

The Role of the Petrochemical Sector in the COVID-19 Pandemic

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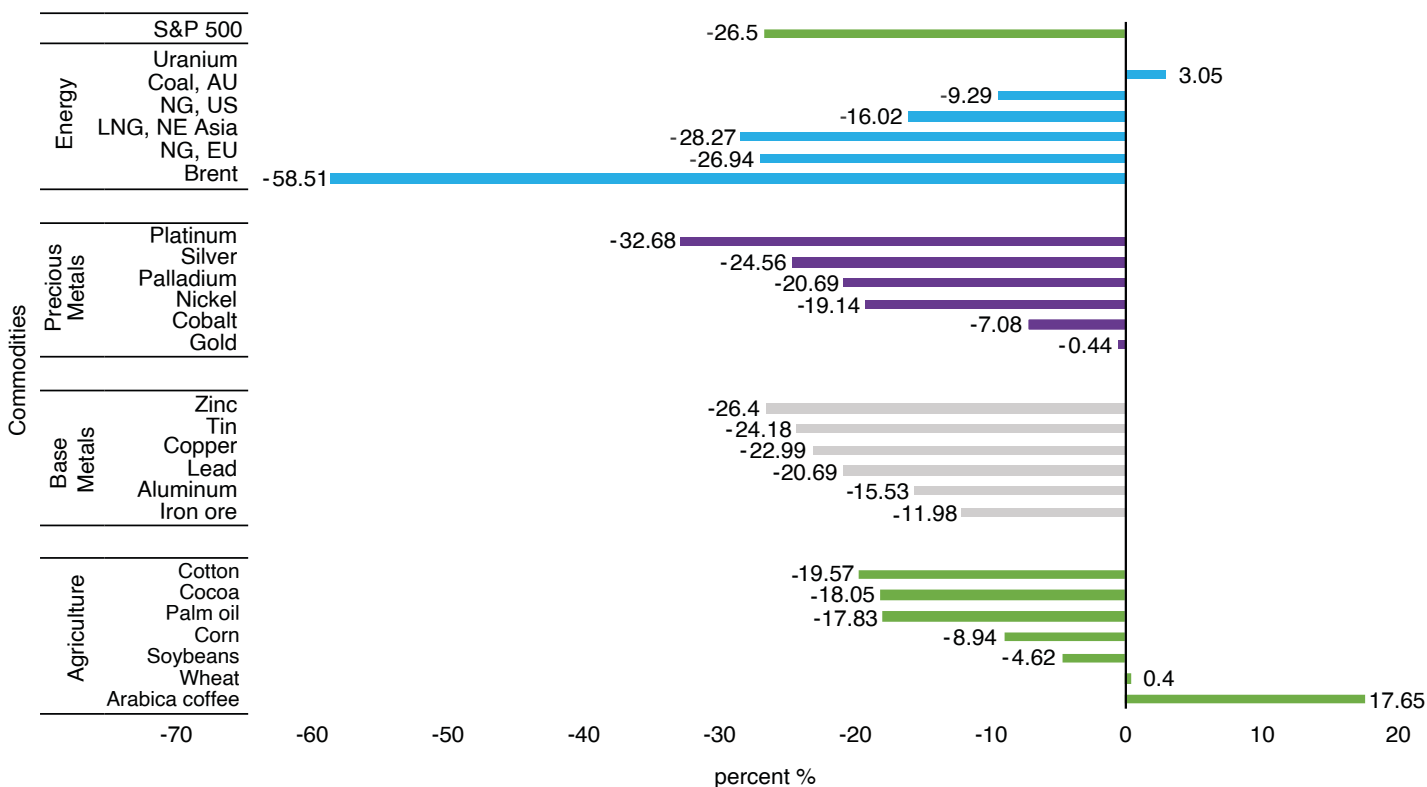
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Introduction: The great slowdown

Our super-connected world enabled the COVID-19 virus to quickly evolve into a pandemic, bringing the world to a standstill. Millions of people have been infected by the virus, and billions are impacted by lockdown measures to contain it and the consequent global economic slowdown. The world was unprepared for the virus, and the materials needed to fight and contain it have become scarce commodities. The United States (U.S.) went on a war footing, directing its manufacturing sector to produce medical supplies such as ventilators and personal protection equipment (PPE). Some countries began hoarding food and medicine. The global lockdowns to contain the spread of the virus grounded many passenger flights, halted non-essential road transport and closed businesses. This resulted in global economic stagnation, introducing an exogenous shock to the global economy. The OPEC+ decision to increase production introduced a supply shock in an environment of low oil demand, creating historically high inventory levels and low oil prices. The WTI crude oil futures contract for May 2020 settled in negative territory, an unprecedented event in the history of the market. Global oil consumption fell by more than 20 million barrels per day (MMb/d) due to the lockdown measures, and refining throughput fell by more than 7 MMb/d.

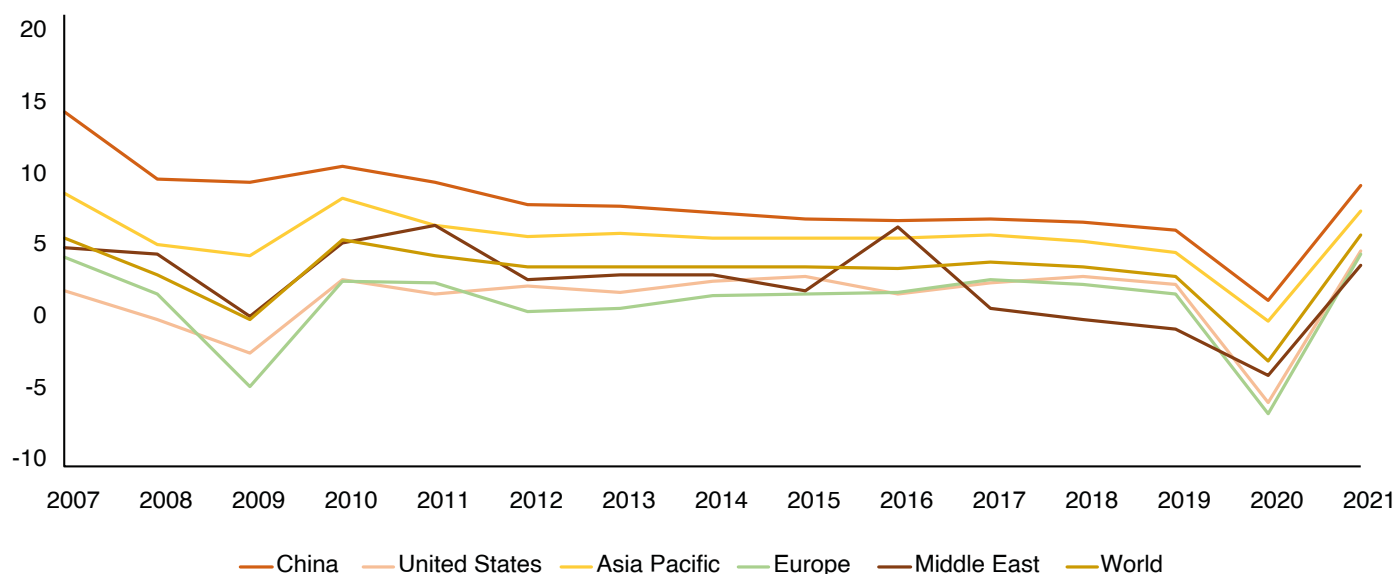
According to the International Monetary Fund (IMF), global real gross domestic product (GDP) growth is expected to shrink by 3% in 2020. In contrast, western hemisphere GDP could shrink by more than 6% (Figure 2). Most commodity prices fell, with the biggest decrease seen in oil prices.

Figure 1. All sectors of the economy are impacted by COVID-19.



Source: IMF (2020).

Figure 2. Impact of the COVID-19 pandemic on real GDP growth.

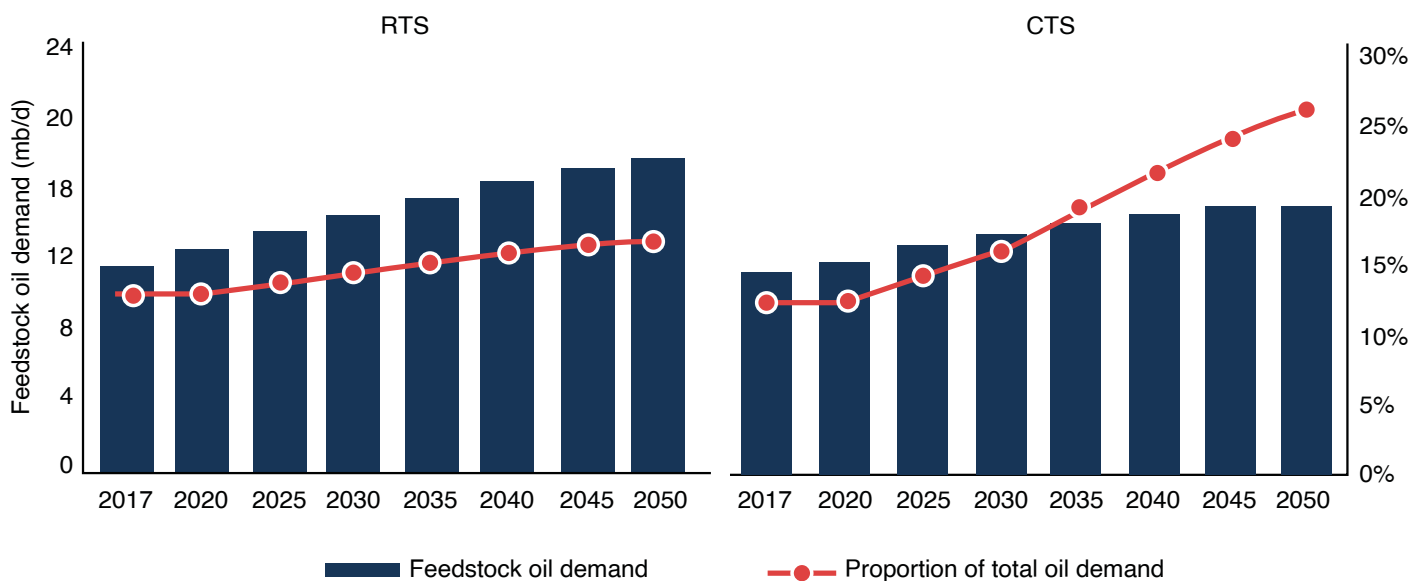


Source: IMF (2020).

The silver lining: How the oil sector is at the forefront of the fight against COVID-19

As the world tries to contain the virus spread, the oil industry, among other frontline sectors, is providing essential materials to keep populations safe. The petrochemical sector normally uses more than 13 MMb/d of crude oil as a feedstock, converts it into important materials such as resins for the plastics industry, and chemicals for the health, pharmaceutical and food sectors. The importance people are giving to their short-term health and hygiene over long-term sustainability has become apparent amid the pandemic. Concerns over safety and cross-contamination have caused single-use plastic bans to be repealed in many U.S. states and in the corporate sector. This has created more demand for bottled water, packaging and single-use plastics. Demand for ethylene and propylene polymers used in the production of plastic water bottles, packaging, single-use plastics and PPE is expected to increase significantly until a viable treatment for COVID-19 is found. Demand for filtration equipment, for example, such as face masks, has grown by over 700% during the pandemic. According to the World Health Organization (WHO), over 166 million items of PPE are required to be produced per month to fight the COVID-19 pandemic. According to the World Economic Forum's Global Risks Report, infectious diseases will be the highest global risks in terms of impact over the next 10 years. It anticipates the economic impact of flu pandemics over the coming decades will cause significant damage to the global population and global economy. The petrochemical sector will continue to be a vital player in providing the products necessary to combat infectious diseases. Fighting the pandemic would have been much harder, and would have caused higher mortality rates and more damage to the global economy if petrochemical products did not exist.

Figure 3. Demand for oil as a petrochemical feedstock.



Source: IEA (2018), “The Future of Petrochemicals.” All rights reserved.

Note: RTS = Reference Technology Scenario; CTS = Clean Technology Scenario.

Facts about the petrochemical sector

- About 4% of global oil production is used to make plastics, and about 2% is used to make textiles, without accounting for energy use during the manufacturing process.
- Approximately 99% of pharmaceutical feedstocks and reagents are derived from petrochemicals.
- Over 98% of PPE items are derived from petrochemicals (polypropylene and polyethylene, among others).
- Plastic used in packaging is the largest segment of global plastic demand.

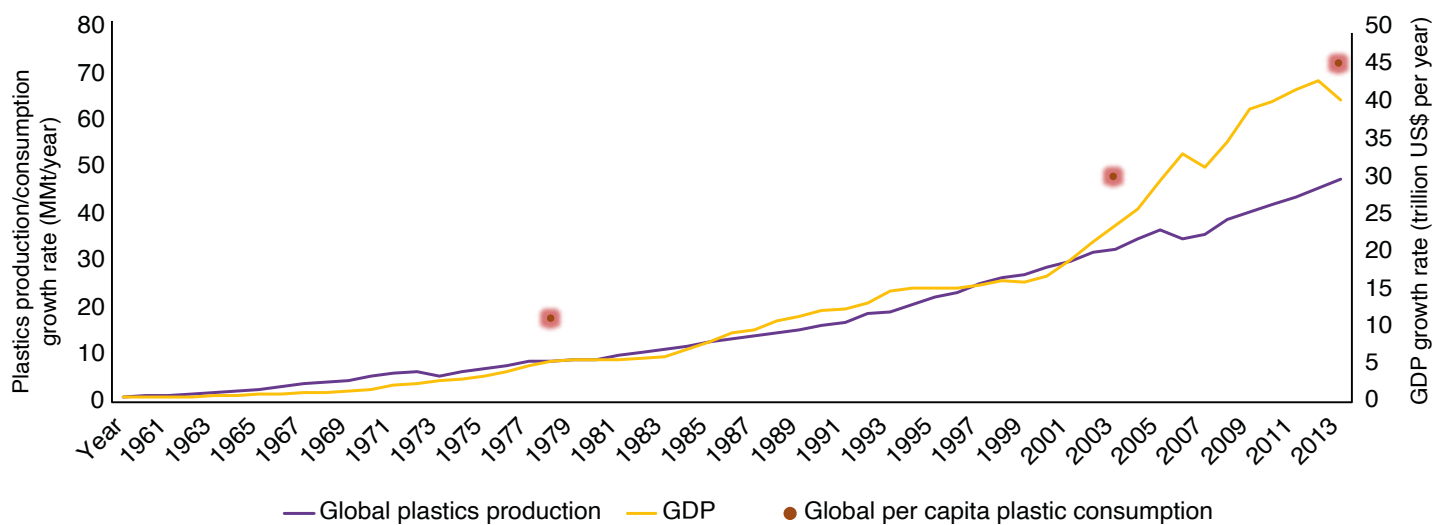
Petrochemical sector growth vs. oil demand as a feedstock

The petrochemical sector has an estimated market size of over \$400 billion. It is directly responsible for supplying materials to almost all sectors of the economy (Figure 6). The demand for petrochemical products is expected to grow at the same rate as population and GDP growth, especially in developing countries. Since 1962 global GDP has steadily increased at the same rate as plastics production/consumption. With production elasticity greater than zero, plastics production/consumption can be viewed as an indicator of economic growth, due to the high correlation between GDP and the plastics sector’s growth. Figure 4 shows that any change in the production of plastics is followed by a change in GDP. According to the International Energy Agency (IEA), demand for high-value chemicals (HVCs) will grow by between 40%-60% (about 1 billion tonnes) by 2050, mainly driven by demand for plastics. The demand for oil as a petrochemical

feedstock will grow by over 20% by 2050, even accounting for better fuel efficiency, enhanced recycling, and the electrification of passenger vehicles (IEA 2018). The demand for oil as a petrochemical feedstock currently accounts for 13% of total oil demand. With the current state and pace of technological innovation, energy efficiency and other value chain optimization efforts in the petrochemical sector, the demand for oil as a chemical feedstock will remain strong. Populations and per capita GDP are expected to grow in developing regions such as the Asia Pacific, the Middle East, Africa, and South and Central America. The consumption of plastics and other petrochemicals in these regions is expected to grow proportionally. Packaging plastic, the largest segment of global plastic demand, is worth about \$244 billion and has a compounded annual growth rate of 4%.

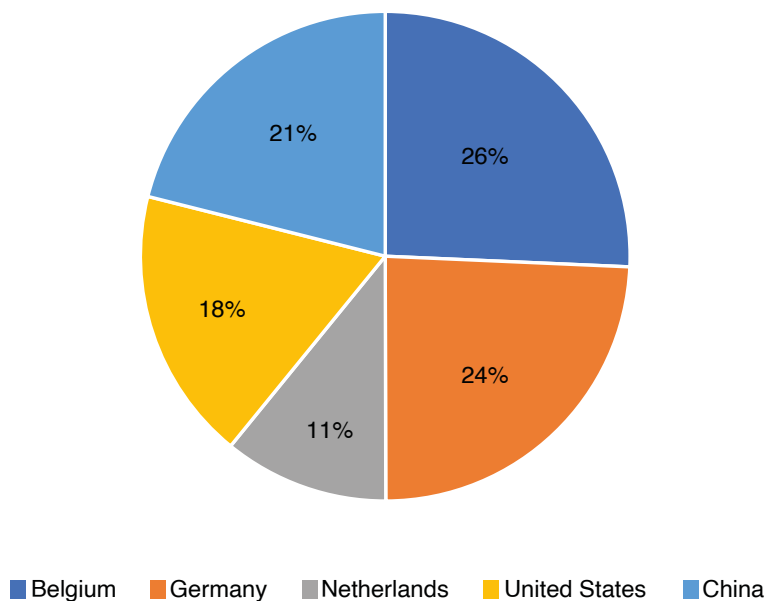
In 2018, industrialized developed countries were the largest importer of HVCs, used to make plastics and other resins (UN 2020). The GDP of developing countries in the Asia Pacific, the Middle East and Africa continues to accelerate. As such, the consumption of products derived from petrochemicals is expected to grow significantly in these regions. This is expected to compensate for the slowdown in demand in developed regions, such as Europe and North America, in the long term.

Figure 4. Plastics consumption/production follows GDP.



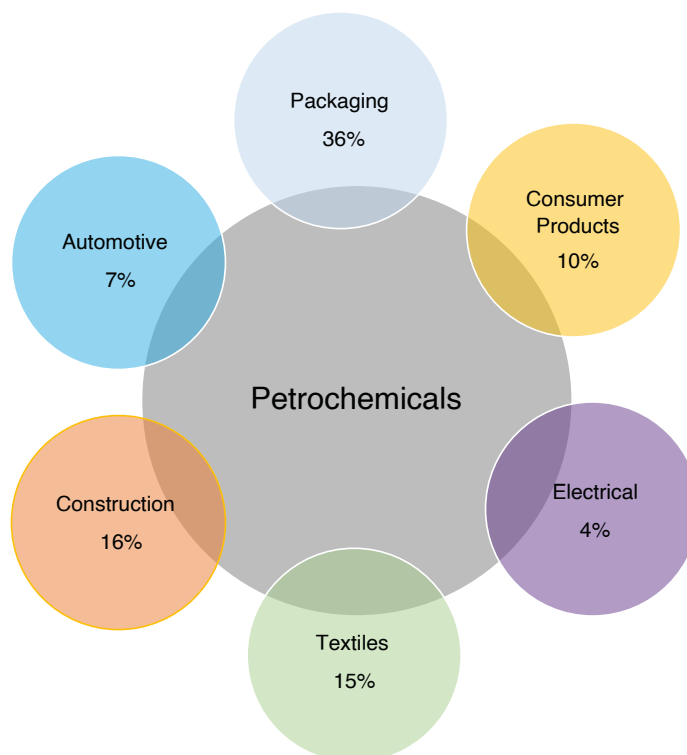
Sources: IMF (2020); UN (2020).

Figure 5. Top importers of liquefied high-value chemicals.



Source: UN (2020).

Figure 6. Interrelationships between the petrochemical sector and major sectors of the economy.



Source: IEA (2018), "The Future of Petrochemicals." All rights reserved.

COVID-19 and beyond: The growth trend of the petrochemical sector

The COVID-19 pandemic has disrupted all sectors of the global economy, many of which are highly linked to the petrochemical sector. As such, reduced economic activity will severely impact the sector in the short term. As Figure 4 shows, plastics production can be regarded as a leading indicator of economic recession. In 2008, a reduction in plastics production was followed by global GDP contraction. However, lower crude oil prices should, to some degree, offset the petrochemical sector's reduced sales, but not fully. For instance, Dow Chemicals reported 11% lower sales in the first quarter (Q1) of 2020 compared with Q1 2019. However, its costs were 10% lower in Q1 2020 than in Q1 2019 due to lower feedstock costs (Chemicals 2020).

Increased precautionary measures related to product handling, PPE, and social distancing will continue for the next few years until a viable treatment for COVID-19 is found. As a result, post-pandemic demand is expected to grow more than would have been the case under normal circumstances. As we move to a transformed future due to the pandemic, we can appreciate the role petrochemicals play in serving society by providing the products individuals need to stay safe and healthy, while facilitating socially responsible economic growth.

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