

COVID-19, Supply Chains and Dependence on China: The Indian Perspective

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China is India's largest source of imports, nearly 15 percent of which are sourced from China. Many of India's major imports—electrical machinery, electronic and semiconductor devices, fertilizers, antibiotics, iron and steel products, and vehicular parts—are extensively sourced from China. The outbreak of the COVID-19 pandemic highlighted the critical dependence of India's pharmaceutical industry on China for active pharmaceutical ingredients (APIs). The dependence on China for both intermediate and finished products, has encouraged India to incentivize greater production at home through production-linked-incentives (PLIs) and to work with Japan and Australia on reorganizing regional supply chains. The paper examines the repositioning of supply chains in the strategic industry of pharmaceuticals. Efforts to reduce dependence on China assume great importance in this regard as India strives to become the leading supplier of affordable vaccines for tackling COVID-19.)

The decade of the 2020's has begun with India embarking on the dedicated mission of reducing import dependence and increasing self-reliance. The COVID-19 pandemic has starkly exposed the frailties of supply chains relying heavily on China. For India, which relies extensively on China for several critical imports, no sector is more vulnerable to disruptions from over-dependence than its pharmaceuticals. India's reputation as the "pharmacy of the world" drawn from its great proficiency in making affordable pharmaceutical formulations and vaccines, relies fundamentally on sourcing essential drug intermediates from China. As one of the leading actors in the world's fight against COVID-19, India is wary of sourcing disruptions from China affecting its ability to contribute to expanding global health security.

After focusing on the import dependence of India's pharmaceutical industry on China, this paper analyzes the recent initiatives announced by India for increasing economic self-reliance and reducing such dependence. It concludes by reflecting on the prospects of India decoupling from China in sourcing pharmaceutical ingredients.

Indian Pharmaceutical industry's Import Dependency on China

With total bilateral trade constituting nearly \$82 billion from April 2019 to March 2020, China was India's second largest goods trade partner for the year after the U.S., with which India's trade was \$89 billion. Despite the totals with both differing by only a few billion, the character of the bilateral trade is markedly different. During 2019-20, India ran a trade surplus of \$17.2 billion with the U.S., in stark contrast to its \$48.6 billion trade deficit with China.¹

India's extensive trade with China is primarily driven by imports, a persistent concern for its policymakers for the past several years, since high import dependence constrains India's ability to respond effectively to an assertive China. Rapid deterioration in geopolitical relations between the two countries last year, soon after the outbreak of COVID-19, heightened such fears, leading to comprehensive efforts by India to reduce import dependence on China.

China accounts for nearly 15 percent of India's total imports, far more than the shares of the European Union (8.9 percent) and the U.S. (7.3 percent).² China's preeminence as a source for imports is notwithstanding the fact it is not a major exporter of crude oil or gold, which are India's largest imports. Its prominence is striking in the leading non-oil, non-gold

imports by India, a look at which (Table 1) reveals that China's share was at least one-third of the total imports for all categories. In four of the top ten—diodes, transistors and semiconductor devices, heterocyclic compounds with nitrogen, antibiotics, and electric accumulators—China accounts for more than half of India's total imports. Imports of antibiotics and heterocyclic compounds with nitrogen reflect China's share of 76.3 percent and 69.0 percent, respectively, highlighting India's high reliance on pharmaceutical imports from China.

	Import	HS Code	Share (%)
1	Electrical apparatus for line telephony/ telegraphy	8517	42.8
2	Automatic data processing machines and units	8471	47.0
3	Electronic integrated circuits and micro-assemblies	8542	32.0
4	Diodes, transistors, and semiconductor devices	8541	63.4
5	Minerals/chemical fertilizers	3105	45.3
6	Heterocyclic compounds with nitrogen	2933	69.0
7	Antibiotics	2941	76.3
8	Electric accumulators	8507	59.0
9	Reception apparatus	8528	43.2
10	Electrical transformers	8504	37.5

Note: The HS Codes for imports are at the 4-digit level of tariff classification. The data are for the year 2018-19.

Source: Export-Import Data Bank (Annual), Department of Commerce, Ministry of Commerce and Industry; Government of India.

Antibiotics & Heterocyclic Compounds

India is among the largest antibiotic importers of the world. During the last decade (2010-2019), India's antibiotic imports, as a proportion of total global antibiotic imports, increased from 6.6 percent to 10.8 percent.³ During 2017-2019, its annual antibiotic imports were more than \$1 billion, making it the second largest antibiotic importer in the world, after Italy. India's annual antibiotic imports are higher than those of the U.S., China, and several other major pharmaceutical exporting countries from Europe (e.g. Germany, France, Belgium, Switzerland).⁴ China is the most important source of India's antibiotic imports.⁵

Heterocyclic compounds—India's other major category of pharmaceutical import from China—also reflects a rising share of India in global imports. During the last decade (2010-2019), India's share in global imports increased from 0.9 percent to 2.3 percent.⁶ Unlike antibiotics, where India is among the world's largest importers, it is not among the world's top ten heterocyclic compound importers. While its imports were as much as \$2 billion in 2019, they were much less than those of Germany, the U.S., China, and several other European countries.⁷ However, India's reliance on China for heterocyclic compound imports too is striking.⁸

India's high antibiotic and heterocyclic compound imports from China need to be looked at in the context of it emerging as a prominent global pharmaceutical exporter. India's share in global pharmaceutical exports nearly doubled from 1.4 to 2.6 percent during 2010-2019.⁹ It has been on the verge of breaking into the club of top ten pharmaceutical exporters with current exports of more than \$16 billion.¹⁰ India is the only developing country, and Asian economy, to catch up with the world's top pharmaceutical exporting nations comprising the U.S. and high-income OECD economies from Europe. India's performance has been even more notable as a producer and exporter of vaccines. During the last decade, India rapidly expanded its share in total global vaccine exports from 0.8 to 3.9 percent. The near five-fold increase has resulted in India becoming the 7th largest exporter of vaccines.¹¹

India's rising significance as a global pharmaceutical exporter, along with concomitant increases in its antibiotic and heterocyclic compound imports, points to the importance of the latter in India's pharmaceutical supply chain. Antibiotics and heterocyclic compounds are bulk drugs used as active pharmaceutical ingredients (APIs)¹² for making final formulations sold as medicines—pills, capsules, or other final dosage forms—to consumers. The largest chunk of India's pharma exports is finished dose drug formulations and biologicals (e.g. vaccines)¹³ meant for retail sale.¹⁴

Heterocyclic nitrogen compounds include carbon and nitrogen in their molecular structures and have extensive therapeutic use, including applications in pharmaceutical research and drug discovery, antibiotic formulations, as well as in anti-cancer, anti-inflammatory, and anti-viral drugs. Nearly 70 percent of India's imports of these pharmaceutical inputs are from China. For antibiotics, the reliance on China is even more with some specific antibiotics—penicillin and its salts, and 6-APA (a chemical compound, used as semi-synthetic penicillin with anti-bacterial and pharmacological characteristics, including that of an allergen)—being imported from China by more than 90 percent, or even 100 percent, of their total imports.¹⁵

Medical Devices

In addition to bulk drugs, India's import dependence on China extends to products that impact the prospects of its healthcare and overall pharmaceutical industry. Of particular importance in this regard are various medical devices. After the U.S., China is the second largest source of India's imports of medical devices, personal protection equipment (PPE) used by healthcare staff in treating the infected, as well as some essential medical supplies. Demand has been high in these areas due to COVID-19. Among these critical products, items for which China is the largest source include humidifiers, flow-splitters, patient monitors and pulse oximeters, chlorine, medical masks, hand sanitizers, protective goggles, aprons, medical headwear, and protective clothing.¹⁶

It is obvious that the Indian pharmaceutical and healthcare industry's dependences on imports from China are broad-based, including those required by medicine producers as intermediates in the supply chain, as well as items meant for end-use by consumers and frontline healthcare professionals as final products. Overcoming such dependence is a formidable challenge.

Reorganizing the Supply Chain

The Indian pharmaceutical industry's import dependence on China, and the vulnerabilities arising therefrom, were clearly visible during the disruptions experienced after COVID-19. As import supplies were interrupted due to a production lockdown and worker quarantine in Wuhan—the hub of bulk drug production in China—Indian pharmaceutical firms began to worry about their ability to supply medicines to consumers. With inventories of imported raw materials shrinking, the urgency of locating alternative sources of APIs and drug intermediates led to high proactivity on initiatives for reducing dependence on China. These subsequent efforts include domestic policies for encouraging higher local production of APIs, drug intermediates, and essential raw materials, and collaboration with other countries for building multi-country partnerships to reduce import dependencies on China.

Domestic Initiatives

The Indian pharmaceutical industry is not alone in its dependence on China for obtaining APIs. China is the world's largest producer of APIs, following the conscious decision of major pharmaceutical formulation producing countries to gradually offshore more and more production of drug intermediates and raw materials to cheaper locations. For more than two decades now, the global pharmaceutical industry, dominated by large pharma businesses from the U.S. and Europe, has been following lean manufacturing practices by reducing production of APIs and expanding capacities for making final formulations. They are largely sourcing APIs from China.¹⁷ Backed by a host of favorable factors, including access to cheap capital, low cost of raw materials, and ability to produce large volumes quickly, China has emerged as the undisputed global leader in production of APIs.

Similar to their counterpart firms in the U.S. and Europe, Indian pharma has found imports from China indispensable. India does not produce enough APIs locally. High production costs arising from poor infrastructure, the large burden of regulatory compliance, lengthy environmental clearances, and inadequate government support, disincentivize local production of APIs and drug intermediates.¹⁸ As a result, for Indian medicine makers, who have developed great proficiencies at the downstream end of the pharma supply chain in producing formulations and exporting to global markets, cheap API imports from China are essential. Intermediate imports from China, combined with home-grown ability in using these efficiently in formulations, have been the recipe for India's rapid growth as a major global manufacturer of generic formulations. India is currently the world's largest exporter of them, while being one of the foremost producers of formulations, both in volume and by value.¹⁹

At a time when the world is looking forward to large supplies of vaccines, and other preventive medicines from India for fighting COVID-19, it is essential for India to ensure its domestic producers are not affected by supply disruptions. An important policy for minimizing such disruptions has been to incentivize local production of APIs. The policy, including the financial incentives for encouraging local production, has been spelled out in the production-linked-incentive (PLI) scheme announced for pharmaceuticals.²⁰

It must be noted, though, that incentives announced for encouraging local production of import substitutes are not limited to pharmaceuticals. The PLI package for pharma is among similar schemes announced for several manufacturing industries deemed strategic and essential for advancing India's overall industrial prowess and reducing dependence on imports. Other than pharmaceuticals, industries being incentivized include automobiles, electronics, textiles, food processing, mobile phones and telecom equipment, solar photovoltaic, modules, chemical batteries, steel and "white goods" (e.g. air-conditioners).²¹ Most of these industries depend critically on imports from China, which is evident from India's topmost imports from China (Table 1). Reducing import dependence on China has been the key driver behind India's efforts to financially incentivize local production under the rubric of the overarching initiative of *Atmanirbhar Bharat*, i.e. an economically self-reliant India.

Self-Reliance and Economic Incentives

While the production lockdown in China after COVID-19 disturbed supply chains almost all across the world, for India, the worries were not just confined to economic anxieties. Concerns begun mounting over the economic dependence on China leading to loss of strategic options in responding to Chinese military aggression on its borders. Alongside the spread of COVID-19, India's relations with China dipped to their lowest in several decades with their militaries clashing on the disputed border in the high Himalayas, leading to the loss of several lives in June 2020.²² The combination of economic dependence and geopolitical friction produced the call for self-reliance from a government searching for solutions to push back China. COVID-19 and concomitant supply chain disruptions provided an unexpectedly conducive context for encouraging domestic production of import substitutes.

Championed by none other than Prime Minister Narendra Modi,²³ *Atmanirbhar Bharat* expands and accelerates the Modi government's flagship initiative of "Make in India" by providing state support for financing import-substitution. While erecting tariff barriers for "encouraging" domestic production, the policy actively encourages private and foreign investments for creating new production capacities by offering financial incentives through PLIs for strategic industries.

Connecting firmly to the self-reliance agenda, Finance Minister Nirmala Sitharaman described the goal of PLIs to "create manufacturing global champions for an *Atmanirbhar Bharat*" in her latest budget speech delivered on February 1, 2021.²⁴ The goal is being implemented through aggregate financial support of INR 2 trillion (\$275 billion), for 13 strategic manufacturing industries including pharmaceuticals, for a period of 5 years beginning from 2021-22. The allocation is supported by the announcement of bold economic reforms for attracting new investments. The reforms include changing outdated labor legislation, freeing up agriculture markets from government control, and implementing an aggressive strategy for privatizing state-owned enterprises, including government-owned banks and insurance companies.

The PLIs and investor-friendly reforms, packed together in the vision of an economically self-reliant India, reflect unusual energy and commitment to attract new investments for increasing domestic production and reducing dependence on imports. Major manufacturing investments from the U.S., Japan, Korea, and France are being targeted.²⁵ Initial responses from global manufacturers such as Apple and Samsung are encouraging,²⁶ as are the ecommerce giant Amazon's plans to manufacture television streaming devices in India.²⁷

Most foreign investments, so far, appear to be moving into the electronics and semiconductor industries. This is unsurprising as, like China, India holds comparative advantages in the more labor-intensive segments of the electronics supply chain, i.e. in assembling, configuration, and testing.²⁸ Global firms in these industries that are looking to shift the assembling segments of their supply chains out of mainland China would certainly look at India and Vietnam as prospective alternatives. India's announcement of PLIs encourages these shifts. Whether such shifts would take place in pharmaceuticals too is still unknown.

Localizing Production through New Investments

The PLI scheme for pharmaceuticals notes its goal is to “attain self-reliance and reduce import dependence in critical APIs.”²⁹ By attracting new investments for producing APIs and drug intermediates, the scheme hopes to reduce India's current reliance on imported intermediates. The specific focus is on expanding production of 53 heavily import-dependent APIs (see Annex).³⁰ The import-dependency, needless to say, is heaviest on China.

Financial support for the producers of the identified items would be provided on the basis of sales for up to six years. The total support for the scheme is INR 694 billion (\$9.6 billion approximately). The financial support will differ according to the nature of the technology employed in production. Items produced through a fermentation-based process are being incentivized for 20 percent of sales for the first four years, followed by 15 percent and 5 percent in the next two years. For chemical synthesis-based products, the incentive is at a uniform rate of 10 percent of sales for all six years. The difference in the proposed payout is arguably for supporting investors of fermentation-based processes, for the longer time taken by their capacities to begin production, and generate revenues.³¹ Capacities in fermentation-based processes are essential for reducing dependence on China. Industry reports indicate that for several critical antibiotics, India's high import dependence on China is due to large capacities of Chinese producers in fermentation boilers, enabling bulk production of these items.³²

The PLI scheme has attracted investors. Five investment proposals worth INR 376 billion (\$5.2 billion) have been approved. These include proposals for producing fermentation-based APIs such as Penicillin G and Erythromycin, for which India relies entirely on sourcing from China.³³ The proposals, however, are all from domestic investors. Whether foreign investors would be keen on funding fresh pharmaceutical ingredient-making capacities will be revealed over time.

Foreign investors might be keener on investing in India through the “brownfield” route of acquiring assets of existing Indian firms, rather than the “greenfield” route of establishing capacities through new projects. Indian authorities prefer the latter given their uneasiness over the prospects of successful Indian generic formulation companies being taken over by foreign firms, particularly Chinese businesses.³⁴ Foreign investments in brownfield pharma projects in India are subject to restrictive conditions such as maintaining minimum production of essential medicines for domestic consumers, pre-specified R&D expenditure levels, and compliance conditions for transfer of technology.³⁵ Moreover, investors also have to comply with government-determined pricing policies for sale in the domestic market. The conflicting perspectives might hinder large foreign investments in India's pharmaceuticals, particularly API production.

Prospects for foreign investment appear brighter in medical devices. The sector is not subject to restrictive quantitative or pricing conditions as investments in pharmaceuticals are. The PLI scheme for medical devices notes the problems of poor infrastructure adversely affecting manufacturing competitiveness of Indian producers and aims to encourage new local capacities by incentivizing greenfield investments.³⁶ A similar admission of infrastructure deficiencies and the importance of overcoming these urgently for improving competitiveness of domestic pharma ingredient producers is noted in the PLI scheme for bulk drugs. The scheme is for building new bulk drug parks comprising state-of-art drug testing and processing facilities.³⁷

Bulk drug producing capacities in India are not going to expand overnight. But from the long-term perspective of reducing import dependence on China, the importance of incentivizing domestic output of APIs and medical devices can hardly be overstated. The rollout of the PLI schemes for medical devices and bulk drugs, apart from providing financial incentives, is also an effort to incentivize more local output by reducing the cost of producing in India through more enabling infrastructure and business conditions. The focus on infrastructure in both schemes is an honest admission on the part of the Indian authorities about the infrastructure paucities that continue to impede local manufacturing.

In the long journey that lies ahead for Indian pharma to reduce dependence on China, greater production of import-substitutes is not achievable through financial incentives alone. China's industrial proficiency is the best example of the value of quality infrastructure in encouraging growth of global industrial champions. For India's domestic bulk drug manufacturing industry, good infrastructure is a non-negotiable requirement.

Less Dependence for Greater Security and Strategic Goodwill

It is interesting to note the emphasis on security in India's PLI schemes for pharmaceuticals. The policy for the PLI scheme for manufacturing APIs and intermediates notes: "Any disruption in supply of drugs can have significant adverse impact on *drug security* of the country."³⁸ It further notes: "Drug security of the country is dependent upon our ability to ensure un-interrupted supply of quality bulk drugs and also our capacity to upscale their manufacturing to meet emergency situations. Self-reliance in manufacturing of drugs is, therefore, highly desirable."³⁹ A similar concern over drug security is noted for the scheme for bulk drug parks.⁴⁰

The anxiety over drug shortages from supply chain disruptions, as experienced during the COVID-19 outbreak in China, highlights the urgency in encouraging greater local production and assured sourcing of bulk drugs and intermediates. The problems caused by sudden snaps in supply chains due to an abrupt halt in imports from China were highlighted in a report produced by India's leading industry chamber FICCI soon after the outbreak of COVID-19 in China in February 2020. The feedback from domestic producers pointed to several common APIs (e.g. ampicillin, ranitidine, paracetamol, diclofenac sodium, ibuprofen) used widely in several formulations having inventories of only a few weeks.⁴¹

At the beginning of an entirely unknown pandemic with little idea on its treatment and spread, the knowledge of low stocks of ingredients for producing essential medicines, would have been a shock for Indian medicine producers and the government. The push on “self-reliance” in this regard from a national security perspective is understandable. The concern is not different from that voiced by the American Medical Association with respect to the US’s API and generic drug dependency on China.⁴²

The sensitivity attached to the availability of bulk drugs and APIs, and the impact they have on India’s ability to produce medicines, is a concern resonating in efforts to manufacture vaccines. India has leaped to the forefront in the global fight against COVID-19 as a major producer of vaccines. The Serum Institute of India, the world’s largest manufacturer of vaccines, is working with AstraZeneca to produce the Covishield vaccine. The vaccine has been rolled out for domestic use and also been dispatched to several countries, including low-income and small countries,⁴³ fetching India considerable strategic goodwill in “vaccine diplomacy.” India’s capacity for mass production of affordable vaccines was described by the UN Secretary General Antonio Guterres as “one of the best assets the world has today” in a global vaccination campaign.⁴⁴ More vaccines manufactured by other Indian firms, such as Bharat Biotech, have become available for public use. Another Indian pharmaceutical producer, Biological E, will be producing large quantities of the single-shot Johnson & Johnson vaccine in India.⁴⁵

In the race to inoculate millions at home, while at the same time responding to rising global demand for vaccines, India needs to ensure that its pharmaceutical supply chain remains resilient. Ironically, such resilience, at least in the foreseeable future, does not seem feasible by delinking from China. For import of critical ingredients being used in vaccines, such as the Covishield manufactured by the Serum Institute of India, China is India’s largest source, after the U.S. and EU.⁴⁶ The reliance on China in India’s medicine supply chain is likely to persist in the foreseeable future.

In the context of drug security and public health concerns, the dependence on China has led to initiatives such as the PLI scheme for building new local capacities for bulk drugs. However, until such capacities actually exist, the concern from over-dependence on imports from China raises a larger anxiety; might China use its economic clout for geopolitical leverage? India is not alone in experiencing this discomfort. The concern resonates among major countries in the Indo-Pacific region.

External Initiatives

Japan and Australia have combined with India to announce the Resilient Supply Chain Initiative (RSCI), which, as jointly spelled out by the trade ministers of the three countries on September 1 2020, emphasizes regional cooperation for increasing the resilience of supply chains in the Indo-Pacific,⁴⁷ and it calls upon other regional countries sharing similar convictions to join the initiative.

All proponent countries of RSCI were heavily affected by disruptions in sourcing from China following the stringent lockdown in Wuhan, and many other parts of China.⁴⁸ While concentration of sourcing in a single location had shown even earlier the disruptions that can be experienced by supply chains, the COVID-19 pandemic exposed the huge scale and depth of economic damages that can arise from high dependence.⁴⁹

Japan, Australia, and India have organic economic relations with China. While being the largest trade partner of Australia and Japan, China is India's second largest trade partner after the United States. China is the largest market for Australia's exports, and the largest source of its imports.⁵⁰ It is the second largest market for Japanese exports, while being the largest source of its imports.⁵¹ Finally, it is India's fourth largest export market, while being the largest source of its imports.⁵² The reliance makes all three heavily vulnerable to the risk of facing domestic shortages if supplies from China are interrupted.

Mounting concerns over supply disruptions caused serious anxieties in Asia and the proponent countries of RSCI after COVID-19. The concerns ranged from difficulties in accessing urgent PPE⁵³ to a large range of essential intermediates and consumer goods. The economic concerns were compounded by geopolitical anxieties as the onset of COVID-19 corresponded with escalation in geopolitical tensions with China for all three countries. As India's relations with China dropped to an unprecedented low after the border clash in June 2020, Australia's relations with China deteriorated over a bitter trade war, while Japan's ties with China were complicated over claims around disputed islands. Antagonism with China increased further as Japan and Australia came out in support of the US and other Western nations in demanding an independent inquiry by the WHO into China's role in the origin of COVID-19.⁵⁴

Economic anxieties coupled with geopolitical tensions led to the imperative of decoupling supply chains from China. The urge was driven by the specter of an aggressive China weaponizing economic dependence for strategic advantage.⁵⁵ RSCI is a geopolitical initiative, whose success in encouraging businesses to shift production from mainland China would diversify sourcing and spread out business risks arising from overdependence on a single source. The outcome would also enable greater strategic leverage for Japan, Australia, and India in responding to an assertive China. The RSCI's mention of the Indo-Pacific in its construct is reflective of the effort of its proponents to spread the message of diversifying risks, and mitigating geopolitical tensions, across the Indo-Pacific geography.

The RSCI's ostensible objective of securing multi-country collaboration for protecting supply chains is not inconsistent with the emphasis on firm-specific collaboration, considered vital for assuring resilience of supply chains. Unanticipated natural calamities (e.g. the Fukushima tsunami and Thailand floods mentioned earlier) and far-reaching socio-political disruptions (e.g. Arab Spring) have variously disturbed global supply chains. The academic literature on supply chain management has widely noted the uncertainties in this regard that variously impact firms and businesses.⁵⁶ The literature identifies collaboration among firms, and their decision-makers and information systems, to be of critical importance in overcoming adverse impacts of unforeseen disruptions by making supply chains resilient.⁵⁷ In the context of RSCI, the critical question is whether, what is considered necessary for firms and businesses in a commercial setting, is also applicable in a wider geopolitical context. The ostensible impression in this regard is that proponents of RSCI would encourage their

businesses and investors to collaborate for minimizing risks—a strategy that apart from making supply chains economically resilient would also advance the geopolitical objective of resisting China, as the latter loses the ability to capitalize on economic advantage for strategic gains.

Conclusion

India's PLI schemes for enhancing local capacities for reducing economic dependence on China have been launched with great expectations. The success of the schemes will not be visible for a few years, determined by the inflow of new investments. Financial incentives alone will not be enough for expanding capacities. Serious efforts to improve business conditions and infrastructure for increasing the competitiveness of domestic producers is equally, if not more, important.

For an industry such as pharmaceuticals, where India's long-term commercial prospects and strategic goodwill are intertwined in the pursuit of the overall objective of vaccinating countries and their populations, self-reliance is understandably important. Without assured access to essential ingredients, India's vaccine diplomacy, and reputation of being the "pharmacy for the world" would be impossible to preserve. Currently, though, the objective cannot be achieved without relying on Chinese imports.

India committed firmly to the RSCI with the intention of decoupling from China. The intention was evident in the restrictions it imposed on Chinese investments after recent border clashes, as well as in banning more than 100 popular Chinese apps, such as TikTok and WeChat. Its collaboration with the U.S. and other leading global democracies in keeping Huawei out of the strategic domestic 5G telecommunication spaces is also notable.⁵⁸ But in spite of these efforts, import dependency on China has not diminished. The latest data on India's imports point to China continuing to remain its largest source.⁵⁹

The continuation of the trend hardly lessens India's worries over China exploiting economic dependence for geopolitical gains. This might be the reason behind India recently shifting to a more pragmatic strategy of "doing business" with China by gradually relaxing controls imposed over Chinese investments.⁶⁰ It is noticeable that the shift comes right after both countries decided to implement a purposeful plan of withdrawing their troops from the Himalayan borders for deescalating tensions.

For India, the inevitability of existing with an economically superior neighbor enjoying great advantages as a global producer of essential items, makes decoupling prospects innately hard. This is more so in pharmaceuticals where it will take years before significant parts of the supply chain can be sustained without imports from China. Until then, pragmatism might be the best way forward for sustaining the domestic economy and maintaining regional stability.

Might this affect the prospects of the RSCI? COVID-19 has been a brutal lesson for several countries on the risks run by global supply chains in their excessive dependence on China. The experience will not be forgotten in a hurry. Countries are expected to continue collaborating through RSCI for reorganizing supply chains. Such efforts, however, need to be looked at in the light of businesses being actually convinced to relocate. Initiatives

such as RSCI must note that it is unrealistic to expect businesses to “give up” on China. China’s enormous pull as a global producer and consumer, demonstrated again after its quick turnaround from the setbacks of COVID-19, leave global and regional supply chains “hooked” on China. How initiatives like RSCI proceed in the light of this reality will be interesting to watch.

Annex

53 items for which India is heavily import-dependent⁶¹

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|------------------------------------|-----------------|-----------------------|
| 1. Amoxicillin | 2. Azithromycin | 29. Losartan |
| 3. Erythromycin Stearate/ Estolate | | 30. Telmisartan |
| 4. Ceftriaxone | | 31. Artesunate |
| 5. Cefoperazone | | 32. Norfloxacin |
| 6. Cefixime | | 33. Ofloxacin |
| 7. Cephalexin | | 34. Metronidazole |
| 8. Piperacillin Tazobactam | | 35. Sulfadiazine |
| 9. Sulbactam | | 36. Levofloxacin |
| 10. Dexamethasone | | 37. Meropenem |
| 11. Prednisolone | | 38. Paracetamol |
| 12. Metformin | | 39. Tinidazole |
| 13. Gabapentin | | 40. Ornidazole |
| 14. Rifampicin | | 41. Ritonavir |
| 15. Vitamin B1 | | 42. Diclofenac Sodium |
| 16. Vitamin B6 | | 43. Aspirin |
| 17. Clindamycin Phosphate | | 44. Levetiracetam |
| 18. Clindamycin HCL | | 45. Carbidopa |
| 19. Streptomycin | | 46. Levodopa |
| 20. Neomycin | | 47. Carbamazepine |
| 21. Gentamycin | | 48. Oxcarbazepine |
| 22. Doxycycline | | 49. Valsartan |
| 23. Potassium Clavulanate | | 50. Olmesartan |
| 24. Oxytetracycline | | 51. Atorvastatin |
| 25. Tetracycline | | 52. Acyclovir |
| 26. Clarithromycin | | 53. Lopinavir |
| 27. Betamethasone | | |
| 28. Ciprofloxacin | | |

Endnotes

- ¹ Export-Import Data Bank (Annual), Department of Commerce, Ministry of Commerce and Industry, Government of India, <https://tradedstat.commerce.gov.in/eidb/iecnttopn.asp>.
- ² India, Trade Profile, World Trade Organization (WTO), 2020, https://www.wto.org/english/res_e/statis_e/daily_update_e/trade_profiles/IN_e.pdf.
- ³ Computed by author from data in the International Trade Center (ITC) Database.
- ⁴ During 2017-2019, India's annual antibiotic imports were \$1.1 billion, \$1.4 billion, and \$1.3 billion. While in 2017 and 2019, its imports fell short of Italy's (\$1.2 billion and \$1.5 billion); they were the same as Italy's in 2018. U.S. antibiotic imports during the period ranged from \$0.7-\$0.9 billion, while those of China's were between \$0.5-0.7 billion. Among European countries, Germany's antibiotics imports rose to \$1.2 billion in 2019, while those of France, Belgium, and Switzerland were around half, or less than half of India's antibiotic imports. Source: International Trade Center (ITC) Database.
- ⁵ As mentioned in Table 1, India imported 76.3 percent of its imports from China in 2018-19. As computed from ITC data, India imported 77.3 percent and 80.1 percent of its antibiotic imports from China in 2018 and 2019. The second largest source of antibiotic imports was the U.S., which accounted for much lower shares of 4.2 percent and 2.3 percent, respectively, of the imports for 2018 and 2019.
- ⁶ Computed by author from data in the International Trade Center (ITC) Database.
- ⁷ During 2019, Germany, the U.S., and China imported heterocyclic compounds worth \$16.7 billion, \$12.9 billion, and \$3.3 billion. Most other major pharmaceutical producing European countries—Belgium, Switzerland, Italy, Ireland, France—had imports of \$2.0-\$8.5 billion for the year. Source: International Trade Center (ITC) Database.
- ⁸ During 2018 and 2019, China accounted for 69.1 and 68.9 percent of India's heterocyclic compound imports. The next largest source was Belgium with shares of 1.7 and 3.1 percent. The shares are computed from the ITC Database.
- ⁹ Computed by author from data in the International Trade Center (ITC) Database.
- ¹⁰ The top ten pharmaceutical exporting nations in 2019 were Germany (\$90.3 billion), Switzerland (\$83.0 billion), the U.S. (\$53.6 billion), Ireland (\$53.4 billion), Belgium (\$52.7 billion), France (\$35.6 billion), Italy (\$33.6 billion), Netherlands (\$30.1 billion), the UK (\$27.1 billion), and Denmark (\$17.5 billion). India was eleventh with exports of \$16.3 billion. Source: International Trade Center (ITC) Database.
- ¹¹ During 2019, India's vaccine exports were worth \$0.8 billion. It followed Belgium, Ireland, France, the UK, the U.S., and Italy in global vaccine exports. Source: International Trade Center (ITC) Database.
- ¹² The U.S. Food and Drug Administration (FDA) defines APIs as "any component that provides pharmacological activity or other direct effect in the diagnosis, cure, mitigation, treatment, or prevention of disease, or to affect the structure or any function of the body of man or animals." Drugs@FDA Glossary of Terms, <https://www.fda.gov/drugs/drug-approvals-and-databases/drugsfda-glossary-terms>.

- ¹³ Biologicals, also referred to as biological drugs, are products of biotechnology created by using living organisms. These include vaccines and tissues used in various medical cell transplants.
- ¹⁴ Pharmaceuticals Export Promotion Council of India, 16th Annual Report, 2019-20 (2020), 23-25, <https://pharmexcil.com/uploads/files/16thAnnualReport.pdf>.
- ¹⁵ Amitendu Palit, "The Novel Coronavirus Outbreak: Risks for India's pharmaceutical industry," 599, *Insights*, Institute of South Asian Studies, National University of Singapore, March 1, 2020, <https://www.isas.nus.edu.sg/wp-content/uploads/2020/03/ISAS-Insights-No.-599.pdf>. From 2014-15 onward, more than 90 percent of India's imports of penicillin and its salts (HS Code 29411010) are from China. 100 percent of 6-APA imports were from China for quite a few years from 2014-15.
- ¹⁶ Amitendu Palit and Joshua Quek Hian Khun, "India's Critical Medical Imports and the China Dependency," *Insights*, no. 627, Institute of South Asian Studies, National University of Singapore, July 15, 2020, Table 3, 6, <https://www.isas.nus.edu.sg/wp-content/uploads/2020/07/627-1.pdf>.
- ¹⁷ The US is heavily dependent on APIs sourced from China. See US-China Economic and Security Review Commission, "Growing US Reliance on China's biotech and pharmaceutical products," 2019 Annual Report to Congress, 248, <https://www.uscc.gov/sites/default/files/2019-11/Chapter%203%20Section%20-%20Growing%20U.S.%20Reliance%20on%20China's%20Biotech%20and%20Pharmaceutical%20Products.pdf>.
- ¹⁸ Confederation of Indian Industry, "Novel Coronavirus in China – An Impact Analysis," February 16, 2020, <https://www.aipima.org/Inknews%203.1%20D.pdf>.
- ¹⁹ Pharmaceuticals Export Promotion Council of India, 23.
- ²⁰ "Production Linked Incentive (PLI) Scheme for promotion of domestic manufacturing of critical Key Starting Materials (KSMs)/Drug Intermediates (Dis) and Active Pharmaceutical Ingredients (APIs) in India," Ministry of Chemicals and Fertilizers, Department of Pharmaceuticals, Government of India, July 21, 2020, <https://pharmaceuticals.gov.in/sites/default/files/Gazettee%20notification%20of%20bulk%20drug%20schemes.pdf>.
- ²¹ "Cabinet Approves PLI Scheme for Enhancing India's Manufacturing Capabilities and Enhancing Exports – Atmanirbhar Bharat," Press Information Bureau of India, November 13, 2020, <https://pib.gov.in/PressReleasePage.aspx?PRID=1671912>.
- ²² "India-China clash: 20 Indian troops killed in Ladakh fighting," BBC News, June 16, 2020, <https://www.bbc.com/news/world-asia-53061476>.
- ²³ "It is time to make India atma nirbhar, become vocal for local: PM Modi," *India Today*, June 11, 2020, <https://www.indiatoday.in/india/story/pm-narendra-modi-icc-annual-plenary-session-atma-nirbhar-bharat-local-manufacturing-1687831-2020-06-11>.
- ²⁴ "Budget 2021-22, Speech of Nirmala Sitharaman, Minister of Finance," Government of India, February 1, 2021, 7, https://www.indiabudget.gov.in/doc/Budget_Speech.pdf.
- ²⁵ "Investors from Japan, France, US, South Korea in forefront for PLI:

- Guruprasad Mohapatra, Secretary, DPIIT," *Economic Times*, November 23, 2020, <https://economictimes.indiatimes.com/news/economy/policy/investors-from-japan-france-us-s-korea-in-forefront-for-pli/articleshow/79357174.cms>.
- ²⁶ Manish Singh, "India approves Apple partners and Samsung for \$143 billion smartphone manufacturing plan," TechCrunch, October 7, 2020, <https://techcrunch.com/2020/10/06/india-approves-apple-partners-and-samsung-for-143-billion-smartphone-manufacturing-plan/>.
- ²⁷ "Amazon to make fire tv stick devices in India in a mega boost to 'Atmanirbhar Bharat,'" *Mint*, February 16, 2021, <https://www.livemint.com/technology/tech-news/amazon-to-manufacture-fire-tv-stick-in-india-from-this-year-11613465958900.html>.
- ²⁸ Ernst & Young, India Cellular and Electronics Association (ICEA), and Federation of Indian Chambers of Commerce and Industry (FICCI), *Mobile Manufacturing: A US\$245 billion (INR 17 lakh crore) opportunity*; (December 2019), 10.
- ²⁹ "Production Linked Incentive (PLI) Scheme for promotion of domestic manufacturing," 7.
- ³⁰ *Ibid.*, Appendix B, 9-10.
- ³¹ *Ibid.*, 7, paras 4, 8, 11.
- ³² Confederation of Indian Industry, 5.
- ³³ "First set of five bulk drugs, pharma input projects under PLI scheme cleared," Business Line, January 22, 2021, <https://www.thehindubusinessline.com/companies/first-set-of-five-bulk-drug-pharma-input-projects-under-pli-scheme-cleared/article33637838.ece#>.
- ³⁴ Soon after the outbreak of COVID-19, India tightened rules for opportunistic takeovers of Indian companies. The new rules require investors from countries having land borders with India to receive prior permission from the government before proceeding on any investments. Though the rules did not mention China, the intention of blocking hostile takeovers from China was evident. See "FDI Policy Section Press Note No. 3 (2020 Series)," Government of India, Ministry of Commerce & Industry, Department for Promotion of Industry and Internal Trade, https://dipp.gov.in/sites/default/files/pn3_2020.pdf.
- ³⁵ Ravi Shah, Ashwin Sapra, and Avani Dalal, "FDI in Brownfield Pharma -Will COVID-19 be the Catalyst for Policy Reforms?" India Corporate Law, Cyril A Cyril Amarchand Mangaldas Blog, June 1, 2020, <https://corporate.cyrilamarchandblogs.com/2020/06/fdi-in-brownfield-pharma-will-covid-19-be-the-catalyst-for-policy-reforms/>.
- ³⁶ "Guidelines for the Production-Linked-Incentive Scheme for Promoting Domestic Manufacturing of Medical Devices," Ministry of Chemicals and Fertilizers, Department of Pharmaceuticals, Government of India, October 29, 2020, https://pharmaceuticals.gov.in/sites/default/files/REVISEDE%20GUIDELINES%20FOR%20MEDICAL%20DEVICES%2029-10-2020_0.pdf. The target sectors under the scheme are medical devices meant for cancer care, radiotherapy, radiology, nuclear imaging, anaesthetics, cardio-respiratory (including catheters), renal care, and all implants including electronic devices.

- ³⁷ As in “Production Linked Incentive (PLI) Scheme for promotion of domestic manufacturing,” Ministry of Chemicals and Fertilizers, press release dated July 21, 2020 on “Scheme for Promotion of Bulk Drug Parks,” 13-14, <https://pib.gov.in/PressReleasePage.aspx?PRID=1641517#:~:text=Scheme%20for%20promotion%20of%20Bulk,1000%20crore>. The scheme notes its objective as: “to promote setting up of bulk drug parks in the country for providing easy access to world class common infrastructure facilities to bulk drug units located in the parks in order to significantly bring down the manufacturing cost of bulk drugs and thereby make India self-reliant in bulk drugs by increasing the competitiveness of the domestic bulk drug industry,” Laxmi Yadav, Pharmabiz.com, July 23, 2020, <http://www.pharmabiz.com/NewsDetails.aspx?aid=129811&sid=1>.
- ³⁸ “Production Linked Incentive (PLI) Scheme for promotion of domestic manufacturing,” 6, para 1.1
- ³⁹ *Ibid.*, 7, para 1.3.
- ⁴⁰ *Ibid.*, 13, para 1.1.
- ⁴¹ “Coronavirus Disease Outbreak in China and its impact on India’s imports of intermediate products from China,” Federation of Indian Chamber of Commerce and Industry (FICCI), February 2020.
- ⁴² US-China Economic and Security Review Commission, 253-54.
- ⁴³ “Supply of Indian manufactured vaccines to neighbouring and key partner countries,” Ministry of External Affairs, Government of India, January 19, 2021, https://www.mea.gov.in/press-releases.htm?dtl/33399/Supply_of_Indian_manufactured_vaccines_to_neighbouring_and_key_partner_countries.
- ⁴⁴ “UN chief lauds India’s COVID19 vaccine assistance to nations,” *Economic Times*, January 31, 2021, <https://economictimes.indiatimes.com/news/politics-and-nation/un-chief-lauds-indias-covid-19-vaccine-assistance-to-nations/articleshow/80554377.cms?from=mdr>.
- ⁴⁵ “Biological E: The mass producer of Johnson & Johnson vaccine,” *Mint*, March 20, 2021, <https://www.livemint.com/companies/news/biological-e-the-mass-producer-of-johnson-johnson-vaccine-11616235431098.html>.
- ⁴⁶ Simon J. Evenett, Bernard Hoekman, Nadia Rocha, and Michele Ruta, “The COVID-19 Vaccine Production Club: Will Value Chains Temper Nationalism,” Policy Research Working Paper no. 9565, World Bank Group, March 2021, <https://openknowledge.worldbank.org/bitstream/handle/10986/35244/The-Covid-19-Vaccine-Production-Club-Will-Value-Chains-Temper-Nationalism.pdf?sequence=1&isAllowed=y>.
- ⁴⁷ “Australia-India-Japan Economic Ministers’ Joint Statement on Supply Chain,” Australia Government, Department of Foreign Affairs and Trade, September 1, 2020, <https://www.dfat.gov.au/news/media-release/australia-india-japan-economic-ministers-joint-statement-supply-chain>.
- ⁴⁸ Elisabeth Braw, “Blindsided on the Supply Side,” *Foreign Policy*, March 4, 2020, <https://foreignpolicy.com/2020/03/04/blindsided-on-the-supply-side/>. More than 50,000 companies have direct suppliers in Wuhan, while around 5 million companies have tier-two suppliers located in Hubei province.

- ⁴⁹ During widespread floods in Thailand in 2011, disruption in supplies for a critical component halted production of the popular Lexus model of Toyota.
- ⁵⁰ "Australia, Trade Profile," World Trade Organization (WTO), https://www.wto.org/english/res_e/statistics_e/daily_update_e/trade_profiles/AU_e.pdf.
- ⁵¹ "Japan, Trade Profile," World Trade Organization (WTO), https://www.wto.org/english/res_e/statistics_e/daily_update_e/trade_profiles/JP_e.pdf.
- ⁵² "India, Trade Profile," World Trade Organization (WTO), https://www.wto.org/english/res_e/statistics_e/daily_update_e/trade_profiles/IN_e.pdf.
- ⁵³ "Global Shortage of Personal Protective Equipment amid COVID19: Supply Chains, Bottlenecks, and Policy Implications," *Asian Development Bank Briefs*, no. 130 (April 2020), <https://www.adb.org/publications/shortage-ppe-covid-19-supply-chains-bottlenecks-policy>.
- ⁵⁴ D. Arase, "The COVID-19 Pandemic Complicates Japan-China Relations: Will This Benefit ASEAN?" ISEAS Yusof Ishak Institute, Perspective 2020, no. 83 (August 5, 2020), https://www.iseas.edu.sg/wp-content/uploads/2020/07/ISEAS_Perspective_2020_83.pdf.
- ⁵⁵ Elisabeth Braw, "Blindsided on the Supply Side."
- ⁵⁶ Alexandre Augusto Karl, Julio Micheluzzi, Luciana Rosa Leite, & Carla Roberta Pereira, "Supply chain resilience and key performance indicators: a systematic literature review," *Production* 28, no.1 (2018), <https://www.scielo.br/j/prod/a/wvgVwPmtRyLmcVKg9gXkcbG/?lang=en>.
- ⁵⁷ Fu-Shiung Hsieh, "Dynamic configuration and collaborative scheduling in supply chains based on scalable multi-agent architecture," *Journal of Industrial Engineering International* 15, no. 1 (2018):1-21, <https://link.springer.com/article/10.1007/s40092-018-0291-5>.
- ⁵⁸ "The UK is forging a 5G club of democracies to reduce reliance on Huawei," Atlantic Council, June 2, 2020, <https://www.atlanticcouncil.org/blogs/new-atlanticist/the-uk-is-forging-a-5g-club-of-democracies-to-avoid-reliance-on-huawei/>.
- ⁵⁹ During April-December 2020, China remained India's largest source of imports. Commodities like telecom equipment, electronic components, computer peripherals, organic chemicals (including antibiotics and other pharma imports) remained India's major imports from China, <https://tradedat.commerce.gov.in/ftpa/matrix.asp>.
- ⁶⁰ Surojit Gupta and Sidhartha, "After 9-month freeze, Centre starts clearing China FDI plans," *Times of India*, February 22, 2021, <https://timesofindia.indiatimes.com/business/india-business/after-9-month-freeze-centre-starts-clearing-china-fdi-plans/articleshow/81143248.cms>.
- ⁶¹ The Gazette of India, "list of identified products," Annexure A, 9, Department of Pharmaceuticals, July 21, 2020, <https://pharmaceuticals.gov.in/sites/default/files/Gazettee%20notification%20of%20bulk%20drug%20schemes.pdf>.