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Representatives

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INTELLECTUAL PROPERTY

Insights Gained from Efforts to Quantify the Effects of Counterfeit and Pirated Goods in the U.S. Economy

Statement of Susan Offutt, Chief Economist

GAO Highlights

Highlights of [GAO-13-762T](#), a testimony before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives

Why GAO Did This Study

The United States is an acknowledged global leader in the creation of intellectual property. According to the Federal Bureau of Investigation, IP theft is a growing threat which is heightened by the rise of the use of digital technologies. IP is any innovation, commercial or artistic, or any unique name, symbol, logo, or design used commercially. IP rights protect the economic interests of the creators of these works by giving them property rights over their creations. Cyber attacks are one way that threat actors—whether nations, companies, or criminals—can target IP and other sensitive information of federal agencies and American businesses. While bringing significant benefits, increasing computer interconnectivity can create vulnerabilities to cyber-based threats. GAO was asked to testify on efforts to estimate the economic impacts of theft of intellectual property. Accordingly, this statement discusses (1) the economic significance of intellectual property protection and theft on the U.S. economy and (2) insights from efforts to quantify the economic impacts of counterfeiting and piracy on the U.S. economy. This statement is based on products GAO issued from April 2010 through June 2012 on the economic impacts of theft of intellectual property and on cyber threats and economic espionage.

What GAO Recommends

GAO is not making any new recommendations in this statement.

View [GAO-13-762T](#). For more information, contact Susan Offutt at (202) 512-3763 or offutts@gao.gov.

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What GAO Found

In April 2010, GAO reported that intellectual property (IP) is an important component of the U.S. economy and IP-related industries contribute a significant percentage to the U.S. gross domestic product. IP-related industries also pay significantly higher wages than other industries and contribute to a higher standard of living in the United States. Ensuring the protection of IP rights encourages the introduction of innovative products and creative works to the public. According to experts and literature GAO reviewed, counterfeiting and piracy have produced a wide range of effects on consumers, industry, government, and the economy as a whole. The U.S. economy as a whole may grow more slowly because of reduced innovation and loss of trade revenue. To the extent that counterfeiting and piracy reduce investments in research and development, companies may hire fewer workers and may contribute less to U.S. economic growth, overall. Furthermore, as GAO reported in June 2012, private sector organizations have experienced data loss or theft, economic loss, computer intrusions, and privacy breaches. For example, in February 2011, media reports stated that computer hackers had broken into and stolen proprietary information worth millions of dollars from the networks of six U.S. and European energy companies.

Generally, as GAO reported in April 2010, the illicit nature of counterfeiting and piracy makes estimating the economic impact of IP infringements extremely difficult. Nonetheless, research in specific industries suggests that the problem is sizeable, which is of particular concern as many U.S. industries are leaders in the creation of intellectual property. Because of the difficulty in estimating the economic impact of IP infringements, assumptions must be used to offset the lack of data. Efforts to estimate losses involve assumptions such as the rate at which consumers would substitute counterfeit for legitimate products, which can have enormous impacts on the resulting estimates. Because of the significant differences in types of counterfeited and pirated goods and industries involved, no single method can be used to develop estimates. Each method has limitations, and most experts observed that it is difficult, if not impossible, to quantify the economy-wide impacts.



Chairman Murphy, Ranking Member DeGette, and Members of the Subcommittee:

Thank you for the opportunity to testify at today's hearing on cyber espionage and the theft of U.S. intellectual property and technology.

Intellectual property (IP) plays a significant role in the U.S. economy, and the United States is an acknowledged leader in its creation. IP is any innovation, commercial or artistic, or any unique name, symbol, logo, or design used commercially. IP rights protect the economic interests of the creators of these works by giving them property rights over their creations. The federal government grants IP protection through patents, copyrights, and trademarks, and takes enforcement actions that range from seizing IP-infringing goods to prosecuting alleged criminals.¹

According to the Federal Bureau of Investigation, IP theft is a growing threat which is heightened by the rise of the use of digital technologies. The increasing dependency upon information technology systems and networked operations pervades nearly every aspect of our society. In particular, increasing computer interconnectivity—most notably growth in the use of the Internet—has revolutionized the way that our government, our nation, and much of the world communicate and conduct business. While bringing significant benefits, this dependency can also create vulnerabilities to cyber-based threats. Cyber attacks are one way that threat actors—whether nations, companies, or criminals—can target the intellectual property and other sensitive information of federal agencies and American businesses. According to the Office of the National Counterintelligence Executive, sensitive U.S. economic information and technology are targeted by intelligence services, private sector companies, academic and research institutions, and citizens of dozens of countries.

¹In addition to copyrights, trademarks, and patents, two other IP protections are trade secrets and geographical indications. Trade secrets are defined as any type of valuable information, including a formula, pattern, compilation, program device, method, technique, or process that gains commercial value from not being generally known or readily obtainable; and for which the owner has made reasonable efforts to keep secret. Geographical indications are defined as indications that identify a good as originating in a country, region, or locality, where a given quality, reputation, or other characteristic of the good is essentially attributable to its geographic origin. Definitions used in this testimony for the various types of IP were provided by the U.S. Patent and Trademark Office.

While we have not conducted an assessment of the economic impact of cyber espionage, our work examining efforts to quantify the economic impact of counterfeited and pirated goods on the U.S. economy can provide some insights on estimating economic losses. Specifically in my testimony today, I will discuss (1) the economic significance of intellectual property protection and theft on the U.S. economy and (2) insights from efforts to quantify the economic impacts of counterfeiting and piracy on the U.S. economy.

My remarks are based on two previous GAO products issued from April 2010 through June 2012. For our April 2010 report assessing the economic impacts of theft of intellectual property on the U.S. economy, we interviewed officials and representatives from U.S. government agencies, industry associations, nongovernmental organizations, academic institutions, and a multilateral organization, and we reviewed documents and studies quantifying or discussing the impacts of counterfeiting and piracy on the U.S. economy, industry, government, and consumers.² We conducted a literature search of studies and estimates of the economic impact of IP infringements published since 1999 to examine various aspects of the economic impacts of counterfeiting and piracy, and to identify other insights about the role IP plays in the U.S. economy. We also interviewed subject matter experts from a range of governmental, nongovernmental, academic, and industry sources, and Organisation for Economic Cooperation and Development (OECD) officials to discuss efforts to quantify the economic impacts of counterfeiting and piracy and to obtain their views on the range of impacts of counterfeits and piracy, insights on counterfeiting activities and markets, and the role of IP in the U.S. economy. For background information on cyber threats, we relied on GAO's June 2012 testimony on cyber threats and economic espionage.³ We conducted all of this work in accordance with generally accepted government auditing standards.

²GAO, *Intellectual Property: Observations on Efforts to Quantify the Economic Effects of Counterfeit and Pirated Goods*, [GAO-10-423](#) (Washington, D.C.: April 12, 2010).

³GAO, *Information Security: Cyber Threats Facilitate Ability to Commit Economic Espionage*, [GAO-12-876T](#) (Washington, D.C.: June 28, 2012).

Background

Both government and private entities increasingly depend on computerized information systems to carry out operations and to process, maintain, and report essential information. Public and private organizations rely on computer systems to transmit sensitive and proprietary information, develop and maintain intellectual capital, conduct operations, process business transactions, transfer funds, and deliver services. In addition, the Internet serves as a medium for hundreds of billions of dollars of commerce each year.

Cyberspace—where much business activity and the development of new ideas often take place—amplifies potential threats by making it possible for malicious actors to quickly steal and transfer massive quantities of data while remaining anonymous and difficult to detect.⁴ Threat actors may target businesses, among others targets, resulting in the compromise of proprietary information or intellectual property. In addition, the rapid growth of Internet use has significantly contributed to the development of technologies that enable the unauthorized distribution of copyrighted works and is widely recognized as leading to an increase in piracy. Digital products are not physical or tangible, can be reproduced at very low cost, and have the potential for immediate delivery through the Internet across virtually unlimited geographic markets. Sectors facing threats from digital piracy include the music, motion picture, television, publishing, and software industries. Piracy of these products over the Internet can occur through methods including peer-to-peer networks, streaming sites, and one-click hosting services.

Economic Significance of Intellectual Property Protection and Theft

As we reported in April 2010, IP is an important component of the U.S. economy and IP-related industries pay higher wages and contribute a significant percentage to the U.S. economy. However, the U.S. economy as a whole may grow at a slower pace than it otherwise would because of counterfeiting and piracy's effect on U.S. industries, government, and consumers.

⁴Office of the National Counterintelligence Executive, *Foreign Spies Stealing U.S. Economic Secrets in Cyberspace: Report to Congress on Foreign Economic Collection and Industrial Espionage, 2009-2011* (October 2011).

Importance of IP Has Long Been Recognized in the United States

The importance of patents and other mechanisms to enable inventors to capture some of the benefits of their innovations has long been recognized in the United States as a tool to encourage innovation, dating back to Article 1 of the U.S. Constitution and the 1790 patent law. Ensuring the protection of IP rights encourages the introduction of innovative products and creative works to the public. Protection is granted by guaranteeing proprietors limited exclusive rights to whatever economic reward the market may provide for their creations and products.

As we reported in April 2010, intellectual property is an important component of the U.S. economy, and the United States is an acknowledged global leader in the creation of intellectual property. According to the United States Trade Representative, “Americans are the world’s leading innovators, and our ideas and intellectual property are a key ingredient to our competitiveness and prosperity.” The United States has generally been very active in advocating strong IP protection and encouraging other nations to improve these systems for two key reasons. First, the U.S. has been the source of a large share of technological improvements for many years and, therefore, stands to lose if the associated IP rights are not respected in other nations. Secondly, a prominent economist noted that IP protection appears to be one of the factors that has helped to generate the enormous growth in the world economy and in the standard of living that has occurred in the last 150 years. This economist pointed out that the last two centuries have created an unprecedented surge in growth compared to prior periods. Among the factors attributed to creating the conditions for this explosion in economic growth are the rule of law, including property rights and the enforceability of contracts.⁵

⁵William J. Baumol, *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism* (Princeton, N.J.: Princeton University Press, 2002).

The U.S. Economy May Experience Slower Growth Due to Lost Sales and Reduced Incentives to Innovate

The U.S. economy as a whole may grow at a slower pace than it otherwise would because of counterfeiting and piracy's effect on U.S. industries, government, and consumers. As we reported in April 2010, according to officials we interviewed and a 2008 OECD study,⁶ to the extent that companies experience a loss of revenues or incentives to invest in research and development for new products, slower economic growth could occur. IP-related industries play an important role in the growth of the U.S. economy and contribute a significant percentage to the U.S. gross domestic product. IP-related industries also pay significantly higher wages than other industries and contribute to a higher standard of living in the United States. To the extent that counterfeiting and piracy reduce investments in research and development, these companies may hire fewer workers and may contribute less to U.S. economic growth, overall. The U.S. economy may also experience slower growth due to a decline in trade with countries where widespread counterfeiting hinders the activities of U.S. companies operating overseas.

The U.S. economy, as a whole, also may experience effects of losses by consumers and government. An economy's gross domestic product could be measured as either the total expenditures by households (consumers), or as the total wages paid by the private sector (industry). Hence, the effect of counterfeiting and piracy on industry would affect consumers by reducing their wages, which could reduce consumption of goods and services and the gross domestic product. Finally, the government is also affected by the reduction of economic activity, since fewer taxes are collected.

In addition to the U.S. economy-wide effects, as we reported in April 2010, counterfeit or pirated products that act as substitutes for genuine goods can have a wide range of negative effects on industries, according to experts we spoke with and literature we reviewed. These sources further noted that the economic effects vary widely among industries and among companies within an industry. The most commonly identified effect cited was lost sales, which leads to decreased revenues and/or market share.

⁶Organisation for Economic Cooperation and Development (OECD), *The Economic Impact of Counterfeiting and Piracy* (Paris: OECD, 2008).

Lost revenues can also occur when lower-priced counterfeit and pirated goods pressure producers or IP owners to reduce prices of genuine goods. In some industries, such as the audiovisual sector, marketing strategies must be adjusted to minimize the impact of counterfeiting on lost revenues. Movie studios that use time-related marketing strategies—introducing different formats of a movie after certain periods of time—have reduced the time periods or “windows” for each format as a countermeasure, reducing the overall revenue acquired in each window. Experts stated that companies may also experience losses due to the dilution of brand value or damage to reputation and public image, as counterfeiting and piracy may reduce consumers’ confidence in the brand’s quality.

Companies are affected in additional ways. For example, to avoid losing sales and liability issues, companies may increase spending on IP protection efforts. In addition, experts we spoke with stated that companies could experience a decline in innovation and production of new goods if counterfeiting leads to reductions in corporate investments in research and development. Another variation in the nature of the effects of counterfeiting and piracy is that some effects are experienced immediately, while others are more long-term, according to the OECD. The OECD’s 2008 report cited loss of sales volume and lower prices as short-term effects, while the medium- and long-term effects include loss of brand value and reputation, lost investment, increased costs of countermeasures, potentially reduced scope of operations, and reduced innovation. Finally, one expert emphasized to us that the loss of IP rights is much more important than the loss of revenue. He stated that the danger for the United States is in the accelerated “learning effects”—companies learn how to produce and will improve upon patented goods. They will no longer need to illegally copy a given brand—they will create their own aftermarket product. He suggested that companies should work to ensure their competitive advantage in the future by inhibiting undesired knowledge transfer.

In addition, private sector organizations have experienced a wide range of incidents involving data loss or theft, economic loss, computer intrusions, and privacy breaches, underscoring the need for improved security

practices. The following examples from news media and other public sources illustrate types of cyber crimes.⁷

- In February 2011, media reports stated that computer hackers had broken into and stolen proprietary information worth millions of dollars from the networks of six U.S. and European energy companies.
- In mid-2009 a research chemist with DuPont Corporation reportedly downloaded proprietary information to a personal e-mail account and thumb drive with the intention of transferring this information to Peking University in China and also sought Chinese government funding to commercialize research related to the information he had stolen.
- Between 2008 and 2009, a chemist with Valspar Corporation reportedly used access to an internal computer network to download secret formulas for paints and coatings, reportedly intending to take this proprietary information to a new job with a paint company in Shanghai, China.
- In December 2006, a product engineer with Ford Motor Company reportedly copied approximately 4,000 Ford documents onto an external hard drive in order to acquire a job with a Chinese automotive company.

Quantifying Economic Impacts Is Difficult, However Industry Research Suggests the Impacts Are Sizable

Generally, as we reported in April 2010, the illicit nature of counterfeiting and piracy makes estimating the economic impact of IP infringements extremely difficult, so assumptions must be used to offset the lack of data. Efforts to estimate losses involve assumptions such as the rate at which consumers would substitute counterfeit for legitimate products, which can have enormous impacts on the resulting estimates. Because of the significant differences in types of counterfeited and pirated goods and industries involved, no single method can be used to develop estimates. Each method has limitations, and most experts observed that it is difficult, if not impossible, to quantify the economy-wide impacts. Nonetheless, research in specific industries suggests that the problem is sizeable.

⁷These examples are taken from [GAO-12-876T](#).

Lack of Data Is the Primary Challenge for Quantifying Economic Impacts of Counterfeiting and Piracy

As we reported in April 2010, quantifying the economic impact of counterfeit and pirated goods on the U.S. economy is challenging primarily because of the lack of available data on the extent and value of counterfeit trade. Counterfeiting and piracy are illicit activities, which makes data on them inherently difficult to obtain. In discussing their own effort to develop a global estimate on the scale of counterfeit trade, OECD officials told us that obtaining reliable data is the most important and difficult part of any attempt to quantify the economic impact of counterfeiting and piracy. OECD's 2008 report stated that available information on the scope and magnitude of counterfeiting and piracy provides only a crude indication of how widespread they may be, and that neither governments nor industry were able to provide solid assessments of their respective situations. The report stated that one of the key problems is that data have not been systematically collected or evaluated and, in many cases, assessments "rely excessively on fragmentary and anecdotal information; where data are lacking, unsubstantiated opinions are often treated as facts."

Because of the lack of data on illicit trade, methods for calculating estimates of economic losses must involve certain assumptions, and the resulting economic loss estimates are highly sensitive to the assumptions used. Two experts told us that the selection and weighting of these assumptions and variables are critical to the results of counterfeit estimates, and the assumptions should, therefore, be identified and evaluated. Transparency in how these estimates are developed is essential for assessing the usefulness of an estimate. However, according to experts and government officials, industry associations do not always disclose their proprietary data sources and methods, making it difficult to verify their estimates. Industries collect this information to address counterfeiting problems associated with their products and may be reluctant to discuss instances of counterfeiting because consumers might lose confidence. OECD officials, for example, told us that one reason some industry representatives were hesitant to participate in their study was that they did not want information to be widely released about the scale of the counterfeiting problem in their sectors.

No Single Approach for Quantifying Impacts of Counterfeiting and Piracy Can be Used

As we reported in April 2010, there is no single methodology to collect and analyze data that can be applied across industries to estimate the effects of counterfeiting and piracy on the U.S. economy or industry sectors. The nature of data collection, the substitution rate, value of goods, and level of deception are not the same across industries. Due to these challenges and the lack of data, researchers have developed

different methodologies. In addition, some experts we interviewed noted the methodological and data challenges they face when the nature of the problem has changed substantially over time. Some commented that they have not updated earlier estimates or were required to change methodologies for these reasons.

A commonly used method to collect and analyze data, based on our literature review and interviews with experts, is the use of economic multipliers to estimate effects on the U.S. economy. Economic multipliers show how capital changes in one industry affect output and employment of associated industries. Commerce's Bureau of Economic Analysis guidelines make regional multipliers available through its Regional Input-Output Modeling System (RIMS II). These multipliers estimate the extent to which a one-time or sustained change in economic activity will be attributed to specific industries in a region.⁸ Multipliers can provide an illustration of the possible "induced" effects from a one-time change in final demand. For example, if a new facility is to be created with a determined investment amount, one can estimate how many new jobs can be created, as well as the benefit to the region in terms of output (e.g., extra construction, manufacturing, supplies, and other products needed). It must be noted that RIMS II multipliers assume no job immigration or substitution effect. That is, if new jobs are created as a result of investing more capital, those jobs would not be filled by the labor force from another industry. Most of the experts we interviewed were reluctant to use economic multipliers to calculate losses from counterfeiting because this methodology was developed to look at a one-time change in output and employment. Nonetheless, the use of this methodology corroborates that the effect of counterfeiting and piracy goes beyond the infringed industry. For example, when pirated movies are sold, it damages not only the motion picture industry, but all other industries linked to those sales.

Economy-Wide Impact of Counterfeiting and Piracy Is Unknown

While experts and literature we reviewed in our April 2010 report provided different examples of effects on the U.S. economy, most observed that despite significant efforts, it is difficult, if not impossible, to quantify the net effect of counterfeiting and piracy on the economy as a whole. For

⁸Commerce, Bureau of Economic Analysis and Economics and Statistics Administration, *Regional Multipliers. A User Handbook for the Regional Input-Output Modeling System (RIMS II)*, 3rd ed. (Washington, D.C.: 1997).

example, according to the 2008 OECD study, it attempted to develop an estimate of the economic impact of counterfeiting and concluded that an acceptable overall estimate of counterfeit goods could not be developed. OECD further stated that information that can be obtained, such as data on enforcement and information developed through surveys, “has significant limitations, however, and falls far short of what is needed to develop a robust overall estimate.” Nonetheless, the studies and experts we spoke with suggested that counterfeiting and piracy is a sizeable problem, which affects consumer behavior and firms’ incentives to innovate.

Chairman Murphy, Ranking Member DeGette, and Members of the Subcommittee, this completes my prepared statement. I would be pleased to respond to any questions you may have at this time.

GAO Contact and Staff Acknowledgement

If you or your staff have any questions about this testimony, please contact me at 202-512-3763 or offutts@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. GAO staff who made key contributions to this testimony include Christine Broderick, Assistant Director; Pedro Almoguera; Karen Deans; and Rachel Girshick.

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