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Breaking the Chains. COVID-19 Impact on the Global Supply Chains in the Health Sector

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Abstract

2020 will be remembered in world history as the Year of the Pandemic and the one with the worst economic recession on record since the Great Depression of the Thirties. While virtually all countries and sectors in the world have been severely affected by Covid-19, there is one that presents unique challenges: the world's pharmaceutical sector, now under enormous stress to discover and manufacture a vaccine and/or an efficient retroviral treatment protocol for the coronavirus emergency. As the last months have shown, countries have made use of heavy-ended protectionist measures to ensure domestic supplies of medical protective equipment and treatment drugs, in the widespread fear that the disruption of the global supply chain of the pharmaceutical sector would restrict or harm their access to treatment. As often in similar situations, unilateral protectionist initiatives generally backfire, resulting in retaliatory actions and in global shortages. This piece analyses the pharmaceutical sector's friction points, discuss possible scenarios, and suggests mitigations strategies.

Keywords: pandemic; global supply chain; pharmaceutical sector; protectionist measure; the EU initiatives



International Trade
and Cooperation



UK



2011



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1. A year like no others

2020 will be remembered in the world history as the Year of the Pandemic. To be true, it is not the first time world has been stricken by a pathogen. The Black Death killed about one-third of Europe population in 1347-1350. In 1919 Spanish Flu made more victims than the First World War, counted in several million. What is unique about Covid-19 and different from the previous two, however, is that, so far, it is proving comparatively deadlier for human activities than for humans themselves.

A look at the data will show that, globally speaking, this is the worst recession on paper since the 1929 Great Depression, due to what the IMF called the 'Great Lockdown', that in spring 2020 put the breaks to economic activities of billions of people to stop the pandemic to spread. And while firm numbers for 2020 GDP are still far from certain, the predicted figure is about a global -3 per cent, for a projected loss of about 9 trillion US\$ (IMF, 2020). As a comparison, the global financial crisis of 2008-2009 only accounted for what seems now a modest -0.1 per cent of real GDP growth, year-on-year per cent change. For some countries, these grim figures are even grimmer. In the UK, the GDP fell by 20.4 per cent in Quarter 2 (April to June) 2020, the worst ever result since records have been taken (ONS, 2020).

Moreover, things can get even worse than that, especially if what everybody fears turns to be correct - i.e., the so-called 'Autumn wave', an even deadlier outbreak of the virus, as it happened with the Spanish Flu - and countries are forced back into lockdown. This seems to be the case in Europe, with France and Spain getting back to localised lockdown at the end of September and other countries, such as Italy and the UK, facing rising numbers of infected.

The IMF predicted an additional -3 per cent in 2020 if the pandemic continues until the end of the year. In the case it draws on 2021, about -8 per cent more could be added to the already bleak forecast.

This is what at least seems to be the history's lesson from the Great Depression, which is the longest (1929-1940) and most severe economic crisis the modern world remembers.

Some comparative analyses (NYT, 2020) draw the attention on disturbing similarities between the two cases; others (Barro et al., 2020) explore instead the economic fallout of the Spanish flu in 1919 not only on GDP growth but

also on inflation, stock exchanges, and government revenue.

And yet, looking now at the way it started back in December 2019 and to the comparatively mild mortality rate (about 3-4 per cent overall), it seems difficult to believe something in kind managed, and still manages, to wreak havoc to the entire planet. After all, while Covid-19's closest relative, the 2003 virus SARS, did create economic fallout in East Asia, that crisis was short-lived. To understand why things are so different, we need to remember that the world economy functions now in a truly interconnected way, far more it was the case two decades ago. Not only the status of enhanced globalisation we live nowadays made possible to the virus to spread like fire across the planet; it obliged countries to virtually shut down essential activities, like international travel, tourism, and global supply chains (GSCs), which are the way both advanced and emerging economies profit from the economic growth.

To the analysis of one specific global supply chain this article is devoted. With one important point: this particular supply chain is fundamental to fight the Covid-19 that caused its disruption in the first place. Because it is about the pharmaceutical sector and its troubles in these difficult times.

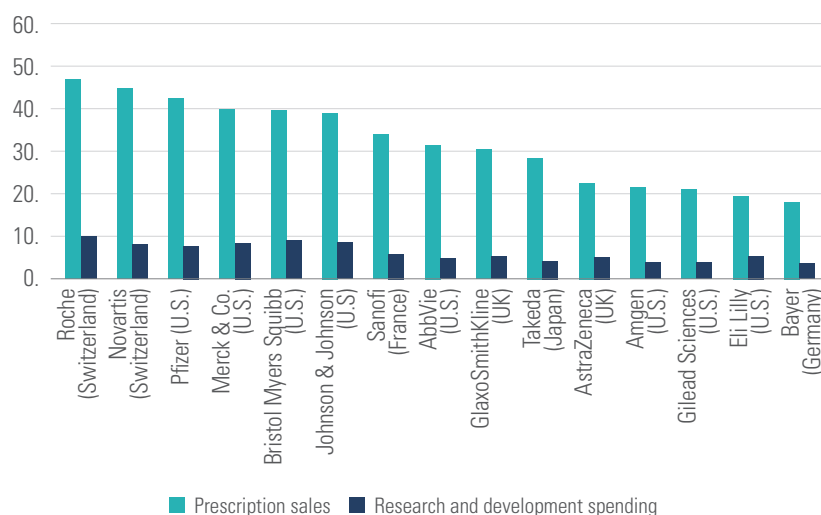
2. Big pharma, big headache? The challenges of a complex supply chain

It might not figure among the top ten world industries for revenue, but the pharmaceutical sector remains one of the most prominent nonetheless, with a global market value of about US\$1.25 trillion in 2019, which was the result of sustained growth over the last decades. Among the top players of the sector, both in terms of R&D and prescription sales, there are European and US companies, including some giants of the sector such as the Swiss Roche (US\$48.25 billion of sales in 2019) and Novartis, the US Pfizer, Merck, Bristol Myer & Squibb, J&J, the UK GSK and AstraZeneca, and the German Bayer. Among the giants, there is also the Japanese Takeda.

Apart from these figures, the American companies were the ones who contributed the most to the development of new chemicals and biological substances – 120 in between 1998-2019, compared to 58 for Europe and 36 for Japan. This also explains the increase in the already elevated industry ratio of R&D, which reached about US\$180 billion in 2018.

Chart 1.

Top 15 global pharmaceutical companies by prescription sales and R&D spending in 2019 (in billion US dollars)



Source: Author's elaboration on Statista data

Even in times when all the Covid-19-related hurdles were not an issue, scholars had already discussed and highlighted specific concerns regarding the global health supply chain, the lack of coordination among the world institutions first of all (Sridhar and Batniji, 2008), something that has gained enhanced attention in 2020 after the Covid-19 struck worldwide.

But there have always been other issues straining the global supply chain of the health sector for a few years now, and they encompass a series of areas (Privett & Gonsalvez, 2014), such as: inventory management; insufficient data about demand; difficulties in recruitment (availability of trained personnel is often a factor, especially in developing countries; Dowling, 2011); insufficient contingency plans against localised shortages; the issues of expiration dates and other technical fault lines (warehouse management and temperature control among them) and, last but not the least, shipment policies.

But in 2020, due to the Covid-19 crisis, another quite serious fault line has emerged. It is something that directly affects not, or not just, the market leaders in R&D but the so-called generic drugs manufacturers. These companies, while less known than the giants in the above chart

are nonetheless an important and ubiquitous feature in the world's pharmaceutical industry.

Once the patent protection over a branded drug expires, companies other than the original manufacturer are free to get the compound formula and produce it, at a generally cheaper price. Many of these companies are now increasingly based in emerging countries, in what has represented a market shift since the 2000s (Kesic, 2009) when they belonged mostly advanced economies; they also supply the world with both over-the-counter products such as acetaminophen (paracetamol), aspirin, and with chemical compounds ending up in other drug manufacturing.

Their business model is therefore quite different from the so-called branded-drug companies considered before, which invest heavily (a company like AstroZaneca spends about a quarter of its revenue share in R&D) in the development of new drugs from where most of the profits come from.

In line with the growth of the global pharmaceutical market, the generic drug segment has been growing as well and is projected to rise at a compound annual growth rate (CAGR) of about 8.7 per cent in the next years. The five-year projection (2016 to 2021) forecasts a global increase from US\$352 billion to \$533 billion (European Pharmaceutical Review, 2019).

Some of the biggest generic drug manufacturers have a substantial dimension – like the segment leader, the Israeli Teva Pharmaceutical Industries (US\$18.9 billion of revenue) – even though with lower revenues compared to the sector giants.

India prominently figures among them, both in terms of companies and as a consumer market. The country is by far the largest suppliers of generic drugs in the world, contributing up to 40 per cent of the United States' generic demand in 2019 and widely exporting everywhere in the world (only in 2019, India pharmaceutical export grew of +11 per cent). Among the Indian leading companies, there's the Mumbai-based Lupin Pharmaceutical with a turnover of about US\$2.3 billion, and Sun Pharmaceuticals (US\$4 billion) also based in Mumbai.

Taking everybody by surprise, in March 2020 India decided to restrict exports of 26 drugs' active ingredients in order to prevent internal shortages,

and sounded alert bells everywhere (*BBC*, 4 March 2020; after a few weeks, however, India eventually relaxed the ban due to the US retaliation threats; *The Economic Times*, 9 April 2020).

This followed the temporary closure of compound manufacturers in China, which supply about 70 per cent of Indian pharmaceutical companies, including components such as a few antibiotics – tinidazole and erythromycin – the fertility drug progesterone, Vitamin B12 and the omnipresent paracetamol.

Panicked headlines in the press apart, the reaction of the pharmaceutical industry has been mixed. Some generic drug manufacturers such as the European Mylanm admitted drug shortage a possibility in the medium term, while others, like the US-based Eli Lilly excluded any adverse impact on its own products, as for instance, insulin products.

However, when considering that together China and India produce more than 80 per cent of the world's paracetamol (China 59 per cent and India 25 per cent in 2016), 90 per cent of its penicillin and amoxicillin (two essential antibiotics), and 50 per cent of its ibuprofen, any change in their foreign trade approach is liable to create alarm and fuel stockpiling initiatives or, worse, retaliatory measures to address the shortage threat.

3. What next? Scenario analysis

Some projections suggest that the Covid-19 pandemic will probably be over in a couple of years, especially if one or a handful of the many vaccines under study at the moment (about 180 to date, 32 of which are currently in human trials; *New York Times*, 21 August 2020) makes to the finishing line and starts delivering results. However, as discussed above, even in these allegedly optimistic scenarios there's the lingering and not-so-far-fetched worry that the economy will suffer many years to come. Moreover, as shown above, the global health sector faces specific challenges, some of them already well known to the sector experts. However, in some cases, Covid-19 is increasingly regarded as the proverbial last straw that breaks the camel's back.

Since the start of the emergency in January 2020, the US FDA (Food and

Drugs Administration) has kept close contact with the manufacturers of medical equipment and with more 180 producers of human drugs, with the dual aim of getting notification of any anticipated supply disruptions and evaluating their global supply chain, including active pharmaceutical ingredients (i.e. the main ingredient in the drug) and other filling components, especially the ones manufactured in China (FDA, 2020).

This adds to the general concerns about the over-reliance on the Asian raw production of API (active pharmaceutical ingredients) that the CFR has been already flagging in pre-Covid-19 times, under a security framework perspective.

“While the Department of Defence only purchases a small quantity of finished pharmaceuticals from China, about 80 per cent of the active pharmaceutical ingredients (APIs) used to make drugs in the United States are said to come from China and other countries like India” (CFR, 2019, online).

It is possible, albeit not likely, that the US would consider restructuring their pharmaceutical supply chain due to security concerns, even though the case of REEs is a good example of how this is neither simple nor easily achievable in the short term.

The EU has gone even further in its vulnerability security assessment.

A EU report of July 2020 takes stock of a perceived medicine shortage in the European market, coming out with what looks like a geopolitical assessment (The EU Commission, 2020). According to the report, and in line with what mentioned in the previous section, 80 per cent of active pharmaceutical ingredients used in Europe are sourced from India and China; the two countries together account for about 40 per cent of finished medicines sold on the European markets.

To address this looming threat, the EU put on the table a series of mitigation initiatives, the return to EU independence to secure autonomous supplies of medicine and equipment in the first place.

The report goes to the extent of recommending the identification of potential production sites for EU pharmaceutical manufacturing, together with financial incentives to encourage European producers to reshore their production factories.

This will likely take back to Europe the manufacturing of some of the most popular drugs, reversing a trend of the last decades that led to the shutting down of European domestic facilities, as Rodhia, which closed its last plant in Southern France in December 2008 (MacDonald, 2009), leaving the US company Covidien as the only non-Asian paracetamol producer.

In parallel, a more robust intra-EU coordination among member states is advocated as fundamental to deliver affordable and open-to-all health care to European residents.

Even beyond the EU Commission concerns, there are evidence countries are starting stockpiling both chemical compounds and ready-to-use medical supplies, in what looks like an understandable but hardly helpful reaction to a global supply threat.

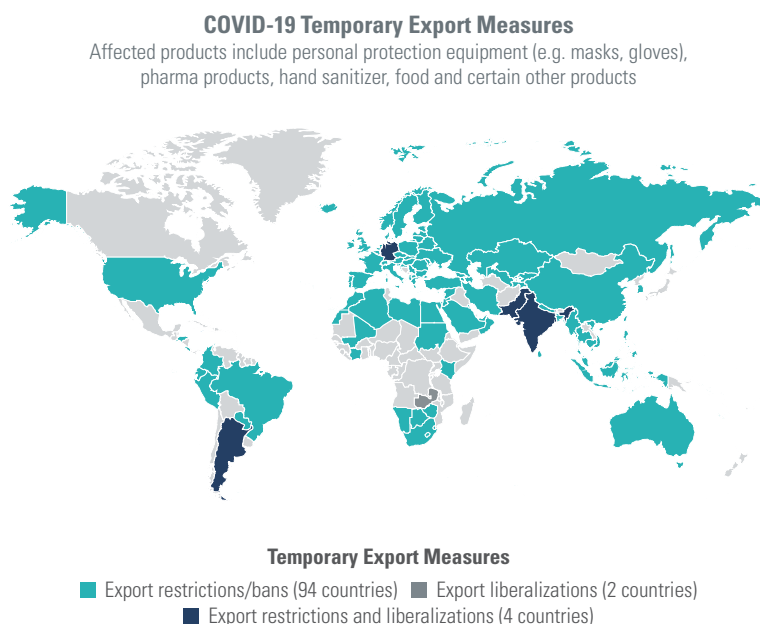
A quite recent example is Finland, which has started stockpiling generic (but essential in Covid-19 emergency) medications such as paracetamol and dexamethasone in summer 2020 (*Euronews*, 9 August 2020), due to growing worries that the drug global supplies would run out due to production cut in China as had already happened in March 2020.

This is a cause for concern.

A long experience and studies in the economics of stockpiling show that this kind of policy approach risks to be counterproductive for everybody and severely harmful for the most vulnerable countries. This adds to worries of protectionist measures aimed at restricting exports of the drug compounds and other medical supplies to support the domestic medical sector. As mentioned before, a few of these measures have been enacted in the past months during the peak of the Covid-19 crisis, joining India-imposed ban on paracetamol export in March 2020 and making the global situation worse.

As the International Trade Centre reported (ITC, 2020) in April 2020, 88 countries had some kind of protectionist measures in place, ranging from an outright ban to some sort of restrictions on selected items). While some countries have since then relaxed those measures, especially in summertime, others have not.

Chart 2.**Covid-19 temporary export measures worldwide**



Source: International Trade Centre, 2020

“It has become apparent that protectionist measures are affecting the global pharmaceutical supply chain. Export bans and national stockpiling, within and outside the EU, can easily lead to inequitable supply and shortages in the EU and worldwide.” (The EU Commission, 2020:5).

It doesn't need to be in this way.

If there is anything good that has emerged from the Covid-19 emergency, it is in the sense of a never-before witnessed close cooperation among large pharmaceutical companies in a joint effort to find a cure.

In March 2020, a few of the sector leaders, Novartis, AstroZaneca, Takeda, Eli Lilly, Novartis, Gilead among them, formed a research group, Covid-19 R&D, to share best practice, data analysis, and streamline cooperation toward a vaccine (*The Scientist*, 2020).

Another example of global cooperation is the Access to COVID-19

Tools (ACT) Accelerator, launched in April 2020 and that was the result of a combined effort by the WHO Director-General, the French President Emmanuel Macron, the EU President, and the Bill & Melinda Gates Foundation to bring together public and private organisation against the new coronavirus challenge (WHO, 2020).

More importantly, *“the collaboration between Gavi, SII, and the Gates Foundation supports the efforts of the ACT Accelerator’s vaccines pillar, also known as COVAX, co-led by Gavi, CEPI and the World Health Organization (WHO), to accelerate the development of COVID-19 vaccines and ensure rapid, global access to them. Decisions around investment in manufacturing are taken in close collaboration between these three lead organisations of the COVAX pillar,”* (Gavi, 2020, online), which will become crucial once one or more vaccines will be approved for use and will need to go into mass production.

Global cooperation is the way to go.

A multinational, concerted response to the virus and the economic fallout that is stretching the limits of more of one industry or country is required if the world wants to limit the damages of what increasingly looks like a perfect storm.

Managing the supply chain of one of the essential ammunitions we have against the virus –our global health care sector – and avoiding protectionist measures that undermine joint efforts are, and have to remain, the world’s top priorities.

List of References

- BBC (2020) Medicine Shortage Fears As India Limits Exports. 24 March 2020, Retrieved 24 August 2020, From <https://www.bbc.com/news/business-51731719>
- Barro et al. (2020). The Coronavirus And The Great Influenza Pandemic: Lessons From The “Spanish Flu” For The Coronavirus’s Potential Effects On Mortality And Economic Activity Retrieved 14 August 2020, From <https://www.nber.org/papers/W26866.pdf>
- CFR (2019) U.S. Dependence on Pharmaceutical Products From China, Council of Foreign Relation, 19 August 2019, Retrieved 28 August 2020, from <https://www.cfr.org/blog/us-dependence-pharmaceutical-products-china>
- Dowling P. (2011) Healthcare Supply Chains In Developing Countries: Situational Analysis, Arlington, 2011.
- FDA (2020) Coronavirus (Covid-19) Supply Chain Update, 27 February 2020, Retrieved 28 August 2020, From <https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-supply-chain-update>
- The Economic Times (2020) India Relaxes Ban On Exports Of Paracetamol, Hydroxychloroquine 09 April 2020. Retrieved 28 August 2020, From <https://economictimes.indiatimes.com/Industry/Healthcare/Biotech/Pharmaceuticals/India-Relaxes-Ban-On-Exports-Of-Paracetamol-Hcq/ArticleShow/75035983.cms?from=mdr>
- European Pharmaceutical Review (2019) Top Five Generic Drug Makers. Retrieved From <https://www.europeanpharmaceuticalreview.com/article/93095/top-five-generic-drug-makers/>
- Euronews (2020) Finland Is Stockpiling Paracetamol Over Fears Of A Second Wave. 9 August 2020. Retrieved 27 August 2020, From <https://www.euronews.com/2020/08/18/coronavirus-finland-is-stockpiling-paracetamol-over-fears-of-a-second-wave>
- The EU Commission (2020) C2272 8.4.2020 : Guidelines On The Optimal And Rational Supply Of Medicines To Avoid Shortages During The Covid-19 Outbreak Retrieved 24 August 2020, From https://ec.europa.eu/health/sites/health/files/human-use/docs/guidelines_isc_en.pdf
- The EU Parliament (2020) Medicine Shortages In The Eu: Causes And Solutions | News | European Parliament. Retrieved 24 August 2020, From <https://www.europarl.europa.eu/news/en/headlines/society/20200709s-to83006/medicine-shortages-in-the-eu-causes-and-solutions>

- Gavi (2020) *New collaboration makes further 100 million doses of COVID-19 vaccine available to low- and middle-income countries*, Retrieved 4 October 2020, from <https://www.gavi.org/news/media-room/new-collaboration-makes-further-100-million-doses-covid-19-vaccine-available-low>
- GBR Reports (2020) *The World's Pharmacy: India's Generic Drug Industry*. Retrieved 24 August 2020, From <https://www.gbreports.com/Article/The-Worlds-Pharmacy-Indias-Generic-Drug-Industry>
- IMF (2020) *The Great Lockdown: Worst Economic Downturn Since The Great Depression*. Retrieved 14 August 2020, From <https://blogs.imf.org/2020/04/14/The-Great-Lockdown-Worst-Economic-Downturn-Since-The-Great-Depression>
- Lupin Pharmaceuticals, Inc. (2019) *Lupinpharmaceuticals.Com* Company website [Cited 11 July 2019]. Available From: <http://www.lupinpharmaceuticals.com/about.htm>
- Macdonald, G (2009), *Europe's Last Paracetamol Plant Closes Its Doors*, Outsourcing Pharma, Retrieved 28 August 2020, From <https://www.outsourcing-pharma.com/article/2009/01/06/Europe-S-Last-Paracetamol-Plant-Closes-Its-Doors>
- ON (2020) *GDP Monthly Estimate, May 2020*, UK Office For National Statistics. 24 May 2020. Retrieved 28 August 2020, From <https://www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/gdp-monthlyestimateuk/june2020>
- Privett N. & D. Gonsalvez (2014) *The Top Ten Global Health Supply Chain Issues: Perspectives From The Field*, Operations Research For Health Care, Volume 3, Issue 4, December 2014, Pages 226-230
- Sridhar D. & R. Batniji, (2008) *Misfinancing Global Health: A Case For Transparency In Disbursements And Decision Making*, Lancet 372 (2008) 1185–1191
- Sun Pharmaceutical Industries Ltd. (2019) *Sunpharma.Com*. 2019 [Cited 11 July 2019]. Available From: <https://www.sunpharma.com/>
- The Scientist (2020) *How The Pharma Industry Pulled Off The Pivot To Covid-19*. Retrieved 24 August 2020, From <https://www.the-scientist.com/bio-business/how-the-pharma-industry-pulled-off-the-pivot-to-covid-19-67719>
- The New York Times (2020) *Coronavirus Vaccine Tracker*, 21 August 2020. Retrieved 24 August 2020, From <https://www.nytimes.com/interactive/2020/science/coronavirus-vaccine-tracker.html?Auth=Login-Google>
- The New York Times (2020) *Why We Can't Foresee The Pandemic's Long-*

Term Effects. (2020). Retrieved 14 August 2020, From <https://www.nytimes.com/2020/05/29/business/coronavirus-economic-forecast-shiller.html>

WHO (2020) The Access to *COVID-19 Tools (ACT)* Accelerator, Retrieved 4 October 2020, from <https://www.who.int/initiatives/act-accelerator>