UPDATE

TO THE

IP COMMISSION REPORT

THE THEFT OF AMERICAN INTELLECTUAL PROPERTY:
REASSESSMENTS OF THE CHALLENGE
AND UNITED STATES POLICY

2017

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The Report of the Commission on the Theft of American Intellectual Property (also known as the *IP Commission Report*) was published in May 2013. This update was published in February 2017.

UPDATE

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ACKNOWLEDGMENTS

Over three years ago we co-chaired a report by the Commission on the Theft of American Intellectual Property. The report outlined the enormous magnitude of the problem and presented a series of recommended actions to stem the loss of the lifeblood of American entrepreneurship. The original report received, and continues to receive, widespread public attention. Congress adopted several Commission recommendations to provide the executive branch and private industry with unprecedented, powerful tools with which to fight intellectual property (IP) theft. The executive branch took a limited number of actions, while American businesses have continued to confine their actions to defensive measures. The Commission still believes that IP theft is one of the most pressing issues of economic and national security facing our country. It is our unanimous opinion that the issue has not received the sustained presidential focus and strong policy attention that it requires.

This Commission remains composed of its original, extraordinary members. We are indebted to our fellow Commissioners for their selfless bipartisanship, insights, and help in explaining the original report to the American people, policymakers, and members of the press for over three years.

The Commission's staff has continued to be terrifically effective. It includes several who have remained in their positions, including Commission Director Richard Ellings and Deputy Director Roy Kamphausen. Other stalwarts working on the Commission since the beginning are John Graham, Amanda Keverkamp, and Joshua Ziemkowski. New commission staff who contributed to the update to the original report include Dan Aum, Jessica Keough, Mariana Parks, Craig Scanlan, and Sandra Ward. Special thanks are due to Mike Dyer, who shouldered more than his fair share of this latest round of research, and to outside specialists for their guidance and reviews. The Commission is grateful to The National Bureau of Asian Research (NBR) and its Slade Gorton International Policy Center, which have provided the unrestricted support that has underwritten the Commission's work and complete independence.

The importance of ensuring the viability and success of the U.S.-China relationship in part gave rise to this Commission and our participation in it. We offer this update so that the United States can better understand, prioritize, and solve a critical challenge.

Dennis C. Blair
Co-chair

Jon M. Huntsman, Jr.
Co-chair

The Commission on the Theft of American Intellectual Property is an independent and bipartisan initiative of leading Americans from the private sector, public service in national security and foreign affairs, academia, and politics. The members are listed in the section About the Commissioners.

The three purposes of the Commission are as follows:

1. Document and assess the causes, scale, and other major dimensions of international intellectual property (IP) theft as they affect the United States.
2. Document and assess the role of China and other infringers in international IP theft.
3. Propose appropriate U.S. policy responses that would mitigate ongoing and future damage and obtain greater enforcement of IP rights (IPR) by China and other infringers.

IP theft pervades international trade in goods and services due to lack of legal enforcement and national industrial policies that encourage IP theft by public, quasi-private, and private entities. While some indicators show that the problem may have improved marginally, the theft of IP remains a grave threat to the United States. Since 2013, at the release of the *IP Commission Report*, U.S. policy mechanisms have been markedly enhanced but gone largely unused. We estimate that the annual cost to the U.S. economy continues to exceed **$225 billion** in counterfeit goods, pirated software, and theft of trade secrets and could be as high as **$600 billion**.[1] It is important to note that both the low- and high-end figures do not incorporate the full cost of patent infringement—an area sorely in need of greater research. We have found no evidence that casts doubt on the estimate provided by the Office of the Director of National Intelligence in November 2015 that economic espionage through hacking costs $400 billion per year.[2] At this rate, the United States has suffered over $1.2 trillion in economic damage since the publication of the original *IP Commission Report* more than three years ago.

Scale and Cost of IP Theft

In three categories of IP theft, new evidence and studies make it possible to provide more accurate assessments of the damage done to the U.S. economy today than was the case in 2013.[3] These categories are counterfeit and pirated tangible goods, pirated software, and trade secret theft.

With regard to the first category, the most reliable data available now suggests that in 2015 the United States imported counterfeit and pirated tangible goods valued between $58 billion and $118 billion, while counterfeit and pirated tangible U.S. goods worth approximately $85 billion were sold that year worldwide.[4] The estimate by the Organisation for Economic Co-operation and

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[1] On November 18, 2015, William Evanina, national counterintelligence executive of the Office of the Director of National Intelligence, estimated that economic espionage through hacking costs the U.S. economy $400 billion a year, which falls within the range of the findings of the IP Commission. Evanina also stated, "We haven't seen any indication in the private sector that anything has changed [in terms of Chinese government involvement in hacking]." To date, the IP Commission has not found any evidence to the contrary. Chris Strohm, "No Sign China Has Stopped Hacking U.S. Companies, Official Says," Bloomberg, November 18, 2015, https://www.bloomberg.com/news/articles/2015-11-18/no-sign-china-has-stopped-hacking-u-s-companies-official-says. The full report from the Office of the Director of National Intelligence is available from the IP Commission website at http://www.ipcommission.org/report/Evolving_Cyber_Tactics_in_Stealing_US_Economic_Secrets_ODNI_Report.jpg.

[2] Strohm, "No Sign China Has Stopped Hacking U.S. Companies, Official Says."

[3] *The Report of the Commission on the Theft of American Intellectual Property* (Seattle: National Bureau of Asian Research on behalf of The Commission on the Theft of American Intellectual Property, 2013), http://www.ipcommission.org/report/ip_commission_report_052213.pdf.

[4] These values were found using statistics from the Organisation for Economic Co-operation and Development (OECD) and European Union Intellectual Property Office (EUIPO), *Trade in Counterfeit and Pirated Goods: Mapping the Economic Impact* (Paris: OECD Publishing, 2016), http://dx.doi.org/10.1787/9789264252653-en.

Development (OECD) and the European Union Intellectual Property Office (EUIPO) for the total value of counterfeit and pirated tangible goods imported into the United States or counterfeit and pirated tangible U.S. goods sold abroad on the conservative low end was $143 billion in 2015. The Commission believes that these goods did not displace the sale of legitimate goods on a dollar-for-dollar basis and estimates that at least 20% of the total amount of counterfeit and pirated tangible goods actually displaced legitimate sales. Thus, the cost to the American economy, on the low end of the estimate, is $29 billion.[5]

The same OECD/EUIPO study found that while 95% of counterfeit goods seized by customs officials were protected by trademarks, only 2% were counterfeits of patent-protected goods.[6] This means that although there is some overlap between our estimates of the value of counterfeit goods and patent infringement, the vast majority of patent infringement is unaccounted for in this report. We are disappointed that there is a paucity of reliable data on the economic costs of patent infringement, but from anecdotal evidence we are led to believe the costs are substantial.

The proliferation of pirated software is believed to be a much larger problem in scope than statistics suggest because of the ease of downloading software, ubiquitous use of software across industries and countries, and inadequate surveys. The value of software pirated in 2015 alone exceeded $52 billion worldwide. American companies were most likely the leading victims, with estimated losses of at least 0.1% of the $18 trillion U.S. GDP, or approximately $18 billion.[7]

The cost of trade secret theft is still difficult to assess because companies may not even be aware that their IP has been stolen, nor are firms incentivized to report their losses once discovered. As IP theft remains hard for firms to detect, much less obtain legal redress for, their incentives are to rely more on their own efforts to conceal trade secrets and less on patents that entail public disclosure.[8] New estimates suggest that trade secret theft is between 1% and 3% of GDP, meaning that the cost to the $18 trillion U.S. economy is between $180 billion and $540 billion.[9]

These figures, while startling, do not take into account the second-order effects on the economy from IP theft. First, there is the practical matter of IP protection costs, which have skyrocketed, especially in response to cyber-enabled IP theft. More importantly, when trade secrets and other IP are stolen by competitors, U.S. firms are discouraged from investing the substantial capital required to innovate or effort required to work to be the first movers to market. The immediate and long-term loss of these advantages makes American firms less competitive globally.

China

China, whose industrial output now exceeds that of the United States, remains the world's principal IP infringer. China is deeply committed to industrial policies that include maximizing the

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[5] For purposes of aggregating the direct costs of IP theft in the three listed categories—counterfeit and pirated tangible goods, software piracy, and trade secret theft—the Commission estimates that no less than 20% of counterfeit sales would displace legitimate sales. However, the precise amount is unknowable, because the purchase of counterfeit goods does not displace the sale of legitimate goods on a dollar-for-dollar basis. For more discussion on the complex relationship between counterfeit and legitimate sales, see OECD, "The Economic Impact of Counterfeiting," 1998, 26–29, https://www.oecd.org/sti/ind/2090589.pdf.

[6] OECD and EUIPO, *Trade in Counterfeit and Pirated Goods*.

[7] Business Software Alliance (BSA), "Seizing Opportunity through License Compliance," BSA Global Software Survey, May 2016, http://globalstudy.bsa.org/2016/downloads/studies/BSA_GSS_US.pdf.

[8] R. Mark Halligan, "Trade Secrets v. Patents: The New Calculus," *Landslide*, July/August 2010, http://www.americanbar.org/content/dam/aba/migrated/intelprop/magazine/LandslideJuly2010_halligan.authcheckdam.pdf.

[9] Center for Responsible Enterprise and Trade (CREATe.org) and PricewaterhouseCoopers, "Economic Impact of Trade Secret Theft: A Framework for Companies to Safeguard Trade Secrets and Mitigate Potential Threats," 2014, https://create.org/resource/economic-impact-of-trade-secret-theft.

acquisition of foreign technology and information, policies that have contributed to greater IP theft. IP theft by thousands of Chinese actors continues to be rampant, and the United States constantly buys its own and other states' inventions from Chinese infringers. China (including Hong Kong) accounts for 87% of counterfeit goods seized coming into the United States.[10]

China continues to obtain American IP from U.S. companies operating inside China, from entities elsewhere in the world, and of course from the United States directly through conventional as well as cyber means. These include coercive activities by the state designed to force outright IP transfer or give Chinese entities a better position from which to acquire or steal American IP.

U.S. Policy Response

After the release of the *IP Commission Report* in May 2013, the Obama administration and Congress made important procedural changes to how the United States defends itself from IP theft and related cyberattacks, but they have been applied unevenly.

First, there are several positive developments. Chief among them is that cyberattacks may have declined in volume since about 2014, although whether this is a result of a crackdown in China on responsible units in the People's Liberation Army (PLA) or other factors is not entirely clear. In any case, the cyber units of the PLA may have responded by shifting their tactics from blatant mass hacking of U.S. entities to a more targeted and discreet approach.[11]

Second, the gravity and complexity of IP theft are better understood today than in 2013. Our report and other studies raised public awareness through extensive media coverage and government attention. The *IP Commission Report* continues to be cited by the world's press and commentators. The report was downloaded over 20,000 times in the first week of its release and over 200,000 times since then. It has come to be viewed as the foundational study in the field.

Implementation is the major challenge today. The Obama administration and Congress adopted some of the report's key recommendations that set in place the legal basis for combatting IP theft successfully. The report's major impact is Section 1637 of the 2015 National Defense Authorization Act (NDAA). The law requires the president to issue a report on economic cyberespionage and on actions taken by the executive branch against those who are stealing American IP through cyber means. More importantly, the language gives the president the power to sanction foreign entities, from persons to companies to countries. The deadline for issuance of the report was June 17, 2015. Unfortunately, however, the report was not published until November 2016, and it gives no indication that President Obama used Section 1637 to sanction foreign IP infringers.

In addition, last year Congress passed, and President Obama signed, the Defend Trade Secrets Act of 2016, which, among other things, creates a private right of action for U.S. entities under the Economic Espionage Act. This was another IP Commission recommendation. The president took into account some of our recommendations for cybersecurity when he implemented the administration's Cybersecurity National Action Plan and signed Executive Order 13691 to mitigate vulnerabilities in cyberspace and increase cooperation between the private and public sectors on this issue. The National Cybersecurity and Communications Integration Center has proved effective, as far as we can ascertain.

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[10] U.S. Customs and Border Patrol, "Intellectual Property Rights Seizure Statistics Fiscal Year 2015," 2016, https://www.cbp.gov/sites/default/files/assets/documents/2016-Apr/FY%202015%20IPR%20Stats%20Presentation.pdf.

[11] FireEye iSight Intelligence, "Red Line Drawn: China Recalculates Its Use of Cyber Espionage," Special Report, June 2016, https://www.fireeye.com/content/dam/fireeye-www/current-threats/pdfs/rpt-china-espionage.pdf.

Introduction

As the authors of the original *Report of the Commission on the Theft of American Intellectual Property* (also known as the *IP Commission Report*), we were encouraged by the widespread interest in the report and its impact on new legislation. In addition to the high volume of downloads, the report was regularly cited, quoted, or referred to in the national and international media, including the *New York Times*, *Wall Street Journal*, *Washington Post*, and *Economist*.

We are pleased that Congress and the Obama administration took the lead from our report and implemented several of our top recommendations. Congress gave the president the power to sanction foreign entities that engage in cyberespionage of IP and gave U.S. entities private right of action in federal courts against thieves of their trade secrets. For its part, the Obama administration set up a mechanism to sanction foreign persons engaged in "significant malicious activities."[12]

Despite the success of the report and resulting legislation, there is still much work that needs to be done. We estimate that at the low end the annual cost to the U.S. economy of several categories of IP theft exceeds $225 billion, with the unknown cost of other types of IP theft almost certainly exceeding that amount and possibly being as high as $600 billion annually.[13] Further, while cyberespionage may have decreased from some actors, several sources report that the worst and most capable actors still persist in hacking for economic gain. IP thieves continue to use traditional means to attack targets.

What follows is an update to our original report. This update begins with an overview of the legislative and executive actions that the U.S. government has taken since 2013. It moves on to assess the economic cost of IP theft and discuss the challenges to IP protections abroad that persist despite attempts to deal with the problem. In the conclusion, we argue that Section 1637 of the 2015 NDAA needs to be implemented and that many of our original recommendations remain relevant and ripe for adoption. Our recommendations are outlined in detail in the appendix.

New Developments to Counter IP Theft

After the release of the *IP Commission Report* in May 2013, the Obama administration and Congress took several actions to reduce the theft of American IP. Some of the policies enacted have borrowed from the recommendations that the Commission made in 2013, while others have fallen short and left the Commission wanting more. Outlined below are the statutory and executive actions that the U.S. government has implemented over the past three-plus years:

Indictment of five PLA officers. One year after the release of the *IP Commission Report*, the Department of Justice indicted five members of PLA unit 61398 in Shanghai on economic espionage charges. The indictment alleges the PLA officers hacked into the networks of several U.S. companies and maintained access over several years to steal trade secrets and other sensitive information. The indictment of the five officers signified a break with the Obama administration's strategy of

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[12] "Blocking the Property of Certain Persons Engaging in Significant Malicious Cyber-Enabled Activities," Executive Order 13694, April 1, 2015, Code of Federal Regulations, title 3 (2015), 297–99, https://www.gpo.gov/fdsys/pkg/CFR-2016-title3-vol1/pdf/CFR-2016-title3-vol1-eo13694.pdf.

[13] As noted in the Executive Summary, in November 2015 William Evanina, national counterintelligence executive of the Office of the Director of National Intelligence, estimated that economic espionage through hacking costs the U.S. economy $400 billion a year, which is within the range of the IP Commission's findings. See Strohm, "No Sign China Has Stopped Hacking U.S. Companies, Official Says." The full report from the Office of the Director of National Intelligence is available from the IP Commission website at http://www.ipcommission.org/report/Evolving_Cyber_Tactics_in_Stealing_US_Economic_Secrets_ODNI_Report.jpg.

quietly pressuring the Chinese government to establish mutually acceptable norms in cyberspace.[14] However, the indictment is largely symbolic; the PLA officers will likely never be tried in a U.S. court as they are unlikely to travel to the United States. The action seemed intended to shame the People's Republic of China (PRC) as publicly as possible, but in reality it probably served to disperse the hackers away from the PLA unit and the associated unit headquarters, without achieving real punishment for cyberattacks.

2015 National Defense Authorization Act, Section 1637, Actions to Address Economic or Industrial Espionage in Cyberspace. The language of the section is remarkably similar to the Deter Cyber Theft Act, which was introduced in its original sanction-less form in May 2013 by Senator Carl Levin, then chairman of the Senate Armed Services Committee. (The bill cosponsors included Senator John McCain, current chairman of the committee.) In May 2014 the Deter Cyber Theft Act was reintroduced with the sanctions provision and was referred to the Senate Banking, Housing, and Urban Affairs Committee, where no action was taken. In December 2014, Section 1637 was included in the 2015 NDAA.

Section 1637 has two major components. First, it directs the president to submit a report to Congress that contains a list of countries that engage in "economic and industrial espionage in cyberspace" and a list of technologies or services that are being targeted by foreign actors. The list of countries is similar to that of the Special 301 Report published by the United States Trade Representative (USTR). Both require "priority" categories for the most egregious offending countries. The report also must identify the actions taken by the president to "decrease the prevalence of economic or industrial espionage in cyberspace."[15] The National Counterintelligence and Security Center released the report in November 2016—some seventeen months late. The report outlines how state intelligence services have improved their cyberespionage techniques over the past several years while U.S. companies have become more vulnerable targets due to increased use of the cloud and other factors. The report concludes that the cost from cyber theft to U.S. businesses appears to be increasing.[16]

Second, and more importantly, the bill authorizes the president "to prohibit all transactions in property" of any person who the president determines "knowingly engages in economic or industrial espionage in cyberspace."[17] This authority is an expansion of the long-standing International Emergency Economic Powers Act (IEEPA). There are two points worth considering on what counts as a "person." First, the bill is limited to foreign persons. Therefore, people within the United States still must be prosecuted under the Economic Espionage Act. Second, IEEPA has been used for many years, and it has targeted organizations as well as people.

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[14] Michael S. Schmidt and David E. Sanger, "5 in China Army Face U.S. Charges of Cyberattacks," *New York Times*, May 19, 2014, http://www.nytimes.com/2014/05/20/us/us-to-charge-chinese-workers-with-cyberspying.html.

[15] U.S. Congress, *Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015*, 113th Cong., Public Law 113-291 (Washington, D.C., December 19, 2014).

[16] Office of the Director of National Intelligence, National Counterintelligence and Security Center, "Evolving Cyber Tactics in Stealing U.S. Economic Secrets: Report to Congress on Foreign Economic Collection and Industrial Espionage in Cyberspace 2015," 2016, available at http://www.ipcommission.org/report/Evolving_Cyber_Tactics_in_Stealing_US_Economic_Secrets_ODNI_Report.jpg. Much of the data in the report only goes through 2015. For a report dated November 2016, we had hoped that more current data would be available. The report also lacks the priority country list and the description of actions taken by the executive to decrease economic espionage in cyberspace, as mandated by Section 1637. As noted above, the report concludes that the problem is growing worse due to several factors. These findings would seem to contradict President Obama's assertion that cyber theft would get better in light of the agreement he struck with President Xi Jinping.

[17] For the purposes of Section 1637, cyberspace is defined as "the interdependent network of information technology infrastructures" and includes "the internet, telecommunications networks, computer systems, and embedded processors and controllers." See U.S. Congress, *Carl Levin and Howard P. "Buck" McKeon National Defense Authorization Act for Fiscal Year 2015*.

Five months after this legislation was signed into law, President Obama signed Executive Order 13694 invoking the IEEPA emergency powers as urged by Congress, but unfortunately he apparently never applied them to address the problem of IP theft. See the section below on Executive Order 13694 for more information.

National Cybersecurity Protection Act of 2014. This law amends the Homeland Security Act of 2002 and codifies the Department of Homeland Security's cybersecurity operations center (the National Cybersecurity and Communications Integration Center, or NCCIC). It grants authority for the Department of Homeland Security to work with private and public entities to encourage information sharing, including with international partners. It further instructs the NCCIC to report to Congress on several issues, including the secretary's recommendations for how to "expedite the implementation of information-sharing agreements" between the public and private sectors and the NCCIC's progress in creating the center and implementing the law. The act also introduces a federal agency "data breach notification" law, requiring federal agencies to notify Congress and individuals affected by a data breach as quickly as possible. (There are already 47 states with similar data statutes requiring agencies to alert applicable persons.)

Federal Information Security Modernization Act (FISMA) of 2014. This law amends the Federal Information Security Management Act of 2002 and instructs agencies to update their monitoring systems for identifying data security compliance. Currently these processes require a lot of redundant paperwork. FISMA outlines responsibilities for agencies and forces them to develop better information security practices.

Cybersecurity Workforce Assessment Act of 2014. This act mandates that the Department of Homeland Security review, update, and bolster its cybersecurity workforce. It also requires the secretary of homeland security to develop a strategy to enhance "the readiness, capacity, training, recruitment, and retention of the cybersecurity workforce of the Department."

Cybersecurity Enhancement Act of 2014. With the aim to enhance the security of federal networks and to "support the development of a voluntary, consensus-based, industry-led set of standards," the Cybersecurity Enhancement Act of 2014 authorizes the National Institute of Standards and Technology to coordinate and consult with government agencies and the private sector to develop best practices, including establishing research centers and scholarships for cultivating cybersecurity professionals.

Executive Order 13691 of February 13, 2015, promoting private-sector cybersecurity information sharing. Executive Order 13691 establishes "information-sharing and analysis organizations" to strengthen the security cooperation among private industries, nongovernmental organizations, and the federal government. The administration hopes these organizations will help U.S. firms in the asymmetrical fight against state-sponsored cyberespionage.

Executive Order 13694 of April 1, 2015, blocking the property of certain persons engaging in significant malicious cyber-enabled activities. As urged by Congress in Section 1637 of the 2015 NDAA, President Obama signed Executive Order 13694 blocking the transfer, payment, or export of property of individuals who have engaged in cyberespionage directed against the "national security, foreign policy, economic health, or financial stability of the United States." The executive order specifically states that it will apply to individuals engaged in misappropriating trade secrets for commercial or competitive advantage as well as to the commercial entities in receipt of such information. President Obama declared that the national emergency would continue for another

year on March 29, 2016, as required by law. As of December 2016, Executive Order 13694 had yet to be used against any individual in response to IP theft.[18]

Executive Order 13718 of February 9, 2016, establishing the Commission on Enhancing National Cybersecurity. President Obama established the bipartisan Commission on Enhancing National Cybersecurity to make "detailed recommendations to strengthen cybersecurity in both the public and private sectors" through raising awareness, studying risk management strategies, and developing methods to improve the adoption of best practices throughout the government. The commission's goal was to seek input from both cybersecurity experts and the victims of significant cybersecurity incidents to identify barriers to improved cybersecurity. The commission submitted its final report in early December 2016.

Defend Trade Secrets Act of 2016. Signed into law on May 11, 2016, the bipartisan Defend Trade Secrets Act establishes private right of action in federal court for U.S. entities that have had their trade secrets stolen and offers them protections in the course of a trial to prevent their trade secrets from becoming public. This was a key recommendation of the IP Commission in 2013. Prior to the passage of the act, a victim of trade secret theft could only seek a remedy with a civil suit in a state court unless the Department of Justice filed a criminal suit, which was rare.[19] The act also requires the Department of Justice to submit a report to Congress on the size and scope of trade secret theft outside the United States no later than one year after the date of enactment of the law and to offer recommendations for combating such theft. At the time of writing, the report, if submitted, is not publicly available

IPEC Joint Strategic Plan on Intellectual Property Enforcement FY2017–2019. Published by the Office of the Intellectual Property Enforcement Coordinator (IPEC), this report was mandated by the Prioritizing Resources and Organization for Intellectual Property Act and presents an account of the economic cost of IP theft and the various methods employed to commit IP-related crime. It then offers several recommendations for securing cross-border trade and promoting frameworks to enhance IPR enforcement.[20] The report was released in the final month of the Obama administration, and the effect on the Trump administration is yet to be determined.

State of the Problem: Damage Report

Despite executive and legislative action to stem the damage from IP infringement, the incentives to steal IP persist, due in part to weak enforcement and penalties and in part to foreign industrial policies and practices. The annual cost to the U.S. economy from IP theft remains in the hundreds of billions of dollars. This update to the *IP Commission Report* provides a conservative, low-end estimate of the cost of IP theft in three categories—counterfeit and pirated tangible goods, software piracy, and trade secret theft—to be in excess of $225 billion, and the cost is possibly as high as $600 billion.

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[18] Executive Order 13694 was amended on December 29, 2016, and applied to sanction nine individuals and entities "in response to the Russian government's aggressive harassment of U.S. officials and cyber operations aimed at the U.S. election." "Executive Order—Taking Additional Steps to Address the National Emergency with Respect to Significant Malicious Cyber-Enabled Activities," White House, Press Release, December 29, 2016, https://www.whitehouse.gov/the-press-office/2016/12/29/executive-order-taking-additional-steps-address-national-emergency.

[19] "Congress Authorizes Federal Cause of Action for Trade Secret Misappropriation," Lexology, 2006, http://www.lexology.com/library/detail.aspx?g=9c07d09d-67b7-4937-af54-c7a313bcb85e.

[20] Intellectual Property Enforcement Coordinator, *U.S. Joint Strategic Plan on Intellectual Property Enforcement FY2017–2019: Supporting Innovation, Creativity & Enterprise* (Washington, D.C., December 2016), https://www.whitehouse.gov/sites/default/files/omb/IPEC/2016jointstrategicplan.pdf.

The Continuing Significance of the Problem

The threat to American IP-intensive industries stems from the difficulty of enforcing protections against advanced and persistent foreign threats. Law enforcement lacks the capacity to patrol and protect the vast U.S. business community. When foreign actors are implicated in stealing American IP, it is highly unlikely that they will ever be brought to justice in a U.S. court, as evidenced by the indictment of the five PLA officers implicated in the theft of IP from six U.S. companies.[21] The problem is made worse by foreign industrial policies and practices that rely on securing new technologies cheaply to catch up with developed economies.

The threat of IP theft is in turn significant because of IP's contribution to the U.S. economy. IP protection is important to every business, as trade secrets and trademarks pervade the private sector. According to the Global Intellectual Property Center of the U.S. Chamber of Commerce, sales from IP-intensive firms totaled $6.9 trillion in 2013. IP-intensive industries are also responsible for 56 million jobs in the United States—roughly 35% of the U.S. labor force. Moreover, a job with an IP-intensive company pays on average 26% more than a job with a non-IP-intensive company.[22]

The Difficulty in Measuring the Damage

Measuring the economic impact of IP infringement and counterfeit goods is extraordinarily difficult because of the illicit nature of piracy and trading in counterfeit goods, the ease of using pirated software, and the disincentives associated with reporting trade secret theft. Victims of trade secret theft—to the extent that they are aware of the crime—are often reluctant to share information on the resulting financial loss (when such theft necessitates disclosure) out of fear of declining investment opportunities or diminished market valuation.

Most statistics of trade in counterfeit tangible goods are based on seizure data reports from the Customs and Border Patrol (CBP), with the understanding that customs officials only capture a small portion of counterfeit goods entering U.S. territory at the border and the statistics do not account for counterfeit goods exchanged within the United States. They also do not capture data for counterfeit U.S. goods sold in foreign markets, nor do they take into account the vast amount of pirated goods, which is even more difficult to measure. Moreover, even if the total amount of pirated and counterfeit goods entering the United States could be quantified, this figure would only represent the value of these goods and not necessarily the value of lost revenues. Finally, it is difficult to measure how many buyers know that what they are purchasing is counterfeit and would not otherwise be in the market for legitimate goods at an authorized price.

Despite these difficulties, the damage to the U.S. economy can still be estimated by using existing data and proxies. The following discussion provides a range for the cost to the U.S. economy of counterfeit and pirated tangible goods, software piracy, and trade secret theft.

Estimate of the Cost of IP Theft

Counterfeit and pirated tangible goods. In 2016, the OECD and EUIPO used worldwide seizure statistics from 2013 to calculate that up to 2.5%, or $461 billion, of world trade was in counterfeit

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21 "U.S. Charges Five Chinese Military Hackers for Cyber Espionage against U.S. Corporations and a Labor Organization for Commercial Advantage," U.S. Department of Justice, May 19, 2014, https://www.justice.gov/opa/pr/us-charges-five-chinese-military-hackers-cyber-espionage-against-us-corporations-and-labor.

22 U.S. Chamber of Commerce Global Intellectual Property Center, "Employing Innovation across America," 2016, http://image.uschamber.com/lib/fee913797d6303/m/1/GIPC_Employing_Innovation_Report_2016.pdf.

or pirated products.[23] By applying this percentage to U.S. trade, we estimate that in 2015 the value of these goods entering the U.S. market was at least $58 billion.

The United States, however, is a much larger market for imports than the average market. It is nearly equivalent in size to the European Union, where the OECD/EUIPO study determined that approximately 5% of imports are counterfeit or pirated tangible goods.[24] By using 5% as a proxy for the proportion of counterfeit and pirated tangible goods in U.S. imports ($2.273 trillion),[25] we estimate that the United States may have imported up to $118 billion of these goods in 2015. Thus, anywhere from $58 billion to $118 billion of counterfeit and pirated tangible goods may have entered the United States in 2015. This represents the approximate value of counterfeit and pirated tangible goods (not services) entering the country.

With respect to counterfeit and pirated tangible U.S. goods sold in foreign markets, the OECD/EUIPO study found that they accounted for nearly 20% of the value of reported worldwide seizures.[26] In 2015, estimated worldwide seizures of counterfeit goods totaled $425 billion, meaning that as much as $85 billion of counterfeit U.S. goods (20% of worldwide seizures) entered the world market (including the U.S. market).[27]

Certainly, in the absence of counterfeit goods some sales would never take place, and thus the value of illegal sales is not the same as the sales lost to U.S. firms. The true cost to law-abiding U.S. firms in sales displaced due to counterfeiting and pirating of tangible goods is unknowable, but it is almost certain to be a significant proportion of total counterfeit sales. For purposes of aggregating the total cost to the U.S. economy of IP theft, we have estimated that 20% of counterfeits might have displaced actual sales of goods. *When applied to the low-end estimate ($143 billion) of the total value of counterfeit and pirated tangible goods imported into the United States and counterfeit and pirated tangible U.S. goods sold abroad, the conservative estimate of the cost to the U.S. economy is $29 billion. When applied to the high-end estimate ($203 billion), the cost to the U.S. economy is estimated at $41 billion.*

How much of that total is intercepted by customs officials, where does it come from, and how does it get to the United States? CBP releases the Intellectual Property Rights Seizure Statistics each year. From the nearly 29,000 seizures in 2015, CBP seized $1.35 billion in counterfeit goods at the U.S. border, or 1.2%–2.3% of the estimated total value of counterfeit goods entering the United States, according to the approximation from the OECD/EUIPO model.[28] Worldwide, counterfeit goods travel mostly by postal service (62%) and quite often in small shipments of ten items or fewer (43%).[29] This makes seizing them extraordinarily difficult.

CBP also tracks from where the counterfeit goods are imported. Slightly more than half (52%) of all counterfeit goods entering the United States come from mainland China.[30] This is significantly

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23 OECD and EUIPO, *Trade in Counterfeit and Pirated Goods*. Because the dynamics of trade have changed since 2013, and because the United States is a larger market for imports than the average country, the 2.5% figure is not directly applicable to the United States, but it can provide a rough approximation in the absence of updated data.

24 Ibid.

25 U.S. Bureau of Economic Analysis, "U.S. International Transaction Tables," December 2016, https://www.bea.gov/scb/pdf/2017/01%20January/0117_international_transactions_tables.pdf. It should be noted that there are significant differences between the two economies, including apparently more porous borders in the European Union. As a result, the EU economy is not a perfect proxy for the U.S. economy.

26 OECD and EUIPO, *Trade in Counterfeit and Pirated Goods*.

27 Ibid.

28 U.S. Customs and Border Patrol, "Intellectual Property Rights Seizure Statistics Fiscal Year 2015."

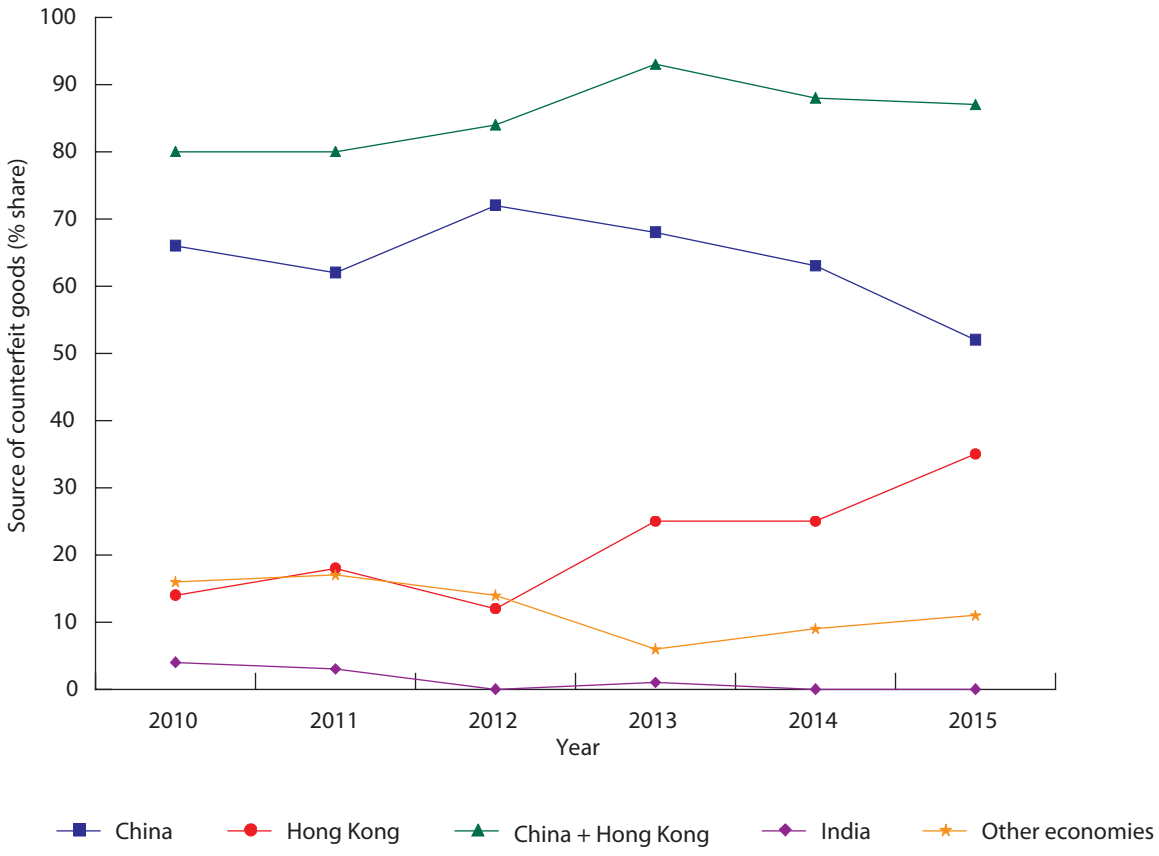
29 OECD and EUIPO, *Trade in Counterfeit and Pirated Goods*.

30 Ibid.

lower than in 2013, which saw 68% of counterfeit goods coming from mainland China. However, these improvements are offset by the increase in counterfeit goods imported from Hong Kong, which, although a separate customs territory and economic entity, is under PRC sovereignty, allowing for a more fluid border with regard to the transport of goods in some cases. The PRC as a whole (including Hong Kong) accounts for 87% of all counterfeit goods seized. This is only slightly lower than in 2013 and is slightly higher than the five-year average. All other economies combined represent around 13% of imported counterfeit goods (see **Figure 1**). It is not just the United States that is receiving counterfeits from China; 80% of the counterfeits seized in Canada are China-sourced as well.[31]

Patent infringement. Unfortunately, our investigation has revealed no reliable quantitative data on the economic cost of patent infringement to the U.S. economy, and therefore this is not included in our total figures. However, through testimony to the Commission and anecdotal evidence in the press, we can conclude that the cost to U.S. businesses from patent infringement abroad is at least in the billions of dollars, although the full scale cannot be estimated.[32] China presents a mixed case. Of particular note, China has become the top source of new patents, accounting for around one-third

FIGURE 1 Source economies of counterfeit goods



[31] "RFA: China Has Become the Largest Fake Product Source for Canada's Online Market," Chinascope, December 13, 2016, http://chinascope.org/archives/10777.

[32] As noted in our 2013 report, the U.S. International Trade Commission (USITC) estimated that U.S. companies suffered $0.2 billion to $2.8 billion in losses from Chinese patent infringement in 2009 alone. USITC, *China: Effects of Intellectual Property Infringement and Indigenous Innovation Policies on the U.S. Economy* (Washington, D.C., May 2011), 3–37, http://www.usitc.gov/publications/332/pub4226.pdf.

of all new patents filed in 2015.[33] However, many of these are "petty" or "utility" patents, which grant protections to rights holders without questioning how innovative the subject matter might be.[34] These patent holders are then able to sue foreign companies bringing their IP into the Chinese market. For more background on patent infringement, please see our original report.

Pirated software. The Business Software Alliance (BSA) and International Data Corporation track the rates and value of illicit software in use throughout the world.[35] According to their 2015 data, the "shadow market" for globally pirated software shrunk approximately 17% from $62.7 billion in 2013 to $52.2 billion in 2015.[36] *The low-end estimate for the cost to U.S. firms is $18 billion, using 0.1% of U.S. GDP as a proxy—a percentage in line with BSA's historical estimates of global software piracy.*[37]

Globally the proportion of illicit software was 39% in 2015, down from 43% in 2013. The Asia-Pacific region remains the worst offender, with 61% of all software in use being illicit—which amounts to 36% of the world's illicit software value (see **Figure 2**).[38] Lost sales from pirated goods are difficult to quantify.

The BSA study finds a strong correlation (0.78 coefficient) between illicit software and harmful malware. In a separate study based on data from its wide network of users, Symantec discovered "more than 430 million new unique pieces of malware, up 36 percent from the year before."[39] Malware and ransomware are often components of cyberattacks.

Theft of trade secrets. Of all the forms of IP theft, trade secret theft—in an increasing number of cases enabled by cyberespionage—might do the greatest damage to the U.S. economy. In a 2014 study, "Economic Impact of Trade Secret Theft: A Framework for Companies to Safeguard Trade Secrets and Mitigate Potential Threats," PricewaterhouseCoopers and the Center for Responsible Enterprise and Trade, using several proxy measures, found that trade secret theft could be estimated to be between 1% and 3% of GDP.[40] Given this calculation, the economic impact of trade secret theft on the U.S. economy in 2015 is estimated to be between $180 billion and $540 billion. *Using the lower end of the range, we estimate that trade secret theft costs the U.S. economy at least $180 billion per year.*

Cyber theft is a cheap way to avoid costly and time-intensive R&D that may simply be beyond the thieves' capacity. Foreign firms benefiting from the cyber theft of American IP are thus able to sell goods and services developed using stolen IP at a much cheaper price than firms investing in R&D organically.

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33 "Global Patent Applications Rose to 2.9 Million in 2015 on Strong Growth from China; Demand Also Increased for Other Intellectual Property Rights," World Intellectual Property Organization, Press Release, November 23, 2016, http://www.wipo.int/pressroom/en/articles/2016/article_0017.html.

34 USITC, *China: Effects of Intellectual Property Infringement and Indigenous Innovation Policies on the U.S. Economy*.

35 We consider pirated software as one category of pirated digital goods (other categories include all forms of digital media) that is separate from pirated tangible goods. There is much reliable data on counterfeit and pirated tangible goods based on seizure statistics from customs and border patrol agencies, but much less data is available on pirated digital goods as a result of the ease of downloading and sharing pirated digital content.

36 BSA, "Seizing Opportunity through License Compliance."

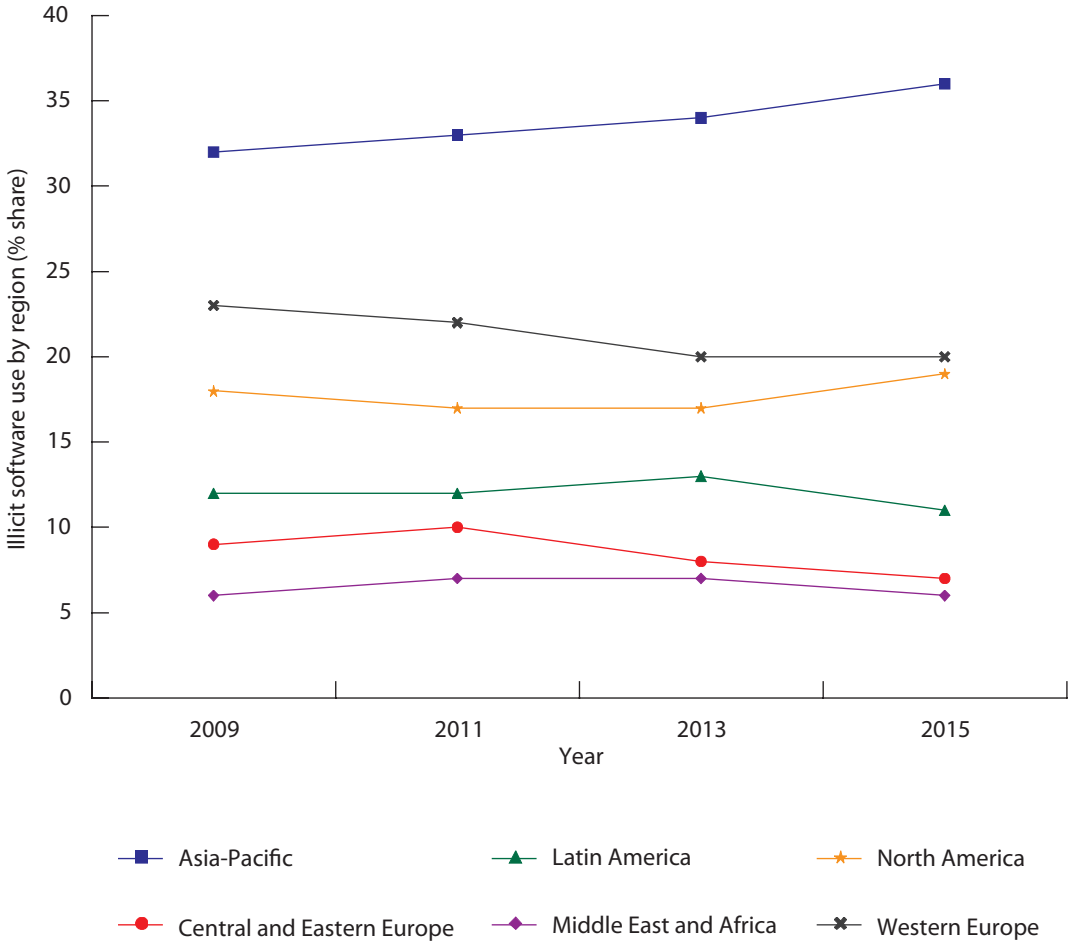
37 CREATe.org and PricewaterhouseCoopers, "Economic Impact of Trade Secret Theft."

38 BSA, "Seizing Opportunity through License Compliance."

39 Symantec, "Internet Security Threat Report," vol. 21, April 2016, https://www.symantec.com/content/dam/symantec/docs/reports/istr-21-2016-en.pdf.

40 CREATe.org and PricewaterhouseCoopers, "Economic Impact of Trade Secret Theft."

FIGURE 2 Global proportion of illicit software use by region



Totaling It All Up

In summary, we estimate that the total low-end value of the annual cost of IP theft in three major categories exceeds $225 billion, or 1.25% of the U.S. economy, and may be as high as $600 billion, based on the following components:

- The estimated low-end value of counterfeit and pirated tangible goods imported and exported, based on a conservative estimate that 20% of the cost of these goods detracts from legitimate sales, is $29 billion. The high-end estimate for counterfeit and pirated tangible goods imported and exported is $41 billion.
- The estimated value of pirated U.S. software is $18 billion.
- The estimated low-end cost of trade secret theft to U.S. firms is $180 billion, or 1% of U.S. GDP. The high-end estimate is $540 billion, amounting to 3% of GDP.

We have thus found no evidence that the Office of the Director of National Intelligence's estimate of $400 billion is incorrect.[41] Again, these are only the direct costs of IP theft that can

[41] Strohm, "No Sign China Has Stopped Hacking U.S. Companies, Official Says."

be roughly estimated. The indirect costs to the U.S. economy, such as the loss of competitiveness and devaluation of trademarks, are more difficult to measure, but we conclude that they are no less substantial. It is also important to note that these figures do not account for the economic cost of patent infringement.

Innovation is the United States' greatest competitive advantage.[42] The massive theft of American IP undermines that advantage, making the United States less competitive over the long term. Further, IP-intensive jobs have a greater multiplier effect on employment than do other types of jobs. For every high-tech job created in the United States, five jobs are also created indirectly in a local economy.[43] China does not just steal the most American IP of any country; it targets the sectors at the forefront of innovation that could create the best jobs for Americans in the 21st century. Firms in nascent industries such as biotechnology and next-generation IT that have the greatest potential to drive future growth in the U.S. economy are unfortunately under the greatest threat.

The Intellectual Property Rights Climate Abroad

Every year, the USTR reviews the development in IPR protection abroad and establishes watch lists. In 2016 the USTR reviewed 73 trading partners for its Special 301 Report and listed 34 countries on its Priority Watch List or Watch List. Only Ecuador and Pakistan moved off the Priority Watch List.[44] These watch lists are important for the U.S. government to identify the most salient issues of IPR protection among U.S. trade partners. The Special 301 Report is not all negative; it also identifies best IPR practices by trading partners and other positive developments abroad. The 2016 report recognized China specifically for overhauling its IPR laws and regulations and for signing an expanded memorandum of understanding with the National Intellectual Property Rights Coordination Center of the Department of Homeland Security.[45]

In addition to the watch lists, the USTR announced that it would conduct four out-of-cycle reviews in 2016 to encourage foreign nations to make continued progress on IPR issues. Specifically, the reviews would examine and make recommendations for Colombia, Pakistan, Spain, and Tajikistan. The out-of-cycle reviews were not available from the USTR website at the time of writing.

The Special Case of China

As previously mentioned, China (including Hong Kong) is the source of 87% of counterfeit physical goods entering the United States. It is not surprising, then, that in the "2016 China Business Climate Survey Report" the American Chamber of Commerce in the People's Republic of China lists IP infringement as a concern regarding doing business in China, with 23% of respondents listing it as a top challenge.[46] This evidence is corroborated by the U.S.-China Business Council, which found that IPR enforcement was the eighth-highest concern of U.S. companies it surveyed—an improvement over the previous year. Of note, the top concerns for U.S. companies in the Business

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42 Derek Scissors, "Fixing U.S.-China Trade and Investment," American Enterprise Institute, April 13, 2016, https://www.aei.org/publication/fixing-us-china-trade-and-investment.

43 Enrico Moretti, *The New Geography of Jobs* (Boston: First Mariner Books, 2013).

44 USTR, "2016 Special 301 Report," April 2016, https://ustr.gov/sites/default/files/USTR-2016-Special-301-Report.pdf.

45 Ibid.

46 American Chamber of Commerce in the People's Republic of China, "2016 China Business Climate Survey Report," 2016, http://www.amchamchina.org/policy-advocacy/business-climate-survey.

Climate Survey are issues relevant to this report—inconsistent interpretation of regulations and unclear laws—which is a sign that China's regulatory regime is developing in uneven ways.[47]

The Chinese government recognizes that it must reform its regulatory environment to support the development of an IP-intensive economy that produces its own high-value products and to become not just a "large IP country" but also a "strong IP country."[48] The Chinese government has made strengthening its IPR regime a goal since it enacted a series of laws in the 1970s. It signed on to the Agreement on Trade-Related Aspects of Intellectual Property Rights in the 1990s and ultimately joined the World Trade Organization (WTO) in 2001.[49] Yet China has only had IP courts since 2014 and is still reforming its laws and regulations.

To realize those reforms, China's State Council issued a new action plan in 2016. Building on a 2015 policy document outlining goals to develop a stricter IPR regime, the action plan, titled "Opinion of the State Council on Accelerating the Construction of Intellectual Property Powers for China as an Intellectual Property Strong Country under the New Situation—Division of Tasks," duplicates standing policy but also lists several priorities for reform of the IPR regime.[50] According to analysis by Mark Cohen, a long-standing expert on China's IP environment, the document suggests that China is making a greater effort to raise the damages a victim can sue for in Chinese courts.[51] The action plan also stresses international cooperation and the placement of more IP officials overseas to protect Chinese companies. It goes on to encourage the study of China's IP-intensive industries and the use of fiscal policy to promote their development.[52] Taken as a whole, the plan appears to be more geared toward fostering stronger IP-intensive industries at home than developing the rule of law.

In both its Report to Congress on China's WTO Compliance and the Special 301 Report, the USTR identifies problems with trade secret theft, software piracy, and counterfeit physical goods.[53] The "2016 Special 301 Report" outlines several deficiencies in China's IPR regime that go uncorrected in the most recent action plan:

> Progress toward effective protection and enforcement of IPR in China is undermined by unchecked trade secret theft, market access obstacles to ICT [information and communications technology] products raised in the name of security, measures favoring domestically owned intellectual property in the name of promoting innovation in China, rampant piracy and counterfeiting in China's massive online and physical markets, extensive use of unlicensed software, and the supply of counterfeit goods to foreign markets. Additional challenges arise in the form of obstacles that restrict foreign firms' ability to fully participate in standards setting, the unnecessary introduction of inapposite competition concepts into intellectual property laws, and acute challenges in protecting and incentivizing the creation of pharmaceutical inventions and test data. As a result, surveys continue to show that the uncertain intellectual property environment

47 U.S.-China Business Council, "USCBC 2016 Membership Survey: The Business Environment in China—Key Findings," 2016, https://www.uschina.org/sites/default/files/USCBC%202016%20Annual%20Member%20Survey%20%28ENG%29_1.pdf.

48 "New State Council Decision on Intellectual Property Strategy for China as a Strong IP Country," China IPR, July 24, 2016, https://chinaipr.com/2016/07/24/new-state-council-decision-on-intellectual-property-strategy-for-china-as-a-strong-ip-country.

49 Mingde Li, "Current IP Issues in China and the Multilateral Trading System," Chinese Academy of Social Sciences, February 26, 2015, https://www.wto.org/english/tratop_e/trips_e/Li_Mengde.pdf.

50 "New State Council Decision on Intellectual Property Strategy for China as a Strong IP Country."

51 Ibid.

52 Ibid.

53 USTR, "2015 Report to Congress on China WTO Compliance," December 2015, https://ustr.gov/sites/default/files/2015-Report-to-Congress-China-WTO-Compliance.pdf.

is a leading concern for businesses operating in China, as intellectual property infringements are difficult to prevent and remediate.[54]

China also singles out high-tech sectors for special support in its five-year plans. In testimony to the U.S.-China Economic and Security Commission, Jen Weedon, formerly of the cybersecurity firm FireEye, asserted that while all sectors are potential targets of Chinese cyberespionage, firms in strategic industries identified in the 12th Five-Year Plan are targeted by a greater number of advanced hackers sponsored by the Chinese government.[55] One such targeted high-tech sector is the semiconductor industry. The Chinese government hopes that China can attain "world-class status" in semiconductor production by 2030.[56] It aims to do so through subsidizing domestic firms, and by what the President's Council of Advisors on Science and Technology calls "zero-sum tactics" that hurt the overall industry and global economy but help Chinese firms. These tactics include the overt and covert theft of IP, among others.[57]

Numerous examples help demonstrate the scope of the Chinese industrial policy of gaining access to foreign expertise in key sectors. For example, in the United Kingdom, the sensitive nuclear project at Hinkley Point proposed for co-development with China General Nuclear Power Company was delayed. It came to light that the Chinese firm was indicted (along with one of its senior employees, Allen Ho) for "conspiracy to unlawfully engage and participate in the production and development of special nuclear material outside the United States, without the required authorization from the U.S. Department of Energy."[58]

Perhaps the most recent case is China's development of the Micius satellite, considered the world's first quantum communications satellite, which China launched into orbit in 2016. Scientists at national laboratories and academic institutions around the world have been working on developing technology based on quantum mechanics to create a communications system that is considered to be completely secure from penetration. China is eager to develop this technology to protect its own communications from potential adversaries like the United States. However, perhaps ironically, China was able to develop quantum communications technology ahead of its rivals by incorporating their research findings. In an interview with the *Wall Street Journal*, Pan Jianwei, the physicist leading the project, was quoted saying, "We've taken all the good technology from labs around the world, absorbed it and brought it back."[59] This may be just an innocent quip about how scientists share their basic research findings with one another across borders. However, it has been demonstrated

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54 USTR, "2016 Special 301 Report."

55 Jen Weedon, testimony before the U.S.-China Economic and Security Review Commission, Hearing on Commercial Cyber Espionage and Barriers to Digital Trade in China, Washington, D.C., June 15, 2015, http://www.uscc.gov/sites/default/files/Weedon%20Testimony.pdf.

56 "China's Global Semiconductor Raid," *Wall Street Journal*, January 12, 2017, http://www.wsj.com/articles/chinas-global-semiconductor-raid-1484266212.

57 President's Council of Advisors on Science and Technology, *Report to the President: Ensuring Long-Term U.S. Leadership in Semiconductors* (Washington, D.C., January 2017), https://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/pcast_ensuring_long-term_us_leadership_in_semiconductors.pdf. The other zero-sum tactics include forcing customers to buy domestic and forcing foreign companies to transfer technology for market access. A fourth zero-sum tactic, not mentioned in the report from the President's Council of Advisors on Science and Technology, is barring foreign firms from providing certain services in the Chinese market. For example, value-added telecommunications services cannot be provided by a foreign-owned entity. The best a foreign company can do is own 49% of an entity providing such services because the necessary license can only be granted to a majority-Chinese-owned entity. This means that online stores and cloud storage, among other services, have to be provided by the latter, forcing the foreign company to share the technology and profits with a Chinese partner.

58 "U.S. Nuclear Engineer, China General Nuclear Power Company and Energy Technology International Indicted in Nuclear Power Conspiracy against the United States," U.S. Department of Justice, April 14, 2016, https://www.justice.gov/opa/pr/us-nuclear-engineer-china-general-nuclear-power-company-and-energy-technology-international.

59 Josh Chin, "China's Latest Leap Forward Isn't Just Great—It's Quantum," *Wall Street Journal*, August 20, 2016, http://www.wsj.com/articles/chinas-latest-leap-forward-isnt-just-greatits-quantum-1471269555.

that the Chinese government systematically collects information and secrets from abroad to further its technology development goals, as illustrated by the cases discussed above.

Beyond security issues is the concern that Chinese firms are able to underbid competitors because of unfair business practices, such as a firm enjoying preferential funding arrangements as a state-owned enterprise or engaging in the theft of IP and resources, as the U.S. Department of Justice finds.[60] Not only do these business practices allow Chinese firms to outbid potential rivals; they help Chinese researchers in the state sector develop competitive technology faster than some of their international rivals.

Conclusion

The scourge of IP theft and cyberespionage likely continues to cost the U.S. economy hundreds of billions of dollars a year despite improved laws and regulations. The theft of American IP is not just the "greatest transfer of wealth in human history," as General Keith Alexander once put it; IP theft undercuts the primary competitive advantage of American business—the capacity for innovation. IP-intensive companies generate more jobs both directly and indirectly than firms in other sectors. The growth of the U.S. economy and the strength of the U.S. labor market depend on the ability of Americans to innovate and increase productivity. The scale and persistence of IP theft, often committed by advanced state-backed groups, erode the competitiveness of U.S. firms and threaten the U.S. economy.

Apart from the economic costs of IP theft are the political costs. Allowing persistent state-backed IP theft to continue represents the erosion of the norms between countries that buttress the international order. The United States has chosen to uphold these norms for generations and continues to uphold them when they are threatened in other domains. It should not give up on leading toward a code of conduct in the cyber domain or on addressing the issue of IP theft. Such leadership requires that the United States enforce its own laws.

The commissioners were discouraged by the Obama administration's inaction on IP theft and cyberespionage. Congress has implemented several of the recommendations from our 2013 report, namely Section 1637 of the 2015 NDAA and the Defense Trade Secrets Act of 2016. Although the president took steps to bring his emergency economic powers to bear on cyber-enabled IP theft, the Obama administration failed to bring any cases against the perpetrators of cybercrime or IP theft.

The U.S. government has the capability and resources to address this problem. President Donald Trump should make IP theft a core issue in the early months of his administration. It is perhaps the single best way to correct the problems in the Sino-U.S. relationship that he highlighted during his campaign. To that end, several of this Commission's recommendations (outlined in the appendix) remain ripe for implementation, and we hope that the new Congress and administration will examine them early in 2017. If the makeup of this Commission is any suggestion, there exists broad bipartisan support for addressing IP theft and safeguarding the competitive advantages of U.S. firms, entrepreneurs, and workers.

60 "U.S. Nuclear Engineer, China General Nuclear Power Company and Energy Technology International Indicted in Nuclear Power Conspiracy against the United States."

Adopted Recommendations

Short-term Solutions

- **Enforce strict supply-chain accountability for the U.S. government.**
    - According to the Government Accountability Office, the Department of Defense has made some improvements in its supply-chain management, although much work remains to be done.

Medium-term Solutions

- **Amend the Economic Espionage Act to provide a federal private right of action for trade secret theft.**
    - The Defend Trade Secrets Act of 2016 created private right of action for victims of trade secret theft in U.S. courts. The act also created protections for plaintiffs to conceal the nature of their trade secrets.
- **Strengthen U.S. diplomatic priorities in the protection of American IP.**
    - Additional IP attachés are posted abroad, including a dedicated IP attaché in Beijing.

Long-term Solutions

- **Build institutions in priority countries that contribute toward a rule-of-law environment in ways that protect IP.**
    - This long-term solution is arguably in progress. A key component of the Obama administration's Joint Strategic Plan on Intellectual Property Enforcement was building capacity internationally to contribute to a rule-of-law environment.

Recommendations for Cybersecurity

- **Implement prudent vulnerability-mitigation measures.**
    - This recommendation is being implemented through the Cybersecurity National Action Plan and through Executive Order 13691 establishing information-sharing and analysis organizations.

Recommendations Pending Action

Short-term Solutions

- **Designate the national security adviser as the principal policy coordinator on the protection of American IP to reflect the president's priority and to ensure interagency coordination on this issue.**
    - Not implemented. The U.S. intellectual property enforcement coordinator, within the Office of Management and Budget, is still the principal policy coordinator.

- **Provide statutory responsibility and authority to the secretary of commerce to serve as the principal official responsible for effectively administering the president's policies on IP protection.**
    - Not implemented.
- **Strengthen the International Trade Commission's 337 process to sequester goods containing stolen IP.**
    - Not implemented. However, Section 1637 of the 2015 NDAA allows the president to sanction individuals and organizations found to be involved in economic espionage.
- **Empower the secretary of the Treasury, on the recommendation of the secretary of commerce, to deny the use of the U.S. banking system to foreign companies that repeatedly use or benefit from the theft of American IP.**
    - Authority established but not exercised. The IEEPA allows the president to sanction individuals and organizations and to "prohibit any transaction in foreign exchange."
- **Increase Department of Justice and FBI resources to investigate and prosecute cases of trade secret theft, especially those enabled by cyber means.**
    - Partially implemented. Ad hoc evidence suggests that more resources have been dedicated, but progress on this recommendation is difficult to quantify.
- **Consider the degree of protection afforded to U.S. companies' IP a criterion for approving major foreign investments in the United States under the Committee on Foreign Investment in the U.S. (CFIUS) process.**
    - Not Implemented. No relevant new legislation has passed and no new executive orders have been implemented since 2008 that affect CFIUS.
- **Require the Securities and Exchange Commission to judge whether companies' use of stolen IP is a material condition that ought to be publicly reported.**
    - Not implemented.
- **Greatly expand the number of green cards available to foreign students who earn science, technology, engineering, and mathematics degrees in American universities and who have a job offer in their field upon graduation.**
    - Not implemented.

Medium-term Solutions

- **Make the Court of Appeals for the Federal Circuit the appellate court for all actions under the Economic Espionage Act.**
    - Not implemented.
- **Instruct the Federal Trade Commission to obtain meaningful sanctions against foreign companies using stolen IP.**
    - Not implemented.

Long-term Solutions

- **Develop a program that encourages technological innovation to improve the ability to detect counterfeit goods.**
    - Not implemented.
- **Ensure that top U.S. officials from all agencies push to move China beyond a policy of indigenous innovation toward becoming a self-innovating economy.**
    - Not implemented.
- **Develop IP "centers of excellence" on a regional basis within China and other priority countries.**
    - Not implemented.
- **Establish in the private nonprofit sector an assessment or rating system of levels of legal protection for IP, beginning in China but extending to other countries as well.**
    - Not implemented.

Recommendations for Cybersecurity

- **Support U.S. companies and technology that can both identify and recover IP stolen through cyber means.**
    - Not implemented.
- **On an ongoing basis, reconcile necessary changes in the law with a changing technical environment.**
    - Partially implemented on an ad hoc basis.

Dennis C. Blair is the Chairman of the Sasakawa Peace Foundation USA and the Co-Chair of the Commission on the Theft of American Intellectual Property. He is the former commander in chief of the U.S. Pacific Command and the former U.S. director of national intelligence. Prior to rejoining the government in 2009, Admiral Blair held the John M. Shalikashvili Chair in National Security Studies with the National Bureau of Asian Research and served as deputy director of the Project for National Security Reform. From 2003 to 2006, Admiral Blair was president and chief executive officer of the Institute for Defense Analyses, a federally funded research and development center based in Alexandria, Virginia, that supports the Department of Defense, the Department of Homeland Security, and the intelligence community. He also has been a director of two public companies, EDO and Tyco International. During his 34-year career with the U.S. Navy, he served on guided-missile destroyers in both the Atlantic and Pacific fleets and commanded the *Kitty Hawk* Battle Group. Ashore, Admiral Blair served as director of the Joint Staff and held budget and policy positions on the National Security Council and several major navy staffs. A graduate of the U.S. Naval Academy, Admiral Blair earned a master's degree in history and languages from Oxford University as a Rhodes Scholar and was a White House Fellow at the Department of Housing and Urban Development. He has been awarded four Defense Distinguished Service medals and three National Intelligence Distinguished Service medals and has received decorations from the governments of Japan, Thailand, South Korea, Australia, the Philippines, and Taiwan.

Jon M. Huntsman, Jr., is the former U.S. ambassador to China (2009–11), the former governor of Utah (2005–9), and the Co-Chair of the Commission on the Theft of American Intellectual Property. He is currently the Chairman of the Atlantic Council and Co-Chairman of No Labels. Governor Huntsman was appointed U.S. ambassador to China by President Barack Obama and confirmed by the Senate on August 7, 2009. As ambassador, he worked closely with U.S. business owners to facilitate commerce in the growing Asian market and advocated for the release of U.S. citizens wrongfully imprisoned. As governor of Utah, he cut waste and made government more efficient. As a result, the state held its AAA bond rating and earned national accolades for debt management. Utah also ranked number one in the United States in job creation and was named the best-managed state by the Pew Research Center. Prior to serving as governor, he was named U.S. ambassador to Singapore, becoming the youngest head of a U.S. diplomatic mission in a century. Governor Huntsman also served as U.S. trade ambassador under President George W. Bush, during which time he helped negotiate dozens of free trade agreements with Asian and African nations. Governor Huntsman holds a BA in international politics from the University of Pennsylvania.

Craig R. Barrett is a leading advocate for improving education in the United States and around the world. He is also a vocal spokesman for the value technology can provide in raising social and economic standards globally. Dr. Barrett joined Intel Corporation in 1974 and held the positions of vice president, senior vice president, and executive vice president from 1984 to 1990. In 1992, he was elected to Intel Corporation's Board of Directors and was promoted to chief operating officer in 1993. Dr. Barrett became Intel's fourth president in 1997, chief executive officer in 1998, and

chairman of the board in 2005, a post he held until May 2009. He has served on numerous other boards as well as on policy and government panels. Until June 2009, he was chairman of the United Nations Global Alliance for Information and Communication Technologies and Development, which works to bring computers and other technology to developing parts of the world. Dr. Barrett has also been an appointee of the president's Advisory Committee for Trade Policy and Negotiations and the American Health Information Community. He has co-chaired the Business Coalition for Student Achievement and the National Innovation Initiative Leadership Council, and has served as a member of the Board of Trustees for the U.S. Council for International Business and the Clinton Global Initiative Education Advisory Board. Dr. Barrett has been a member of the National Governors' Association Task Force on Innovation America, the National Infrastructure Advisory Council, and the Committee on Scientific Communication and National Security and has served on the Board of Directors of the U.S. Semiconductor Industry Association, the National Action Council for Minorities in Engineering, and TechNet. Dr. Barrett received BS, MS, and PhD degrees in materials science from Stanford University. After graduation, he joined the faculty of Stanford University in the Department of Materials Science and Engineering and remained there through 1974. He was a Fulbright Fellow at Danish Technical University in Denmark in 1972 and a NATO Postdoctoral Fellow at the National Physical Laboratory in England from 1964 to 1965.

Slade Gorton is a former U.S. senator (1981–87 and 1989–2001) and a member of the National Commission on Terrorist Attacks Upon the United States. Senator Gorton is currently a Counselor at the National Bureau of Asian Research. His years in the Senate saw him appointed to powerful committee posts, including Appropriations; Budget; Commerce, Science, and Transportation; and Energy and Natural Resources. He served as the chairman of the Interior Appropriations Subcommittee (1995–2001), the Commerce Subcommittees on Consumer Affairs (1995–99), and the Aviation Committee (1999–2000). He was also a member of the Republican leadership as counsel to the majority leader (1996–2000). Senator Gorton began his political career in 1958 as a Washington state representative, and he went on to serve as state House majority leader. In 1968, he was elected attorney general of Washington State, in which capacity he argued fourteen cases before the U.S. Supreme Court. In June 1980, Senator Gorton received the Wyman Award, the highest honor accorded by the National Association of Attorneys General. Senator Gorton also served on the president's Consumer Advisory Council (1975–77) and on the Washington State Criminal Justice Training Commission (1969–81). He was chairman of the Washington State Law & Justice Commission (1969–76) and served as an instructor in constitutional law to public administration graduate students at the University of Puget Sound. Senator Gorton received his BA from Dartmouth College and his JD from Columbia Law School.

William J. Lynn III is the Chief Executive Officer of both Leonardo North America and DRS Technologies, Inc. Prior to joining DRS in January 2012, he served as the 30th U.S. deputy secretary of defense (2009–11). As deputy secretary of defense, Mr. Lynn served under Secretaries Robert Gates and Leon Panetta, managing three million personnel and overseeing an annual budget of $700 billion. He also personally led the department's efforts in cybersecurity, space strategy, and energy policy. From 2002 to 2009, Mr. Lynn was senior vice president of government operations and strategy at the Raytheon Company. Previously, he served as undersecretary of defense (comptroller) from 1997 to 2001 and as director of program analysis and evaluation

in the Office of the Secretary of Defense from 1993 to 1997. Mr. Lynn also worked on the staff of Senator Ted Kennedy as his counsel for the Senate Armed Services Committee. He has been recognized for numerous professional and service contributions, including four Department of Defense medals for distinguished public service, the Joint Distinguished Civilian Service Award from the chairman of the Joint Chiefs of Staff, and awards from the U.S. Army, Navy, and Air Force. Mr. Lynn holds a law degree from Cornell Law School and a master's degree in public affairs from the Woodrow Wilson School of Public and International Affairs at Princeton University. He is also a graduate of Dartmouth College.

Deborah Wince-Smith is the President and CEO of the U.S. Council on Competitiveness. Founded in 1986, this unique business-labor-academia coalition of CEOs, university presidents, and labor union leaders puts forth actionable public policy solutions to make the United States more competitive in the global marketplace. In 2004, Ms. Wince-Smith spearheaded the groundbreaking National Innovation Initiative (NII). The NII shaped the bipartisan America COMPETES Act, created state and regional innovation initiatives, and brought a global focus to innovation. She has also led a bilateral dialogue between the United States and Brazil on competitiveness and innovation strategy, including leading the 2007 and 2010 U.S.-Brazil Innovation Summits. Ms. Wince-Smith serves as a director of several publicly and privately held companies, national and international organizations, and U.S. government advisory committees. She is also a Senate-confirmed member of the Oversight Board of the IRS. She chaired the secretary of commerce's Advisory Committee on Strengthening America's Communities and served on the secretary of state's Advisory Committee on International Economic Policy. During her seventeen-year tenure in the federal government, Ms. Wince-Smith held leading positions in the areas of science, technology policy, and international economic affairs. Most notably, she served as the nation's first Senate-confirmed assistant secretary of commerce for technology policy in the administration of President George H.W. Bush. Ms. Wince-Smith received a BA from Vassar College and was one of the first female students to enter King's College at the University of Cambridge, where she read for a master's degree in classical archaeology. In 2006, she received an honorary doctorate in humanities from Michigan State University.

Michael K. Young is the President of Texas A&M University. Also a tenured Professor of Law, he has a distinguished record as an academic leader with broad experience in public service and diplomacy. He previously served as president of the University of Washington, where he led the nation's top public university (second among all universities) in attracting federal research funding. Prior to his appointment at the University of Washington, he served as president and distinguished professor of law at the University of Utah. Under President Young's leadership, Utah raised its stature nationally and internationally. Before assuming the presidency at Utah, he was dean and Lobingier Professor of Comparative Law and Jurisprudence at the George Washington University Law School. He was also a professor at Columbia University for more than twenty years, and prior to joining the Columbia University faculty, he served as a law clerk to justice William H. Rehnquist of the U.S. Supreme Court. President Young has held numerous government positions, including deputy undersecretary for economic and agricultural affairs and ambassador for trade and environmental affairs in the Department of State during the presidency of George H.W. Bush. He also served as a member of the U.S. Commission on

International Religious Freedom from 1998 to 2005 and chaired the commission on two occasions. He has published extensively on a wide range of topics, including the Japanese legal system, dispute resolution, mergers and acquisitions, labor relations, the legal profession, comparative law, industrial policy, international trade law, the North American Free Trade Agreement, the General Agreement on Tariffs and Trade, international environmental law, and international human rights and freedom of religion. He is a member of the Council on Foreign Relations and a fellow of the American Bar Foundation. President Young received a BA from Brigham Young University and a JD from Harvard Law School, where he served as a note editor of the *Harvard Law Review*.

LIST OF COMMON ABBREVIATIONS

CBP – U.S. Customs and Border Patrol

CFIUS – Committee on Foreign Investment in the U.S.

EUIPO – European Union Intellectual Property Office

FISMA – Federal Information Security Modernization Act

IEEPA – International Emergency Economic Powers Act

IP – Intellectual Property

IPR – Intellectual Property Rights

NCCIC – National Cybersecurity and Communications Integrity Center

NDAA – National Defense Authorization Act

OECD – Organisation for Economic Co-operation and Development

PLA – People's Liberation Army

PRC – People's Republic of China

USTR – United States Trade Representative

WTO – World Trade Organization

THE IP COMMISSION

THE COMMISSION ON THE THEFT OF AMERICAN INTELLECTUAL PROPERTY

The Commission on the Theft of American Intellectual Property is an independent and bipartisan initiative of leading Americans from the private sector, public service in national security and foreign affairs, academe, and politics. The three purposes of the Commission are to:

1. Document and assess the causes, scale, and other major dimensions of international intellectual property theft as they affect the United States.
2. Document and assess the role of China in international intellectual property theft.
3. Propose appropriate U.S. policy responses that would mitigate ongoing and future damage and obtain greater enforcement of intellectual property rights by China and other infringers.

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