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Executive summary

Responding to techno-nationalism need not be a binary choice between decoupling and engagement with China.

Though trade tensions between the United States and China have disrupted global supply chains, responding to techno-nationalism need not be a binary choice between decoupling and engagement with China. Extended supply chain manufacturing entails inputs and factors from multiple countries. One factor is intellectual property (IP) rights. Products made over extended global supply chains tend to be IP-intensive. Focusing on these IP rights as a basis for mitigating disrupted supply chains suggests that a techno-globalist alternative based on strategic diversification may be more appropriate to addressing disrupted supply chains than embracing a binary solution. This whitepaper outlines that approach by:

1. Demonstrating the connection between goods associated with extended supply chains and industrial categories that three of the world's largest IP offices identify as patent-intensive
2. Explaining the use of IP in mitigation and restructuring through licensing terms and asset relocation
3. Discussing how forces of state policy and competition discourage reshoring in an absolute sense
4. Recommending to policy makers that they support a virtuous circle of competition in both emerging and developing economies to provide greater diversification and resilience in these supply chains.

Introduction

Global IP-protective strategies can also help remedy the IP theft concerns underlying US-China trade tensions.

Trade tensions between the United States and China have disrupted global supply chains through such measures as increased tariffs, export control, and investment restrictions. Due to the nature of the products and industries involved, these disrupted supply chains also raise a variety of intellectual property (IP) issues, particularly technology licensing. IP issues, particularly forced technology transfer and alleged IP theft,¹ were also a driving force behind US actions that precipitated the trade war in 2017. IP is in a sense both the origin of the problem and part of the solution. As companies consider the binary risks of decoupling or engagement with trading partners due to these supply chain disruptions, we believe that more practical approaches that also incorporate IP strategies can help build stable, durable and resilient supply chains. These include:

1. Recognizing that the IP-intensive nature of extended supply chains means that the licensing/ relocation of IP rights can play a key role in tariff mitigation strategies and supply chain restructuring
2. Understanding that binary choices to pull away from China or further invest/ maintain a presence there may be more positively approached through strategic diversification, which the creative management of IP portfolios can help to achieve
3. Noting that in the long run, competitive pressures can lead to enhanced IP regimes both in China and in economies where goods may be on-shored, thereby supporting a virtuous cycle for trade relations among supply-chain contributing economies.

By introducing these elements to the discussion, we propose a “techno-globalist” alternative for supply chain managers and policymakers to pursue in the medium to long run, which contrasts with binary techno-nationalist choices. In this sense, global IP-protective strategies can also help remedy the IP theft concerns underlying US-China trade tensions while sustaining more resilient transnational production networks.

I. The IP-intensive nature of extended supply chains

A managed decoupling of China and the United States is underway amidst the new Cold War environment.

Products made over extended supply chains are by their nature IP-intensive. By “extended supply chain,” we do not mean activities like the production of garments, the shipment of food and agricultural products, or the acquisition/refining process for most extractive industries. These activities tend to feature fewer links between initial inputs and finished products, though they may indeed be intermediary parts of more elongated production processes for other goods and services. By “extended supply chain” we refer to processes that not only feature a larger number of intermediary steps but also involve a higher degree of network trade.

As an example, consider the Apple iPhone. Apple sources physical components for its iPhone from twenty-three companies in up to ten regions including America, Taiwan, China, South Korea, France, Italy and the Netherlands, with some components made in more than one country. For example, batteries are made in two countries. Design work, software programming, research and development, product localization, packaging and marketing may also be done in many parts of the world. Although China has historically played an important role in the manufacture of these products, imports to China are in fact highly dependent on Apple’s global network.

A different process appears to be emerging with respect to the Mac Pro, however. Apple has announced that its new Mac Pro is in fact being made in Texas with a higher proportion of US-manufactured components than in prior Mac Pros and that it will invest US\$350 billion in the US economy by 2023, including sourcing parts from thirty-six different states.²

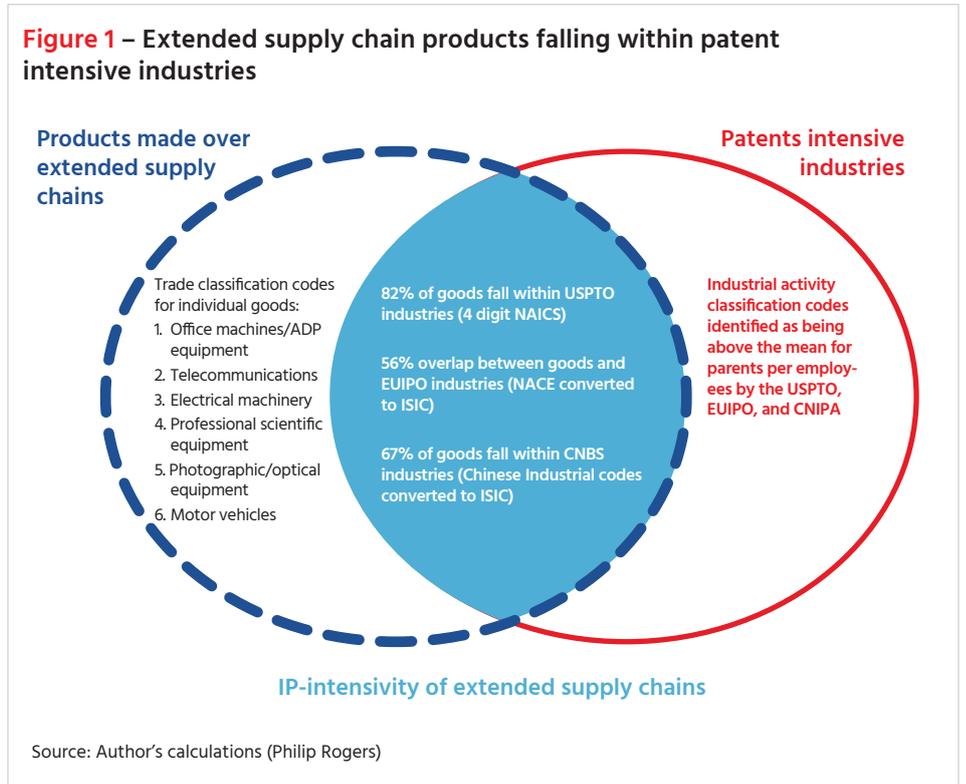
As these two examples indicate, supply chain strategies can vary from product to product, even within the same company. There is no one size that fits all or a single archetypal example, but a variety of companies that depend on China for vital aspects of its global supply chain are grappling with challenges of increased production costs and political instability. As Alan Dupont³ and Alex Capri⁴ have described in other Hinrich Foundation publications, a managed decoupling of China and the United States is underway amidst the new Cold War environment emerging from their geostrategic and technological competition. This decoupling, however managed, will continue to significantly impact those companies. These geopolitical developments gain traction not only from the structural features of global manufacturing but from its IP-intensive nature as well.

The general types of goods that tend to be manufactured over extended supply chains include: office machines/ADP equipment, telecommunications, electrical machinery, motor vehicles, professional scientific equipment, and photographic/optical equipment.⁵ The products in these categories overlap with industrial sectors that three of the largest government intellectual property offices in the world have identified as patent intensive. Specifically, the United States Patent

and Trade Office (USPTO), the European Intellectual Property Office (EUIPO) and China’s National Bureau of Statistics (CNBS), working with China’s National Intellectual Property Administration, have each published lists of patent-intensive industries,⁶ with “patent intensive” defined as an above average ratio of patents to employees in the industrial category (in the case of the USPTO and EUIPO) or above average rates of patent issuance, patents per employees, or R&D intensity (in the case of the CNBS). Using concordance tables provided by the various intellectual property agencies,⁷ we have quantified the overlap between goods in the supply-chain dependent categories specified above and the patent intensive industries by these three intellectual property agencies. Figure 1 illustrates our findings in this regard: 82% of the extended supply chain goods fall within USPTO patent-intensive categories, 56% fall within EUIPO patent-intensive industries and 67% fall within CNBS patent-intensive industries. These findings not only illustrate the connection between IP and supply chain management but also serve to underscore the role of IP and manufacturing in the broader race for technological leadership, particularly in newer technologies.

The types of goods often produced over extended supply chains are also coincident with many of the MIC 2025-targeted sectors.

Currently, the Trump Administration is considering subsidies and other support for American companies seeking to reshore their manufacturing activities away from China, which will also help reduce the risk of IP theft in China.⁸ These issues were discussed at length in the initial Section 301 Report that initiated the tariff-based sanctions imposed upon China, in part due to China’s unfair activities in support of its efforts to implement its Made in China 2025 program (MIC 2025).⁹ The types of goods often produced over extended supply chains are also coincident with many of the MIC 2025 targeted sectors, which include new advanced information technology, automated machine tools and robotics, new-energy vehicles and equipment, power equipment and advanced medical products.



The fact that extended supply chains are IP-intensive in nature is not the sole source of friction.

The fact that extended supply chains are IP-intensive in nature is not the sole source of friction. Other factors such as the trade deficit have been a source of bilateral friction, as has China's counterretaliation against US sanctions through the imposition of sanctions on agricultural products.

Though the brief analysis above has focused on patents specifically, it illustrates the value of seeing developments through an IP lens more generally. Other data sets and IP rights may also be applicable to determining the IP-intensity of supply chains. For example, patent assignment data, typically housed at patent offices which record changes in ownership, may be useful in assessing ownership changes in patents which can help determine trends in intellectual property collateralization and the markets for technology and innovation.¹⁰ Trademark data, including assignment data, may also be important indicators of innovation and industrial change.¹¹ Payments for technology, which may be reflected in census or balance of payments data, may also be useful for evaluating trends in technology licensing. Technology payments to unrelated parties may also be indicative of greater dispersions of technology, including licensing activity for supply chain intensive ICT products made pursuant to standardized technologies with multiple, multinational contributors.

Applying an IP-oriented lens more fully contextualizes supply chain disruptions.

Applying an IP-oriented lens also more fully contextualizes the supply chain disruptions underway through tracking of technological developments made in anticipation of supply chain migrations. These data can in turn shed light on opportunities for companies to reduce risks of various kinds in their supply chains. As the next section details, the IP-intensive nature of extended supply chains also enables the pragmatic licensing/relocation of IP rights to contribute to tariff mitigation strategies and supply chain restructuring.

II. Using IP for mitigation and restructuring: Licensing terms and asset relocation¹²

During the initial phases of the trade war, destabilizing and progressively escalating tariffs along with other trade sanctions such as export and investment controls forced importers to consider adjusting their supply chains to maintain customer relationships and profitability. This dynamic has accelerated in light of the global pandemic, which has threatened the fragility of just-in-time, multiple country sourcing and overreliance on Chinese components for certain finished products in short supply. The recent US revocation of Hong Kong's special trading status further complicates strategies, as Hong Kong has historically transshipped a major share of China's exports to the United States.¹³

A key dimension of the responses to these supply chain disruptions has been the implementation of tariff mitigation strategies.

A key dimension of the responses to these supply chain disruptions has been the implementation of tariff mitigation strategies. According to a KPMG survey, companies implementing tariff mitigation strategies in 2019 saved an average of 59% on their tariffs. The principal method was restructuring sales relationships to reduce the imposition of tariffs based on sales made to the US by intermediaries, i.e., optimizing the "first sale doctrine" as a basis for the valuation of imported goods. The second most common strategy was to change the Harmonized Tariff Schedule classification of the product while the third most common strategy was to move production outside of China to achieve a non-China country of origin. Finally, the fourth most common strategy involved procurement or supply chain changes.¹⁴ The licensing or relocation of IP rights can be an integral part of all three of these additional strategies, as discussed below.¹⁵

1. Reassigning IP rights

Reassigning IP rights can modify country of origin specifications and dutiable value in response to new tariff schedules.

One direct approach for companies is the relocation of manufacturing to change the country of origin from China to another country. Simply passing goods through another country, or establishing a "screwdriver" operation where only minimal processing is applied to imported components, will generally not succeed in minimizing duties. Instead, long-standing US precedent dictates that a change in country of origin is accomplished by the goods undergoing a "substantial transformation" whereby they obtain a new "name, character and use."¹⁶ In other words, the good in question must be transformed into a new and different article of commerce in the third country. Generally, a change in name is far less important than a change in character or use. Moreover, substantial transformation decisions are highly fact-specific. In determining whether goods have been substantially transformed from its Chinese origin, the additional value contributed by local IP rights in the country where the substantial transformation is occurring may also be a factor in changing the country of origin. Earlier case law supports the use of IP rights to affect a substantial transformation. As an example, programming that affects the use of software in a product may constitute a substantial transformation, enabling a change in the country of origin of a product.¹⁷

Companies exporting goods manufactured in China from parts made over extended supply chains may wish to negotiate new IP license agreements to support arguments that particular products have been substantially transformed in the newly proposed country of origin. If this is not feasible, an alternative strategy is to restructure IP ownership to reduce the valuation of the goods directly imported from China. Under US law, for example, “any royalty or license fee related to the imported merchandise that the buyer is required to pay, directly or indirectly, as a condition of the sale of the imported merchandise for exportation to the United States”¹⁸ is defined as an “assist” that factors into the transaction value used to calculate the duties paid by companies who import goods from unrelated parties. Restructuring the IP rights pertaining to such assists can lower or eliminate taxes on the royalties involved, thereby reducing the overall duty levied. In evaluating the impact of such licensing shifts, companies may also wish to consult data on patent assignments or licensing revenues to better structure such transactions and anticipate shifts in manufacturing undertaken by their competitors to reduce supply chain uncertainties.¹⁹

Recent changes in China’s technology licensing regime also enables more flexibility in the licensing of foreign designs for Chinese manufacture.

Recent changes in China’s technology licensing regime also enables more flexibility in the licensing of foreign designs for Chinese manufacture. Traditionally, licensors of foreign patent rights, trade secrets or technology were required to grant their Chinese licensee the rights to all improvements to the technology and indemnify the Chinese licensee against all third-party legal risks. However, recent amendments to Chinese law have dropped these mandates such that these matters are now freely negotiable. This change in law may also facilitate a renegotiation of the values for technologies licensed for production of goods in China. One of the ironies of the trade war is that supply chains are being restructured in response to China’s unfair and overly restrictive technology transfer regime, precisely at a time when China has taken significant steps due to reform that regime and has thereby facilitated more flexible licensing structures.

Foreign companies constituted only 2.8% of all design patent applications in China in 2019.

Foreign companies designing a product for import into the United States may also wish to consider obtaining appropriate Chinese IP rights to better secure their China market position and support a rebalancing of royalty payments in light of the increased possibility of China-based licensing revenues. For example, Chinese design patents are relatively inexpensive to obtain, granted quickly and have good enforcement and licensing value. This approach appears to be under-utilized. Foreign companies constituted only 2.8% of all design patent applications in China in 2019. Moreover, the number of such applications increased by less than 1% from 19,702 in 2018 to 19,846.²⁰

2. IP portfolios consolidation

IP portfolios can be consolidated in or shifted to particular jurisdictions when navigating export restrictions with an eye to production opportunities and participation in international standard-setting.

Perhaps the most high-profile target of US export restrictions during the Trump administration is Huawei, whose value chain relies heavily on the semiconductor technology that the United States currently dominates.²¹ Huawei’s problems are not easily resolved – it faces an embargo on US technology, including chips, that constrains the strategic deployment of IP assets in concert with the geography of production.

Some US companies may initially have decided to shift the manufacturing of products for the Chinese market away from the US. For example, Intel's sales to China have notably risen amidst Sino-American trade tensions through production in Israel.²² But on 22 May, 2020, the US Commerce Department placed twenty-four new Chinese companies on its Entities List,²³ explaining in a statement that Huawei had tried to "undermine" its previous restrictions by using American software and technology to make its own semiconductors and buy products from foreign foundries that used American equipment.²⁴ In response to the ratcheting up of sanctions, TSMC (one of Huawei's main suppliers), announced plans to open a US\$12 billion production plant in Arizona²⁵ and has indicated that it will comply with Washington's intentions regarding dealings with Huawei.²⁶ It should be noted that TSMC was the twelfth largest assignee of granted patents in the United States in 2019, with a portfolio of 36,000 patents globally as of June 2019.²⁷ TSMC's decision to invest in the United States and distance itself from China is supported in no small part by its robust US patent portfolio.

Another response to these sanctions is to migrate technology or IP rights away from the United States in order to avoid United States ownership and regulatory oversight. For example, RISC-V is an industry standard association that was initially incubated at UC Berkeley and that participates in software and hardware innovation. Its members include Chinese companies like Huawei, ZTE and Alibaba Cloud as well as many leading high-tech companies from throughout the world. In March 2020, it decided to reincorporate in Switzerland for what it asserted to be non-political reasons²⁸ shortly after US companies were initially banned from participating in international standard setting with Huawei in 2019.²⁹ The US Commerce Department has since specified exceptions for working with Huawei on international standards setting, most recently doing so in June 2020.³⁰ The restructuring of RISC-V is one indication that political instability may have a disruptive effect independent of ultimate sanctions being imposed. As a geostrategic matter, having a rival such as Huawei participate in global standards-setting activities is actually a positive development in that it offers a window into competitors' technological capabilities. As a commercial matter, building such windows rather than walls requires trust and transparency regarding participants' IP assets.

3. IP asset reallocation and supply chain restructuring

IP assets can be reallocated and created to complement new technological innovations pushing supply chain restructuring.

In the wake of the Covid-19 pandemic, seeking a balance between operational efficiency and contingency preparedness is a new emphasis for supply chain managers. While such a balance directly involves logistical concerns like inventory and proximity to production, the anticipation and adoption of emerging technologies following the pandemic may also further alter the production and consumption processes for supply chain goods. A prime example is the prospect of 3D printing, which permits the rapid transfer of design data to a 3D printing site in any location by a design establishment, including (as previously discussed) the utilization of tariff-mitigation strategies by relocating design work to the United States and consequently reducing the assessed value of the manufactured product when imported into the United States. As Hewlett-Packard writes in

In the wake of the Covid-19 pandemic, seeking a balance between operational efficiency and contingency preparedness is a new emphasis for supply chain managers.

a report on the subject, “Building incentives to accelerate the adoption of 3D printing, especially at the state and city level, will spur development of a complete 3D ecosystem that will attract manufacturing to their geographies, create robust new markets, and ensure leadership and prosperity in the 4th Industrial Revolution and beyond.”³¹

3D printing not only changes the geographic locations manufacturers are drawn to, it raises the possibility of reallocating IP resources and investments to reduce the risk of tariff or national security uncertainty. As with semiconductor fabless design, countries or economies that afford adequate IP protections can protect IP rights that are relocated to their jurisdictions and thereby help companies optimize their responses to changing trade realities, as well as utilize manufacturing capacity that is less subject to tariff or sanction risks. Taiwan’s semiconductor manufacturing sector has thrived on such a model of licensing-in overseas designs.

III. Prioritizing strategic diversification: A techno-globalist alternative

Global companies are still feeling simultaneously pushed toward and pulled away from China.

Though political narratives around techno-nationalist forces promote a binary choice of decoupling or engagement, factors currently in play enable more nuanced approaches. Global companies are still feeling simultaneously pushed toward and pulled away from China. These dual forces suggest both the possibility and desirability of strategic diversification rather than a focus on reshoring in an absolute sense. In line with the practical considerations outlined in the previous section, strategically diversifying assets can be “techno-globalist” by incorporating considerations of trade resiliency, the availability of emerging technologies, export control risk reduction, and other factors like the availability of adequate IP protections in multiple markets. More specifically, a techno-globalist approach accounts for the following issues:

1. State policy and competition

State policy may simultaneously intensify competitive opportunities both inside and outside of China.

Although the US government may seek to encourage reshoring, China’s commitment to its supply chains signals a possibility that multinational manufacturing resources will not be diverted but recreated in parallel as secondary supply chains with continued manufacturing capacity in China. One recent example of this commitment occurred when the Chinese Communist Party Central Committee’s Bureau of Politics on 17 April, 2020, announced “Six Guarantees” in response to the Covid pandemic, including residents’ employment, the people’s basic livelihood, principal components of the market, food and energy resource security, the stability of production/supply chains and base-level operations.³²

By late May 2020, there were reportedly at least 10 bills proposed by governments around the world focused on the security of pharmaceutical supply chains.

Economies seeking to onshore or reshore supply chains are not limited to China and the United States. By late May 2020, there were reportedly at least ten bills proposed by government around the world focused on the security of pharmaceutical supply chains.³³ Japan has also earmarked US\$2.2 billion of its economic stimulus in response to the Covid 19 pandemic to help Japanese manufacturers move production out of China³⁴ and the South Korean government’s “Korean New Deal” in response to the pandemic includes tax breaks and support for companies who bring manufacturing operations back to Korea.³⁵ In the developing world, India has also undertaken several new measures to try to become the premier destination for electronics manufacturing in the next two to three years.³⁶ India is also partnering with the United States on internet security issues, including banning of certain Chinese apps, and an expected ban on Huawei and ZTE infrastructure in its 5G rollout, which may also help support additional investment in non-Chinese telecom and app development.³⁷

Other countries have also embraced important pro-trade and pro-IP policies. Vietnam and Mexico have both signed on to the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), the successor agreement to the Trans-Pacific Partnership, which also provides for more robust IP protection

policies. The US-Mexico-Canada Agreement (USMCA) similarly provides a level of economic and IP-related integration that can support current and emerging technologies as well supply chain integration.

2. Revisiting the China Plus One strategy

In its 2019 report on US company reshoring, the consultancy firm Kearny found that US\$31 billion in US imports shifted from China to other low-cost countries in Asia in 2019, with almost half being absorbed by Vietnam.³⁸ The report further indicates that the ratio of US imports of manufactured goods from low-cost Asian countries to US domestic gross output of manufactured goods increased between 2018 and 2019, the first such increase since 2011.³⁹

Businesses patterns may be pulled toward tweaking supply chains without abandoning China altogether.

At the same time that other markets are hanging out their welcome sign, the American Chamber of Commerce in China's 2020 Business Climate Survey (conducted at the end of 2019) found that only 9% of US businesses indicated that "Yes, [they] have started the process of relocating manufacturing or sourcing outside of China." In addition, 83% indicated that "No, [they] are not considering relocating manufacturing or sourcing outside of China."⁴⁰ A flash survey in February 2020 asked how the Covid-19 epidemic is impacting companies' long-term (three to five years) business strategy; only 4% of respondents indicated that they were "considering relocation of some or all manufacturing outside China" and only 3% indicated that they were "adjusting [their] supply chain by seeking to source components and/or assembly outside China."⁴¹ Similarly, the European Union Chamber of Commerce's 2020 Business Confidence Survey found that only 11% of respondents are "considering shifting current or planned investments in China to other markets."⁴² Notwithstanding these statements of commitment to China, a survey of 260 global supply chain leaders conducted by consulting firm Gartner Inc. in the same time period (February and March 2020) found that 33% of respondents "had moved sourcing and manufacturing activities out of China or plan to do so in the next two to three years."⁴³ Reconciling these diverse findings suggest that businesses patterns may be pulled toward tweaking supply chains without abandoning China altogether.

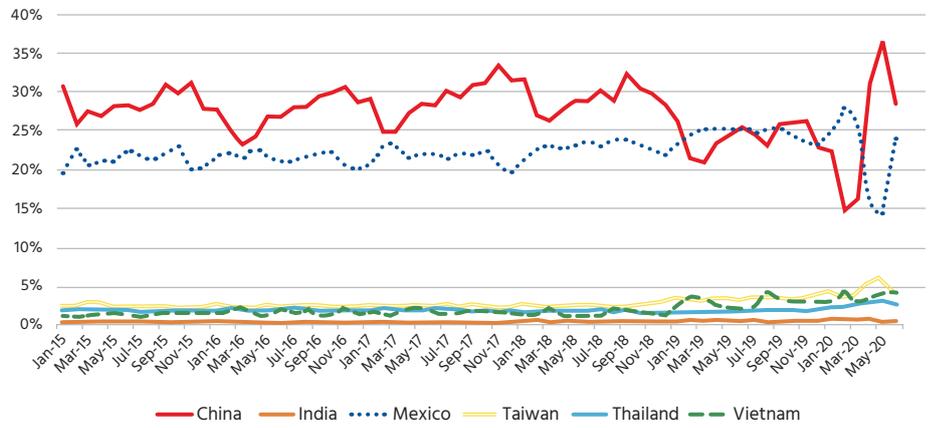
3. Scalability and the China advantage

Issues of scalability complicate efforts to divest from China entirely.

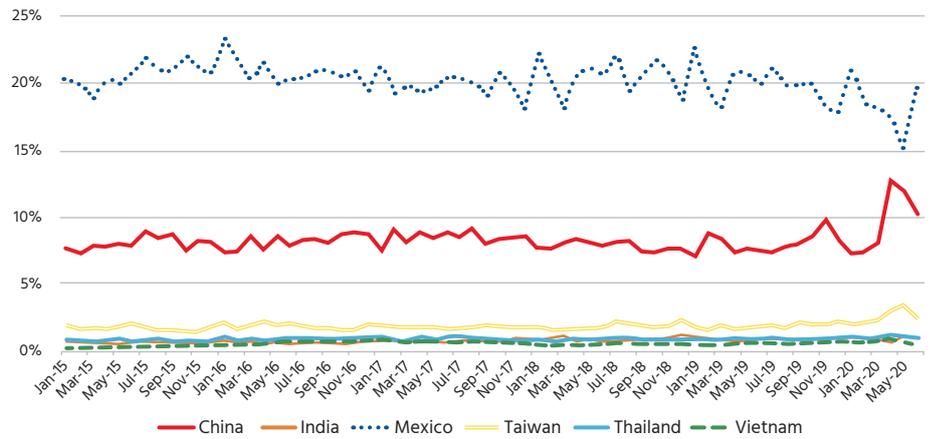
Due to its scale, contingency planning around China may be easier said than done. Figures 2 examines US imports and exports of goods associated with extended supply chains: office machines/ADP equipment, telecommunications, electrical machinery, motor vehicles, professional scientific equipment and photographic/optical equipment. These charts underscore the magnitude of Chinese trade relative to India and key emerging markets in Southeast Asia. They also reflect the relative size of China and Mexico as US trading partners but nevertheless point to the difficulty of decoupling from China completely. For the time being, at least, China's scale cannot be ignored.

Figure 2

Percent of total US imports in extended supply chain categories by trading partner over time (US customs determination of import source)



Percent of total US exports in extended supply chain categories by trading partner over time (US customs determination of export destination)



Source: US Census Bureau Trade Statistics (aggregation of SITC 75, 76, 77, 78, 87, and 88), <https://www.census.gov/foreign-trade/statistics/country/sitc/index.html>

IV. Techno-globalist recommendations for promoting a virtuous circle of competition

Strong patent rights will significantly encourage/expand manufacturing trade – particularly in IP-intensive goods.

While there is no one-size-fits-all approach for companies developing a techno-globalist strategy, the considerations described above suggest a range of pragmatic approaches to today’s current political climate in which IP considerations can play a key role. In the case of solutions to supply chain disruptions, a critical element that can help ensure greater resilience incorporates some of the very IP issues that caused those disruptions in the first place. Maskus observed in 2000 – just before China entered the WTO – that “weak patent rights are significant barriers to manufacturing trade, particularly in IPRs-sensitive goods” and that “a one-unit increase in the patent index of the average developing economy would raise the asset stock of US multinational affiliates by about 16%, or US\$1.9 billion.”⁴⁴ It is our proposition that the converse also applies: Strong patent rights will significantly encourage/expand manufacturing trade – particularly in IP-intensive goods – and can also serve to reduce concerns about alleged predatory Chinese IP practices. Rather than getting caught in a vicious cycle of techno-nationalist confrontation, it is possible for businesses to actually promote a virtuous circle of competition with a more robust focus on IP. We therefore recommend policymakers and supply chain managers focus on the areas discussed below and consider the actions summarized in Table 1.

Table 1 – Creating a virtuous circle of competition with a techno-global approach to IP

Area of focus	Action items for	
	Supply chain managers	Policy makers
1. Acknowledge the sophistication of China’s IP regime while continuing to push for enhanced protection	Take fuller advantage of the ease/affordability of filing design patents and other rights in China	Continue to point out problematic areas of mutual concern
2. Create more welcoming investment and trade regimes by applying lessons learned from the trade war	Distribute IP assets and design work to minimize dutiable value and substantially transform goods to a new country of origin	Seek out bilateral/plurilateral trade agreements with strong IP chapters; strengthen domestic patent examination processes
3. Direct trade agendas and assistance toward countries more interested in their IP regimes	Invest in a variety of markets that offer competitive advantages in IP protection	Pursue more partnership programs between larger patent/trademark offices in developed markets and smaller patent/trademark offices in emerging markets

1. The attractions of China's IP regime

The sophistication of China's IP regime should be acknowledged while still pushing for enhanced protection.

China's patent and trademark office, as well as its courts, are the most active in the world.

One may question why foreign companies, who had complained about lax IP protection in China, nonetheless significantly invested – and continue to invest – in China. One answer is that other factors, such as low production costs, size of the market, management talent, infrastructure, and taxation also play significant roles in those decisions. The relationship between IP and foreign direct investment (FDI) is even more complex in the context supply chain disruptions arising from the US-China trade war. But to the extent IP protection may be an important factor in these IP and supply chain intensive products, China also has a scale of operations that is unmatched in the developing world. Currently China's patent and trademark office, as well as its courts, are the most active in the world. China received 1,400,661 invention patents and 7,837,441 trademark applications in 2019. By comparison, in FY 2019, the United States (the second largest IP office) received 616,852 utility patent applications (comparable to Chinese invention patents) and 673,233 trademark applications. China's IP filings are also several multiples of any of the developing countries in its periphery. By comparison, India received 30,036 patent filings in 2018, Mexico received 2,695, Indonesia received 1451, Vietnam received 749, and the Philippines received 736.⁴⁵

Taken altogether, the aggregate of patent filings in many of the countries proposed as alternatives to China for supply chain manufacturing are far less than China.

Taken altogether, the aggregate of patent filings in many of the countries proposed as alternatives to China for supply chain manufacturing are far less than China. As the vast majority of Chinese patent filings are from China-based companies, the magnitude of the discrepancies may be reduced somewhat through focusing on foreign-related filings, or by focusing on patents for technologies of competitive concern. For example, companies like Qualcomm, Samsung, and many Chinese high-tech companies have been increasing their patent filings in markets such as India. However, due to their overall modest size, the soft infrastructure provided by IP rights to better safeguard investments in many emerging markets may not be sufficient to satisfy potential demand if supply chains are further disrupted in favor of those markets. While relocating IP assets to these other countries may be a necessary part of any tariff or political risk reduction strategy, it is also clear that, despite whatever advantages these economies may offer, they currently lack the sophistication and depth of the IP systems of China or the United States.

As trade relations proceed, it will be constructive to acknowledge this situation while at the same time pushing for continued improvements in China. Being able to manage both realities may be necessary for sustainable supply chain manufacturing.

2. Lessons for emerging economies

Emerging markets should seize the opportunity to create more welcoming investment and trade regimes by applying the lessons learned from the trade war as well as best practices from other economies.

Companies may be seeking to relocate because of difficulties in protecting their IP rights or IP theft, due to instability in tariff or export control treatment, in response to political pressure, or due to other reasons. As noted by Bentley:

“From the Southeast Asian perspective, there is a clear recognition that strong and enforceable IP rights play an important role in encouraging transfer of technology, stimulating innovation and creativity, and influencing the implementation of trade policies that will create more competitive domestic markets for foreign companies.”⁴⁶

Many countries are currently in the process of improving their IP regimes.

As has been demonstrated with respect to India, there is also the possibility of initiating a virtuous cycle through expansion of global supply chains, especially to scalable and welcoming markets. Many countries are currently in the process of improving their IP regimes, including through accession to bilateral trade agreements (such as the EU-Vietnam FTA) or plurilateral trade agreements with the West which include strong IP chapters or through domestic reforms in their own patent systems. India’s patent office, for example, has shown notable improvements in recent years in examining patents and in its civil IP regime, including joining a “patent prosecution highway” for accelerated review of patents in cooperation with Japan in 2018. The US Chamber of Commerce noted in its International IP Index (2020) that India had “passed a series of reforms and precedential court rules that strengthen IP enforcement, address administrative inefficiencies and increase penalties for IP infringement.” Nonetheless, this same report notes, there are significant “barriers to licensing and technology transfer, including strict registration requirements.”

To the extent India wishes to assume an increased leadership role in supply chains, it will need to compete even harder. Vietnam by comparison also saw the highest increase of any Asian economy by the US Chamber in its International IP Index. Among middle income economies, Taiwan also showed a significant improvement, while Malaysia and Mexico both showed modest increases and all had more highly rated IP systems than China.⁴⁷ Considering Mexico’s out-sized role in extended supply chains, the data suggests that improvement in its modest IP regime could be especially helpful in attracting more high-tech investment to that country.

3. Lessons for developed economies

Developed economies should direct their trade agendas toward those countries that better protect investments in technology.

Companies that are looking to relocate some or all of their supply chain may choose to relocate back to the United States if economic circumstances are favorable. They can also choose to adopt a techno-globalist approach. Investing to some extent in other Asian markets that offer sufficient competitive advantages would interject a healthy dose of competitive pressure on China with regards to IP

and supply chain product manufacturing. It would likewise amplify the focus that many of these economies now have on participating in those supply chains and supporting increased IP protection and enforcement. Emerging economies that have often existed in China's shadow now have a prime opportunity to support the manufacture of IP-intensive products that are made over these extended supply chains, as well as to engage more productively in the technologies and products of the future. Developed economies, which are themselves both an originator of and market for such products, can accelerate and deepen that process through new trade agreements, cooperation on IP-related matters, development of better analytical tools, and even the posting of government IP officials to those economies to work with home country companies investing in the region.

Although tensions in the global trading environment are disrupting global supply chains and presenting both firms and governments with a supposedly binary techno-nationalist choice, the techno-globalist approach that we have outlined here offers a compelling alternative. Viewed from an IP perspective, this approach creates opportunities for firms to diversify supply chains and build resilience. There are equally important opportunities for government leadership in developing the hard and soft infrastructure to support diversification and resilience in those investments.

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Endnotes

- ¹ We date the beginning of the trade war with the August 24, 2017 initiation by the United States Trade Representative of its investigation into “China’s Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation” 82 Fed. Reg 40213 (Available at <https://www.federalregister.gov/documents/2017/08/24/2017-17931/initiation-of-section-301-investigation-hearing-and-request-for-public-comments-chinas-acts-policies>). The investigation did not materialize into IPR-related trade sanctions until after its completion. The Section 301 Report itself was published on March 22, 2018 (<https://ustr.gov/sites/default/files/enforcement/301Investigations/301%20Report%20Update.pdf>), and a proposed list of imported products to be sanctioned by the US was published by USTR on April 3, 2018 (<https://ustr.gov/about-us/policy-offices/press-office/press-releases/2018/april/under-section-301-action-ustr>). See also White House Office of Manufacturing and Trade Policy, “How China’s Economic Aggression Threatens the Technologies and Intellectual Property of the United States and the World” (June 2018), (<https://www.whitehouse.gov/wp-content/uploads/2018/06/FINAL-China-Technology-Report-6.18.18-PDF.pdf>). For a contrary perspective on loss calculations see Mark A. Cohen, “The 600 Billion Dollar China IP Echo Chamber” (May 12, 2018), <https://chinaipr.com/2019/05/12/the-600-billion-dollar-china-ip-echo-chamber/>.
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- ⁷ As starting point, we used the five-digit Standard International Trade Codes (SITC) beginning with 75 (office machines/ADP equipment), 76 (telecommunications), 77 (electrical machinery), 78 (motor vehicles), 87 (professional scientific equipment), and 88 (photographic/optical equipment). The USPTO, EUIPO, and CNBS all use different industrial classification codes, and there is inevitably a degree of information lost in translation when determining the correspondence between SITC codes and industrial categories. To minimize the amount of translation to the greatest possible extent, we converted the NACE codes reported by the EUIPO to their corresponding International Standard Industrial Classification (ISIC) code using the EU’s concordance table between NACE Revision 2 and ISIC Revision 4 (available at https://ec.europa.eu/eurostat/ramon/relations/index.cfm?TargetUri=LST_LINK&StrNomRelCode=NACE%20REV.%202%20-%20ISIC%20REV.%204&StrLanguageCode=EN). We likewise converted the Chinese National Economic

- Industrial Codes used by the CNBS to the corresponding ISIC codes using Appendix C of the PRC's National Standards Document, GB/T 4754-2017 (available in Chinese at <http://www.stats.gov.cn/tjsj/tjbz/201709/P020180124537249410457.pdf>). We are confident in this decision, as both the NACE and Chinese Industrial Category codes are based on the ISIC system. To find the correspondence between the five-digit SITC codes, we used the Product Concordance software developed by Steven Liao, In Song Kim, Saymi Miyano, and Hao Zhang, which allows the conversion of SITC codes to NAICS and ISIC codes (see <https://CRAN.R-project.org/package=concordance> and <https://rdr.io/github/insongkim/concordance/f/README.md>).
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- ¹⁷ See Headquarters Ruling Letter (HQ) 558868, dated February 23, 1995 (programming of SecureID Card substantially transforms the card); HQ 735027, dated September 7, 1993 (programming blank media [EEPROM] with instructions that allow it to perform certain functions that prevent piracy of software constitutes substantial transformation). These examples are drawn from the Tuttle Law Newsletter, "Substantially Transformed or Not, That Is the Question: Understanding U.S. Origin Rules in Uncertain Times" (October 18, 2018), https://www.tuttlelaw.com/newsletters/2018/10-18-18_country_of_origin.html
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