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Rethinking Overseas Production: The Case of COVID-19 and Negative Externalities

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Based on the negative externality argument, we illustrate that international production is a suboptimal solution from the societal perspective of a multinational company's home country, because moving production abroad can lead to insufficient production in the home country, and excess production abroad. The suboptimal outcome increases with the essentiality of the product. The present argument and results are relevant to policymakers and managers of multinationals, in addition to being useful in the classroom as an additional perspective that shows the complexity of international trade and international production locations.

INTRODUCTION

This article highlights a unique issue emerging from the extensive restrictions on exports imposed by many countries due to COVID-19. A simple graphic model, which is based on the results of a more sophisticated analytical model, shows that the decision to produce essential products at foreign locations does not consider negative externality from the home country's perspective. This leads to production locations that are suboptimal for society in the country where the company is headquartered. A multinational company (MNC) seeking to optimize profits by shifting production to lower-cost host countries produces too much abroad and too little locally (i.e., in their home country) from the societal perspective of the home country. This happens because production abroad creates costs for the home society that the MNC does not consider in its decision-making process.

This finding is relevant for policymakers and multinational managers alike. Policymakers can use the argument presented here to justify interference in free international trade and production locations for essential products, based on a robust economic argument. Simultaneously, managers of MNCs should be aware that post COVID-19, there will likely be more restrictions on the free flow of commodities around the globe due to suboptimal production of essentials at the home country. This conclusion is especially relevant to multinationals from developed countries.

The outbreak of COVID-19 resulted in many adverse outcomes for societies around the world, including an unprecedented increase in governmental restrictions on exports. The limitations applied to varied products, especially medical supplies, food, and personal protection equipment (PPE). As of May 14, 2020, ninety-three countries had imposed temporary export restrictions on commodities essential for fighting COVID-19¹ in response to the pandemic rapidly spreading around the globe. The extent of the re-

strictions varies by country. For example, China imposed licensing or permit requirements for exporting test kits, medical supplies, and PPE.

Traditionally, governmental restrictions on exports are rare, especially compared to the more significant trade barriers as customs, levies, tariffs, and quotas on imports. The limited export restrictions are due to the positive effect exports have on the GDP and employment. In ordinary times, most restricted exports are imposed on defense-based goods and technology for reasons of national security. However, in times of crisis, governments do impose export restrictions to protect their society from expected shortages in essential commodities. For instance, during the 2007–2009 financial crisis, Vietnam and India, two of the world's largest suppliers of rice, prohibited or restricted rice exports (Clarete, 2015).

The restrictions on exports affect multinational companies with manufacturing facilities in host countries that impose restrictions. For example, "the U.S.-based 3M company saw its Chinese factories 'nationalized, effectively' by the Chinese government, said Peter Navarro, a manufacturing and trade adviser to President Donald Trump, speaking to Fox Business in February" (Brenan, 2020). Even if we assume that the average MNC optimizes its profits and the hedging strategy of its international supply chain by diversifying production locations, we cannot assume that it considers the viewpoint of the society in its home country. In other words, the home-country supply chain will be under-diversified and result in local under-production.

This conclusion is based on the externality theory (Buchanan & Stubblebine, 1962; Meade, 1952), especially on negative externality. Scitovsky (1954: 143) writes, "external economies are a cause for divergence between private profit and social benefit and thus for the failure of perfect competition to lead to an optimum situation." Externality theory contends that an economic unit considers its direct costs and benefits when optimizing its goals, but not costs

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¹ COVID-19 Temporary Trade Measures: <https://www.macmap.org/covid19>.

or benefits imposed on third parties, if it is not penalized for creating the cost or compensated for creating the benefits for the third parties. Therefore, private optimization by an MNC results in a suboptimal solution from a societal perspective.

Multinational companies seeking to reduce manufacturing costs, especially in labor-intensive industries, move manufacturing to developing nations where production costs are lower (e.g., China). When making this decision, an MNC considers factors related to overall-cost reduction and the concentration of the production and supply chain in a foreign country. Usually, it does not consider the impact on the home country's national/macro level when choosing where to manufacture (externality). For example, it would not weigh the negative effect of the nation's aggregate supply of a product being concentrated in manufacturing facilities in foreign countries or even in one foreign country. Causing the aggregate supply of a country to be dependent on one dominant foreign country can be problematic during global crisis like COVID-19. Also, the MNC does not consider that a foreign nation could use concentrated production to leverage in case of geopolitical tensions, as China does with the production of pharmaceuticals. For example, the U.S. is so dependent on China for production of drugs that "U.S. policymakers worry about China 'weaponizing' drug exports" (Palmer & Bermingham, 2020).

This means that the social cost is higher for essential products. Medicines and PPE should have a relatively high social cost compared to textiles and apparel. Essential products could be lacking in the home country during a crisis due to the export restrictions imposed by a host country. Currently, the best example is the short supply of masks and other PPE essentials in home countries of MNCs (Palmer & Bermingham, 2020), as the result of increased demand combined with restrictions on exports imposed by countries like China and Turkey.

MNC OPTIMIZATION AND HOME COUNTRY PRODUCTION

Foreign subsidiaries are governed by the laws and regulations of the host country, including export restrictions. [Figure 1](#) compares the outcome of an MNC's optimization with optimal local and foreign production in a home country from a societal perspective.

In [Figure 1](#), D represents demand for an essential product in the home country (Q). The profit maximizing MNC has a home country manufacturing unit and a foreign manufacturing subsidiary. The MNC can produce in either country, because its objective is to maximize net profits, meaning revenues from the home country sales less the cost of manufacturing at home and/or abroad. Optimal production that maximizes profitability is achieved when marginal revenue (MR) equals marginal cost (MC). The MNC produces abroad if the marginal cost of the foreign output (MC_F) is lower than the marginal cost in the home country (MC_L). If $MC_F < MC_L$ then the MNC will move production to the foreign subsidiary. Point d in [Figure 1](#) represents the optimal solution leading to a q_{F1} production in the foreign subsidiary and no local production, all of the local consumption is based on foreign manufacturing, leading to price to consumers at P_1 .

As we explained above, when deciding on the location of production, an MNC does not take into account societal factors like not having sufficient production in the home country for extreme cases, like a pandemic or other global or local crisis. The MNC contributes to concentrating the

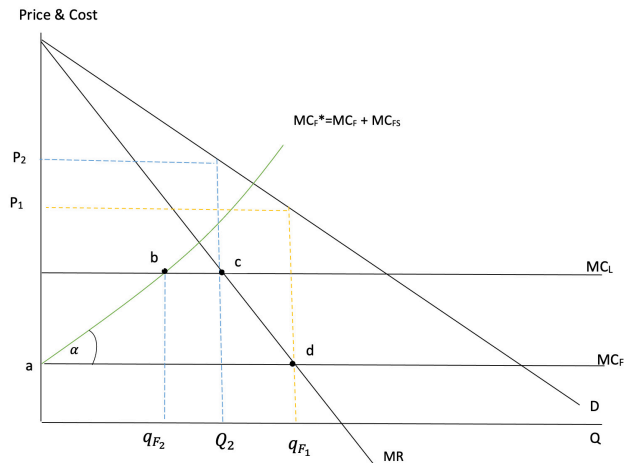


Figure 1: Negative externality: The suboptimal production in the home country

national supply abroad but is not penalized for this cost, and therefore it does not consider this in the maximization process. The lack of domestic output of essential products like PPE, medicine, food, and security equipment is problematic from a societal perspective. Even though local demand increases in the home country, foreign governments (host countries) can restrict the export of vital products so the products are available in their own country, thereby safeguarding the population of the host country.

From a societal perspective, the marginal cost to society at home due to the negative externality of the foreign output (MC_{FS}) should be added to the foreign marginal cost of production. As can be seen in [Figure 1](#), MC_{FS} is added to MC_F at point a , and increases by the quantity produced at the foreign subsidiary. The real cost of foreign production is MC_F^* that includes $MC_F + MC_{FS}$. As evident in [Figure 1](#), at point b the marginal cost of foreign production including the negative externality marginal cost (MC_F^*) exceeds the marginal cost of production in the home country (MC_L). At point b , production moves to the home country leading to an optimization quantity where MR equals MC_L at point c , resulting in a total quantity Q_2 and a price of P_2 . In this case, the production is split between home and host production. As long as MC_F^* is lower than the marginal cost of domestic production the MNC should produce abroad (q_{F2} in [Figure 1](#)), and the additional quantity is produced at the home country ($Q_2 - q_{F2}$ in [Figure 1](#)). This leads to the conclusion that essential products should be partly produced in the home country even at a higher direct cost of production, which translates to a higher price to the consumer. The increased price is the difference between P_2 and P_1 in [Figure 1](#) (the essential premium).

The negative social externality cost increases with the essentiality of the product. In the figure, α represents the level of essentiality, meaning the more essential the product, the steeper the slope of MC_F^* will be, moving the quantity produced abroad closer to the Y-axis, and leading to more domestic output and less by the foreign subsidiary. For some products, which are extremely essential for national security, the slope becomes vertical, and no foreign production is permitted. No one would expect the U.S. government to permit assembling F-35 airplanes in China, even if it were extremely less expensive for Lockheed Martin. Conversely, some products are not essential on any level, and have no societal cost above the marginal cost of produc-

tion. These products include most consumer goods (toys, clothing, etc.), so the optimal production is in the foreign subsidiary (point d in [Figure 1](#)). Between these two extremes there are many products, like PPE and medicines, that include some level of negative externality. In this case, the optimal societal solution is dividing production between home and abroad, as seen in [Figure 1](#).

IMPLICATIONS FOR POLICYMAKERS AND MNC MANAGERS

The results presented above lead to the conclusion that, at the national level (mainly in developed nations), an overly large quantity of essential products might be manufactured abroad. This has a significant practical implication for policymakers and MNCs alike. For example, the U.S. government should restore local production of essentials to an optimal level from a social perspective. Due to the negative externality argument presented in this paper, the solution from a national, public perspective could be based solely on government intervention in the location where essential products are produced, because the market is not efficient from a societal perspective.

There are many ways that policymakers can intervene in the market, from taxing imports at the same level as the negative externality to society to imposing quotas on imports. One solution unique to the negative externality presented here would be imposing local production quotas on companies that produce essential products and want to sell in the home country. For example, a company that wants to sell PPE in the U.S. market should be required to produce 30%–40% locally. The increased local production would reduce the dependency on foreign supplies and make it possible to accelerate domestic production quickly in an emergency situation like COVID-19. The percentage of the local production required should have a positive correlation to the essentiality of the product.

One adverse outcome is that prices are likely to increase in the home country, as can be seen in [Figure 1](#). The higher prices paid by consumers in the home country should be considered a preventative measure, like paying a premium to buy insurance for a “rainy day.” The cost of the insurance for consumers is the price increase from P_1 to P_2 in [Figure 1](#).

Our model and argument are also crucial for managers of MNCs, who should consider the implicit costs of foreign production to their home society, thereby preventing government intervention to solve negative externality. Taking preventive action before the government imposes taxes or quotas on foreign production is usually a better outcome for a company than acting in response to government policy. If the MNC has a bigger market share in its home country, taking preventative action by shifting part of its production to the home country would more efficiently reduce the probability of government intervention in the form of taxes or

regulation of foreign production by the MNC. An additional negative effect for the MNC is losing reputation in the home country. For example, 3M was subject to severe criticism for its production policy and inability to supply PPE to the U.S. home market at the early stages of the COVID-19 crisis (Hufford & Palazzolo, 2020).

CONCLUSION

To conclude, the negative externality argument presented in this paper provides substantial support for government intervention so that MNCs return the manufacture of essential products to the home country. This result should also affect the location decision by MNC managers. Even if the MNC does not consider the societal cost to the home country when moving production abroad, it should take into account the probability of government intervention. If the MNC locates some of its production in the home country, it reduces the probability of government intervention in location decisions, either through direct measures or indirect measures like customs.

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Ofra Bazel-Shoham is an assistant professor of finance and academic director PMBA at the Fox School of Business. She holds a doctorate and an MS from Temple University and an LL.M from Bar-Ilan University. Her research focuses on gender in the business environment. She published in the *Journal of World Business*, *Long Range Planning*, and awarded the best paper at the 2018 Engaged Management Scholarship Conference. Her research is motivated by fifteen years of management experience in a male-dominated environment.

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