccines was mediated by economic and power relations over which the developing countries have little influence.

This paper analyzes this troubling context in five sections. The first section presents the main issues; the second discusses vaccines as a global common good; the third analyzes the financing provided to vaccine developers, including multinational companies, and anticipated purchases; the fourth compares the strategies of certain companies from an international political economy perspective; while the last section presents the conclusions.

[3] As of March 2021, 10.38 billion doses had been pre-ordered (Hooker & Palumbo, 2020) while the world population in 2021 is almost 7.9 billion people.

## 2. KNOWLEDGE AS A GLOBAL COMMON GOOD

Pursuing the common good (Gozum, 2021), and overcoming the commodification of health, have been envisaged in a number of ways, highlighting its relevance for the well-being of human life. Health has been considered as a preferred or social good[4], a public good and a common good[5], and presently as a global common good (Yunus, Donaldson & Perron, 2020) in the sense of Ostrom & Hess (2016).

In this context, vaccines have been placed at the center of health prevention to achieve a gradual return to pre-pandemic life, to a 'normality' that favors economic growth. It is pertinent, hence, to look at them under the common goods lens as it

> provides a coherent alternative model for bringing economic, social, and ethical concerns into greater alignment. It is able to talk about the inalienability of certain resources and the value of protecting community interests. The commons fills a theoretical void by explaining how significant value can be created and sustained outside of the market system. The commons paradigm does not look primarily to a system of property, contracts, and markets, but to social norms and rules, and to legal mechanisms that enable people to share ownership and control of resources. (Bollier, 2016, p. 63)

Due to the unaffordable cost of medicines for the poor—especially for the preventable diseases common in countries of the Global South such as tuberculosis and malaria, or viral global diseases such as that caused by HIV/AIDS—these medicines can be considered "global public goods" (GPGs). In the course of deliberations on how to enhance access to medicines under this concept, the discussion turned to the grant of compulsory licenses including "in the case of sanitary emergencies, together with the transfer of technologies to countries with less productive capacity" (Vieira, 2002, p. 427).

Although, since the beginning of negotiations on the Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS Agreement), concerns had been expressed on the role of patents in the access to medicines and the need to make them accessible worldwide. The treaty ended up as a mechanism for increasing the protection of intellectual property rights for medical innovations.[6]
The knowledge necessary to produce medicines is a typical public good with non-rivalry in consumption and subject -by the very nature of knowledge- to non-excludability. This means that

> the participation of an additional agent in the benefits derived from the consumption of a good does not reduce the benefits obtained by the other consumers, which implies that the marginal cost of admitting an additional user is zero. Consequently, and since the participation of one agent in the benefits does not affect those of the others, it is not efficient to exclude any further

[4] Because of the consideration of "the drug as an object of commercialization and its [decisive] use value" (Vernengo, 1996).
[5] Common goods are considered as "institutional spaces in which human agents can act free from the specific restrictions required by the markets [... they] can use resources governed by restrictions other than those imposed for property rights [...]" (Benkler, 2008, p. 128).
[6] See, e.g. Carlos Correa, "Globalisation and intellectual property rights. The struggle of developing countries to influence TRIPS", in *Globalisation and the Quest for Social and Environmental Justice: The Relevance of International Law in an Evolving World Order*, Shawkat Alam, Natalie Klein and Juliette Overland (eds.) (London, Routledge, 2011).

> consumption once the good has been provided. On the other hand, non-excludability implies that it is not possible (even if it were efficient), once the good has been provided, to exclude any agent from the benefits of its consumption (García-Arias, 2004, p. 188).

As Hess & Ostrom (2007) have pointed out, however, "[t]here are clearly multiple uses and competing interests in these commons. Corporations have supported increased patents and copyright terms, while many scientists, scholars, and practitioners take actions to ensure free access to information" (pp. 9–10). Patents, in particular -which create barriers to access- imply the privatization of knowledge, often overlooking the large amounts of public resources provided for the research and development processes, as discussed below. This is particularly the case of COVID-19 vaccines which provide public benefits by reducing pandemic risks, as discussed below.

While the COVID-19 vaccines do not prevent the infection, they do prevent its most severe health effects. Behind the debates on considering vaccines as GPG, which would facilitate greater access at lower costs, is the tension between the private and public interests widely addressed in conventional economic analyses. The dispute goes beyond the purely economic sphere. It involves ethical aspects and shows the need for a debate on a new model of global governance, not only regarding health matters, but one that would also allow the international community to confront the multiple and interrelated crises that have a profound impact on the world-system. From this perspective, the COVID-19 pandemic made the need of considering alternatives to the current hegemonic model and global governance mechanism clear. As noted by Žižek,

> The coronavirus epidemic does not signal just the limit of the market globalization, it also signals the even more fatal limit of nationalist populism which insists on full state sovereignty: it's over with "America (or whoever) first!" since America can be saved only through global coordination and collaboration. I am not a utopian here, I don't appeal to an idealized solidarity between people— on the contrary, the present crisis demonstrates clearly how global solidarity and cooperation is in the interest of the survival of all and each of us, how it is the only rational egotist thing to do (Žižek, 2020, p. 74).

In the same vein, Velásquez & Syam (2021) argue that for present and future pandemics "collective and organized action is necessary to protect public health throughout the world and to ensure that the needs of all are anticipated and met, particularly in developing and least developed countries" (p. 2). However, such collective action is complicated by the financial interests of multinational enterprises (MNEs) and other private producers while the resources and capacity to act at the multilateral level is not found within the World Health Organization (WHO).[7]

The financing of vaccine R&D and advance purchases are discussed in the next section.

[7] For example, the Gavi initiative plays a fundamental role in immunization through the COVAX initiative in which the WHO participates. Gavi also made advance purchases of vaccines. Although the World Health Assembly has the possibility to issue binding conventions, it has only done so in the case of tobacco, through the WHO Framework Convention on Tobacco Control (FCTC) which has been ratified by 177 countries. In the case of COVID-19, immunization was considered a global public good (GPG) but the vaccines were not. See Nirmalya Syam, "The UN General Assembly Resolutions on COVID-19: Solemn Assurances for Access to Health Technologies without an Action Plan", Policy Brief, No. 81 (Geneva, South Centre, 2020). Available from https://www.southcentre.int/wp-content/uploads/2020/07/PB-81.pdf.

## 3. FINANCING AND ADVANCE PURCHASES

The urgent need for vaccines has led, as of mid-2021, to at least 23 vaccines worldwide with different levels of approval. While China, India and Cuba were able to rapidly develop their own vaccines, the accelerated process of development of vaccines in the wealthier countries was fundamentally made possible by the large public resources invested, with a total contribution that amounted to more than USD 6 billion, as shown below in Table 1.

*Table 1: Investment in research and development of COVID-19 vaccines*

| Country | Amount (USD million) | % of total investment |
|---|---|---|
| United States | 2,358.67 | 39% |
| Germany | 1,507.22 | 25% |
| United Kingdom | 501.16 | 8% |
| European Union | 327.50 | 5% |
| Canada | 283.57 | 5% |
| Norway | 262.42 | 4% |
| Singapore | 250.00 | 4% |
| China | 160.40 | 3% |
| Saudi Arabia | 150.00 | 2% |
| Spain | 87.29 | 1% |
| Others | 58.86 | 1% |
| Netherlands | 57.93 | 1% |
| Australia | 25.48 | 0% |
| Switzerland | 21.81 | 0% |
| France | 17.73 | 0% |
| **Total** | **6,070.03** | |

Source: Authors' elaboration based on Global Health Centre (2021)

Three countries, the United States, Germany, and the United Kingdom, concentrated almost 72% of investment in the research and development of COVID-19 vaccines, with the United States contributing more than half of this. When looking at contributions relative to gross domestic product (GDP), the countries that contributed the most were Singapore, Norway, Germany, Saudi Arabia, and the United Kingdom[8].

Philanthropic contributions, such as those by the Gates Foundation, or by personalities such as Jack Ma of Alibaba and Dolly Parton obtained high public recognition, but this was beyond their true importance. It does, in fact, turn out that these were marginal in comparison to the financing provided by governments, especially if advance purchases of vaccines (i.e. purchases before they were fully developed) are taken into account.

[8] In relation to GDP in 2020, this represented 0.0735% of Singapore's GDP, 0.0723% in the case of Norway, 0.0396% in Germany, 0.0214% in Saudi Arabia, and 0.0185% for the United Kingdom. In the case of the United States, which appears in seventh place, this implied 0.0113%.

*Table 2: Funding for vaccine research and development by source area*

| Source area | Amount (million USD) | % of total |
|---|---|---|
| Public | 5,958.01 | 98.15% |
| Private Sector | 17.83 | 0.29% |
| Philanthropy | 83.80 | 1.38% |
| Other | 10.39 | 0.17% |
| **Total** | **6,070.03** | **100.0%** |

Source: Authors' elaboration based on Global Health Centre (2021)

While, in total, philanthropy contributed 1.4%, the private sector contributed only 0.3%. In the 'other' category, unidentified contributions came mainly from Switzerland, and to a much lesser extent, from Canada. This reliance on state funding is not new. As Mazzucato (2013) has made it clear, while the State may assume the risks by becoming an entrepreneurial State, it is not necessarily compensated by the revenues derived from these investments, which remain in the hands of the private sector beneficiaries.

The analysis of the above data needs to be complemented with those mentioned by Hooker & Palumbo (2020) regarding the participation of non-governmental organizations. This is where the Coalition for Epidemic Preparedness and Innovation (CEPI)[9] appears, with the financing of 733.40 million USD for the purchase and supply of vaccines as shown in Table 3.

The flow of R&D resources by beneficiary is presented in the Table below.

*Table 3: Vaccine R&D financing flow: sources and beneficiaries*

| | Vaccine | Total Amount | Financing | Sources | Beneficiaries |
|---|---|---|---|---|---|
| | | (millions of USD) | | | |
| 1 | Janssen | 1,027.9 | 1,027.9 | United States | Johnson & Johnson |
| 2 | Moderna | 957.3 | 955.3 | United States | Moderna |
| | | | 1.0 | Dolly Parton COVID-19 Research Fund | |
| | | | 1.0 | CEPI | |
| 3 | BioNTech/Pfizer | 800.3 | 434.4 | Germany | BioNTech<br>Fosun<br>Pfizer |
| | | | 115.9 | European Union | |
| | | | 250.0 | Singapore | |
| 4 | Curevac | 741.7 | 639.5 | Germany | Curevac |
| | | | 86.9 | European Union | |
| | | | 15.3 | CEPI | |
| 5 | Novavax | 508.0 | 388.0 | CEPI | Novavax |
| | | | 105.0 | United States | |
| | | | 15.0 | Gates Foundation | |
| 6 | Sichuan Clover Biopharm | 328.0 | 328.0 | CEPI | Clover Biopharmaceutical |
| 7 | Sinopharm | 145.0 | 145.0 | China | Sinopharm |
| 8 | Medicago | 135.5 | 135.5 | Canada | Medicago |
| 9 | IDT-Biologika | 132.1 | 132.1 | Germany | IDT-Biologika |
| 10 | Oxford University /AstraZeneca | 118.0 | 115.2 | United Kingdom | AstraZeneca |
| | | | 1.1 | CEPI | |

[9] CEPI was created in 2017 with the aim of accelerating the development of vaccines against infectious diseases and facilitating their access. CEPI is part of the COVAX initiative.

| | | | | | |
|---|---|---|---|---|---|
| | | | 0.1 | China | |
| | | | 1.6 | Wellcome Trust | |
| | **Total** | **4,893.6** | | | |

Source: Authors' elaboration based on Global Health Centre (2021)

Interestingly, with a few exceptions, each country financed vaccines developed by their own companies or institutions; for example, AstraZeneca was 98% financed by the United Kingdom, which is equivalent to 23% of the total amount invested by that country. The vaccine that received the most funding was Janssen, which obtained 100% of its R&D resources from the United States.

The vaccine produced by the German company BioNTech in association with the multinational Pfizer ranks third on the list of most funding received. The vaccine received a third of all German funding, 35% of European Union funding, and all of Singapore's funding.

Although all these companies received public resources, the vaccine intellectual property rights remained in their hands; hence, the results of research and development are neither public nor accessible and there was no willingness to share the technologies through the COVID-19 Technology Access Pool (C-TAP), the mechanism set up by WHO with that purpose. In contrast, the genome sequence of the COVID-19 virus was rapidly shared (Velásquez & Syam, 2021).

In addition to the resources directly received for R&D, it is worth noting that the vaccine developers were also financed by means of the advance purchases made by governments, as shown in the following table.

*Table 4: Vaccine R&D financing flow: advance purchases*

| | **Vaccine** | **Total Amount** | **Financing** | **Sources** | **Beneficiaries** |
|---|---|---|---|---|---|
| | | **(millions of USD)** | | | |
| 1 | BioNTech/Pfizer | 6,420.32 | 352.50 | Israel | BioNTech/Pfizer |
| | | | 11.34 | European Union | |
| | | | 84.00 | Panama | |
| | | | 5,972.48 | United States | |
| 2 | Curevac | 2,767.50 | 2,767.50 | European Union | Curevac |
| 3 | Moderna | 10,080.00 | 5,580.00 | European Union | Moderna |
| | | | 4,500.00 | United States | |
| 4 | Sanofi Pasteur/GSK | 4,890.00 | 2,790.00 | European Union | Sanofi Pasteur/GSK |
| | | | 2,100.00 | United States | |
| 5 | Janssen | 4,900.00 | 1,700.00 | European Union | Johnson & Johnson |
| | | | 1,000.00 | United States | |
| | | | 2,200.00 | African Union | |
| 6 | Novavax | 1,600.00 | 1,600.00 | United States | Novavax |
| 7 | University of Oxford/AstraZeneca | 4,086.04 | 1,060.00 | European Union | AstraZeneca |
| | | | 4.30 | Panama | |
| | | | 1,200.00 | United States | |
| | | | 942.65 | Brazil | |
| | | | 469.09 | Thailand | |
| | | | 250.00 | Indonesia | |
| | | | 120.00 | Bangladesh | |
| | | | 40.00 | Dominican Republic | |
| 8 | Valneva | 858.00 | 858.00 | United Kingdom | Valneva |
| | **Total** | **35,601.9** | | | |

Source: Authors' elaboration based on Global Health Centre (2021)

The vaccine developers, including large multinationals, received seven times more for advanced purchases than for R&D. Through pre-purchase agreements, those receiving the largest amounts were Moderna and BioNTech/Pfizer. The first one received 25 to 35 USD per dose and the second one around 19 USD per dose, values that do not include transport and storage, which in the case of the BioNTech/Pfizer vaccine requires special conditions. In Table 4, it should be noted that the Sanofi/GSK and Valneva vaccines are in phase 3 and are not yet approved and available for sale (as of February 2022).

These advance purchases have reflected a form of 'vaccine nationalism' (Abbas, 2020) similar to that observed in 2009 with the H1N1 virus. Advance purchase agreements are bilateral agreements that allow for the provision of vaccines under preferential conditions (Phelan, Eccleston-Turner, Rourke, Maleche & Wang, 2020), which have led to a widely known shortage of supply to low-income countries. The COVAX initiative consequently "competes with rich countries that can buy by paying pharmaceutical companies in advance for stocks of vaccines" (EFE, 2021).

*Table 5: Vaccine R&D financing flow: advance purchase agreements by purchaser*

| Country | Amount (millions of USD) |
|---|---|
| European Union | 25,237.50 |
| United States | 13,372.48 |
| African Union | 2,200.00 |
| Brazil | 942.65 |
| United Kingdom | 858.00 |
| COVAX | 750.00 |
| Thailand | 469.09 |
| Israel | 352.50 |
| Indonesia | 250.00 |
| Bangladesh | 120.00 |
| Dominican Republic | 40.00 |
| Philippines | 12.47 |
| **TOTAL** | **44,604.69** |

Source: Authors' elaboration based on Global Health Centre (2021)

At the beginning of the century, it had already become evident that the price of HIV retrovirals was hindering their availability in developing countries (Collazo Herrera, 2004). This led countries such as Brazil, India, and South Africa to rethink their policies on pharmaceutical patents related to diseases, such as HIV/AIDS, malaria, and tuberculosis, that are widespread in countries of the Global South (Giaccaglia, 2010). Some of these countries also developed their own manufacturing capacity in this field through different processes.

India produces second-line generic drugs for HIV/AIDS thanks to its 1970 patent legislation, as revised. On the other hand, Brazil was able to obtain licenses to manufacture more than 50% of the so-called 'AIDS cocktail' after negotiations with pharmaceutical companies (Giaccaglia, 2010). Several countries issued compulsory licenses to enhance access to HIV/AIDS drugs.[10] The 2001 World Trade Organization (WTO) Doha Conference reaffirmed that countries can issue compulsory licenses in various circumstances, including but not only during national emergencies. The efforts

[10] See, e.g. Carlos Correa, ed., *Pharmaceutical Innovation, Incremental Patenting and Compulsory Licensing* (Geneva, South Centre, 2013). Available from https://www.southcentre.int/wp-content/uploads/2016/05/Bk_2013_Pharmaceutical-innovation_EN.pdf.

made in the Global South were crucial in helping to address the HIV/AIDS crisis. The current situation with COVID-19 is different as, given the limited vaccine manufacturing capacity, many developing countries had to rely on supply from Western companies.

Below is an analysis of the differentiated strategies of some of the vaccine producers.

## 4. VACCINE PRODUCERS' DIFFERENTIATED STRATEGIES

Among all the COVID-19 vaccines approved (on an emergency basis), the most used globally has been the BioNTech/Pfizer's vaccine, whose administration requires special logistics and transport requirements at a very low temperature. This vaccine, and the financial operations described below, may have benefited from Pfizer's well known 'brand' in various areas of health, such as cancer treatments.

Pfizer, which was the first to obtain permission in the United Kingdom, has been reported to require sovereign guarantees, such as embassies or military bases, to protect against any future legal claim (Davies, Furneaux, Ruiz & Langlois, 2021). However, the WHO has taken out an insurance against the possibility of future legal claims through "no-fault immunization programs" for the vaccines provided by COVAX. With this type of insurance, "vaccine manufacturers are freed from the burden of responsibility for adverse effects" (Velásquez & Syam, 2021, p. 10).

A comparative analysis of the financial strategies by Moderna, BioNTech-Pfizer and AstraZeneca allows us to understand their financial results as well as their strategic and symbolic positioning in Latin America. The selection criteria used for these three vaccines were price, effectiveness, and awareness amongst the population. Moderna was the most expensive, AstraZeneca was the cheapest, and BioNTech-Pfizer was the first to be approved and is the best known in Latin America.

*Table 6: Vaccine R&D financing, advance purchase agreements and range of prices per dose*

| Vaccine | R&D financing | Advance purchase agreements | Range of price per dose (US dollars) | |
|---|---|---|---|---|
| Moderna | 957.30 | 10,080.00 | 25 | 37 |
| Pfizer-BioNTech | 800.29 | 6,420.32 | 18.34 | 19 |
| AstraZeneca | 118.01 | 4,086.04 | 4 | 8.1 |
| Janssen | 1,027.90 | 4,900.00 | 10 | |

Source: Authors' elaboration based on Global Health Centre (2021), Hooker & Palumbo (2020)

The AstraZeneca vaccine was made under the auspices of the University of Oxford in the United Kingdom. It has been the cheapest vaccine because it is sold at the cost of production. In terms of R&D support, it received 118.01 million USD and more than 4 billion USD in advance purchases. This vaccine uses a traditional viral vector technology and is slightly less effective than the other two. For example, hospitalization for the Delta variant has a 92% prevention rate after the second dose, while Pfizer-BioNTech reaches 96% effectiveness (PHE, 2021). AstraZeneca's shares maintained their value in the first year of the pandemic and experienced an increase of 25% in the first ten months of 2021.

In terms of its two-dose effectiveness, Moderna's vaccine is 94.1% effective (CDC, 2021b), while Pfizer-BioNTech's is 95% effective in preventing laboratory-confirmed COVID-19 cases with no evidence of previous infections (CDC, 2021c).

The Moderna and BioNTech-Pfizer vaccines also use a more recent, innovative technology based on messenger RNA (mRNA) that "teaches our cells to produce a protein, or even a portion of a protein, that triggers an immune response within our body" (CDC, 2021a). Moderna's vaccine is the most expensive amongst all those

approved, with a higher cost in Europe than in the United States (Kollewe, 2021). Moderna is also second on the list of those receiving the highest funding for R&D with 957.3 million USD (second only to the Janssen's vaccine and eight times more than AstraZeneca's) and received advance purchases of 10,080 million USD. This company, founded in 2010, saw a 434% increase in its share price during the first year of the pandemic and 230% in the first ten months of 2021.

BioNTech, the German company that formed an alliance in 2018 with the multinational Pfizer to manufacture influenza vaccines (H1N1), employed a different financing strategy. It obtained 800 million USD in R&D support and 6,420 million USD in advance purchases. BioNTech first entered into a development and commercialization agreement with the Chinese company Fosun Pharma for 135 million USD. Fosun Pharma spent 50 million USD in buying 1.58 million shares, while agreeing to share with BioNTech profits from sales of the vaccine in China (BioNTech, 2020), thus ensuring distribution in that country.

Later, the US-based multinational Pfizer invested 185 million USD in BioNTech, buying shares for 113 million USD (SEC, 2020), thereby ensuring future profits should the vaccine be successful. The German government later provided 434.4 million USD in R&D support, more than double the amount Pfizer had invested in BioNTech shares. BioNTech's vaccine development then received 115.9 million USD from the European Union and 250 million USD from Singapore. BioNTech's share price increased 140.6% in 2020 and 242% in the first ten months of 2021, Fosun's shares increased by 106% by the end of 2020, while those of Pfizer decreased by 0.9%. In the first ten months of 2021 the variation was of -7.39% and 18.83%, respectively. Due to the increase in the company's market value, BioNTech shareholders currently figure on the ranking of the wealthiest people in the world (Tognini, 2020).

*Table 7: Share values of firms involved in COVID-19 vaccine development (in USD)*

| **Firms** | 12/31/2019 | 12/31/2020 | 2019 - 2020 variation | 10/29/2021 | 2020 -2021 variation |
|---|---|---|---|---|---|
| AstraZeneca PLC ADR | 49.86 | 49.99 | 0.3% | 62.38 | 24.78% |
| BioNTech SE | 33.88 | 81.52 | 140.6% | 278.73 | 241.92% |
| Moderna Inc | 19.56 | 104.47 | 434.1% | 345.21 | 230.44% |
| Pfizer Inc | 37.14 | 36.81 | -0.9% | 43.74 | 18.83% |
| Shanghai Fosun Pharmaceutical Group Co Ltd (Shanghai) | 26.2 | 53.99 | 106.1% | 50 | -7.39% |

Source: Authors' elaboration based on Investing (2021)

The BioNTech vaccine, in addition to having greater effectiveness than other vaccines, has the reputation of the Pfizer brand behind it. Moderna used a more traditional strategy, receiving multiple public resources, including scientific cooperation,[11] in R&D and charging the highest price; as a result, of the three companies considered here, Moderna is the company whose share price increased the most.

Another of the findings that highlight the behavior of vaccine developers is the difference between the strategies of the Chinese company Fosun and American Pfizer: the former guaranteed supply for the Chinese market, while the latter privileged the interests of the company. Based on the above information, there is little doubt that the provision of R&D resources and the unknown terms of advance purchases should be

[11] A conflict has been known because this pharmaceutical company did not recognize the contribution of three National Institute of Health (NIH) researchers in developing technology patented by Moderna (Gay Stolberg & Robbins, 2021).

matters for discussion, particularly about the use of public resources and whether their outcomes should be deemed common goods.

So, it is interesting to note that when talking about this particular vaccine, the names of the company that produced it and the second transnational company that invested in it and bought Biotech shares do not appear.

The economic value of intellectual property rights is often higher when held by multinationals, given their capacity to defend and enforce such rights. Pharmaceutical companies that own the intellectual property of their vaccines also benefit from the public image of epistemic communities, i.e. recognized professional networks with a prestige and capacity to influence national strategies (Haas, 1992).[12] It is no coincidence perhaps that the vaccine sold by the multinational Pfizer - the first to obtain an emergency approval - has been considered the best in the public imaginary regardless of its actual effectiveness.[13] This is because it has taken advantage of the reputation of its 'brand', public relations and communications aimed at obtaining social acceptance through questionable publicity (King Mantilla, 2020).

A new binding international treaty (or other international instrument) dealing with pandemic prevention, preparedness and response is currently being discussed. A treaty or other instrument could eventually be adopted by the WHO, but one main obstacle for an equitable solution is the WTO TRIPS Agreement which obliges WTO Members to protect, *inter alia*, vaccine patents (Velásquez, 2019). And while the United States supported the proposal for a temporary exemption from TRIPS during the COVID-19 pandemic, it has been opposed by the European Union, notably Germany perhaps due to the success of the BioNTech/Pfizer vaccine. The TRIPS Agreement poses a major challenge to the Global South, as it limits the room to put in place "mechanisms to allow open access to technologies, including technical knowledge, in order to expand the local manufacturing of health supplies related to the pandemic" (p. 7).

This implies that in the Global South, and Latin America in particular, several countries have been left out of the broader vaccination processes. For example, while in Chile the percentage of vaccination (as of 31st October 2021) was 78.7%, in Brazil it was 56.4%, in Mexico 46.5%, and in Bolivia 32.6% (Mathieu *et al.*, 2021).

[12] According to Hass: "An epistemic community is a network of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue - are […] The members of a prevailing community become important actors at the national and transnational level as decision makers request their information and delegate responsibility to them. A community's advice, however, is informed by its own broader worldview. To the extent to which an epistemic community consolidates bureaucratic power within national administrations and international secretariats, it tends to institutionalize its influence and insinuate its views into wider international politics" (Haas, 1992, pp. 3–4).

[13] The market value of multinational companies' brands is related to the subjective issue of quality and lifestyle (King Mantilla, 2020).

## 5. CONCLUSIONS

Despite receiving massive public funding for R&D, COVID-19 vaccine developers, including global pharmaceutical companies, have been allowed to keep control over the technologies, while this knowledge should have rather been considered a global public good. The countries of the North have taken advantage of their financial capacity to consolidate their hegemonic position in many areas and ensure privileged access to the outcomes of such R&D.

The race for the production and acquisition of vaccines creates a moment of intense disarray and dispute. A reform of the multilateral system is needed to ensure that in future global health emergencies private interests are subordinated to global public health needs, and that global action is not conditioned by nationalism and hegemonic positions in international relations.

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