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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 leading 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. China is 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 in many cases companies' their market access was has been denied during a critical, formative period of digital growth in China. Alongside China's other protectionist measures, this 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.¹ Meanwhile, U.S. firms have largely missed out on the opportunity to compete on fair and level terms with local firms during this critical time.

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 due to Chinese censorship and related 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.

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 makes for a very difficult and different business environment. Moreover, in many cases, China's approach to censorship is unwritten, with enforcement often arbitrary. 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 can also be applied by prohibiting 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) use a range of legitimate public policy goals to defend their approach to censorship—such as public safety, morals, and security and national security—the United States and other governments have been reluctant to challenge Chinese practices. 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. 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, rules-based global digital economy have failed to respond to the growing number of countries that have enacted a censorship system that acts (whether intentionally or inadvertently) as a non-tariff barrier to trade (as in China). 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 and overly restrictive barriers to trade, as is clearly the case in China, then trade rules at the WTO and elsewhere should provide a clear path for trade partners to challenge the misuse of these exceptions.

In addition, some U.S. policymakers exacerbate this issue 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 Google’s case, they rightly say that Google would have to comply with Chinese censorship rules. But while telling companies like Google to stay out of 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. So it is time that our policy vis-à-vis U.S. information services exports to China be based on national interest, not national moralizing.

This testimony provides a detailed analysis of China’s censorship, including the Great Firewall. 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: CENSORSHIP AND THE GREAT FIREWALL

China's persistent pursuit for censorship has resulted in societal changes. Most censorship is at the user level in the form of self-censorship given people realize the potential negative consequences. It's also important to note that China's evolving and increasingly sophisticated and repressive approach to censorship is coinciding with a broader political crackdown under Chinese President Xi Jinping. President Xi also wants China to become a "cyber superpower," which includes being free and independent from foreign technology (which has obvious trade implications), and to (re)write the rules for global cyber governance.⁴ As ITIF reports have shown, as it relates to governance of the global Internet and digital economy, China's preferred governance model is at odds with those of the many other countries that recognize the value provided by an open, innovative, global digital economy.⁵ In essence, China is pushing an alternative to the current mostly open Internet.⁶ While it is only one part of China's approach to censorship, the broad use of the Great Firewall is central to its model for cyber sovereignty. There are reportedly over 10,000 websites blocked in China.⁷ 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.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.

Typically, China says that a firm has used "illegal content"—a catch-all explanation for censorship. As it relates to attempts to access a blocked site from China typically results in a connection error caused by the inability for the Chinese nameservers—address books that match up website names to their digital locations—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.⁹ Beyond the Great Firewall, censorship in China is part of a complicated and often imperfect legal, political, bureaucratic, and firm-level frameworks, processes, and decisions. It appears in a wide range of laws and regulations. For example, China's new counter-terrorism law requires companies to monitor user behavior to ensure public safety.¹⁰ 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.¹¹

Established in 2011, the State Internet Information Office is reportedly responsible for Internet censorship.¹² China relies on the state control of the main telecommunication companies (China Telecom, China Unicom and China Mobile) to enforce blocks and other measures. However, the United States Trade Representative (USTR) has cited 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.¹³

While state agencies obviously play a key role, especially in defining and using the Great Firewall, the implementation of censorship is increasingly decentralized to private firms who act as intermediaries. The government then relies on private firms (such as the big tech firms) and others involved in the technology sector, such as members of China's Cross-border Data Telecommunications Industry Alliance.¹⁴ This essentially makes these firms liable for content moderation. Tech firms are critical intermediaries in

enacting and enforcing censorship in China, especially China's "big three" Internet firms: Baidu, Alibaba, and Tencent. These firms do so, in part, as they have to manage content as part of their license to operate.¹⁵ China prohibits foreign investment in "Internet publishing" (providing the public with publications through the Internet).¹⁶ Intermediaries are also responsible for monitoring the behavior of users on their platforms. Chinese laws also prohibit people and firms from developing or hosting tools that could be used to circumvent these controls.¹⁷

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.¹⁸ 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.¹⁹

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 extrapolate from this central direction to block services and material that they think the government would also consider offensive or sensitive. China's online crackdowns are also often cyclical, especially in the lead-up to key CCP meetings. 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. The opaque, evolving, and decentralized nature of censorship 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.²⁰

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

China's blocking of websites, restrictive ownership and licensing arrangements, and restrictive connectivity regulations affect services being provided from overseas, while their domestic counterparts can provide the same or similar services and content. This is a discriminatory barrier to market access. In this way, whatever the stated motivation or intention, China's approach to censorship acts as a significant barrier to trade for U.S. firms and their goods and services.

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 the point is that U.S. firms should have market access and clear, predictable, and consistent rules around illegal material so that they could compete on level terms in China. 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.

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, Apple, and a group of older companies like IBM, Microsoft, and Intel, few have a major presence in the country today.²¹ 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.

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.

Most of the foreign online services, apps or intermediaries that China blocks are rarely revised and lifted (see the list below). Firms that have their web services temporarily blocked typically find that this is simply a prelude to a total and permanent block. Furthermore, 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, 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 2018.²²
 - 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.”²³ China is among the small number of countries where Amazon Prime Video is not available.²⁴
- 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.²⁵
- Dropbox
 - First blocked in May 2010.²⁶ Temporarily restored in February 2014, but then blocked again in June 2014.²⁷
- Facebook (further details below).
 - Blocked in 2009.

- Instagram was blocked in September 2014.
- WhatsApp was blocked in September 2017.²⁸
- Operates an online advertising unit to target foreign markets. In 2018, China was the second-largest source of foreign revenue for ad spend on Facebook.²⁹
- 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).³⁰ Google operates an online advertising unit in China there to target foreign markets.
 - 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.³¹
- Microsoft (further details below).
 - Microsoft OneDrive was blocked in 2014.³² Bing was the last major U.S. search engine blocked in China in January 2019.³³
- 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.³⁴
- Other search engines:
 - DuckDuckGo, Baidu Japan, Baidu Brazil, Yahoo Hong Kong, and Yahoo Taiwan are all blocked in China.³⁵
- Pinterest
 - Blocked in 2017.³⁶
- Reddit
 - Blocked in August 2018.³⁷
- Slack

- Access has been inconsistent for years, despite not being completely blocked.³⁸ 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.³⁹
- Snapchat
 - Unclear when first blocked, but Snap has a small research office in China despite the block.⁴⁰
- Twitter
 - Blocked in June 2009.⁴¹

Censorship can also be applied through prohibiting or restricting foreign equity ownership in businesses and through restricting licensing to only local firms in key sectors. 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.⁴² Similarly, foreign ownership in basic telecommunication services (fixed line, mobile and broadband) is capped at 49 percent.⁴³

The impact of China’s censorship on 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 communication services they need for day-to-day operations and international trade.⁴⁴ U.S. firms also report that pushing all traffic through the Great Firewall adds delays to transmission that can significantly degrade the quality of the service, which in some cases is to a commercially or operationally unacceptable level (thus cutting off market access).⁴⁵ China will also “throttle” access to foreign websites in order to make them so slow as to be unusable. Such throttling is also 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 re-directed all China-based requests for Google, Yahoo, and Microsoft to Baidu, which is indicative of protectionist motives.

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”, a catch-all explanation for censorship.⁴⁶ Attempts to access cn.bing.com from China resulted in a connection error. The connection error was caused by an inability of the Chinese nameservers—address books that match up website names to their digital locations—to correctly retrieve the Internet protocol (IP) address of Bing’s China platform. This form of nameserver corruption has been often used by the Chinese government to block platforms. 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 as the only remaining major English search engine in China.⁴⁷

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.⁴⁸ In a first for Chinese users, Google placed a notice that content had been removed when users searched for it, but this wasn't popular with regulators.⁴⁹ From 2006 to 2010, Google China fought skirmishes with the Chinese government over content restrictions.⁵⁰

However, 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.⁵¹ So, in 2010, Google shut down its search engine. China's state-controlled media quoted an 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."⁵² At this time, Google trailed its main Chinese rival, Baidu.com, with 33 percent market share to Baidu's 63 percent.⁵³ China has since blocked the full suite of Google services (as listed). In August 2018, media reports suggested that Google was working on a secret prototype of a new, censored Chinese search engine, called Project Dragonfly.⁵⁴ In mid-December 2018, Google suspended its development efforts, in part due to political opposition in the United States.⁵⁵ 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.⁵⁶ Media reports have stated that Google Scholar has been on a priority list to be allowed back over the Great Firewall, but this hasn't happened.⁵⁷

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, but the focus will be on developing AI for global products.⁵⁸ 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.⁵⁹ 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.⁶⁰ JD.com also setup a Google Express site in March, 2019.⁶¹ Together, the partners aim to compete with Amazon and Alibaba, especially in fast-growing south east Asian markets.⁶² However, the Google Shopping portal is blocked in China.

Facebook's main social network 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.⁶³ 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.⁶⁴ 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, being released).⁶⁵ In 2018, there were media reports that Facebook had gained approval to open a subsidiary, which Facebook said it would use for research. But then the registration disappeared and references to the subsidiary were partly censored in Chinese media.⁶⁶ This incident underscores how much of a challenge it is for

Facebook—a global social network—to get into China in any meaningful way. Facebook is now limited in how it can operate in China. However, through a local partner (Meet Social) Facebook has setup an experience center for potential customers to learn how to advertise on Facebook to access customers elsewhere around the world. In 2019, Meet Social’s CEO reportedly expected to do \$1 billion to \$2 billion in ad sales on Facebook and Instagram.⁶⁷ In total, Facebook’s revenue from Chinese-based advertisers reached an estimated \$5 billion in 2018, or about 10 percent of its total sales.⁶⁸

Beyond advertising, the lack of a clear, consistent, and open framework for foreign firms to navigate is one way China’s censorship acts as a barrier to trade for Facebook and other firms. The Facebook case is indicative in that it shows how U.S. firms seeking to enter the market must navigate multiple, often opaque rules and laws with a decentralized system in which provinces, cities, and ministries all vie for influence and have the ability to make key decisions. However, even in cases where one part of the government may be happy to support a foreign company (like Facebook), other parts may disapprove and therefore override their decision. This lack of transparency and predictability is a market barrier.

Apple does sell in China. However, to do so it had to agree to remove offensive apps, such as news apps, from its app store. Apple removed 805 apps in China from 2018 to 2019.⁶⁹ Most recently, Apple removed the app game “Plague” following the coronavirus outbreak.⁷⁰ However, only six month after launching in China, Apple closed the iTunes Store (iBooks and iTunes Movies) in April of 2016.⁷¹ Initially, Apple apparently had the Chinese government’s approval to introduce the services, however, then the State Administration of Press, Publication, Radio, Film and Television demanded the closings.⁷²

In 2014, LinkedIn agreed to start censoring content and formed a partnership with two influential Chinese venture capital investment funds to create a separate China operation, who were able to ensure good communications with the Chinese government.⁷³ It also focused on the specific characteristics of the Chinese market. It hired knowledge 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.⁷⁴ 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. However, despite all these challenges, it has found a niche market with tens of millions of users.⁷⁵ 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.

China’s Impacts on Market Access for U.S. Content Creators

U.S. content creators also face major market access and operational issues in China due to censorship. The exhaustive content review requirements that every movie and television show has to go through, which are based on vague and non-transparent criteria, create a slow, unpredictable, and burdensome market access restriction.⁷⁶ 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 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.⁷⁷ This has effectively prevented access by U.S. content creators and distributors to one of the largest consumer markets in the world.

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.⁷⁸ 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.⁷⁹ Furthermore, China also doesn’t allow foreign firms to hold a majority share in entities engaged in the production and publication of audiovisual content.

In a similar way, opaque, unpredictable, and discriminatory Chinese censorship has affected the approval and distribution of video games via the State Administration of Press and Publication (SAPP). 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 rules for video game oversight).⁸⁰ While the actual content being censored is often not political (such as gore 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 nine months, it quickly approved nearly 1,000 games, which included 30 foreign games.⁸¹

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. Only community features like forums and adult games on the platform are blocked.⁸² 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.⁸³ However, in 2018, Valve announced that it was going to partner with a local firm and develop a China-specific Steam platform.⁸⁴

Having clear and predictable rules and processes to access China’s video game market is a huge issue as China overtook the United States as the world’s largest video-game market in 2016.⁸⁵ As an industry, video games are now worth three times as movies worldwide.⁸⁶ China is a daunting market for outsiders and is undoubtedly the most challenging market to enter—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.⁸⁷ 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: 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. 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. GitHub (owned by Microsoft) is a U.S.-based global company that provides hosting for software development. 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.⁸⁸

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.⁸⁹ 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.”⁹⁰ The block was lifted on January 23, 2013. However, access to GitHub from China is often slow and unreliable.

More recently, Chinese programmers have used GitHub to complain about working conditions in China's tech sector.⁹¹ It also remains a popular platform for creating and sharing anti-censorship software tools within China.⁹² However, in this case, China did not block Github. This placed Microsoft, which has extensive operations in China, in a potentially tough spot given it has introduced a tailored version of Microsoft Office for Chinese government use. Microsoft also owns LinkedIn, the only major Western social media platform accessible in China, which frequently blocks content and accounts in China deemed politically sensitive.⁹³ 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).⁹⁴

The balance may change as 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.⁹⁵ 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.”⁹⁶ 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.

Information Control: Censorship Provides Limited Options for Business Connectivity with 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, operations, and cross-border sales and service. In the last few years, China has tightened regulations and restrictions around

VPNs in China, which seriously affects the reliability and quality of connections to the global Internet for China-based U.S. firms and their staff.

Firms have relied on VPNs to connect locations and services inside of China with the rest of the world and to ensure the confidentiality of communications.⁹⁷ Before, China sought to disrupt (through technical means) the use of VPNs and has shut down Chinese VPN providers. 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 critical global services (such as allowing government officials to access and use Twitter or for researchers to access academic literature). But increasingly, China targets the development and distribution of these services, whether for personal or business use. Apple has removed many VPN apps from the apps store (the first example of China using its influence with a major foreign tech platform to push back on certain software).⁹⁸ Meanwhile, Amazon's partner in China warned customers on its cloud computing services against host VPN services on their sites.⁹⁹ All app developers offering VPNs needed to obtain a government license.

Multinational firms have historically used VPNs to bypass censorship and protect their communications from hacking and government surveillance. These firms typically use their own public Internet by setting up and using their own global VPN infrastructure to connect users and business units around the world (such as via a Multiprotocol Label Switching (MPLS)). Since 2018, China has started strictly managing and limiting the connections that U.S. firms use so that they maintain oversight of this connectivity.

However, in January 2018, China 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.¹⁰⁰ The Ministry of Industry and Information Technology said these restrictions are in accordance with goals and provisions set out by government created Cross-border Data Telecommunications Industry Alliance.¹⁰¹

These restrictions were very disruptive to businesses that depended on their VPNs for access to cloud services and data security and can 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.¹⁰² 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 uses a company-built VPN.¹⁰³ Furthermore, U.S. software firms are finding it increasingly difficult to license and sell software to users in China (or customers that use software 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.

With these restrictions in place, U.S. firms have a few options to maintain connectivity with the rest of the Internet. 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).¹⁰⁴ 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.”¹⁰⁵

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.¹⁰⁶ 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.”¹⁰⁷ 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.¹⁰⁸ But these still provide the Chinese government with access and oversight over these data transfers.¹⁰⁹

At the heart of these restrictions is the Chinese government’s oversight of content. 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 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.¹¹⁰ 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 ON 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.¹¹¹ 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.¹¹²

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.¹¹³

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 others 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.¹¹⁴

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.¹¹⁵ Another data source (comScore) from 2009 gives Naver 62 percent and Google 7.3 percent.¹¹⁶ 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.¹¹⁷ 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 AdSearch 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).¹¹⁸ 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.¹¹⁹ 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.¹²⁰

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).¹²¹ 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).¹²²

U.S. FIRMS SHOULD BE ALLOWED, AND ENCOURAGED, TO OPERATE INSIDE A CONSTRAINED AND 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 artificial intelligence, 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 are able to 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 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."¹²³ 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 than they do today back in 2010, 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.¹²⁴

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 evident of China's sensitive and punitive nature, but its encroachment into how the United States and others expect people and firms there to act. But this concern 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/information about them be deleted.¹²⁵ This is the same with content removal, which is hardly unique to China. Indonesia's communication ministry has asked Google to remove 73 apps that it considers offensive.¹²⁶ Germany requires social networks to remove Nazi symbols.¹²⁷ Instead, the focus should be on ensuring that U.S. firms only having to apply this and other comparable country or region specific rules in those jurisdictions.

OVERLY BROAD CENSORSHIP AND TRADE LAW: APPLICABLE, BUT 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 unfairly restricts the cross-border supply of a service.

For as long as there has been international trade rules, there have had exceptions, including for countries to enact measures for morals protection. In a WTO trade dispute involving trading rights and distribution services for audiovisual entertainment products, China has claimed that control of cultural content is a matter of fundamental importance, which was recognized as legitimate by the WTO dispute panel.¹²⁸ However, the panel's overall verdict showed how China's desire to control online content does not enable it to ignore WTO rules.¹²⁹ Even back in 2006, academics like Tim Wu from Colombia University realized that countries were not considering the trade law implications of overly broad online censorship.¹³⁰

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 given morals and security exceptions.¹³¹ 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.

Most relevant rules for censorship are contained in article XX of General Agreement on Tariffs and Trade (GATT) and article XIV of GATS. 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's 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.¹³² 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.¹³³ They need to be deemed "necessary" when evaluated under the 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.¹³⁴

As it relates to the necessity test, given it has never been tested in a dispute, it is unclear how this factor relates to the footnote under article XIV that indicates the article can only be invoked to protect a member against a genuine and sufficiently serious threat to one of the fundamental interests of society. 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.¹³⁵ As it relates to proportionality, a WTO dispute panel would take into consideration the capabilities of the state in assessing what is a “reasonable, available measure must be assessed in the light of the economic and administrative realities facing the member concerned or must be a “genuine alternative” for the desired level of protection—and the burden of proof is on the complainant to prove such measure actually exists.¹³⁶ On this factor, it seems clearer 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 in that censors in China tend to block entire foreign web sites, while a domestic site may simply be asked to remove individual pages. This practice is a breach of national treatment commitments under GATS.

A case brought before the WTO over censorship would be very likely to give rise to a debate about sovereignty and the ever-expanding scope of trade-related issues under the WTO. However, such a case would mark an important borderline against disproportionate and arbitrary censorship when a partial blockage would be sufficient to achieve the aims of the censors. It would also be economically significant. 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.¹³⁷

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.”¹³⁸

The United States would be ill served to simply wait and hope China realizes the futility of its approach to censorship; 20 years shows that this is extremely unlikely. The United States needs a targeted, detailed, and broader strategy to enact the rules and pressure to at least shape China’s approach so that U.S. firms can enter and operate on level terms in competition with their Chinese and other foreign counterparts. The United States has struggled to pressure China to change its approach to censorship to eliminate or at least limit the impact it has on trade. As such, 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*.¹³⁹

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.¹⁴⁰ 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 holistic and detailed digital trade policy response to China's use of censorship as a barrier to trade. USTR does address various individual as part of 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.¹⁴¹ 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. For example, 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.¹⁴²

The United States should also 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, especially on data flows, as part of its trade agreements. China sees e-commerce through the lens of traditional trade issues, 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.¹⁴³ 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 policy makers have sent clear messages to U.S. technology companies that entering the Chinese market is greedy, immoral, and un-American. While this might get policymakers invited on the Sunday talk shows or to the next human rights gala, it actually works against U.S. national and economic interests. 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.”¹⁴⁴ 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 and will likely have no effect on Chinese policies. The fact that U.S. firms operate in China now (and others that want to) does not mean that they support the CCP and the Chinese government, just as it doesn’t imply that U.S. firms working in other authoritarian countries support those regimes.¹⁴⁵ As an extension of today’s hearing, U.S. policymakers are obviously free to push for transparency around how U.S. firms operate in China and other countries and how other governments try to impact their operations and activities back in the United States that run counter to U.S. values. Such an approach is a realistic and balanced approach that seeks to maximize the benefits of trade and economic engagement, while working to mitigate the risks to the United States.

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 implications of this, there are clear economic and trade implications as many other countries would no doubt be attracted to China’s censorship model, and the Great Firewall, in how it protects local firms from U.S. competitors. In this way, China’s censorship 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 as other countries are drawn to China’s censorship model, especially in authoritarian countries, so it’s likely that U.S. firms will encounter similar barriers. 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 they 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:

- iResearch, "Revenue of Search Engine Companies in China 2013-2020," April 01, 2019, http://www.iresearchchina.com/content/details7_53447.html
- statscounter, Search Market Share (China and South Korea, 2010-2019), accessed February 27, 2020, <https://gs.statcounter.com/>.

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

Sources:

- China Internet Watch, "Alibaba Cloud owns 43% China's public cloud market in 2018," February 12, 2019, <https://www.chinainternetwatch.com/28150/public-cloud-h1-2018/>.
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- Business Wire, "Alibaba Cloud Ranked First in Asia Pacific(*) by Gartner Market Share: IT Services in IaaS and IUS," April 24, 2019, <https://www.businesswire.com/news/home/20190424005371/en/>.
- IDC, "New IDC Forecast Reveals Asia/Pacific* Spending on Public Cloud Services to Reach USD 76.1 Billion by 2023," August 7, 2019, <https://www.idc.com/getdoc.jsp?containerId=prAP45431219>.

APPENDIX C: AGGREGATE IMPACT

This table summarizes 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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