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**Hearing on
“Censorship as a Non-Tariff Barrier to Trade”**

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Good afternoon Senator Grassley, Senator Cornyn, and members of the Committee; thank you for inviting me to testify. I am Nigel Cory, Associate Director, Trade Policy with the Information Technology and Innovation Foundation (ITIF). ITIF is the world's top-ranked think tank for science and technology policy. We advocate for policies that accelerate innovation and boost productivity in order to spur growth, opportunity, and progress. As part of that mission, my area of focus encompasses barriers to digital and high-tech trade with China and other countries around the world.

OVERVIEW: CENSORSHIP AS A NON-TARIFF BARRIER TO TRADE

The U.S. lead in the digital economy is under threat as a growing number of countries enact overly restrictive and discriminatory laws and regulations around digital content they identify as illegal in ways that becomes barriers to trade. Explicit content review processes are the most visible aspect, but it also includes content distribution, Internet, and connectivity services as these play a crucial role in managing and controlling information, especially online. China is by far the worst offender. U.S. firms have lost significant revenue by being blocked or inhibited from accessing and operating in the Chinese market. The impact has been especially damaging given that for many companies' their market access has been denied during a critical, formative period of economic growth in China. This has not only reduced U.S. company global market share but provided Chinese competitors with a protected market from which to launch competitive challenges in other regions, such as South America, the rest of Asia, and Africa. Alongside China's other protectionist measures, this also means that a generation of Chinese consumers have grown up without knowing that their Internet and consumer experience is completely different than what is available in most other countries. They have little or no idea about Google, Twitter, Facebook, or other U.S. firms and their products, even as Chinese government officials and party "apparatchiks" use these platforms to spread propaganda in the United States.¹

The economic impact is not trivial. A host of U.S. industries and firms, in sectors ranging from Internet services to cloud computing, video games, and movies, have likely lost hundreds of billions of dollars in revenues due to Chinese censorship and related market restrictions. Importantly, these revenues would have supported innovation and job creation in the United States, while limiting Chinese firms' ability to grow and capture global market share. While it is not possible to calculate an exact figure, ITIF conservatively estimates (based on market-share comparisons) that Google, which withdrew from the Chinese market in 2010, subsequently lost \$32.5 billion in search revenue from 2013 to 2019, while Amazon and Microsoft's cloud services (IaaS, which is restricted in China) lost a combined \$1.6 billion over the two-year period from 2017 to 2018. As the China market continues to rapidly grow, these losses will also grow significantly. And it is important to remember that this was all during a time when China was already running significant trade surpluses with the United States.

U.S. firms and their increasingly digital goods and services are susceptible to non-tariff barriers in the form of both at-the-border and behind-the-border laws and regulations. The Great Firewall of China represents a rare case where U.S. digital exports face a barrier at the border. Meanwhile, behind this clear market access barrier, U.S. firms face a complicated, opaque, and changing regulatory framework tied to content moderation and

information control that together makes for a very difficult and different business environment. Moreover, in many cases, China's approach to censorship is unwritten, with enforcement often being arbitrary and delegated to private firms. This is in large part a conscious decision to avoid WTO sanctions which would be much easier to put in place if the rules are on paper. Ever changing political sensitivities in China make it even more challenging to figure out what is expected of foreign firms. As we recently saw when China blocked NBA games, the Chinese Communist Party (CCP) is also increasingly assertive in punishing foreign firms for actions or speech that occurs outside of China. Censorship is obviously a major factor in China's decision to prohibit foreign firms from operating in key sectors (for example, by not giving them licenses or allowing foreign equity stakes in local firms) and through onerous, unpredictable, and discriminatory content-review processes, such as for video games and movies. Taken together, China's approach to censorship is clearly restrictive and discriminatory towards foreign firms and their goods and services.

Because China (and other countries) rely on a range of legitimate public policy goals to provide a justification for their approach to censorship—such as public safety, morals, cybersecurity and national security—the United States and other governments have been reluctant to challenge Chinese practices. Trade-related concerns over censorship are also just one of many issues in the U.S.-China trade relationship. While the primary motivation for censorship may be political, by making life hard or simply keeping U.S. firms out of China, the government gets the added benefit of supporting China's innovation mercantilism strategy by protecting local firms from foreign competition. Over time, this has greatly re-shaped trade and market dynamics in China to the detriment of U.S. firms and the U.S. economy.

Whatever the stated motivation for its approach to censorship, China sees it as essential to achieving the most important goal of all—regime stability. But the implications go far from China's domestic politics. Chinese President Xi Jinping has outlined his vision for “cyber sovereignty,” a concept in which each country is free to set its own rules and exercise absolute control of the Internet within its own borders.² Thus far, the United States and other countries that support an open and rules-based global digital economy have failed to respond to the situation in China where it has enacted a censorship system that acts (whether intentionally or inadvertently) as a non-tariff barrier to trade (as in China). Other countries view the “China model” of digital development as a success and one they want to replicate, in part, because it has used censorship for political and economic ends. At the multilateral level, the trade rules of the global economy (as under various World Trade Organization (WTO) agreements) allow countries to enact restrictions based on a range of broad exceptions for public morals, public order, privacy, and national security. But when those are used as disguised barriers to trade, as is clearly the case in China, then trade rules at the WTO and elsewhere should provide a clear path for countries to challenge the misuse of these exceptions.

Some U.S. policymakers exacerbate the impact of Chinese censorship and mercantilism by calling for U.S. firms to leave or stay out of China by saying that it's immoral to do business there.³ In many companies' case, they rightly say that the U.S. companies would have to comply with Chinese censorship rules. But while telling companies like Google to stay out China might allow advocates to assert moral authority, it would have no actual beneficial effect on free speech and human rights: China's Internet users would still face a

censored Internet. Yet it would give companies like Baidu (the main Chinese search engine company) the vast Chinese market, and they would use those revenues to continue innovating and expanding into markets all around the world, ultimately taking market share and jobs from American technology companies.

There should be no doubt that it is in America's long-term economic and security interests that U.S. companies sell as many goods and services to China as possible. Every dollar's worth of digital and physical exports from the United States to China is a dollar that Chinese firms do not make—and it is a dollar American firms can use to reinvest in R&D and support employment in the United States. We should be encouraging, rather than berating, U.S. firms to engage in the Chinese market (not including, obviously, selling directly to the Chinese military) for we are locked in a critical competition for global technology leadership with them. Walking away from the China market only gives China a leg up in that competition. It is time that our policy vis-à-vis U.S. information services and digital content exports to China be based on national interest, not national moralizing.

None of this means that the U.S. government shouldn't continue supporting human rights, free speech, and democracy around the world—it most clearly should. Congressional representatives, U.S. government agencies, and successive U.S. administrations have dedicated funds and attention to how censorship affects these issues over the last decade. Whether this is the State Department's global Internet freedom programs, U.S. government advocacy on Internet governance at the International Telecommunications Union, or U.S. government membership of the Freedom Online Coalition of likeminded countries, all these ensure that U.S. values are being promoted.⁴ The point here is that the onus should be on the U.S. government to keep leading the case to promote U.S. values around the world.

This testimony provides a detailed analysis of censorship in China, including how it uses the Great Firewall and other censorship-related restrictions to prohibit market access and trade. I will explain how this censorship is a significant and growing non-tariff barrier to U.S. trade, how it has negatively affected a number of leading U.S. firms and sectors, and by extension how it impacts U.S. jobs and the U.S. economy. I will then provide a conservative estimate as to the large and growing impact censorship has had on search (Google) and cloud (Amazon), and the limited utility of trade law to challenge Chinese censorship. It then provides recommendations for U.S. policymakers to pressure China to revise its approach to censorship, even if it doesn't cease the practice, so that it doesn't act as a model of digital protectionism that other countries try and replicate, and so that it provides meaningful market access to U.S. firms.

CHINA'S USE OF CENSORSHIP: BROAD, COMPLICATED, AND OPAQUE

China's Communist Party has centralized, strengthened, and expanded the censorship mechanisms it uses in an attempt to protect itself at home and abroad.⁵ In recent years, this has been driven by a broader political crackdown under Chinese President Xi Jinping. It is one part of President Xi goal for China to become a "cyber superpower," which includes being free and independent from foreign technology (which has obvious trade implications) and objectionable content that may threaten his and the CPP's control of China. But the implications extend internationally—China wants to (re)write the rules for global cyber governance.⁶ China's model is at odds with those of many other countries that recognize the value provided by an open, innovative,

and global digital economy.⁷ In essence, China is pushing an alternative to the current mostly open Internet.⁸ While there are most definitely economic and commercial considerations, ultimately – China’s Internet management system is about control and the goal of maintaining order. However, the focus of this testimony will be on the trade and economic impact on U.S. firms and the U.S. economy.

Censorship in China is a broad, complicated, and opaque system involving a range of actors, laws and regulations, and social, economic, and political interests. At the individual level, these come together and result in considerable self-censorship given people realize the potential negative consequences of crossing the many unclear lines on what may or may not be allowed. In this way, China’s pursuit for censorship has resulted in significant societal changes.

As to the formal structure of censorship, the State Internet Information Office (established in 2011) is reportedly responsible for Internet censorship.⁹ However, censorship is a much broader endeavor. The United States Trade Representative (USTR) states that Chinese government officials from as many as 12 separate agencies are involved in monitoring and filtering Internet traffic that enters China, focusing primarily on the content that they deem objectionable on political, social, religious or other grounds.¹⁰

While it is only one part of China’s broader censorship machine, the Great Firewall is central. Typically, China says that a firm has used “illegal content”—a catch-all explanation for censorship. Attempts to access a blocked site from China typically results in a connection error as the Chinese nameservers—address books that match up website names to their digital locations—is unable to correctly retrieve the IP address of the requested website. This form of nameserver corruption has been often used by the Chinese government to block platforms.¹¹ There are reportedly over 10,000 websites blocked in China.¹² In the first half of 2018 alone, China’s regulator the Cyber Administration of China (CAC) said it had shut down or revoked the licenses of more than 3,000 websites.¹³

While state agencies obviously play a key role, Chinese private firms play a crucial role. Government agencies rely on the state control of the main telecommunication companies (China Telecom, China Unicom and China Mobile) to enforce blocks and other censorship and information control measures. Another crucial group of firms are the members of China’s Cross-border Data Telecommunications Industry Alliance, which sets out common self-discipline measures for firms involved in managing cross-border data traffic.¹⁴ However, the implementation of censorship is decentralized to a much broader range of private firms who act as crucial intermediaries.

Tech firms, especially China’s “big three” Internet firms Baidu, Alibaba, and Tencent, are critical intermediaries in enacting censorship in China. These firms do so, in part, as they have to manage content as part of their license to operate.¹⁵ China’s new counter-terrorism law also requires companies to monitor user behavior to ensure public safety.¹⁶ Another law on “mobile internet application programs” requires app providers to monitor online content and keep records of user violations and report them to the relevant government authorities.¹⁷ In many areas, this role is strictly limited to Chinese firms as China prohibits foreign investment in “Internet publishing” (providing the public with publications through the Internet).¹⁸

Chinese laws also prohibit people and firms from developing or hosting tools that could be used to circumvent its data and content control measures.¹⁹

Chinese tech firms often have thousands of content moderators to remove censored content. These moderators look for code words or slang that people use to try and get around censorships as well as memes that deal with subjects that the government doesn't want people to access.²⁰ There are also censorship "factories" in China that fulfil these duties for firms. For example, one such firm is Beyondsoft, which has a service (called Rainbow Shield) that has compiled over 100,000 basic sensitive words and over three million derivative words, with about one-third related to political content, followed by words related to pornography, prostitution, gambling, and knives.²¹

China's censorship system, and the criteria it uses, are opaque and unpredictable, which together create considerable market and policy uncertainty. China's regulatory authorities frequently take actions that appear to be arbitrary, rarely issue lists of banned search terms or banned sites, and provide little or no justification or means of appeal when they block access to all or part of a website. Furthermore, while non-state actors often take explicit guidance from government authorities, they also take an educated guess to block services and material that they think the government would consider offensive or sensitive. China's online crackdowns are often cyclical, especially in the lead-up to key CCP meetings. The unclear and imperfect application of censorship means that firms and content moderators face the challenge of adapting to Chinese users reverting to slang words and memes when communicating on Chinese social media apps like Weibo, QQ, and WeChat. In many ways, the opaque, evolving, and decentralized nature of censorship is one of the factors that makes it easier for China to avoid a legal challenge at the WTO as many parts of its censorship model is through informal administrative guidance or unguided intermediary action.²²

Censorship in China is a Significant and Growing Non-Tariff Barrier to U.S. Trade

China's use of censorship affects both market entry and operations in China and the provision of digital services and products from overseas. This section outlines how China's use of censorship acts as a significant barrier to trade for many U.S. firms and their goods and services, while also showing how a smaller subset of U.S. tech firms have successfully managed to enter and compete.

In analyzing the trade and economic impact of censorship in China it's important to note that even if China was fully open to U.S. firms and their goods and services that they would not necessarily be able to gain the market share they have in the United States and elsewhere around the world. Chinese firms are robust competitors. But U.S. firms may be better than local firms in some areas, in part, as they're able to draw on their experience and technologies developed and used elsewhere around the world that Chinese firms have not yet developed. But the point is that U.S. firms should have market access and clear, predictable, and consistent rules around illegal material so that they could at least compete on level terms in China.

Drawn by the world's largest smartphone market and an increasingly wealthy population deeply intrigued by new technologies, just about every American tech company has taken a shot at China. But outside of LinkedIn, Airbnb, Apple, and a group of older companies like IBM, Microsoft, and Intel, few have a major

presence in the country today.²³ While U.S. firms may not hold the same market shares as they do in the United States and other foreign markets, it's not hard to expect that a greater number and range of U.S. firms would have some, probably sizable, market share in China if there was better market access.

However, success is far from assured. It's also getting more challenging to achieve, in part, as President Xi and CPP have become even more sensitive to content and action that they deem offensive or illegal. Foreign firms understand that doing business in China is contingent on the firm doing its best to not offend the CCP, both in words and deeds in China and elsewhere around the world. The economic and trade tradeoff with censorship is increasingly clear with an assertive CCP: entering China means you get access to a huge and dynamic market, but the government gets to hold you accountable for offending it. When there are few or no legal limits (whether domestic or trade law-related) to the Chinese government's reaction, then foreign firms are obviously at a major disadvantage.

Censorship in China is much broader than website blocking. It no doubt plays a role in China's decision to prohibit wholly or partially owned foreign firms from key sectors. For example, China uses licenses to strictly control who can offer value-added telecommunication services, such as voice-over-internet protocol calls, online database storing and searching, electronic data exchange, online data processing and transactions processing, domestic multiparty communication services, virtual private network (VPN) services, and video conferencing and who can interconnect these services with public telecommunication networks.²⁴ Similarly, foreign ownership in basic telecommunication services (fixed line, mobile and broadband) is capped at 49 percent.²⁵

As it relates to blocking, most of the foreign online services, apps or intermediaries that China blocks are rarely revised and lifted (as the list above shows). Firms that have their web services temporarily blocked typically find that this is simply a prelude to a total and permanent block. The impact of being blocked is cumulative in its trade impact as for many services that are already blocked, if they add innovative new services and products, the block is automatically extended. For example, China's initial blocking of foreign search engines has expanded to encompass many email, cloud storage, and other services. This shows that even if there was a specific politically or socially offensive article to prompt a block, the extension of this block to new services makes it much more impactful from a trade and economic perspective.

The status of a range of key U.S. and foreign firms and services blocked or throttled in China.

- Amazon
 - Twitch (a live video streaming service) has been blocked since September 2018.²⁶
 - Local marketplace Amazon.cn shut down in 2019, due to a small market share (not due to being blocked). Amazon focuses on "cross-border commerce."²⁷ China is among the small number of countries where Amazon Prime Video is not available.²⁸

- Box.com
 - There appears to be a soft block on Box's cloud and sync services. Users who have Box pre-installed (e.g., travelers) can generally use the service, or through a China-specific link. Box appears to work best for those who are visiting rather than long-term residents.²⁹
- Dropbox
 - First blocked in May 2010.³⁰ Temporarily restored in February 2014, but then blocked again in June 2014.³¹
- Facebook (further details below).
 - Main Facebook website was blocked in 2009. Instagram was blocked in September 2014. WhatsApp was blocked in September 2017.³²
 - Operates an online advertising unit for Chinese customers to target foreign markets. In 2018, China was the second-largest source of foreign revenue for ad spend on Facebook.³³
- Google (further details below).
 - Temporarily blocked in 2002, but was later re-opened. However, Google decided to withdraw its search engine from China in 2010 and direct all traffic to google.com.hk (which is blocked in China).³⁴ Google also operates an online advertising unit in China.
 - YouTube was blocked on-and-off in the late 2000s before being permanently blocked in March 2009.
 - Also blocked: Gmail, Google Drive, Google Docs, Google Play, Google Translate, Google Calendar, Google Picasa, Google Groups, Google Keep, Google Voice, Google Wallet, Google Earth, Google Earth, Google Chrome homepage, Google Code, Google Blogspot, and Google Feedburner.³⁵
- Microsoft (further details below).
 - Microsoft OneDrive was blocked in 2014.³⁶ Bing was the last major U.S. search engine blocked in China in January 2019.³⁷
- News services
 - *The Washington Post*, *The Guardian*, *Bloomberg*, *The New York Times*, *Reuters*, *The Wall Street Journal*, *BBC Chinese*, *Chosun Chinese*, and *Google News* are all blocked in China.³⁸
- Other search engines:
 - DuckDuckGo, Baidu Japan, Baidu Brazil, Yahoo Hong Kong, and Yahoo Taiwan are all blocked in China.³⁹

- Pinterest
 - Blocked in 2017.⁴⁰
- Reddit
 - Blocked in August 2018.⁴¹
- Slack
 - Access has been inconsistent for years, despite not being completely blocked.⁴² China, along with a number of countries have recently blocked certain online services, including AWS, which hosts Slack, making it very difficult for such services to access those markets.⁴³
- Snapchat
 - Unclear when first blocked, but Snap has a small research office in China despite the block.⁴⁴
- Twitter
 - Blocked in June 2009.⁴⁵

The impact of China’s censorship and blocking of U.S. firms varies along a spectrum: from a minor, periodic constraint on service access to a severely degraded connection that essentially makes it unviable from an operational or commercial perspective to a complete block. China has gradually been ratcheting up the restrictions so that it is more often at the restrictive end of the spectrum. Frequent blocking and unlocking of websites (and VPNs) can make it hard for firms to have confidence they will have the communication services they need for day-to-day operations and international trade.⁴⁶ U.S. firms also report that pushing all traffic through the Great Firewall adds transmission delays that can significantly degrade the quality of the service, to the point where it’s commercially or operationally unacceptable (thus cutting off market access).⁴⁷ In a similar way, China has “throttled” access to foreign websites in order to make them so slow as to be unusable. Throttling is often a precursor to being blocked completely. For example, before Google got fully blocked, it was throttled for a long time, which had the effect of making it appear as if Google’s search engine was slow and buggy. Furthermore, in 2007, China temporarily re-directed all China-based requests for Google, Yahoo, and Microsoft to Baidu.⁴⁸

The case of Microsoft’s Bing is typical. When it was blocked in January 2019, Bing was the only major foreign search engine left in China. News reports quote anonymous sources that stated that China Unicom, one of China’s major state-owned telecoms companies, had received an order from the government to block Bing for “illegal content.”⁴⁹ Attempts to access cn.bing.com from China resulted in a (nameserver) connection error. As of December 2018, Bing held a 2 per cent market share in China (far behind Chinese industry leader Baidu, with 70 percent), but it enjoyed a niche market for English-language searches.⁵⁰

Google has been one of the major casualties of China’s approach to censorship and digital protectionism. It entered China in 2006 with a local search engine, under an arrangement with the government that required it

to purge search results on banned topics.⁵¹ In a first for Chinese users, Google placed a notice that content had been removed when users searched for it, but this apparently wasn't popular with regulators.⁵² From 2006 to 2010, Google China fought skirmishes with the Chinese government over content restrictions.⁵³ Google struggled to comply with ever-tightening censorship requirements and a far-reaching hacking attack (known as Operation Aurora) that targeted everything from Google's intellectual property to the Gmail accounts of Chinese human rights activists.⁵⁴ So, in 2010, Google shut down its search engine. China's state-controlled media quoted a State Council Information Office official saying that "Google has violated its written promise it made when entering the Chinese market by stopping filtering its search service and blaming China in insinuation for alleged hacker attacks."⁵⁵

At this time, Google trailed its main Chinese rival, Baidu.com, with 33 percent market share to Baidu's 63 percent.⁵⁶ China has since blocked the full suite of Google services (as listed above). In August 2018, media reports suggested that Google was working on a secret prototype of a new, censored Chinese search engine, called Project Dragonfly.⁵⁷ In mid-December 2018, Google suspended its development efforts, in part due to political opposition in the United States.⁵⁸ China has gone so far as to block Google Scholar, a benign search engine for academic literature that many researchers rely upon. Lack of access to this service clearly inhibits China's broader innovation goals.⁵⁹ Media reports stated that Google Scholar was on a priority list to be allowed back through the Great Firewall, but this hasn't happened.⁶⁰

Since 2010, Google has maintained only limited connections and entry points into China. It has an active business distributing online ads for desktop computers and mobile applications, and Chinese makers of smartphones use its Android mobile device software. Google has setup a research center that focuses on artificial intelligence (AI), but the focus will be on developing AI for global products.⁶¹ In 2018, Google's revenue in Greater China (which includes mainland China as well as Hong Kong, Macau, and Taiwan) grew more than 60 percent to more than \$3 billion.⁶² In 2018, Google indirectly accessed China via a \$550 million investment in prominent Chinese online retailer JD.com. As part of this, Google and JD.com formed a strategic partnership where the latter connects its supply chain and logistics expertise with the Google Shopping platform.⁶³ JD.com also setup a Google Express site in March, 2019.⁶⁴ Together, the partners aim to compete with Amazon and Alibaba, especially in fast-growing south east Asian markets.⁶⁵ However, the Google Shopping portal is blocked in China.

Facebook's main social network site was blocked in 2009, followed by Instagram in 2014, and Whatsapp in 2017. But this has not stopped Facebook from repeated attempts to access the market.⁶⁶ In 2016, Facebook started developing software tools for third parties to use to abide by censorship laws as it relates to stories and topics that may appear on the social network.⁶⁷ In 2017, Facebook developed a photo-sharing app called "Colorful Balloons" that was released through a separate local company (without carrying the firm's name).⁶⁸ In 2018, there were media reports that Facebook had gained approval to open a subsidiary in the Chinese province of Zhejiang, which Facebook said it would use for research. But then the registration disappeared and references to the subsidiary were partly censored in Chinese media. Media report state that the approval was rescinded after a disagreement between officials in Zhejiang and the Cyberspace Administration of China,

which was angry that it had not been consulted more closely.⁶⁹ This incident underscores how much of a challenge it is for Facebook—a global social network—to get into China in any meaningful way. It also highlights how U.S. firms seeking to enter the market must navigate multiple, often opaque rules and laws within a system in which cities, provinces, and national government agencies all vie for influence and can make key decisions.

Facebook is now limited in how it can operate in China. Facebook has setup an experience center through a Chinese advertising partner (Meet Social), where potential customers learn how to advertise on Facebook to access customers elsewhere around the world. In 2019, Meet Social reportedly expected \$1 billion to \$2 billion in ad sales on Facebook and Instagram.⁷⁰ In total, Facebook’s revenue from Chinese-based advertisers reached an estimated \$5 billion in 2018, or about 10 percent of its total sales.⁷¹

Apple has major operations in China. In the 2019 financial year, Apple made \$44bn of revenues in Greater China during, mostly from selling iPhones.⁷² However, to do so it had to agree to Chinese user data in the country and to remove offensive apps, such as news and VPN apps, from its app store. Apple removed 805 apps in China from 2018 to 2019.⁷³ Most recently, Apple removed the app game “Plague” following the coronavirus outbreak.⁷⁴

While standard iPhone services like iMessage work in China, many paid offerings that help Apple generate revenue from services related to its devices aren’t available in China. Only six month after launching in China, Apple closed the iTunes Store (Apple Books, Apple TV, Apple News, and iTunes Movies) in April of 2016.⁷⁵ While the Chinese government initially approved Apple’s introduction of the services, for whatever reason, this changed a few months later when the State Administration of Press, Publication, Radio, Film and Television demanded it be closed.⁷⁶ China’s blocking extends to newer services like Apple TV+ video streaming, the Apple Card, Apple Arcade, and the News+ subscription.⁷⁷ While China is a huge market for Apple and its smart devices, its ability to earn from associated services is severely constrained. This puts a sort of cap on its current and future profitability.⁷⁸

LinkedIn is among the few prominent foreign tech platforms that are legally allowed in China and that have been successful in the market. In 2014, LinkedIn agreed to censor content when it decided to enter China.⁷⁹ In 2019, LinkedIn’s transparency report shows that it received two requests for member data from China’s government (this contrasts with 663 for the United States in the same time period) and 17 requests for content removal (of which it took action on 14).⁸⁰ Part of LinkedIn’s success is that it formed a partnership with two influential Chinese venture capital investment funds to create a separate China operation, who were also able to build a good relationship and communication channel with the Chinese government.⁸¹ It also focused on the specific characteristics of the Chinese market. It hired local staff who, in part, created a stand-alone app to bring LinkedIn, a service built around email and computers, to China’s smartphone-dependent population.⁸² But even here, it has to adapt to the fact that Chinese users rely on messaging apps and not email, thereby pitching it against WeChat and other larger social networks. LinkedIn isn’t trying to compete against the “super apps” like WeChat, but to grow as a career development platform.⁸³ Despite all these challenges, it has found a market with tens of millions of users (reported at 47 million in 2019).⁸⁴ While its

success may be modest, it is indicative of what should be possible for other U.S. firms if given the chance to enter and compete in China.

While Airbnb (the home sharing site) is not directly involved in censorship related activities and content, it's indirect involvement and compliance and cooperation with local laws and government agencies has contributed to its success in China. It's among the few clear examples where a foreign technology firm can be successful when given the opportunity to compete on fair terms. For Airbnb, China is a critical source of both outbound customers (Chinese tourists travelling overseas) and local hosts for domestic and foreign tourists. As of October 2016, more than 3.5 million Chinese travelers used Airbnb listings around the world.⁸⁵ Airbnb faces stiff competition from Chinese rivals, such as Tujia.com and Xiaozhu.com, which also comply with the same requirements as Airbnb. Airbnb used these outbound Chinese tourists and its global network (which it's local competitors don't have) to build up its domestic operations in China. In 2018, Airbnb reported that 91 percent of total nights booked within China were booked by locals.⁸⁶ Airbnb has also introduced premium services and expanded into many second and third-tier cities.

Airbnb setup local operations to both abide by local laws and to ensure its services were tailored to the market. In 2016, Airbnb setup a new business entity to manage operations in China. It has moved to store its data in China and has cancelled bookings during politically sensitive events (such as China's National People's Congress).⁸⁷ In March 2018, Airbnb stated that it will comply send customer details to Chinese government authorities to abide by local regulations that require foreigners to register their accommodation with police (hotels have done this for a long time).⁸⁸ Listings and non-China operations are not affected by these requirements. In November 2019, Airbnb's China president Tao Peng highlighted that localizing its platform is the key to success in China. It has changed its local name (to Aibiyang in Chinese) and doubled its staff (to 500) in Beijing, in part, to build a customized version of its platform to better suit local preferences, such as the use of WeChat Pay and Alipay.⁸⁹ Airbnb wants to find a home in the notoriously difficult and cloistered market, and thus far, it has done a pretty good job of doing so.⁹⁰

Both Airbnb and LinkedIn (among other cases above) shows that foreign firms can successfully compete against Chinese competitors even when there are local requirements related to data and content that are significantly different to other major markets. They've found an equilibrium between the laws of their home market and Chinese laws, while still being successful. These experiences provide a blueprint, and perhaps a cautionary lesson, for other foreign tech firms wanting to enter China, but also to policymakers in recognizing what approach is most effective in regard to both trade and human rights.⁹¹

Case Study: Zoom and Censorship in China

Zoom—the video-chat service that operates in more than 80 countries—recently tripped two major landmines that demonstrate how U.S. companies need to establish clear boundaries between operations involving China and other markets given how censorship requests in the former can quickly spillover to the later. No doubt, Zoom has made mistakes, but it has admitted and addressed many of these in an effort to operate by local laws in China and elsewhere.⁹² It made these challenging adjustments while expanding from

10 million meetings a day in December 2019 to doing 200 million meetings a day in March 2020.⁹³ Its experience provides useful lessons for other U.S. firms and policymakers.

Zoom is headquartered in San Jose, California and is listed on the NASDAQ. It has over 2,500 employees, with about 1,400 in the United States, with the remainder overseas, including about 700 at subsidiaries in China (doing research and development work).⁹⁴ While not every mid-sized U.S. technology company uses China-based research and development, hundreds of multinational firms have R&D centers in China.⁹⁵ The main zoom website (zoom.us) and international app appear blocked in China, but there are reportedly several third-party services that allow access in China (e.g., zoom.cn, zoomvip.cn, zoomcloud.cn).⁹⁶ Zoom's local service and app (<https://zoom.com.cn>) has reportedly been (generally) reliable and popular for users in calls between China and the outside world, including in reaction to COVID-19.⁹⁷

In April 2020, Zoom encountered significant public scrutiny when the University of Toronto's Citizen Lab released a report that showed that Zoom meeting encryption keys were sent via China-based servers and that it used non-industry standard cryptographic techniques that may mean calls could be intercepted (which raised concerns about China's laws concerning encryption key disclosure).⁹⁸ Zoom's CEO responded, stating that the firm added sever capacity in China as part of its efforts to rapidly scale capacity in response to COVID-19-related demand, during which it failed to fully implement geo-fencing best practices.⁹⁹ As a result, certain non-China related meetings may have been routed through these servers in China, when they otherwise would not have. Zoom has removed these servers from the list of backup servers for users outside of China. It also enacted new safeguards and internal controls to prevent unauthorized access to data, including by staff, regardless of where data gets routed. Most recently, it updated its encryption protocols and that it will introduce end-to-end encryption for all calls (for both free and paid services, but it will be an optional feature as it limits some meeting functionality).¹⁰⁰ Zoom services generally store data in the United States, though it stores data locally where required or when customers choose to have their data stored outside of the U.S (in their geographic vicinity).¹⁰¹

Zoom encountered another major issue when it briefly blocked, and then restored, accounts of Chinese human rights activists (including Zhou Fengsuo) who wanted to use the platform to organize a public commemoration of the 1989 Tiananmen Square crackdown.¹⁰² Mr. Fengsuo is an American who lives in the United States. China asked Zoom to terminate four meetings scheduled to be hosted on Zoom and three accounts (one in Hong Kong and two in the United States) hosting the calls. Zoom cancelled the three meetings that involved participants from mainland China.¹⁰³ It reportedly did this mid-event. U.S.-based staff reviewed meeting metadata (such as IP addresses) to determine which meetings had China-based participants. Zoom terminated the meetings as (at that time) it did not have the ability to remove specific participants from a meeting or block participants from a certain country from joining a meeting. It states it did not provide any user information or meeting content to the Chinese government.¹⁰⁴

While reactive and incomplete, Zoom's response and approach is the right one in that it wants to manage operations so that they abide by laws in each jurisdiction. This approach is comparable to every other multinational firm in the world—just because a firm is foreign owned does not make it immune from local

laws, even if those laws are ones that most Americans would disagree with. The degree and type of segregation obviously depends on the nature of local laws, which in the case of Internet-related firms in China, is becoming significant. Firms are enacting administrative and technical firewalls between China and non-China operations. This is the case for U.S. and other foreign firms in China, but also Chinese firms that operate overseas. For example, Chinese tech firm Bytedance separates its two key services (Douyin inside of China and TikTok outside of China) to minimize cross-border interaction on either platform. It recently implemented restrictions on China-based employees from accessing the code bases for overseas products.¹⁰⁵ Zoom rightly committed to “not allow requests from the Chinese government to impact anyone outside of mainland China.”¹⁰⁶ It has developed technology to remove or block participants based on their country, which will allow the firm to take a much more granular action in response to requests from local authorities when they determine that certain activity on the platform is illegal in that country.

Zoom has also committed to release a transparency report that details information related to requests for data, records, or content.¹⁰⁷ As you’d expect, given the need to follow local laws, U.S. technology companies frequently turn over private information requested by home and foreign governments, including those in the United States. Businesses other than Zoom routinely submit to Chinese government censorship demands in China, though there have been few public, high-profile cases involving cross-border issues like this one (besides Yahoo in 2005).¹⁰⁸

The onus should be on the United States government and likeminded countries that value and advocate for human rights—not firms like Zoom—in China, whether by engagement, negotiation, or confrontation. As Zoom stated: “It is not in Zoom’s power to change the laws of governments opposed to free speech. However, Zoom is committed to modifying its processes to further protect its users from those who wish to stifle their communications.”¹⁰⁹ The time has long since passed, if it ever existed, where an individual U.S. firm could change Chinese government policy through such a public challenge or withdrawal.

For those policymakers and advocates that want Zoom to leave China or cut off services on moral grounds, they also need to recognize that there are clear negative tradeoffs: Zoom is currently a rare channel of relatively low-friction communication through the Great Firewall and the myriad barriers to in-person meetings. The company, and everyone else, should weigh the importance of that connectivity in deciding how to best deal with the underlying challenge that is China’s approach to human rights.¹¹⁰

Censorship’s Impact on Market Access for U.S. Content Creators

U.S. content creators face major market access and operational issues that are directly and indirectly related to censorship. The explicit censorship review process is just the tip of the iceberg in terms of market restrictions U.S. content creators face in China. Indicative of this, the International Intellectual Property Alliance reported that the ability of U.S. producers to compete in the Chinese marketplace for all audiovisual content was even more drastically curtailed during 2019, with licensing opportunities on all distribution platforms significantly hampered, through opaque regulations, obscure content review processes, and a “soft ban” on new or never released U.S. imports.¹¹¹ This has effectively prevented access by U.S. content creators and distributors to one of the largest consumer markets in the world.

The formal content review process that every movie and television show goes through in China is based on vague and non-transparent criteria, which are applied inconsistently, which together create an unpredictable and burdensome market access restriction.¹¹² Reviewers may require various changes, such as edits in the script, obfuscated translation, and title changes. Sometimes the censors simply don't respond, thus denying access. Furthermore, U.S. content creators have to submit full seasons of television shows (rather than as episodes are developed), which also delays distribution, instead of allowing advance registration and rolling approval for content as it's finalized. U.S. films are also often locked out from prime release dates.

The discriminatory and restrictive conditions that U.S. content creators face in China are similar to other sectors in that this review mechanism is combined with other restrictions that exclude them (but not domestic firms) from key services in the Chinese market. The State Administration of Press, Publication, Radio, Film and Television (SAPPRFT) and other Chinese regulatory authorities have taken actions to prevent the cross-border supply of online video services (no doubt, they'd inevitably cite some censorship-related rationale if pressed), which may implicate China's WTO commitments relating to video distribution.¹¹³ SAPPRFT also requires that video platforms all be state-owned, thus preventing foreign suppliers from qualifying for a license to distribute content. At the same time, several Chinese companies (including Alibaba) appear exempt from some requirements.¹¹⁴ Furthermore, China also doesn't allow foreign firms to hold a majority share in entities engaged in the production and publication of audiovisual content.

China uses explicit quotas to limit U.S. market access to their theatrical film sector. Since 1994, China has placed a quota (at that time it was 10) on the number of foreign films that can be shown in Chinese theatres. In 2002, the quota increased to 20. In 2009, the United States won a WTO trade dispute challenging China's restrictions on foreign films (that they only be imported through a few government-designated intermediaries) at the WTO.¹¹⁵ In 2012, the United States and China negotiated an increase in the quota from 20 to 34.¹¹⁶ The 2012 agreement also allows foreign movie makers to keep a bigger share of the box office takings, increasing from 13 percent to 25 percent. A rate that is significantly lower than in market-based economies. This quota mainly affects the major U.S. studios. A few dozen foreign independent films also get approved for release each year. Both sides agreed to re-negotiate the quota five years after this 2012 revision, but there hasn't been any further progress as the issue got rolled into the broader U.S.-China trade war.¹¹⁷ The formal quota comes on top of an unofficial policy of manipulating the market to ensure Chinese movies account for a 60 percent box office share.¹¹⁸ On top of all of this, studios have had problems getting paid for what they are allowed to distribute in China. For example, a Motion Pictures Association-requested audit of the Chinese box office in 2016 showed that Chinese cinemas underreported box office numbers by 9 percent, which given the revenue sharing arrangement, meant U.S. studios were underpaid by about \$40 million.¹¹⁹

The impact of China's censorship and market restrictions on U.S. movie exports has grown more costly over time. Before COVID-19 hit, China was on track to overtake the United States as the world's largest movie market in 2020.¹²⁰ While U.S. movie-ticket sales (pre-COVID) are relatively flat, China's have more than tripled since 2011.¹²¹ China has become an important market delivering profits that support Hollywood's blockbuster franchise offerings. Overseas box office revenue is what often turns somewhat new and ambitious

films (like *Interstellar* or *Life of Pi*) into blockbusters. The Hollywood releases that break out in China are generally the same ones that succeed globally.¹²² While China cannot be counted upon to bail out big-budget movies that bomb in the United States, U.S. content producers want to (at least) be able to count on potential revenue to justify the budgets that keeps the industry growing.

In a similar way, the State Administration of Press and Publication's (SAPP) opaque, unpredictable, and restrictive Chinese censorship has affected the approval and distribution of video games. In 2018, China stopped all game license reviews, which severely affected both domestic and foreign firms and game distributors (due to a restructuring of departments and new rules for video game oversight).¹²³ While the actual content being censored is often not political (such as intimacy, pornography, and violence), the criteria is often vague and unevenly enforced. For example, "anything that harms public ethics or China's culture and traditions" and "anything that violates China's constitution" are both prohibited in Chinese videogames. Once SAPP started reviewing game licenses again after a nine-month hiatus, it quickly approved nearly 1,000 games, which included 30 foreign games.¹²⁴

An anomaly in China's restrictive approach to video game censorship is Steam (owned by Valve, an American video game developer), which remains accessible (without a VPN) to Chinese users. With Steam, only community features like forums and adult games on the platform are blocked.¹²⁵ Indicative of the opportunity for foreign firms if they're able to abide by Chinese law and operate in these censored sectors, it's become incredibly valuable for Steam: it has an estimated 40 million Chinese players and hundreds of game developers. Indicative of how local Chinese developers can benefit from working with global platforms like Steam, many local games have been very successful.¹²⁶ In 2018, Valve announced that it was going to partner with a local firm and develop a China-specific Steam platform.¹²⁷

Having clear and predictable access to China's video game market is a huge issue as China overtook the United States as the world's largest video-game market in 2016.¹²⁸ As an industry, video games are now worth three times as much as movies globally.¹²⁹ However, China is a daunting market for foreign firms—93 percent of total spend on Apple's iOS mobile operating system in China is spent on Chinese games, which is more localized than any other country, including Japan or South Korea.¹³⁰ This shows that even without restrictions, U.S. firms would have their work cut out given local preferences, complex distribution systems, and how successful Chinese game developers and platforms have been, but they (again) should have the opportunity to compete on the same terms as local developers.

Case Study: GitHub: Where China's Censorship Found a Limit and Model for Moderation and Engagement

GitHub—the largest public code repository in the world that allows developers to collaborate on projects—presents an interesting case as to the potential limits of censorship given how it affects China's broader digital development goals. GitHub (owned by Microsoft) is a U.S.-based global company that provides hosting for software development. It's known as a critical repository for open source code, providing the vital digital infrastructure on which much of the multibillion-dollar software business depends. While Microsoft does not publish GitHub's financial information, if the number of developers is a guide, China is its second-most-important market after America, and one of the fastest growing.¹³¹

On January 21, 2013, GitHub was blocked in China due to DNS hijacking. The blocking of GitHub gained greater attention in the country after the former head of Google's China operations, Kai-Fu Lee, posted about it on Sina Weibo (China's version of Twitter), where it was re-tweeted over 80,000 times.¹³² He made the case that “blocking GitHub is unjustifiable, and will only derail the nation's programmers from the world, while bringing about a loss in competitiveness and insight.”¹³³ The block was lifted on January 23, 2013. However, access to GitHub from China can still be slow and unreliable. More recently, Chinese programmers have used GitHub to complain about working conditions in China's tech sector.¹³⁴ It also remains a popular platform for creating and sharing anti-censorship software tools within China.¹³⁵ However, in this case, China did not block Github. This placed Microsoft, which has extensive operations in China, in a potentially difficult situation given it has introduced a tailored version of Microsoft Office for Chinese government use. Microsoft also owns LinkedIn.¹³⁶ GitHub has already received notices from China's government to remove content. In 2019 it received five notices from China's Ministry of Public Security to take down content related to Falun Gong (a religious group).¹³⁷

Similar to other U.S. firms, GitHub is looking to open a subsidiary in China. In December 2019, media reports stated that GitHub was moving to setup an office in China.¹³⁸ In response to a question about China, GitHub CEO Nat Friedman reportedly said that ““on net,” the company's approach “is that we want to lean towards more access to GitHub for every developer, even in countries that aren't democratic, even in teams that are doing things that we might disagree with.”¹³⁹ While a GitHub subsidiary in China will make it easier for it to censor individual projects, such as Great Fire products, it would probably provide greater regulatory and market certainty for the firm.

China's Pursuit of Censorship and Information Control Restricts Business Connectivity to the Global Internet

China's censorship and information control efforts extend to restrictions over all forms of connectivity, including how U.S. firms use virtual private networks (VPNs) to allow intra-firm networks and operations and cross-border sales and service. In the last few years, China has tightened regulations and restrictions around these VPNs, which seriously affects the reliability and quality of connections to the global Internet for China-based U.S. firms and their staff.

China has a track record of targeting individuals (consumers) wanting to use VPNs (such as by shutting down Chinese VPN providers). As mentioned, China targets the development and distribution of these services, often via intermediaries such as app stores and cloud storage providers.¹⁴⁰ Interestingly, periodic clamp downs on VPNs (which are relaxed afterwards) show that Chinese authorities realize that there is some need for balance in how they restrict VPNs as they are used by government officials, academics, researchers, and others as a lifeline for must-have global services (such as allowing Chinese government officials to access and use Twitter or for researchers to access academic literature).

Restrictions on VPNs are also a barrier to the cross-border sale, development, service, and use of software. U.S. software firms are reportedly finding it increasingly difficult to license and sell software to users in China (or existing customers that want to use the same software when setting up in China, such as multinationals)

that rely on VPNs as these connections are increasingly poor and unreliable. Similarly, some U.S. venture capital firms and software developers are reportedly avoiding China-based investments or partners as poor connectivity with the global Internet makes it uncertain whether the firm would be able to scale globally even if their software product is valuable.

Many U.S. and foreign firms use VPNs for corporate purposes to connect locations and services inside of China with the rest of the world and to protect their communications from hacking and government surveillance.¹⁴¹ These firms typically use their own global VPN infrastructure to connect users and business units around the world (such as via Multiprotocol Label Switching (MPLS)). In 2018, China started managing and limiting the connections that U.S. firms use so that they maintain oversight of this connectivity. It enacted new regulations that forced firms to buy and use expensive licensed VPN services, which are from one of China's three state-owned telecommunication firms: China Telecom, China Unicom, and China Mobile.¹⁴² The Ministry of Industry and Information Technology said these restrictions are in accordance with goals and provisions set out by the government created Cross-border Data Telecommunications Industry Alliance.¹⁴³

These restrictions were especially disruptive to businesses that depended on their VPNs for access to cloud services and data security. They can also be more expensive and unreliable, while exposing communications to government surveillance. Indicative of this, the *Financial Times* reported that an American non-profit group and a British company told them that their company-built VPNs had been blocked, disrupting their ability to do business.¹⁴⁴ It also reported another representative from an American Fortune 500 company as saying that it had become increasingly difficult to access blocked websites from their Beijing office, which similarly uses a corporate VPN.¹⁴⁵

With these restrictions in place, U.S. firms have a few options to maintain connectivity with the rest of the Internet—each with their own disadvantages. Firms can use a managed IPSec VPN (one of two common VPN protocols) from one of the Chinese telecommunication firms. But this means that all outbound traffic is forced through the Great Firewall. This allows the provider to block restricted traffic (which of course is hardly ideal for firms) and causes connectivity performance issues (i.e., delays in websites loading).¹⁴⁶ Where firms setup private connections (such as private leased VPN lines), Chinese regulations state that “the basic telecom operators shall establish a centralized user archive and specify that the lines are leased for the purpose of internal office use only and shall not be used to connect data centers or service platforms at home or abroad for telecommunication services.”¹⁴⁷

Otherwise, a foreign firm may use an authorized MPLS circuit from within China to outside (such as to Hong Kong or Singapore) where it then connects into the firm's existing VPN network. However, this is very expensive, takes a long time to deliver, and is bandwidth-constrained. A typical Chinese MPLS circuit is somewhere south of 20 MB of bandwidth, and it could cost \$15,000 to \$20,000 for a single circuit.¹⁴⁸ Similarly, “where multinational companies lease international private lines to build their own office networks, qualified third parties (including enterprises with licenses for domestic IP-VPN services and fixed-network domestic data transmission services) may be entrusted to provide outsourcing services such as system

integration and maintenance and management.”¹⁴⁹ Some providers have recently developed a software defined wide-area network (WAN) that is supposedly compliant with China’s new regulation, which provides supposedly seamless and high-speed access between intra-China and international networks.¹⁵⁰ But these still provide the Chinese government with access and oversight over these data transfers.¹⁵¹

At the heart of these restrictions is the Chinese government’s drive to control content it deems illegal. It tries to create a very narrow and controlled lane for business-specific connections, while strictly prohibiting the potential use of these connections for broader dissemination to the public. Beyond the examples above, this approach extends to those few, limited, and restricted U.S. cloud providers in China. China restricts and manages how cloud service operators connect their China-based cloud service platform servers with the overseas network, which must be done through the international Internet service portal approved by the Ministry of Industry and Information Technology (MIIT), rather than private lines, VPNs or other channels.¹⁵² No matter the connection, the Chinese government wants to have visibility of the network and the data.

These restrictions give Chinese authorities the capability to oversee and control flows of commercial information and data, but it does not mean that they’re necessarily examining company traffic (if there’s no specific reason for China’s government to be focusing on a firm’s communications). Obviously, firms with sensitive intellectual property may have legitimate fears about how these rules raise the risk of inadvertent disclosures given China’s aggressive and comprehensive cyber theft of trade secrets. There are other ways and tools for U.S. firms to mitigate this risk, such as encryption. However, the U.S. government and firms should be concerned as China’s restrictions over commercial connectivity services that are needed for day-to-day trade and business operations are unique, complicated, and act as yet another regulatory hurdle for U.S. firms to clear in seeking to simply enter and operate in China.

THE COST OF CHINESE CENSORSHIP TO U.S. SEARCH AND CLOUD SERVICES

U.S. firms have lost significant revenue by being blocked or inhibited in accessing the Chinese market, especially during such a transformative stage of growth in China’s economy. In 2019, China had nearly 800 million Internet users (an increase of 25 million from 2018). The average download speed of mobile broadband has increased six times in the last five years.¹⁵³ The OECD’s (narrow) definition of the digital economy estimates it represents 6 percent of GDP in China as compared to 8 to 10 percent in South Korea and Japan.¹⁵⁴

While China’s overall digitalization still lags advanced economies, China has emerged as a global leader in key new digital industries. In e-commerce China accounts for over 40 percent of global transactions, and the penetration of e-commerce (in percent of total retail sales) stands now at 15 percent, compared to 10 percent in the United States. On fintech, Chinese companies account for more than 70 percent of the total global valuations. The value of China’s consumption-related mobile payments by individuals totaled US\$790 billion in 2016, 11 times that of the United States. On cloud computing, Alibaba cloud computing has set up 14 data centers globally, with overseas cloud computing revenues growing at 400 percent.¹⁵⁵

There have been few attempts to quantify the trade impact of China’s censorship in part because any estimate is fraught with difficulties and assumptions. For example, China’s digital ecosystem—with key “super apps” providing a single portal for a range of integrated services—has evolved in a way that is very different to the United States. This evolution has largely taken place since Google and other major U.S. firms were blocked, so it’s impossible to know how market share would be divided if Google were able to remain. In many regards, China is one of the most competitive places for consumer services and technology. So the factors that affect a U.S. firm’s market share are beyond the impact that censorship has on U.S. firms’ market access and operations.

To develop an estimate of the economic impact of China’s censorship on U.S. firms, ITIF chose South Korea as a comparator market for U.S. search firms (Google), while the Asia Pacific region was used for estimating revenues and market share for cloud service providers (Amazon and Microsoft. See the appendix for data). South Korea was chosen as its digital economy has evolved in a way that is somewhat similar to China, while obviously being substantially different to that of the United States. Like other Asia Pacific countries, users in Korea access the Internet primarily through their mobile phones (mobile first culture). This meant that app and service developers had to find a way to provide a variety of services in the simplest way possible, which led to the development of “super apps.” While super apps exist in the United States, the single aggregation of features never took center stage the same way as in China and Asia, such as with WeChat.¹⁵⁶

In search, South Korea’s local search service Naver had 77 percent market share in 2007, while Google had only 1.7 percent. At this stage Google did not have as much Korean language content to refine its search services.¹⁵⁷ Another data source (comScore) from 2009 gives Naver 62 percent and Google 7.3 percent.¹⁵⁸ However, overtime Google seized greater market share over time. However, we realize that other sources give Google and Naver very different market shares. Nielson’s KoreanClick 2018 gives Naver around 39 percent of mobile search market share, compared to 29 percent for Google.¹⁵⁹ However, Nielson relies on unique user counts while Stat Counter utilizes total page views, with page views serving as a much better proxy for ad revenue, and suggesting that Korean Google users are significantly more active than Naver users.

Google’s main revenue source is advertising through Google sites and its network, such as Google Search and Google Maps. Revenue comes via from ads served through its advertising programs, such as AdSense for example. Assuming revenue is a proportionate measure for search volume (and ad revenue), if Google’s search market share hadn’t fallen from the 37 percent it held in 2010, it would have made a total of \$32.5 billion more in the period 2013 to 2019 (appendix A).¹⁶⁰ If it had mirrored South Korea, where it held a similar market share to China (39 percent) and trailed the domestic firm Naver in 2010, but later became dominant, Google would have made \$61.3 billion more over the same period.¹⁶¹ These estimates suggest that without Chinese interference, Google would have earned between \$7.7 and \$17.2 billion more in search revenue in 2019 alone, a 5 to 11 percent increase of Alphabet’s \$162 billion 2019 global revenue.¹⁶²

In the cloud service sector, we focused on Infrastructure as a Service (IaaS) and used the Asia Pacific as the comparator. IaaS is a form of cloud computing that provides virtualized computing resources over the Internet. IaaS is highly scalable and allows businesses to purchase resources on-demand and as-needed instead

of having to buy hardware outright. Amazon Web Services (AWS), Cisco Metacloud, DigitalOcean, Google Cloud, Microsoft Azure, and Rackspace are popular IaaS providers around the world.

Just using a simple direct estimation, if Amazon and Microsoft had the market share in China for IaaS that they did in the Asia Pacific region overall, they would have made \$516 million and \$140 million more, respectively, in 2017 and 2018 (appendix B).¹⁶³ It's easier to do a direct comparison for IaaS as it is a neutral service platform and is not affected by different cultural and design preferences. Of course, China makes up half of the region's spending on IaaS, so just using their market shares in the rest of Asia Pacific, suggests that these two firms they would have earned \$1.03 billion and \$571 million more, respectively.

Collectively, ITIF's estimates losses for the search and cloud sectors suggest that these companies would have made \$5.8 to \$10.6 billion more in 2017 and \$7.5 to \$14.3 billion more in 2018 (appendix C).¹⁶⁴

U.S. FIRMS SHOULD BE ALLOWED, AND ENCOURAGED, TO OPERATE INSIDE A CENSORED CHINA

The trade and economic implications of the Great Firewall and Chinese censorship more broadly, combined with other digital protectionism, undermines U.S. firms and the U.S. economy overall. This is problematic for America's position as the world's leading innovator. Most technology-based industries have high barriers to entry. In sectors that rely on AI, for example, firms spend hundreds of millions, and years of effort, developing ever more sophisticated technical capabilities. The initial investment can be quite high. While fixed costs are extremely high, marginal costs are low as firms can deploy their services over the Internet to many markets around the world.

If U.S. innovation industries lose market share to unfairly competing firms supported by their innovation mercantilist governments, it means two things. First, sales fall. This is true because global sales are largely fixed, and if a mercantilist-supported competitor (unfairly) gains market share, the market-based competitor loses share. Second, because profits decline more than sales, it is now more difficult for the market-based innovator to reinvest revenues in the next generation of products or services, meaning that the mercantilist-supported entrant has an advantage in creating the next generation of products. Also, to the extent the United States continues to lose technological capabilities to China, U.S. technological advantage in defense over China will diminish, if not evaporate, as U.S. capabilities whither and Chinese ones strengthen.

U.S. policymakers are obviously well within their rights to protest against China's approach to human rights, such as freedom of expression, which is affected by censorship. This can, and should, continue to be done directly by the U.S. government with the Chinese government and in relevant international forums. The United States has benefited tremendously from a global trading system that allows firms and people from all political systems and belief systems to improve their standard of living through greater trade and innovation. However, with limited exceptions (such as facilitating genocide, war crimes, or some other heinous international crime), unilaterally holding U.S. firms accountable for the values of the country they operate in is not what has defined U.S. trade and foreign policy. Moreover, it works against U.S. economic interests, especially the goal of leading China technologically and economically.

As Google stated in a blog from when it withdrew in 2010, “filtering our search results clearly compromises our mission” but, as it added, “failing to offer Google search at all to a fifth of the world’s population, however, does so far more severely.”¹⁶⁵ This is a fair assessment of the tradeoff. Obviously, U.S. firms have the right to decide whether to enter or stay out of China for whatever reason. People talk about the decision about whether U.S. firms should enter (or re-enter) the world’s largest, and one of its fastest growing digital markets, and whether they will have to compromise the principles and values of the United States. While firms like Google may or may not have had more leverage to negotiate a better deal back in 2010 (as compared to today), the situation in relation to governance intention and capability has clearly changed and solidified around censorship and the control of information in China and between China and the rest of the world. Under any rational business calculation, it would be impractical to expect one of the world’s largest Internet companies to stay out of the world’s largest digital economy, especially when U.S. firms have shown that they can operate under the Chinese government’s intrusive rules.¹⁶⁶

A realistic approach should recognize that it is far more constructive to recognize a government’s right to regulate content online and debate about how these content moderation frameworks, even if for political speech purposes, are designed and enforced. This should be a legitimate part of the political and economic response in ensuring that rules are clear, provide sufficient time for action, build in notification processes, are no more onerous than necessary, and are as precise as possible.

A key, and fair, concern is that changes U.S. firms make to abide by Chinese censorship laws affect their actions and the goods and services they provide in other markets around the world. Recent cases with the NBA being penalized in China for remarks from one coach in the United States is not only evidence of China’s sensitive and punitive nature, but its extra territorial application of censorship in selectively targeting people and firms for what they say and do in the United States. However, this is extraterritorial application of domestic law is not unique to China. Privacy regulators in Europe have tried to dictate what information U.S. firms make available to people in Europe, but also the rest of the world, through their “right to be forgotten” requirement that gives European Union citizens the power to demand that data and information about them be deleted. Germany requires social networks to remove Nazi symbols. In 2017, the Supreme Court of Canada upheld orders for Google to “de-index” a website, and asserted the jurisdiction of Canada’s courts over Internet intermediaries in other countries. The United States should focus on ensuring that U.S. firms only apply these rules in local jurisdictions and come up with other tools to counteract its spillover into the United States.

OVERLY BROAD CENSORSHIP AND TRADE LAW: APPLICABLE, BUT LARGELY UNTESTED

Trade law allows countries to enact censorship for a range of reasons, such as pornography, gambling, and faith-based objections, but these must be necessary and proportionate. This raises the prospect for a WTO dispute case based on the claim that China’s approach to censorship is overly broad, restrictive, and discriminatory as it can unfairly restrict the domestic and cross-border supply of a service.

For as long as there has been international trade rules, there have been exceptions, including for countries to enact measures to protect public morals. Back in 2006, academics like Tim Wu from Columbia University

realized that countries were not considering the trade law implications of overly broad online censorship.¹⁶⁷ A 2009 WTO trade dispute (initiated by the United States) represents the clearest example of how trade law can address issues like censorship. This case involved trading rights and distribution services for audiovisual entertainment products. China sought to justify restrictions on foreign firms involved in importing and distributing books, movies, and other “culturally sensitive” materials because it wanted to protect public morals and control content. China claimed that control of cultural content is a matter of fundamental importance, which was recognized as legitimate by the WTO dispute panel.¹⁶⁸ However, the panel’s overall verdict showed how China’s desire to control online content does not enable it to ignore WTO rules.¹⁶⁹

The European Center for International Political Economy (ECIPE) report *Protectionism Online: Internet Censorship and International Trade Law* presents a detailed and convincing case that a WTO dispute panel might rule that China’s permanent blocks on search engines, photo-sharing applications, and other services are inconsistent with the General Agreement on Trade in Services (GATS) provisions, even with the exceptions for morals and security.¹⁷⁰ Less resourceful countries, without means of filtering more selectively, and with a censorship system based on moral and religious grounds, are more likely to be able to defend broader censorship blocks in the WTO. But the exceptions do not offer a blanket cover for the arbitrary and disproportionate censorship that still occurs despite the availability to the censoring government of selective filtering.

Article XX of General Agreement on Tariffs and Trade (GATT) and article XIV of GATS contain many relevant rules that govern the potential use of censorship. GATT permits governments to take measures “necessary to protect public morals.” GATS permits measures “necessary to protect public morals or to maintain public order.” However, Article XX of GATT outlines that, “subject to the requirement that such measures are not applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail, or a disguised restriction on international trade.”

However, as ECIPE explains, trade law sets limits to a country’s use of censorship for moral reasons. The conditions under which these provisions can be applied tend to be quite strictly applied.¹⁷¹ GATS article XIV is even annotated by a footnote stating that the paragraph may only be invoked where a “genuine and sufficiently serious threat is posed” to a “fundamental interest” of society.¹⁷² They need to be deemed “necessary” when evaluated under a factor-based test. Such factors include: the relative importance of the objective pursued by the measure; the contribution of the measure to that objective; the trade-restrictiveness of the measure; and the existence of “reasonably available” alternative measures.¹⁷³

Given it has never been tested in a WTO dispute, it is unclear how the necessity test relates to the footnote under article XIV. This would be an extremely difficult question for a WTO dispute panel to answer once faced with questions about how to assess and respond to the threat from certain online content.¹⁷⁴ As it relates to proportionality, a WTO dispute panel would take into consideration the capabilities of the state in considering whether a measure was reasonable and whether there is a genuine alternative for the desired level of protection. The burden of proof is on the complainant to prove such a measure actually exists.¹⁷⁵ On this

factor alone, it seems clear that active filtering is far less trade restrictive than a total, permanent ban of a site and service. There's also the related aspect of proportionality and discrimination in that censors in China tend to block entire foreign web sites, while a domestic site may simply be asked to remove individual pages.

The growing importance of digital content to trade makes it important to challenge and (hopefully) rectify China's overly expansive use of censorship as an NTB. A case brought before the WTO over censorship would inevitably prompt a debate about sovereignty and the scope of trade-related issues under the WTO, but it's a fair debate given the original negotiators of GATT and GATS envisaged limits to how countries could use public morals and other exceptions as disguised forms of protectionism. There needs to be a debate about where and how to draw the lines against disproportionate, arbitrary, and opaque censorship. As ECIPE notes in conclusion, although the dispute settlement mechanism of neither the WTO nor other trade instruments could be used to eliminate Internet censorship, they might limit the use of its more commercially damaging forms.¹⁷⁶

RECOMMENDATIONS

On March 8, 2000, former U.S. President Bill Clinton gave a speech that touched on China's accession to the WTO, the Internet, and censorship in China:

“Membership in the W.T.O., of course, will not create a free society in China overnight or guarantee that China will play by global rules. But over time, I believe it will move China faster and further in the right direction, and certainly will do that more than rejection would....Now there's no question China has been trying to crack down on the Internet. Good luck! That's sort of like trying to nail jello to the wall. But I would argue to you that their effort to do that just proves how real these changes are and how much they threaten the status quo.”¹⁷⁷

The United States would be ill served to simply wait and hope China realizes the futility of its approach to censorship; the 20 years shows that this is extremely unlikely. The United States will need to double down and keep pushing for it as the track record shows limited and uneven progress. Meanwhile, the stakes for U.S. firms and the broader economy only increase given China's economic growth. Given this, it's worth pursuing a fresh assessment of the issue and options to develop a targeted, detailed, and broader strategy to that (at least) U.S. firms can enter and operate on level terms in China. In line with this, there are a number actions Congress and the administration can take to reduce the economic impact of censorship on the U.S. economy. In addition to the below, ITIF has called for a broader range of institutional and policy changes to better respond to Chinese innovation mercantilism, such as in the reports *Constructive, Alliance-Backed Confrontation: How the Trump Administration Can Stop Chinese Innovation Mercantilism* and *Why and How to Mount a Strong, Trilateral Response to China's Innovation Mercantilism*.¹⁷⁸

Congress Should Ask the United States International Trade Commission for a Detailed Study into the Trade Impact of Censorship

For such a significant trade issue, there is a surprising lack of data and research done on the impact of censorship in China and elsewhere on U.S. firms. To help fill this gap, the Senate Finance Committee should ask the United States International Trade Commission (ITC). The ITC has done and continues to do valuable research on global digital trade and barriers to U.S. firms.¹⁷⁹ Congress should ask ITC to author an in-depth investigation into the trade implications of censorship around the world, with a specific focus on China. This analysis should include more detailed modelling estimates about the trade impact of China's overly broad, onerous, and restrictive approach to censorship.

Push USTR to Develop New Trade Law Provisions to Target the Countries Use of Censorship for Protectionism

The United States should develop a digital trade policy response to China's use of censorship as a barrier to trade. USTR addresses some components in the United States-Mexico-Canada trade agreement and the "Digital Two Dozen" which formed the basis for U.S. negotiations in the Trans-Pacific Partnership.¹⁸⁰ However, USTR and other U.S. government agencies (such as the Department of Commerce) need to ensure that U.S. trade policy addresses the individual elements as part of a holistic and broader global digital economy agenda. USTR's recently released *2020 Trade Policy Agenda and 2019 Annual Report* details individual digital provisions that relate to censorship, but without a broader context or strategy to address the use of censorship and other non-tariff barriers to digital trade as part of the growing trend towards 'digital sovereignty' in China, Europe, India, and elsewhere around the world.¹⁸¹

The United States should prioritize these digital and censorship issues as part of "phase 2" trade talks with China. Thus far, China has not made substantive or enforceable commitments on e-commerce or digital trade as part of its trade agreements. China sees e-commerce through the lens of traditional trade, where e-commerce platforms sell physical goods that need facilitation through customs, while the United States, Japan, and many other nations see it much broader, encompassing both purely digital products and the digitally enabled delivery of goods and services.¹⁸² However, in the event that China refuses to change its restrictive approach to data governance and digital trade, the United States should focus its efforts on enacting ambitious new rules at the WTO's e-commerce negotiations to ensure that data localization does not become the norm around the world.

Send a Clear Message that U.S. Technology Firms Should be Encouraged to Enter Chinese Markets.

All too often policymakers have sent clear messages to U.S. technology companies that entering the Chinese market is greedy, immoral, and un-American. The fact that U.S. firms operate in China now does not mean that they support the CCP, just as it doesn't imply that U.S. firms working in other authoritarian countries support those regimes.¹⁸³ Pressuring U.S. companies to not serve the Chinese market may feel good as a virtue signal, but not only will it do nothing to improve the situation, it will hurt the interests of the United States as it will cut off technology services exports.

Forcing U.S. companies to not serve that market will do nothing to change the situation on the ground in China. China is not a small country that would be susceptible to boycotts. Furthermore, it's impossible, and unrealistic, to expect U.S. firms to stand up to the Chinese government. It should be clear by now that foreign firms are not going to change China's censorship regime. Even if foreign firms responded as a group, it'd be unlikely to change Chinese government policy. If they left, it'd likely just create further space for increasingly competitive Chinese firms to fill. This obviously doesn't prevent firms from deciding to not operate in China, as they're free to do. The basis for action lies with the U.S. government, and its likeminded partners, to advocate for their human rights values in China.

Over the long term, not supporting U.S. firms in China risks losing the crucial ability to develop and shape the technologies that'll form the basis of economic competitiveness. U.S. innovation thrives when its firms are able to enter and compete in as many markets as possible. Arthur Kroeber, the managing director of Gavekal Dragonomics (a research firm in Beijing) makes this clear in a *New Yorker* article "Total revenue of U.S. companies and affiliates in China in 2017, for one year, was five hundred and forty-four billion dollars. What's the chance these numbers can go down eighty or ninety per cent? Almost no chance. We can remove a few of those tangles, but the cost to the U.S. economy of removing them all would be unacceptably high."¹⁸⁴

CONCLUSION

In recent years, Chinese officials have not only continued to defend China's approach to censorship and "Internet sovereignty" but called it a successful model that other countries should adopt. Beyond the political, there are clear economic and trade implications as many other countries would no doubt be attracted to China's censorship model, in part, as it protects local firms from U.S. competitors. In this way, China's model plays into other countries strategies for local digital protectionism (just like in China) or even as the European Union has recently proposed, "digital sovereignty" (to protect EU firms against both Chinese and U.S. technology firms). The United States needs to develop a better response to counter China's use of censorship as an NTB, as well as its use in other countries that may seek to replicate it. U.S. firms shouldn't (again) have to sit out critical formative stages of digital development in mature or emerging markets, only to watch local firms gain an unfair advantage and a protected home market to use as a launch point to compete in third-country markets and in the United States.

APPENDIX A: SEARCH

Google's current revenue is estimated by multiplying its market share of Chinese search engines with the total revenue of search engine companies in China for each year. As comparisons, the estimate assumes that total search engine revenue is unchanged and repeat the calculations for Google maintaining its 2010 market share of 37 percent and experiencing the same market share growth as it experienced in South Korea.

	China Revenue (B RMB)	China Baidu Market Share	China Google Market Share	Korea Naver Market Share	Korea Google Market Share	Est Google Revenue	Static Share Revenue	Korea Share Revenue	Est Google Revenue	Static Share Revenue	Korea Share Revenue	
2010		61%	37%	48%	39%							
2011		65%	31%	53%	37%							
2012		65%	27%	12%	76%							
2013	39.46	66%	10%	29%	62%	3.79	14.8	24.36	\$0.53	\$2.07	\$3.41	
2014	59.96	62%	6%	39%	54%	3.79	22.4	32.59	\$0.53	\$3.14	\$4.56	
2015	80.76	79%	2%	36%	57%	1.59	30.2	46.36	\$0.22	\$4.23	\$6.49	
2016	86.87	77%	2%	25%	68%	2.08	32.5	58.87	\$0.29	\$4.55	\$8.24	
2017	112.41	77%	2%	24%	66%	1.92	42.1	74.72	\$0.27	\$5.89	\$10.46	
2018	135.76	69%	2%	20%	69%	2.48	50.8	94.27	\$0.35	\$7.12	\$13.20	
2019	158.08	70%	3%	14%	80%	4.38	59.2	126.92	\$0.61	\$8.29	\$17.77	
									Total	\$2.80	\$35.29	\$64.13
									Difference		\$32.49	\$61.33

Sources:

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APPENDIX B: CLOUD SERVICES

For cloud services: Amazon's and Microsoft's Infrastructure as a Service (IaaS) market shares in China are compared to their market shares in the overall Asia Pacific region, estimating the revenues each company would earn if they held their regional market share within China. Additionally, the Chinese market is subtracted from the Asia Pacific region to estimate the market share each company holds in the rest of the region, which are once again substituted for the Chinese market shares.

Asia Pacific IaaS Market Share			China IaaS Revenue		Est. Revenue		Asia Pacific Share Revenue		
	Amazon	Microsoft	(\$B)		Amazon	Microsoft	Amazon	Microsoft	
2017	11.2%	7.0%	2017	2.68	0.14	0.13	0.30	0.19	
2018	11.0%	8.0%	2018	8.78	0.61	0.33	0.97	0.70	
					Total	0.75	0.46	1.27	0.89

China IaaS Market Share			2017 and 2018 Difference	
	Amazon	Microsoft		
2017	5.4%	5.0%	Amazon	0.52
2018 H1	6.9%	3.7%	Microsoft	0.14
			Total	0.66

Non CN Asia Pacific Market Share			Est. Revenue		Asia Pacific Share Revenue		
	Amazon	Microsoft	Amazon	Microsoft	Amazon	Microsoft	
2017	17.0%	9.0%	0.14	0.13	0.46	0.24	
2018	15.1%	12.3%	0.61	0.33	1.33	1.08	
			Total	0.75	0.46	1.78	1.32

2017 and 2018 Difference	
Amazon	1.03
Microsoft	0.57
Total	1.60

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APPENDIX C: AGGREGATE IMPACT

This table summarize the results estimating the revenues of U.S. cloud and search companies in China in different scenarios and provide estimates of cumulative losses. The high and low assumptions for each are different. For search, the estimate assumes Google maintained a consistent market share and then assume they beat out Baidu like they beat out Naver in Korea. For cloud, the estimate assumes cloud companies receive the market share equivalent to the average in the Asia Pacific region including China, and then receiving the market share equivalent to the regional average excluding China.

Estimates of Google Ad Revenue in China (\$B)

	Real Market Share	Static 2010 Market Share	South Korean Market Share
2013	\$0.53	\$2.07	\$3.41
2014	\$0.53	\$3.14	\$4.56
2015	\$0.22	\$4.23	\$6.49
2016	\$0.29	\$4.55	\$8.24
2017	\$0.27	\$5.89	\$10.46
2018	\$0.35	\$7.12	\$13.20
2019	\$0.61	\$8.29	\$17.77

Estimates of Cloud Revenue in China (\$B)

	Real Market Share	Asia Pacific Market Share	Rest of Asia Pacific Market Share
Amazon			
2017	\$0.14	\$0.30	\$0.46
2018	\$0.61	\$0.97	\$1.33
Microsoft			
2017	\$0.13	\$0.19	\$0.24
2018	\$0.33	\$0.70	\$1.08

Lost Cloud and Search Revenue in China (\$B)

Company	Low Estimate	High Estimate
Google (2013-19)	\$32.49	\$61.33
Amazon (2017-18)	\$0.52	\$1.03
Microsoft (2017-18)	\$0.43	\$0.86

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