Post-covid Value Chains Resilience and Regionalization, including a Spotlight on Singapore

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Abstract - The global economy, global flows and global economic coordination have been severely disrupted by the COVID-19 pandemic. This note reviews and summarizes some of the current forecasting and predictions of the consequences of the pandemic for global value chains, with an additional focus on Singapore. The review is based on a convenience sample of expert reports, scientific papers, and press articles. The disruption has already caused exceptional economic damage. In the medium and long terms, global value chains and the structure of globalization are expected to adapt significantly due to new attitudes to pandemic and other risks. The dominant prediction is of an organizational and geographical contraction of economic activities and exchanges, within the bounds of economic regions large enough to diversify location risk. At the same time, Singapore is poised to benefit from Asia's economic buoyancy and from regional dynamics in the manufacturing and tech sectors.

Introduction

On top of the casualties of the COVID-19 pandemic, economic coordination is getting disrupted globally as many countries severely curtail freedoms of movement and assembly in the attempt to curb domestic and international contagion. Accordingly, the flows of people and resources within as well as between many countries have been throttled, causing widespread economic damage. Although the future is uncertain, it appears quite certain that the pandemic will have long-lasting economic consequences, as economies strive to recover but also to adapt to a different assessment of risk prompted by the pandemic.

As a small economy with a large global footprint, Singapore is particularly vulnerable to this disruption in flows and coordination, but also well equipped to respond and adapt with agility. The Singaporean economy is highly dependent on global flows of people, merchandise, capital, and knowledge. On the flip side, Singapore also plays a central and active role in intermediating these flows and coordinating overseas business activities. As a result, Singaporean markets are quite sensitive to external developments. For example, the labor and real-estate markets fluctuate significantly according to inflows and outflows of foreign labor and capital. Accordingly, Singaporean economic governance institutions regulate markets and flows far more responsively than is usual in larger economies. In doing so, they also coordinate with other countries to an unusual extent.

Considering Singapore's disproportionate interest in the health of the global economy as well as its role in international business coordination (and control), this paper briefly reviews the state and forecasts of the global economy and global flows. It then attempts to summarize the latest thinking about the future of global value chains, which Singapore contributes to intermediating and

coordinating, in the wake of the global disruption in coordination that we have been experiencing. Next, we consider how Singapore has been interfacing with its region economically and industrially in the context of the pandemic. The goal is to contextualize and supply useful insights to our socio-spatial predictive analysis of the post-pandemic future of offices, shopping, and city centers in Singapore.

The Global Economy Is Reeling

The COVID-19 pandemic is harming the world economy more badly than any crisis in living memory. The global GDP was expected to contract in 2020 by 4.4% (as of October) (IMF, 2020b), 4.5% (as of September) (OECD, 2020a), or by 5.2% (as of June) (World Bank, 2020a). The forecast loss in labor hours is equivalent to 340 million full-time jobs (UN, 2020), although for now attributable to inactivity more than to unemployment (ILO, 2020). Around 100 million people are expected to drop into extreme poverty (living on less than U.S.\$1.90 a day) in 2020 (IMF, 2020b; World Bank, 2020b). Many estimates for 2020 are based on what are now generally considered overoptimistic assumptions about the second half of the year so the downside risk is higher.

After 2020, the future of the economy remains highly uncertain, mainly due to the economically exogenous factors of the pandemic itself and geopolitics. Future pandemic scenarios vary widely depending on whether people develop lasting immunity to the virus, whether seasonality affects its spread, and choices made by governments and individuals, among other factors (Scudellari, 2020). Scenarios range from an endemic virus killing large numbers of people regularly (like malaria) to seasonal outbreaks for years to come, and to disappearance by 2021. A vaccine would reduce the severity of all scenarios but would probably not be fully deployed before herd immunity is achieved anyway (Christakis, 2020). The socio-sanitary damages of the pandemic will probably take until 2024 to die down. Pandemic-induced changes in personal attitudes and practices are likely to endure for much longer but will be hard to tell apart from socio-technical changes that might have happened anyhow, if only later.

Geopolitically, the pandemic has the potential to upend the postwar global order shaped by the United States and its partners (Cimmino et al., 2020). The pivot of change is the U.S.-China rivalry and their respective global influence (CSIS, 2020). The U.S.-Europe relationship is weakening, while China is making inroads into the EU (Cimmino et al., 2020). On the other hand, the U.S.-allied North-East Asian democracies have shown themselves among the most adept countries at containing the virus. The rise of China is straining the multilateralism shaped by the U.S. after the war (Montbrial, 2020). In summary, the main parameters of future scenarios are great power (China, U.S.) cooperation and global influence, national authoritarianism and protectionism, and global-issue multilateralism (CSIS, 2020; Nye, 2020). International Relations luminary Joseph Nye estimates (2020) at less than half the chances that the pandemic will profoundly reshape geopolitics, just as the 1920 Spanish flu did not in spite of its severity.

Economic forecasting is a hazardous exercise in normal times and the more so because of those exogenous sources of uncertainty. Forecasts for 2020 were revised upward by the OECD (2020a) and the IMF (2020b) after a recovery peeked last summer when the first lockdowns were relaxed in many countries. At the same time, that recovery is losing momentum while contagion clusters and social-distancing measures are recurring persistently. Fiscal and monetary remedies have all

but been exhausted (Chang et al., 2020). Nonetheless, global GDP is projected to pick up in 2021 by 5.2% (as of October) (IMF, 2020b), by 5% (as of September) (OECD, 2020a) or by 4.2% (as of June) (World Bank, 2020a). Those predictions imply that output would not rise between 2019 and 2021 (year-end) in many economies, with considerable differences across them. EMDEs (Emerging Market and Developing Economies) are much more badly affected than advanced economies. Conversely, the largest economies in the world, China and the U.S. have performed better than other countries in their respective income-level groups, and China better than the U.S. (Chang et al., 2020).

In the medium-term after 2021, global growth is expected to gradually slow to about 3.5% (IMF, 2020b). This implies a V-shaped recovery in the second half of 2020 and in 2021, followed by growth more-or-less parallel to pre-covid forecasts but from a lower level (Chang et al., 2020; Davies, 2020; IMF, 2020b; OECD, 2020a). This persistent “scarring” is estimated at 3% of global GDP, 3.3% for advanced economies (Davies, 2020) and as much as 8% in the average EMDE (World Bank, 2020a).¹ Scarring reflects changes in attitudes (e.g., more saving, lower business confidence), the reorganization of production with attendant job losses and bankruptcies, and lingering productivity losses (Chang et al., 2020; Davies, 2020; World Bank, 2020a). EMDEs will be additionally held back economically by human development setbacks and structural bottlenecks (World Bank, 2020a). All medium-term forecasts are very sensitive to short-term pandemic fluctuations.

Global Flows Have Been Throttled

Global flows, e.g., trade and transportation, paint a complementary and more vivid picture of the impact of the pandemic on a mechanism of globalization that is vital to Singapore. The WTO (World Trade Organization) (2020) forecasts a 9.2% drop in the volume of world merchandise trade for 2020, followed by a 7.2% recovery in 2021. The services trade has been impacted at least as much. However, the decline of trade relatively to GDP is much less pronounced than after the 2008 financial crisis, because the economic downturn this time owes more to local social-distancing restrictions that affect the production of non-traded services, while monetary and fiscal policies have propped up consumption and imports. For example, trade in agricultural products has been more mildly affected because food consumption remains a necessity even under the strictest lockdown conditions. Similarly, the container-shipping industry has been cushioned by the rise in ecommerce and has managed the crisis well, by flexibly reducing services while hiking prices (Pooler & Hale, 2020).

The outlook is grimmer for air travel than for freight. After dropping by 55% in 2020, passenger numbers are expected to rise 62% in 2021, which will still put them at almost 30% lower than in 2019 (IATA, 2020a) (International Air Transport Association). Passenger traffic should take until 2024 to fully recover, but some in the industry estimate 2025 (Subramanian, 2020). Even then, business travel has traditionally contributed the bulk of airline profits, but teleconferencing may henceforth substitute for many business trips. Airline industry revenues are expected to be down 46% in 2021 (IATA, 2020b), airline bankruptcies are exceptionally high in spite of government

¹ These estimates appear inconsistent because they are from different sources, over different time horizons, and/or because the World Bank estimate may not be weighted, whereas China is categorized as an EDME at the same time as it is a very large economy that is forecast to perform best.

support (Ng, 2020) and one third of the global fleet has been put in storage (Cirium, 2020), so that the supply of air travel may shrink durably.

In the medium term, the disruption of FDI (foreign direct investment) will have more serious consequences for globalization (Seric & Hauge, 2020) because it will undercut offshore production. FDI is forecast to contract by 30% to 45% in 2020, according to the OECD (2020c). Depending on pandemic scenarios, it may recover completely (or remain flat) in 2021, by the end of which it would keep (or start) growing under any scenario. Before the pandemic, the trend had already been negative since 2015 and FDI flows in 2018 and 2019 were the lowest years since 2010. The contraction will be the most severe in the direction of EMDEs, where FDI-dependent manufacturing and (fuel and mineral) extractive industries have been particularly hard hit by the pandemic (OECD, 2020c; Seric & Hauge, 2020). FDI is an important indicator of the evolution of global value chains, which is addressed in the following section.

Global Value Chains Have Started to Reconfigure

The most significant long-term economic effect of the pandemic may be on the structure of globalization, as value chains reconfigure to face future disruption risks. This reconfiguration could change the geographic distribution of investment by MNCs (multinational corporations) to the point of significantly harming the economic prospects of entire countries due to knock-on effects (OECD, 2020c). Indeed, MNCs contribute a large share of global value-added, trade, employment, and R&D, and stimulate local competition and learning.

Increasing globalization and the quest for efficiencies have complexified value chains. Production has fragmented geographically as more places access global markets, which have differentiated as more people join them. The digital transformation of business has enabled increasingly complex value chains to maximize product differentiation and to minimize coordination costs. These complex chains stretch across the globe to extract economies of scale and scope.

Interconnected supply chains and flows of data, finance, and people give more purchase to risk, and effects can ripple rapidly across these networks (Lund et al., 2020). A reassessment of value chains was forced by the pandemic but is likely to (and should) cater for other kinds of risk. For example, the share of production conducted in environmentally or politically exposed places has risen with globalization. Accordingly, the reconfiguration of value chains rests on anticipations that are broader and longer term than the recurrence of contagious outbreaks.

The change in attitudes to risk can be summarized as a shift in emphasis from value-chain efficiency (“just in time”) to resilience (“just in case”) (Christakis, 2020). In a quest for efficiency, companies have tended to focus on managing only the most likely risks (Lund et al., 2020). The pandemic is a reminder that rare events can have very large consequences and need to be factored into planning. The shift to resilience implies moving away from just-in-time logistics and lean manufacturing (Shih, 2020). As businesses and governments seek to increase control and reduce exposure to global catastrophic risk, value chains will reconfigure mainly by shrinking their global footprints. Value chains will simplify and contract geographically, possibly with the help of new technologies.

Simplification of Value Chains

Value chains can be simplified horizontally, by reducing product variety, which reduces the number of chains (Seifert & Markoff, 2020; Shih, 2020), and vertically, by reducing trade, which shortens the chains (Lund et al., 2020).

Pandemic-induced toilet-paper shortages provided a piquant illustration of the risks of differentiation. Shortages occurred because demand abruptly shifted to homes (by +40%), but the toilet-paper market is deeply segregated into small rolls for consumers and large rolls for businesses, respectively distributed through different channels and manufactured in different plants by different companies (Oremus, 2020). It takes time, money, and stable anticipations to adapt value chains. (So that, contrary to received wisdom, the primary cause of shortages was not hoarding.) This reasoning holds for most groceries, whose consumption shifted to homes, and other products and services (Beckdach et al., 2020). Furthermore, demand shifted not only to consumers but to online shopping and to more available or cheaper brands, all with specific value chains. The ever-increasing personalization of products (package size options, line extensions, languages, flavors) and the attendant proliferation of SKUs (stock-keeping units) has specialized and rigidified supply chains (Seifert & Markoff, 2020). Thus, the trade-off between product variety and the flexibility to adjust (production, storage, transportation) capacity at each step of supply chains may have to be revisited in favor of lower variety (Shih, 2020).

Many experts (e.g., EIU, 2020; Lund et al., 2020; Nicola et al., 2020; OECD, 2020c; Shih, 2020) appear to agree that value chains will shorten to increase resilience. Shortening means reducing the number of market players between suppliers and customers, by vertically integrating (e.g., insourcing) or by cutting out intermediaries (e.g., marketing direct-to-consumers). Trade increases exposure to many kinds of risk, such as natural disasters and conflicts (Lund et al., 2020). Both high-value chains, like communication equipment, computers and electronics, and semiconductors and components, and some labor-intensive value chains, such as apparel, can be heavily traded (relatively to their outputs). By contrast, glass and cement, food and beverage, rubber and plastics, and fabricated metals are among the least traded and most regionally oriented value chains.

Geographical Contraction of Value Chains

Geographical proximity also supports coordination and thus can substitute for vertical integration. One step short of insourcing, “reshoring” (the opposite of offshoring) has already started to take place as a direct response to supply-chain disruption of essential supplies (Barbieri et al., 2020). This is especially evident in the medical sector. For example, Stil decided to relocate the production of glass thermometers to France because of the closure of its Chinese suppliers. In the longer term, other businesses may do the same to reduce risk exposure. More broadly, new national policies support reshoring of entire supply chains, either by targeting specific industries, such as France’s paracetamol industry initiative, or by supporting manufacturing in general, such as Singapore’s “SG Together Enhancing Enterprise Resilience Programme.” Reshoring can also be to neighboring countries (“nearshoring”).

Simpler value chains trade efficiency for resilience but simplification is necessarily limited by technological specialization. For example, automakers have no interest in developing on-board electronics (Shih, 2020). Hence, there are technological limitations to product range simplification and vertical integration. Another way to increase value chain resilience is to diversify suppliers geographically (OECD, 2020c), especially, but not only, away from China because of its dominance of manufacturing.

China has been central to the current reassessment of value chains because it is the manufacturing center of the world, because Chinese production was curtailed early and hard by the pandemic, and because of the ongoing U.S.-China trade war. When China put entire manufacturing regions on lockdown, businesses scrambled to identify “invisible” low-tier suppliers based in China whose troubles were interfering with production downstream (Linton & Vakil, 2020). Furthermore, certain businesses realized that their sourcing options were entirely located in China. The manufacturing of certain intermediate goods (commodities, materials, products) concentrates in China, and even in specific regions of China, so that a very localized interruption of supply can impact wide-ranging industries and geographies. For example, 65% of the world’s buttons came from the town of Qiaotou (population 100,000), China (Rasiah et al., 2011) on which thus hangs global garment production. On the other hand, supply chains can prove quickly and relatively painlessly adaptable. For example, China used to produce 93% of the world’s rare earths, a critical ingredient of consumer electronics and electric power production. China’s throttling of rare-earth exports with quotas in 2010 caused rare-earth prices to soar (Yap, 2015) and global economic anxiety. However, global supply smoothly adapted by switching to other geographical sources or even to rare-earth alternatives (Hsu, 2019; Yap, 2015). The challenge of 2020 is that disruptions have hit a broad spectrum of industries in China as well as beyond China, as other manufacturing countries implemented lockdowns in turn, and international trade faltered.

The manufacturing dominance of China has prompted “China plus one” strategies of sourcing from additional countries (Shih, 2020). In the wake of the pandemic, Vietnam presents a plausible alternative, because it is close to China, because it has already been enjoying the status of manufacturing alternative to China, and because it has offered among the best responses to the pandemic. Indonesia and Thailand also represent plausible Southeast-Asian options. When other regional sources of risk, exemplified by the 1997 Asian financial crisis or the 2004 tsunami, are considered, geographic risk diversification may however range farther outside East Asia.

Reconciling shorter value chains with geographically more diversified sources points in the direction of the regionalization of production and trade, as regions constitute a middle-ground between shorter chains and more diversity. Accordingly, production may move closer to consumers, both to avoid concentration in specific regions of the world (Shih, 2020) and to reduce exposure to trade (Lund et al., 2020). Considering the limits imposed by specialization, regionalization might only be necessary for critical components (Shih, 2020). Consistently, the high concentration of rare earth production in China ultimately did not pose undue risk. Going by the biggest markets, manufacturing could shift out of China to Central & Eastern Europe and Turkey to serve Western Europe; to Central America to serve the U.S.; to East Africa and South Asia as alternative hubs of labor-intensive manufacturing for the world (Lund et al., 2020).

An early sign of regionalization is that the container-shipping industry is already anticipating more shorter trips on smaller vessels (Pooler & Hale, 2020). Similarly, short-haul air travel is expected to recover faster than long-haul (IATA, 2020a). It could take decades however to develop the necessary manufacturing capacity and trade infrastructure, as it did China (Shih, 2020). At the same time, economies of scale will be lower than in China as the effort is distributed across more diverse and mutually distant geographies.

A consequence of regionalization could be more pronounced regional divergence, especially in favor of Asia. Asian economies showed more resilience in the face of the pandemic. In the second quarter, exports and imports declined most steeply in Europe (by 24.5% and 19.3% respectively) and North America (by 21.8% and 14.5%) (WTO, 2020). By comparison, Asian exports and

imports dropped by just 6.1% and 7.1%. Similarly, the airline industry is expected to rebound more quickly in Asian markets, including China and India, which had been growing faster than most others (Subramanian, 2020).

Technology

Technology can move the cursor in favor of efficiency without losing resilience, by putting even more flexibility in value chains (Lund et al., 2020; Shih, 2020). The relevant technologies fall into the broad categories of supply-chain management digitization and flexible manufacturing.

Most large firms' knowledge of their suppliers is imprecise beyond the first tier (Lund et al., 2020). Supply-chain management has tended to lag behind the digital transformation of other enterprise functions, making it a low-hanging fruit at current levels of ICT (information and communication technology). Two main stages of improvement are firstly the digitization of commercial and shipping documents across deeper tiers of suppliers and secondly the mapping of supply chains for risk assessment and response planning, based on first-stage data. The digitization of paperwork has the added benefit of minimizing potentially contagious in-person contacts, especially at borders (OECD, 2020b). A parallel, complementary development is the boom in business-to-business digital marketplaces (Digital Commerce 360, 2020).

Flexible manufacturing has been a long-standing trend which supports value-chain resilience by producing closer to customers or by flexibly adjusting the mix of product variety (Shih, 2020). For example, the manufacturing capacity of one or the other variety can be adjusted on demand in response to external shocks. Certain technologies make manufacturing more flexible by increasing the range of product personalization without sacrificing variable costs, or by decreasing fixed costs, which makes smaller and more distributed factories viable. Automation, process efficiency, and additive manufacturing (3d-printing) are three areas of flexible manufacturing technology.

At the same time, the pandemic is a reminder that only humans can respond to unforeseeable risk, so that human presence may be enhanced (in numbers as well as competence) in critical locations.

Singapore Is Affected but Shows Signs of Resilience

How do these trends impact Singapore more specifically? Although Singapore operates as a global hub in certain areas (e.g., shipping, wealth management), it is more generally dependent on what happens in its more immediate vicinity, which encompasses giant China and India. To a large extent, Singapore's fate as regional business coordinator is tied to the economic health of Asia in the short term and to the regional reconfiguration of value chains in the medium term. Singapore's growth has been battered by its neighbors' pandemic woes (as well as its own) and there is not much that it can do to change that. On the bright side, the economic forecasts for Asia are the most optimistic in the world. Moreover, Singapore is well positioned to proactively take advantage of value-chain reconfigurations in the region.

The Asia-Pacific region is already in recovery, albeit a 'multispeed' one (IMF, 2020a). The IMF's forecast was downgraded to -2.2% in 2020, the worst on record for the region (Ostry, 2020). However, the region is expected to grow by 6.9% in 2021. Advanced economies (Australia, Korea, Japan, and New Zealand) are in recession, but not as severely as expected. India's economy contracted sharply and is expected to recover slowly. China took the brunt of the pandemic earlier

than other countries but has enjoyed a strong recovery. Closer to Singapore, the ASEAN5² are forecast to regain pre-pandemic GDP (Gross Domestic Product) levels in 2022, not 2021 (Kusaka, 2020). When all is said and done, Singapore's economic prospects hover somewhere close to the average of the closest and largest neighboring economies (Table 1).

Table 1. Projected GDP growth (IMF, 2020a; Kusaka, 2020)

	2020	2021
<i>ASEAN5</i>	−5.0%	4.3%
<i>China</i>	+1.9%	+8.2%
<i>India</i>	−10.3%	+8.8%
<i>Japan</i>	−5.3%	+2.3%
<i>Singapore</i>	−6.0%	+5.0%

The pandemic has highlighted two recent trends in Asian value chains, both centered on China and benefitting Singapore directly or indirectly. Firstly, Asia's (now not so) newly industrialized economies (NICs: Japan, Korea, and Taiwan being the largest by far) have started offshoring industrial production to Southeast Asia, that is closer to Singapore (Sim, 2019). Korea and Taiwan got into offshoring later than Japan but have been at it already since the 2000s. However, a more recent and significant change is that the direction of offshoring is diverting from China to Southeast Asia, while China herself is joining the action. Well-known basic drivers of this trend are the rise in China's labor costs and the U.S.-China trade war, the latter intensified by the pandemic. What the pandemic has revealed is the criticality of geographically diversifying out of China the risk and exposure of manufacturing. Many Chinese industrialists themselves have become sophisticated and sizable enough to join the ranks of MNCs that optimize and accordingly may opt to diversify their global manufacturing footprint.

The main destinations are Vietnam, Indonesia, Thailand, and Malaysia in Southeast Asia, thus closer to Singapore. For example, Korea became the largest foreign investor in Vietnam in the 2010s. A typical sector is electronics, which is a legacy growth-industry of the NICs and China (Biswas, 2020) and strongly dominated by Asia (Jeong, 2020). Worldwide, around 97% of handsets, 60% of PCs, and many electronic appliances are made there. Vietnam is a favored destination of foreign Asian investment in electronics. For instance, Samsung, the Korean electronics giant, has turned Vietnam into its largest overseas manufacturing base, making U.S.\$66 billion of sales in 2018, which equates to 28% of Vietnam's GDP.³ Taiwan has developed the "New Southbound Policy" to encourage Taiwanese companies to invest in the region (Sim, 2019). In South Asia but also of relevance to Singapore, India has not industrialized as much as expected but remains a potential industrial powerhouse given her market size and technological capabilities, even if she does not end up industrializing as much as China has. Apple's iPhone supply chain has already made significant inroads in India (Biswas, 2020). For example, Taiwanese company

² The Association of Southeast Asian Nations' five biggest economies: Indonesia, Malaysia, the Philippines, Singapore, and Thailand

³ Sales are not directly comparable to GDP, which is an aggregate of value added, but the ratio is nevertheless evocative (and thus commonly used by the press).

Foxconn, one of Apple's largest subcontractors, is in the process of substantially increasing its manufacturing in India, possibly at the expense of its Chinese presence.

This regional shift should bolster Singapore's role as regional business coordinator (besides her roles as a trade and travel hub). The new investment locales are geographically closer (apart from India) and relatively less developed. Consequently, Singapore could expand as a regional center of gravity that offers economies of scale and functional sophistication in infrastructure, higher education, R&D, finance, law, and business administration. For example, Singapore is one of the most common choices in Southeast Asia for locating a treasury and invoicing center, providing funding and cash management services to the region (Sim, 2019). As these countries industrialize, their economic growth should also provide a further boost, at least as long as Singapore maintains a competitive advantage in this role.

A second, more abrupt, and more China- and Singapore-centric trend is that of Chinese business using Singapore as a platform for overseas market access. The trends overlap to the extent that Chinese MNCs may use Singapore as a base both for production in, and market access to, the region. Even though China is next door, Singapore offers the specific advantage of masking their origin, especially in Southeast Asian countries (Harper, 2020). However, a larger and distinct aspect of the latter trend is Chinese tech's effort to maintain or seek *global* market access (Devanesan, 2020a; Puglisi, 2020).

A driver of the Chinese quest for global access is the crowding out of the home market and the corresponding need to pursue competitive advantage and growth outside (Devanesan, 2020a; Mukherjee, 2020). This is not unique to China and merely reflects the new-found sophistication of the Chinese economy, whether in manufacturing or tech. Another factor is that ICT is one of the few industries benefiting from the pandemic. At the point in 2020 when employment contracted the most in Singapore, electronics was the only manufacturing industry to increase it (Abdullah, 2020).

As a result, Singapore already rivals Silicon Valley for Chinese tech presence (Devanesan, 2020a). Tencent/WeChat, ByteDance/TikTok, Huawei, and China Telecom all opened new operations, data centers, R&D, or regional headquarters in Singapore in 2020. Also, Alibaba, Ant Group (an affiliate of Alibaba), Tencent, and others invested in local unicorns (e.g., Grab, Lazada, Sea Limited) or office space (e.g., the Axa tower). Conversely, non-Chinese tech companies may take advantage of Singapore's developing and China-oriented ecosystem to access the Chinese market, if possible.

At least some of this development represents a move away from China risks, linked to her legal and international standing, that have exacerbated during, if not because of, the pandemic. For example, China's ByteDance has moved operations to Singapore in response to national bans by India and the U.S. (Chanjaroen & Huang, 2020). American Zoom had to do the same to preserve access to its home market (Alley, 2020). For tech companies, neutral and open Singapore provides better access to worldwide markets than China because it offers better guarantees for intellectual property, data protection, content regulation, and financial flows (Mukherjee, 2020). For instance, fintech companies (like the Ant Group) need access to the U.S.-dominated financial system. The justification for withdrawing access by social-media companies (like ByteDance) to the U.S. and India is concerns about China's sovereignty over user data and censorship of content. Although the U.S. tends to serve as a lightning rod in these matters, other countries probably share similar concerns and consequently may also be targeted for market access from Singapore.

Conclusion

In the face of the unfolding pandemic and economic crisis, countries have been forced to cope as best they can, with the benefit of prior epidemic experience and policy planning in Singapore. At the same time, the foreseeable reconfiguration of global value chains calls for an in-depth revision of long-term economic plans, particularly in globally connected Singapore. The dominant prediction is of an organizational and geographical contraction of economic activities and exchanges, within the bounds of economic regions that afford the requisite diversification of risk. At the same time, sections of value chains will still stretch across the globe because it is unavoidable (e.g., raw materials) or because the risk is considered acceptable (e.g., non-critical components or services).

The reconfiguration of global value chains may have an outsize effect on Singapore because of its intermediation and coordination role. At the same time, the Singaporean economy is itself configured to respond proactively to such external shocks. When we zoom in on manufacturing and tech in Asia, we find that Singapore is indeed well positioned to leverage its traditional role in business coordination (and control). The recentring of regional manufacturing closer to Singapore is accelerating. In a parallel direction, Chinese tech is expanding in Singapore to improve its global market access. More generally, Singapore's response may still require substantial qualitative changes in the inflows of labor and capital and consequently on the structure of local labor and capital markets and the socio-spatial distribution of workers and real estate.

References

- Abdullah, Z. (2020, October 19). Electronics sector continues to grow despite COVID-19, offered more than 2,800 opportunities since April: MOM. *Channel NewsAsia*.
<https://www.channelnewsasia.com/news/singapore/electronics-sector-grow-covid-19-jobs-opportunities-13311380>
- Agarwal, A. (2020, April 28). Covid-19 highlights Singapore's exposure to oil slump. *Argus*.
<https://www.argusmedia.com/en/news/2100408-covid19-highlights-singapores-exposure-to-oil-slump>
- Alley, A. (2020, August 18). Zoom opens data center in Singapore, its first in South East Asia. *Data Center Dynamics*. <https://www.datacenterdynamics.com/en/news/zoom-opens-data-center-singapore-its-first-south-east-asia/>
- Barbieri, P., Boffelli, A., Elia, S., Fratocchi, L., Kalchschmidt, M., & Samson, D. (2020). What can we learn about reshoring after Covid-19? *Operations Management Research*, 13(3), 131–136.
<https://doi.org/10.1007/s12063-020-00160-1>
- Beccach, C., Brown, B., Halbardier, F., Henstorf, B., & Murphy, R. (2020, April 21). Rapidly forecasting demand and adapting commercial plans in a pandemic. *McKinsey & Company*.
<https://view.ceros.com/mckinsey/coronavirus-promo-video-desktop>
- Biswas, R. (2020, December 11). APAC electronics sector closes 2020 with strong rebound. *IHS Markit*.
<https://ihsmarkit.com/research-analysis/apac-electronics-sector-closes-2020-with-strong-rebound.html>
- Chang, D., Prasad, E., & Wu, E. (2020, October 11). October 2020 update to TIGER: COVID-19 remains an impediment to the global recovery. *Brookings*. <https://www.brookings.edu/research/october-2020-update-to-tiger-covid-19-remains-an-impediment-to-the-global-recovery/>

- Chanjaroen, C., & Huang, Z. (2020, September 11). TikTok Owner to Spend Billions in Singapore After U.S. Ban. *Bloomberg*. <https://www.bloomberg.com/news/articles/2020-09-11/tiktok-owner-plans-to-spend-billions-in-singapore-after-u-s-ban>
- Choo, Y. T. (2020, December 25). Pharma industry drives rebound in factory output. *The Straits Times*. <https://www.straitstimes.com/business/economy/pharma-industry-drives-rebound-in-factory-output>
- Christakis, N. (2020, October 16). The Long Shadow of the Pandemic: 2024 and Beyond. *Wall Street Journal*. <https://www.wsj.com/articles/the-long-shadow-of-the-pandemic-2024-and-beyond-11602860214>
- Cimmino, J., Kroenig, M., & Pavel, B. (2020, June 1). Taking stock: Where are geopolitics headed in the COVID-19 era? *Atlantic Council*. <https://www.atlanticcouncil.org/in-depth-research-reports/issue-brief/taking-stock-where-are-geopolitics-headed-in-the-covid-19-era/>
- Cirium. (2020, October 28). Cirium weekly COVID-19 aviation update. *Cirium*. <https://www.cirium.com/thoughtcloud/cirium-weekly-covid-19-updates/>
- CSIS. (2020). *Four Scenarios for Geopolitical Order in 2025-2030: What Will Great Power Competition Look Like?* Center for Strategic and International Studies. <https://www.csis.org/analysis/four-scenarios-geopolitical-order-2025-2030-what-will-great-power-competition-look>
- Davies, G. (2020, September 21). Expect long-term economic scarring from Covid-19. *Financial Times*. <https://www.ft.com/content/3c2e524f-d1ea-4b02-9e71-e1634b316f99>
- Devanesan, J. (2020a, June 2). China tech firms look to Southeast Asia as U.S. rivalry intensifies. *Tech Wire Asia*. <https://techwireasia.com/2020/06/china-tech-firms-look-to-southeast-asia-as-us-rivalry-intensifies/>
- Devanesan, J. (2020b, December 24). 3 trends shaping the Asian biotech supply chain in 2021. *Tech Wire Asia*. <https://techwireasia.com/2020/12/3-trends-shaping-the-asian-biotech-supply-chain-in-2021/>
- Digital Commerce 360. (2020). *B2B Marketplace Report Series: Part Two*. <https://www.digitalcommerce360.com/industry-resource/2020-b2b-marketplace-report-series-part-two/>
- EIU. (2020). *Middle East brief: Post-Covid-19 supply chains*. Economist Intelligence Unit. <https://www.eiu.com/n/middle-east-post-covid-19-supply-chains/>
- Harper, J. (2020, September 16). Singapore becomes hub for Chinese tech amid U.S. tensions. *BBC News*. <https://www.bbc.com/news/business-54172703>
- Hsu, J. (2019, May 31). Don't Panic about Rare Earth Elements. *Scientific American*. <https://www.scientificamerican.com/article/dont-panic-about-rare-earth-elements/>
- IATA. (2020a). *Recovery Delayed as International Travel Remains Locked Down*. International Air Transport Association. <https://www.iata.org/en/pressroom/pr/2020-07-28-02/>
- IATA. (2020b). *Airlines Unable to Cut Costs Deep Enough to Save Jobs*. International Air Transport Association. <https://www.iata.org/en/pressroom/pr/2020-10-27-02/>
- ILO. (2020). *COVID-19 leads to massive labour income losses worldwide* [Press release]. International Labour Organization. http://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_755875/lang--en/index.htm
- IMF. (2020a). *Navigating the Pandemic: A Multispeed Recovery in Asia* (Regional Economic Outlook). International Monetary Fund.

- <https://www.imf.org/en/Publications/REO/APAC/Issues/2020/10/21/regional-economic-outlook-apd>
- IMF. (2020b). *World Economic Outlook: A Long and Difficult Ascent*. International Monetary Fund. <https://www.imf.org/en/Publications/WEO/Issues/2020/09/30/world-economic-outlook-october-2020>
- Jeong, E.-Y. (2020, November 15). ‘The Zoom Boom’: Asia Leads the World in Covid-19 Economic Recovery. *Wall Street Journal*. <https://www.wsj.com/articles/the-zoom-boom-asia-leads-the-world-in-covid-19-economic-recovery-11605445200>
- Kusaka, K. (2020, December 21). Asian economies to regain pre-COVID scale in 2022: JCER. *Nikkei Asia*. <https://asia.nikkei.com/Economy/Asian-economies-to-regain-pre-COVID-scale-in-2022-JCER>
- Linton, T., & Vakil, B. (2020, March 5). Coronavirus Is Proving We Need More Resilient Supply Chains. *Harvard Business Review*. <https://hbr.org/2020/03/coronavirus-is-proving-that-we-need-more-resilient-supply-chains>
- Lund, S., Manyika, J., Woetzel, J., Barriball, E., Krishnan, M., Alicke, K., Birshan, M., George, K., Smit, S., Swan, D., & Hutzler, K. (2020). *Risk, resilience, and rebalancing in global value chains*. McKinsey Global Institute. <https://www.mckinsey.com/business-functions/operations/our-insights/risk-resilience-and-rebalancing-in-global-value-chains>
- Montbrial, T. de. (2020, May 25). Le Covid-19 a créé une prise de conscience. *Le Figaro*. <https://www.ifri.org/fr/espace-media/lifri-medias/thierry-de-montbrial-covid-19-cree-une-prise-de-conscience>
- Mukherjee, A. (2020, September 17). Singapore Wants Cold War’s Casualties, Not Cash. *BloombergQuint*. <https://www.bloombergquint.com/opinion/haven-from-u-s-china-cold-war-what-s-in-it-for-singapore>
- Nakano, T. (2021, January 6). Singapore emerges as food tech hub, thanks to state support. *Nikkei Asia*. <https://asia.nikkei.com/Business/Startups/Singapore-emerges-as-food-tech-hub-thanks-to-state-support>
- Ng, A. (2020, October 8). Over 40 airlines have failed so far this year—And more are set to come. *CNBC*. <https://www.cnbc.com/2020/10/08/over-40-airlines-have-failed-in-2020-so-far-and-more-are-set-to-come.html>
- Nicola, F. de, Timmis, J., & Akhlaque, A. (2020, September 10). How is COVID-19 transforming global value chains? Lessons from Ethiopia and Vietnam. *World Bank*. <https://blogs.worldbank.org/voices/how-covid-19-transforming-global-value-chains-lessons-ethiopia-and-vietnam>
- Nye, J. S., Jr. (2020, October 6). Post-Pandemic Geopolitics. *Project Syndicate*. <https://www.project-syndicate.org/commentary/five-scenarios-for-international-order-in-2030-by-joseph-s-nye-2020-10>
- OECD. (2020a). *OECD Economic Outlook, Interim Report September 2020* [Text]. Organisation for Economic Co-operation and Development. https://www.oecd-ilibrary.org/economics/oecd-economic-outlook/volume-2020/issue-1_34ffc900-en
- OECD. (2020b). *Trade facilitation and the COVID-19 pandemic*. Organisation for Economic Co-operation and Development. <http://www.oecd.org/coronavirus/policy-responses/trade-facilitation-and-the-covid-19-pandemic-094306d2/>

- OECD. (2020c). *Foreign direct investment flows in the time of COVID-19*. Organisation for Economic Co-operation and Development. <https://www.oecd.org/coronavirus/policy-responses/foreign-direct-investment-flows-in-the-time-of-covid-19-a2fa20c4/>
- Oremus, W. (2020, April 2). What Everyone's Getting Wrong About the Toilet Paper Shortage. *Medium*. <https://marker.medium.com/what-everyones-getting-wrong-about-the-toilet-paper-shortage-c812e1358fe0>
- Ostry, J. D. (2020, October 23). IMF: Everything you need to know about Asia's 'multispeed' recovery. *World Economic Forum & IMF*. <https://www.weforum.org/agenda/2020/10/asia-multispeed-recovery-coronavirus-covid-economies-economics/>
- Pooler, M., & Hale, T. (2020, September 17). Coronavirus and globalisation: The surprising resilience of container shipping. *Financial Times*. <https://www.ft.com/content/65fe4650-5d90-41bc-8025-4ac81df8a5e4>
- Puglisi, G. (2020, January 2). Singapore can be China tech's neutral gateway to ASEAN market. *Asia Times Financial*. <https://www.asiatimesfinancial.com/singapore-can-be-china-tech-s-neutral-gateway-to-asean-market>
- Rasiah, R., Kong, X.-X., & Vinanchiarachi, J. (2011). Moving up in the global value chain in button manufacturing in China. *Asia Pacific Business Review*, 17(2), 161–174. <https://doi.org/10.1080/13602381.2011.533508>
- Scudellari, M. (2020). How the pandemic might play out in 2021 and beyond. *Nature*, 584(7819), 22–25. <https://doi.org/10.1038/d41586-020-02278-5>
- Seifert, R. W., & Markoff, R. (2020, July). How COVID-19 exposed the fault lines of product complexity. *IMD*. <https://www.imd.org/research-knowledge/articles/How-COVID-19-exposed-the-fault-lines-of-product-complexity/>
- Seric, A., & Hauge, J. (2020, May). COVID-19 and the global contraction in FDI. *UNIDO*. <https://iap.unido.org/articles/covid-19-and-global-contraction-fdi>
- Shih, W. C. (2020, October). Global Supply Chains in a Post-Pandemic World. *Harvard Business Review*. <https://hbr.org/2020/09/global-supply-chains-in-a-post-pandemic-world>
- Sim, D. (2019). Companies look to shift supply chain to Southeast Asia. *Citibank*. <https://www.citi.com/commercialbank/insights/banking-tech/en/>
- Subramanian, S. (2020, September 29). Inside the airline industry's meltdown. *The Guardian*. <https://www.theguardian.com/world/2020/sep/29/inside-the-airline-industry-meltdown-coronavirus-pandemic>
- UN. (2020, June 30). Hard times forecast for global job recovery in 2020, warns UN labour agency chief. *United Nations*. <https://news.un.org/en/story/2020/06/1067432>
- Wang, A., & Lee, J. Y. (2020, May 4). Southeast Asia's power sector continues to get battered by COVID-19. *IHS Markit*. <https://ihsmarkit.com/research-analysis/southeast-asias-power-sector-continues-to-get-battered-covid-19.html>
- World Bank. (2020a). *Global Economic Prospects*. World Bank. <https://www.worldbank.org/en/publication/global-economic-prospects>
- World Bank. (2020b). *COVID-19 to Add as Many as 150 Million Extreme Poor by 2021* [Press release]. World Bank. <https://www.worldbank.org/en/news/press-release/2020/10/07/covid-19-to-add-as-many-as-150-million-extreme-poor-by-2021>

WTO. (2020). *Trade shows signs of rebound from COVID-19, recovery still uncertain*. World Trade Organization. https://www.wto.org/english/news_e/pres20_e/pr862_e.htm

Yap, C.-W. (2015, January 5). China Ends Rare-Earth Minerals Export Quotas. *Wall Street Journal*. <http://www.wsj.com/articles/china-ends-rare-earth-minerals-export-quotas-1420441285>