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INTELLECTUAL PROPERTY

Observations on Efforts to Quantify the Economic Effects of Counterfeit and Pirated Goods



GAO

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Highlights of [GAO-10-423](#), a report to congressional committees

Why GAO Did This Study

In October 2008, Congress passed the Prioritizing Resources and Organization for Intellectual Property Act of 2008 (PRO-IP Act), to improve the effectiveness of U.S. government efforts to protect intellectual property (IP) rights such as copyrights, patents, and trademarks. The act also directed GAO to provide information on the quantification of the impacts of counterfeit and pirated goods. GAO (1) examined existing research on the effects of counterfeiting and piracy on consumers, industries, government, and the U.S. economy; and (2) identified insights gained from efforts to quantify the effects of counterfeiting and piracy on the U.S. economy.

GAO interviewed officials and subject matter experts from U.S. government agencies, industry associations, nongovernmental organizations, and academic institutions, and reviewed literature and studies quantifying or discussing the economic impacts of counterfeiting and piracy on the U.S. economy, industry, government, and consumers. GAO is making no recommendations in this report.

INTELLECTUAL PROPERTY

Observations on Efforts to Quantify the Economic Effects of Counterfeit and Pirated Goods

What GAO Found

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, depending on the type of infringements involved and other factors. Consumers are particularly likely to experience negative effects when they purchase counterfeit products they believe are genuine, such as pharmaceuticals. Negative effects on U.S. industry may include lost sales, lost brand value, and reduced incentives to innovate; however, industry effects vary widely among sectors and companies. The U.S. government may lose tax revenue, incur IP enforcement expenses, and face risks of counterfeits entering supply chains with national security or civilian safety implications. The U.S. economy as a whole may grow more slowly because of reduced innovation and loss of trade revenue. Some experts and literature also identified some potential positive effects of counterfeiting and piracy. Some consumers may knowingly purchase counterfeits that are less expensive than the genuine goods and experience positive effects (consumer surplus), although the longer-term impact is unclear due to reduced incentives for research and development, among other factors.

Three widely cited U.S. government estimates of economic losses resulting from counterfeiting cannot be substantiated due to the absence of underlying studies. Generally, 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 suggest that the problem is sizeable, which is of particular concern as many U.S. industries are leaders in the creation of intellectual property.

Negative Effects of Counterfeiting and Piracy, by Stakeholder

Stakeholders	Negative effects
Consumers	Health and safety risks, low quality goods
Industries	Lost sales and brand value, increased IP protection costs
U.S. government	Lost tax revenue, increased enforcement costs, and risks to supply chains with national security or safety implications
U.S. economy	Lower growth and innovation, declining trade with countries having weak IP rights enforcement

Source: GAO analysis.

[View GAO-10-423](#) or [key components](#).
For more information, contact Loren Yager at (202) 512-4347 or yagerl@gao.gov.

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Abbreviations

BSA	Business Software Alliance
CBP	Customs and Border Protection
DHS	Department of Homeland Security
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FDA	U.S. Food and Drug Administration
FTC	Federal Trade Commission
HHS	Department of Health and Human Services
IP	intellectual property
ITC	International Trade Commission
OECD	Organization for Economic Cooperation and Development
PRO-IP ACT	Prioritizing Resources and Organization for Intellectual Property Act of 2008
RIMS II	Regional Input-Output Modeling System
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
USTR	Office of the U.S. Trade Representative
WTO	World Trade Organization

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United States Government Accountability Office
Washington, DC 20548

April 12, 2010

The Honorable Patrick J. Leahy
Chairman
The Honorable Jeff Sessions
Ranking Member
Committee on the Judiciary
United States Senate

The Honorable John Conyers, Jr.
Chairman
The Honorable Lamar S. Smith
Ranking Member
Committee on the Judiciary
House of Representatives

In October 2008, Congress passed the Prioritizing Resources and Organization for Intellectual Property Act of 2008 (PRO-IP Act) (P.L. 110-403), to strengthen and improve the effectiveness of U.S. government efforts to protect the intellectual property (IP) of U.S. industries and IP rights holders. In the PRO-IP Act, Congress noted that U.S. IP industries have created millions of highly skilled, high-paying U.S. jobs and continue to represent a major source of creativity, innovation, economic growth, and competitiveness.

The PRO-IP Act directed GAO to provide information on the quantification of the impacts of counterfeit and pirated goods on the economy and industries of the United States to help the U.S. government better protect the IP of rights holders.¹ Our work: (1) examined existing research on the effects of counterfeiting and piracy on consumers, industries, government, and the U.S. economy; and (2) identified insights gained from efforts to quantify the effects of counterfeiting and piracy on the U.S. economy.

¹The PRO-IP Act also directed GAO to report on the nature and scope of IP statutory and case laws and the extent that they are being used to investigate and prosecute acts of trafficking and counterfeits. As agreed with congressional committees, this part of the mandate was addressed by GAO's report, *Intellectual Property: Federal Enforcement Has Generally Increased, but Assessing Performance Could Strengthen Law Enforcement Efforts*, [GAO-08-157](#) (Washington, D.C.: Mar. 11, 2008).

To address these objectives, 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. We met with officials and reviewed documents from the Departments of Justice (Justice), Homeland Security (DHS), Commerce (Commerce), and Health and Human Services (HHS), the Office of the U.S. Trade Representative (USTR), and the International Trade Commission (ITC). 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.² Among the studies we reviewed was the Organization for Economic Cooperation and Development's (OECD) 2008 report, *The Economic Impact of Counterfeiting and Piracy*.³ Although this study was global rather than focused on the U.S. economy, its unique nature and prominence as the most comprehensive attempt to quantify the impacts of counterfeiting and piracy warranted its inclusion within our reviews. We also interviewed subject matter experts from a range of governmental, nongovernmental, academic and industry sources, and 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. Unless otherwise noted, in our discussion of the impacts and insights on counterfeiting and piracy, we do not distinguish between imported counterfeit and pirated goods and those produced domestically. The literature we reviewed and experts we spoke with focused primarily on imported counterfeit goods rather than those produced within the United States. We determined that the U.S. government did not systematically collect data and perform analysis on the impacts of counterfeiting and piracy on the U.S. economy and, based on our review of literature and interviews with experts, we concluded that it was not feasible to develop our own estimates or attempt to quantify the economic impact of counterfeiting and piracy on the U.S. economy. We shared a copy of the draft report with officials from Commerce, DHS, HHS, Justice, ITC, USTR, and the Office of the U.S. Intellectual Property

²See the Bibliography for a list of studies and estimates that we reviewed.

³Organisation for Economic Cooperation and Development (OECD), *The Economic Impact of Counterfeiting and Piracy*. Paris: OECD, 2008.

Enforcement Coordinator to obtain technical comments. We received comments from the DHS and Justice, and the Office of the U.S. Intellectual Property Enforcement Coordinator and made changes as appropriate.

We conducted our work from April 2009 to April 2010 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations to our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions in this product. For additional details regarding our scope and methodology, see appendix I.

Background

Importance of Protection for Innovators 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.

Today, eight federal agencies and entities within them undertake the primary U.S. government activities in support of IP rights. These agencies and entities include Commerce, HHS, DHS, Justice, ITC, State, USTR, the Copyright Office, and entities such as Customs and Border Protection (CBP), the U.S. Patent and Trademark Office, and the Federal Bureau of Investigation (FBI).

In addition to domestic efforts for protecting IP, the U.S. government participated actively in negotiating the World Trade Organization's (WTO) Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), which came into force in 1995 and broadly governs the multilateral protection of IP rights. Under TRIPS, all WTO member countries are obligated to establish laws and regulations that meet a minimum standard for protecting various areas of IP rights. It also provides for enforcement measures for members. One of USTR's priorities in recent years has been negotiating free trade agreements. Since 2000,

USTR has completed negotiations for free trade agreements that have entered into force with Australia, Bahrain, Central America,⁴ Chile, Jordan, Morocco, Oman, Peru, and Singapore.⁵ According to officials at USTR, these agreements offer protection beyond that required in TRIPS.⁶

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 USTR, “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 terms of 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.⁷

⁴Participants in the Central America Free Trade Agreement are Costa Rica, the Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, and the United States.

⁵The United States also has signed free trade agreements with Colombia, Korea, and Panama, but Congress must enact legislation to approve and implement each individual agreement in order for them to go into effect. Prior to 2000, two other free trade agreements had entered into force: the U.S.-Israel Free Trade Agreement (entered into force in 1985) and the North American Free Trade Agreement between Canada, Mexico, and the United States (entered into force in 1994).

⁶For example, these protections include adherence to new World Intellectual Property Organization Internet treaties, a longer minimum time period for copyright protection, additional penalties for circumventing technological measures controlling access to copyrighted materials, transparent procedures for protection of trademarks, stronger protection for well-known marks, patent protection for plants and animals, protection against arbitrary revocation of patents, new provisions dealing with domain name disputes, and increased enforcement measures.

⁷William J. Baumol, *The Free-Market Innovation Machine: Analyzing the Growth Miracle of Capitalism*. (Princeton, N.J.: Princeton University Press, 2002).

While these conditions are clearly important for generating economic growth, determining the contributions of innovation to economic growth at the level of the overall economy has been a challenging task. Economists have used a variety of techniques to better understand the role of innovation in growth, and historical evidence shows that growth rates have periodically been driven upward by major technological improvements, beginning with the industrial revolution and the role of electricity, and continuing with the current revolution in information technology.⁸

Common Protections Related to IP

Generally, individual countries grant and enforce IP rights. 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.⁹

- *Copyright.* A set of exclusive rights subsisting in original works of authorship fixed in any tangible medium of expression now known or later developed, for a fixed period of time. For example, works may be literary, musical, or artistic.
- *Trademark.* Any sign or any combination of signs capable of distinguishing the source of goods or services is capable of constituting a trademark. Such signs— in particular, words (including personal names), letters, numerals, figurative elements, and combinations of colors, as well as any combination of such signs— are eligible for registration as trademarks.

⁸Edwin Mansfield, *Industrial Research and Technological Innovation*. (New York, N.Y.: W.W. Norton, 1968); Nathan Rosenberg, *Exploring the Black Box: Technology, Economics, and History*. (Cambridge, United Kingdom: Cambridge University Press, 1994); J. Schumpeter, *Business Cycles, A Theoretical and Statistical Analysis of the Capitalist Process*. (New York, N.Y.: McGraw-Hill, 1939).

⁹In 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 report for the various types of IP are provided by the U.S. Patent and Trademark Office.

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- *Patent.* Exclusive rights granted to inventions for a fixed period of time, whether products or processes, in all fields of technology, provided they are new, not obvious (involve an inventive step), and have utility (are capable of industrial application).

“Pirated copyright goods” refer to any goods that are copies made without the consent of the right holder or person duly authorized by the right holder. “Counterfeit goods” refer to any goods, including packaging or bearing without authorization, a trademark that is identical to a trademark validly registered for those goods, or that cannot be distinguished in its essential aspects from such a trademark, and that, thereby, infringes the rights of the owner of the trademark in question. According to the U.S. Food and Drug Administration (FDA), “counterfeit drugs” are defined under U.S. law as those sold under a product name without proper authorization, where the identity of the source drug is knowingly and intentionally mislabeled in a way that suggests that it is the authentic and approved product.¹⁰

Counterfeiting and Piracy Cover a Wide Range of Goods

CBP data show that between fiscal years 2004 and 2009, the domestic value and number of U.S. seizures of counterfeit goods imported from other countries have fluctuated.¹¹ These seizures have been concentrated among certain types of products. For example, seizures of footwear, wearing apparel, and handbags accounted for about 57 percent of the aggregate domestic value of goods seized in those 6 years. Table 1 shows the percent of total domestic value for different types of commodities seized as well as the domestic value of all goods seized and total number of seizures. The value of wearing apparel and cigarette seizures generally declined, while the value of pharmaceutical seizures generally increased. Several factors influence trends in seizure values. For example, values of

¹⁰Counterfeit drugs under this definition may include products without the active ingredient, with an insufficient quantity of the active ingredient, with the wrong active ingredient, or with packaging that falsely suggests the drug was manufactured by an FDA-approved manufacturer.

¹¹CBP data represent seizures made by CBP or Immigration and Customs Enforcement. CBP measures IP activity two ways: number of seizure actions and estimated domestic value of goods seized. The number of goods in one seizure action can range from a few items shipped via international mail to hundreds of boxes in an ocean-going cargo container. Domestic value is calculated as the landed cost plus profit (the cost of the merchandise when last purchased, plus all duties, fees, broker’s charges, profit, unloading charges, and U.S. freight charges to bring the good to the importer’s premises), a value generally lower than the price at which the goods might sell to the final consumer.

seized goods can vary from year to year due to counterfeiters' responses to changes in marketplace demand or enforcement actions. For instance, in fiscal year 2006, a federal enforcement investigation resulted in the seizure of 77 cargo containers of counterfeit Nike Air Jordan shoes and one container of counterfeit Abercrombie & Fitch clothing. The estimated domestic value of these goods was about \$19 million, representing about 12 percent of the total domestic seizure value that year. In addition, the level of federal border enforcement effort varies across ports, resulting in different seizure rates, which is discussed in a later section of this report.

Table 1: DHS Seizures of IP-Infringing Goods, Expressed as a Percentage of Total Domestic Value of Goods Seized Annually, Fiscal Years 2004–2009

Dollars in millions

Commodity	2004 (percentage)	2005 (percentage)	2006 (percentage)	2007 (percentage)	2008 (percentage)	2009 (percentage)	Reported percentage of 2004-2009 totals
Footwear	1	10	41	40	38	38	32
Wearing apparel	37	17	16	14	9	8	15
Handbags/wallets/ backpacks	17	16	9	7	11	8	11
Consumer electronics	6	9	5	8	8	12	9
Computers/ hardware	1	5	9	5	3	5	5
Pharmaceuticals	-	2	1	6	10	4	5
Cigarettes	17	10	-	-	2	1	4
Media	4	-	4	4	2	4	3
Watches/parts	2	3	2	-	-	6	2
Toys/electronic games	3	9	-	-	-	2	2
Batteries	2	-	-	-	1	1	1
Sunglasses/parts	-	-	-	2	3	1	1
Perfumes	-	3	-	1	2	1	1
Jewelry	-	-	-	-	-	4	1
Headwear	-	-	2	-	-	-	-
Health care	-	-	2	-	-	-	-
All other commodities	10	15	8	14	10	3	9
Total domestic value of all seizures	\$139	93	155	197	273	261	\$1,118
Total number of seizures	7,255	8,022	14,675	13,657	14,992	14,841	73,442

Source: GAO analysis of CBP data.

Note: Where percentages are not provided, CBP either did not report the commodity as a separate category in a given year or the percentage seized of the commodity was less than 1 percent of the total domestic value of all commodities seized. Seizures of these commodities may be included in the "All other commodities" category. The percentage values may not add up to 100 percent due to rounding.

According to CBP data, seized counterfeit goods are dominated by products from China. During fiscal years 2004 through 2009, China accounted for about 77 percent of the aggregate value of goods seized in the United States. Hong Kong, India, and Taiwan followed China, accounting for 7, 2, and 1 percent of the seized value, respectively. CBP data indicate certain concentrations of counterfeit production among these countries: in 2009, about 58 percent of the seized goods from China were footwear and handbags; 69 percent of the seized goods from Hong Kong were consumer electronics and watch parts; 91 percent of the seized goods from India were pharmaceuticals and perfume; and 85 percent of seized goods from Taiwan were computers and consumer electronics. CBP data show that goods were also seized frequently from Russia, Korea, Pakistan, Vietnam, and certain Southeast Asian countries. Unlike imported counterfeits, there is little information on the extent and sources for domestically produced counterfeits. According to the Congressional Research Service, the United States is especially concerned with foreign counterfeits of U.S. intellectual property. Compared to foreign countries, counterfeits produced in the United States are estimated to be relatively low.

Another significant aspect of IP infringement is the piracy of digital copyrighted products, which is not captured by CBP seizure data. The development of technologies that enable the unauthorized distribution of copyrighted works is widely recognized as leading to an increase in piracy. The rapid growth of Internet use, in particular, has significantly contributed to the increase. 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. There is no government agency that systematically collects or tracks data on the extent of digital copyright piracy.

These technological developments, along with an increase in the sophistication of packaging for counterfeit goods, have changed the nature of counterfeiting and piracy substantially in recent years. Industry

associations with whom we met commented that technological changes and increased sophistication among counterfeiters have affected their businesses significantly.

Counterfeiting and Piracy Have a Wide Range of Effects on U.S. Consumers, Industry, Government, and the Economy

According to experts we spoke with and literature we reviewed, counterfeiting and piracy have produced a wide range of effects on consumers, industry, government, and the economy as a whole, depending on the type of infringements involved and other factors. Most of the information and views we obtained from our interviews and literature review focused on the significant direct negative effects of counterfeiting and piracy on stakeholders, including health and safety risks, lost revenues, and increased costs of protecting and enforcing IP rights. However, some experts and literature point out that certain stakeholders may experience some positive effects from counterfeits and piracy, though there is little information available on potential positive effects. Table 2 summarizes the positive and negative effects by stakeholder, based on our discussions with experts and literature we reviewed.

Table 2: Potential Direct Effects of IP Infringements in the United States by Stakeholder

Stakeholders	Potential effects
Consumers	Negative effects <ul style="list-style-type: none"> • Damage to health and safety • Costs incurred when product fails due to lower quality of counterfeit good
	Positive Effects <ul style="list-style-type: none"> • Perceived benefits from lower prices of counterfeit and pirated goods
Industry	Negative effects <ul style="list-style-type: none"> • Lost sales • Lost brand value or damage to public image • Cost of IP protection • Decreased incentive to invest in research and development
	Positive effects <ul style="list-style-type: none"> • Increased sales of legitimate goods based on consumer “sampling” of pirated goods

Stakeholders	Potential effects
Government	Negative effects <ul style="list-style-type: none"> • Lost tax revenue due to illegal sales of counterfeit and pirated goods • Cost of IP enforcement • Risks of counterfeits entering supply chains with national security or civilian safety implications
Economy as a whole	Negative effects <ul style="list-style-type: none"> • Lower economic growth as a result of reduced incentives to innovate • Lost revenue from declining U.S. trade in countries with weak IP rights regimes

Source: GAO analysis of data collected through interviews with experts and literature reviewed.

Note: These effects may differ greatly in magnitude by industry and stakeholder, with specific impacts depending on which product or industry is being discussed.

Consumer Effects Include Danger to Health and Safety

A commonly cited concern about counterfeit trade is that certain types of counterfeit goods can have harmful effects on consumers' health and safety, causing serious illness or death. Experts we spoke with and literature we reviewed identified certain counterfeit products, such as pharmaceuticals, automotive parts, electrical components, toys, and household goods, as having potentially damaging health and safety effects. According to experts we spoke with, a key characteristic of these types of counterfeit goods, which distinguishes their effects from other types of counterfeiting or piracy, is that U.S. consumers are likely to have been deceived about the origin of the product. In addition, some studies and an expert reported that counterfeiters have increasingly diversified beyond their traditional products, such as luxury goods, to more functional products such as baby shampoo and household cleaners, and will continue to expand their product portfolios since the profit incentives are large. Examples of the types of counterfeit products that may have negative health and safety effects on consumers are presented below.

- Counterfeit pharmaceuticals may include toxic or nonactive ingredients, correct ingredients in incorrect quantities, or other mislabeling. These products can be ineffective in treating ailments or may lead to adverse

reactions, drug resistance, or even death.¹² The FDA has specifically highlighted and issued warnings to U.S. consumers on the dangers of buying prescription drugs over the Internet.

- Counterfeit automotive products may be substandard. A representative of a U.S. automotive parts supplier stated that it tested a supply of counterfeit timing belts that did not meet industry safety standards and could potentially impair the safety of vehicles.
- Counterfeit or pirated software may threaten consumers' computer security. The illegitimate software, for example, may contain malicious programming code that could interfere with computers' operations or violates users' privacy.

Effects Vary Across Industries and Include Lost Sales and Reduced Incentives to Innovate

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. Many industries lose sales because of consumers' purchases of counterfeit and pirated goods, particularly if the consumer purchased a counterfeit when intending to purchase a genuine product. In such cases, the industry may lose sales in direct proportion to the number of counterfeit products that the deceived consumers purchased. Industries in which consumers knowingly purchase counterfeits as a substitute for the genuine good may also experience lost sales. For example, recording companies have lost sales on a wide scale as a result of pirated music distributed over the Internet and producers of high-end fashion goods have lost sales from purchases of counterfeit goods made to look similar to genuine products.

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—

¹²For example, the FDA in recent years has found cases of a counterfeit HIV/AIDS drug that contained nonsterile tap water instead of an active ingredient; a fake schizophrenia medication that contained aspirin; a counterfeit influenza vaccine; and a misbranded cough suppressant that caused the death of five consumers.

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. Consumers who are unaware that a product is counterfeit may blame the manufacturer of the legitimate good for negative effects of the fake. Some manufacturers learn of the existence of counterfeit versions of their products from returns of inferior counterfeit goods.

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 in nature, 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 the 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 these goods. They will no longer need to illegally copy a given brand—they will be in the aftermarket. He suggested that companies should work to ensure their competitive advantage in the future by inhibiting undesired knowledge transfer.

U.S. Government Loses Tax Revenue, Incurs Enforcement Expenses, and Faces Risks to Supply Chains

Many of the experts we interviewed identified lost tax revenue as an effect of counterfeiting and piracy on governments. IP owners or producers of legitimate goods who lose revenue because of competition from counterfeiters pay less in taxes. The U.S. government also incurs costs due to IP protection and enforcement efforts. Researchers have found anecdotal evidence that organized criminal and terrorist organizations are involved in counterfeiting and piracy. A 2009 RAND Corporation study, for

example, presented case studies showing the involvement of organized crime or terrorist groups involved in film piracy to generate funding for their activities.¹³ Because criminal networks are involved, government law enforcement priorities may be affected since more resources are devoted to combating these networks. Researchers have identified economic incentives that have contributed to the increase in counterfeiting and piracy in recent years. Economic incentives include low barriers to entering the counterfeiting and piracy business, potentially high profits, and limited legal sanctions if caught.

The federal government also incurs costs to store and destroy counterfeit and pirated goods. Seized goods have to be secured, as they have potential value but cannot be allowed to enter U.S. commerce. Storage may be prolonged by law enforcement actions, but the goods are generally destroyed or otherwise disposed of when they are determined to be illegal and are no longer needed. According to CBP officials, as seizures have increased, the agency's storage and destruction costs have grown and become increasingly burdensome. CBP reported that it spent about \$41.9 million to destroy seized property between fiscal years 2007 and 2009.

Counterfeits also pose a threat to the reliability of supply chains that have national security or civilian safety significance. According to a recent Commerce report, counterfeit electronics parts have infiltrated U.S. defense and industrial supply chains and almost 40 percent of companies and organizations—including the Department of Defense—surveyed for the report have encountered counterfeit electronics.¹⁴ Commerce reported that the infiltration of counterfeit parts into the supply chain was exacerbated by weaknesses in inventory management, procurement procedures, and inspection protocols, among other factors. The Federal Aviation Administration (FAA) tracks and posts notifications of incidents of counterfeit or improperly maintained parts entering airline industry supply chains through its Suspected Unapproved Parts Program in an effort to improve flight safety. The FAA program has identified instances of counterfeit aviation parts, as well as fake data plates and history cards to make old parts look new. FAA's program highlights the risks that counterfeit parts pose to the safety of commercial aircraft.

¹³RAND Corporation, *Film Piracy, Organized Crime, and Terrorism*, RAND Safety and Justice Program and the Global Risk and Security Center, (Santa Monica, Calif., 2009).

¹⁴Commerce, Bureau of Industry and Security, Office of Technology Evaluation, *Defense Industrial Base Assessment: Counterfeit Electronics* (Washington, D.C., January 2010).

The U.S. Economy May Experience Slower Growth

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. According to officials we interviewed and OECD's 2008 study, 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.

In addition to the industry effects, 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.

Certain Stakeholders May Experience Positive Economic Effects of Counterfeiting and Piracy

Some experts we interviewed and literature we reviewed identified potential positive economic effects of counterfeiting and piracy. Some consumers may knowingly purchase a counterfeit or pirated product because it is less expensive than the genuine good or because the genuine good is unavailable, and they may experience positive effects from such purchases. For example, consumers in the United States and other countries purchase counterfeit copies of high-priced luxury-branded fashion goods at low prices, although the products' packaging and sales venues make it apparent they are not genuine. Consumers may purchase movies that have yet to be released in theaters and are unavailable in legitimate form. Lower-priced counterfeit goods may exert competitive pressure to lower prices for legitimate goods, which may benefit consumers. However, according to the OECD, the longer-term impact for consumers of falling prices for legitimate goods is unclear, as these changes may affect the speed of innovation.

There are also certain instances when IP rights holders in some industries might experience potentially positive effects from the knowing consumption of pirated or counterfeit goods. For example, consumers may use pirated goods to “sample” music, movies, software, or electronic games before purchasing legitimate copies, which may lead to increased sales of legitimate goods. In addition, industries with products that are characterized by large “switching costs,” may also benefit from piracy due to lock-in effects. For example, some experts we spoke with and literature we reviewed discussed how consumers after being introduced to the pirated version might get locked into new legitimate software because of large switching costs, such as a steep learning curve, reluctance to switch to new products, and search costs incurred by consumers to identify a new product to use.

Some authors have argued that companies that experience revenue losses in one line of business—such as movies—may also increase revenues in related or complementary businesses due to increased brand awareness. For instance, companies may experience increased revenues due to the sales of merchandise that are based on movie characters whose popularity is enhanced by sales of pirated movies. One expert also observed that some industries may experience an increase in demand for their products because of piracy in other industries. This expert identified Internet infrastructure manufacturers (e.g., companies that make routers) as possible beneficiaries of digital piracy, because of the bandwidth demands related to the transfer of pirated digital content. While competitive pressure to keep one step ahead of counterfeiters may spur innovation in some cases, some of this innovation may be oriented toward anticounterfeiting and antipiracy efforts, rather than enhancing the product for consumers.

Lack of Data Hinders Efforts to Quantify Impacts of Counterfeiting and Piracy

According to experts we spoke with and literature we reviewed, estimating the economic impact of IP infringements is extremely difficult, and assumptions must be used due to the absence of data. Assumptions, such as the rate at which consumers would substitute counterfeit goods for legitimate products, can have enormous impacts on the resulting estimates and heighten the importance of transparency. Because of the significant differences in types of counterfeit and pirated goods and industries involved, no single method can be used to develop estimates, and each method has limitations. Nonetheless, research in specific industries suggest that the problem is sizeable. Most experts we spoke with and the literature we reviewed 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.

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

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, *The Economic Impact of Counterfeiting and Piracy*, further states 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."

In cases in which data on counterfeits are collected by federal agencies, such as CBP or FAA, it is difficult to know how complete the data are. For example, it is difficult to determine whether CBP's annual seizure data in table 1 reflect the extent and types of counterfeits entering the United States in any given year, the counterfeit products that were detected, or the level of federal border enforcement effort expended. FAA's notifications on counterfeit parts through its Suspect Unapproved Parts Program rely, in part, on reported incidents or complaints from members of the aviation community.

Commerce and FBI officials told us they rely on industry statistics on counterfeit and pirated goods and do not conduct any original data gathering to assess the economic impact of counterfeit and pirated goods on the U.S. economy or domestic industries. 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.

Assumptions Are Used to Compensate for the Lack of Data

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. Two key assumptions that typically are required in calculating a loss estimate from counterfeit goods include the substitution rate used by consumers and the value of counterfeit goods.

- *Substitution rate.* The assumed rate at which a consumer is willing to switch from purchasing a fake good to the genuine product is a key assumption that can have a critical impact on the results of an economic loss estimate. For example, if a consumer pays the full retail price for a fake movie thinking that it is the genuine good, an assumption can be made that a legitimate copy would have been bought in the absence of the fake product, representing a one-to-one substitution rate. However, this one-to-one substitution rate requires three important conditions: (1) the fake good is almost identical in quality to the genuine one; (2) the consumer is paying full retail price for the fake product; and (3) the consumer is not aware he is purchasing a counterfeit product. When some of these conditions are not met (e.g., the consumer paid a significantly lower price for the counterfeit), the likelihood that the consumer would have purchased the genuine product at full price is not clear. Substitution rates also vary by industry, since factors such as product quality, distribution channels, and information available about the product can differ significantly.
- *Value of fake goods.* Valuation of the fake goods constitutes another set of assumptions that has a significant impact. There are several measures of value that can be used, such as the production cost, the domestic value, or the manufacturer's suggested retail price. For example, CBP announced in a January 2010 press release that it had seized 252,968 DVDs with counterfeit trademarks. The agency reported that the manufacturer's suggested retail price of the shipment was estimated to be more than \$7.1 million and the domestic value was estimated at \$204,904. Officials from the International Trade Commission stated that counterfeits are very difficult to price and estimates of economic impact would benefit from

including a range of prices, from the spot price of the fake on the street corner at the bottom to the manufacturer's suggested retail price at the top.

The level or extent of deception that consumers face is also an important factor to consider when developing assumptions for the substitution rate and value of the fake goods. If a consumer is completely deceived, it could be reasonable to assume a one-to-one substitution rate (i.e., the purchase of a legitimate good in lieu of the counterfeit one) and a full retail price (i.e., the manufacturer's suggested retail sales price). Price, packaging, and location of the transaction are the most important signs to the consumer indicating the legitimacy of a good. Many of the experts we interviewed said that a one-to-one substitution rate is not likely to exist in most circumstances where counterfeit goods are significantly cheaper than the legitimate goods. Some experts also noted that the level of consumer deception varies across industries. For example, consumers who purchase counterfeit pharmaceuticals are more likely to be deceived, particularly when the counterfeit good is sold through the same distribution channel as the genuine product. Some experts observed that few, if any, consumers would willingly purchase a pharmaceutical product they knew might be counterfeit.¹⁵ However, the extent of deception among consumers of audiovisual products is likely lower because sales venues for counterfeit audiovisual goods tend to be separate from the legitimate ones. Unless the assumptions about substitution rates and valuations of counterfeit goods are transparently explained, experts observed that it is difficult, if not impossible, to assess the reasonableness of the resulting estimate.

Three Widely Cited Estimates Sourced to U.S. Agencies Cannot Be Substantiated

Three commonly cited estimates of U.S. industry losses due to counterfeiting have been sourced to U.S. agencies, but cannot be substantiated or traced back to an underlying data source or methodology. First, a number of industry, media, and government publications have cited an FBI estimate that U.S. businesses lose \$200-\$250 billion to counterfeiting on an annual basis. This estimate was contained in a 2002 FBI press release, but FBI officials told us that it has no record of source data or methodology for generating the estimate and that it cannot be corroborated. Second, a 2002 CBP press release contained an estimate that U.S. businesses and industries lose \$200 billion a year in revenue and 750,000 jobs due to counterfeits of merchandise. However, a CBP official

¹⁵A FDA official told us that most of the fake pharmaceutical purchases were made through the Internet, where consumers were seeking drugs without prescription.

stated that these figures are of uncertain origin, have been discredited, and are no longer used by CBP. A March 2009 CBP internal memo was circulated to inform staff not to use the figures. However, another entity within DHS continues to use them. Third, the Motor and Equipment Manufacturers Association reported an estimate that the U.S. automotive parts industry has lost \$3 billion in sales due to counterfeit goods and attributed the figure to the Federal Trade Commission (FTC). The OECD has also referenced this estimate in its report on counterfeiting and piracy, citing the association report that is sourced to the FTC. However, when we contacted FTC officials to substantiate the estimate, they were unable to locate any record or source of this estimate within its reports or archives, and officials could not recall the agency ever developing or using this estimate. These estimates attributed to FBI, CBP, and FTC continue to be referenced by various industry and government sources as evidence of the significance of the counterfeiting and piracy problem to the U.S. economy.

No Single Approach for Quantifying Impacts of Counterfeiting and Piracy Can Be Used, but Different Studies Indicate Problem Is Sizeable

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. 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. The most commonly used methods to collect and analyze data, based on our literature review and interviews with experts, are presented below.

Extrapolation of Enforcement Seizure Data

Seizure data from CBP is one of the few types of hard data sources available and is often used to extrapolate the level of counterfeit and pirated trade. This approach provides hard evidence of the minimum quantity of counterfeit goods, but a major limitation is that levels of border enforcement efforts can vary. For example, in our study of seizures made by the CBP field offices, we calculated "seizure rates" for the top 25 U.S. ports, based on the dollar value of IP seizures at each port compared to

the dollar value of IP-related imports there. These ports accounted for over 75 percent of the value of all IP-related imports into the United States in fiscal year 2005.¹⁶ We found that the top 3 ports seized over 100 times more IP counterfeits than the lowest 5 of these ports per dollar of IP-related imports. As a result, it appears that the importance of IP enforcement and the skill of the personnel at the ports have significant impact on the level of seizures. This suggests that seizure data might be useful as a floor, but are not indicative of the actual level of U.S. imports of counterfeit goods.

A study conducted by the Los Angeles County Economic Development Corporation, *A False Bargain: The Los Angeles County Economic Consequences of Counterfeit Products*,¹⁷ used extrapolation of seizure data as one of its three approaches to estimate the economic impact of counterfeits.¹⁸ The authors noted that the key variable in extrapolating seizure data from CBP was to determine CBP's success rate in interdicting illegal goods, which they acknowledged was "unknowable." One of the study's estimates that used CBP seizures to extrapolate the value of counterfeit and pirated goods in Los Angeles County calculated a range between \$1 billion and \$4.6 billion in 2005. This range was based on different assumptions used for seizure rates and other variables.

Another challenge when extrapolating seizure data is determining the dollar value to assign to the seized good, which can have a significant impact on the magnitude of the estimates. For example, in 2009, CBP seized a shipment of counterfeit sunglasses from China and reported an estimated total domestic value at \$12,146 and a manufacturer's suggested retail price at \$7.9 million.

¹⁶This method enabled us to perform a better comparison across ports by reducing the influence of non-IP-related imports, as well as eliminating the impact of the fact that some ports handle many times the volume of imports compared to other ports. For a more detailed explanation of U.S. custom seizure data and our analysis see GAO, *Intellectual Property: Better Data Analysis and Integration Could Help U.S. Customs and Border Protection Improve Border Enforcement Efforts*, [GAO-07-735](#) (Washington, D.C.: Apr. 26, 2007).

¹⁷Gregory Freeman, Nancy D. Sidhu, and Michael Montoya, *A False Bargain: The Los Angeles County Economic Consequences of Counterfeit Products*. (Los Angeles, Calif.: Los Angeles County Economic Development Corporation, February 2007).

¹⁸The authors used the extrapolation method in combination with two other methods as tests of reasonableness.

Surveys of Supply and Demand

Researchers have conducted surveys to gather data on the consumption or sales patterns of counterfeit or pirated goods. The main advantage of this method is that it can also show consumers' behavior in terms of their preferences. For example, a survey could collect information on the consumer's willingness to pay for a counterfeit good; the number of counterfeit units purchased in a determined period of time; the minimum expected quality; the necessary price reduction of the legitimate good to avoid the consumer's purchase of the counterfeit good; the knowledge of sanctions if caught purchasing the counterfeit good; and the knowledge of potential "side effects" due to the purchase of fake goods. However, a survey can be a labor-intensive project and can cost in the millions of dollars. Moreover, one expert stated that the bias in surveys is hard to identify. For example, he commented that students, who are often the subjects in surveys of illegal file sharing, may either not admit that they are engaging in illegal activity, or may admit to such behavior because it may be popular for this demographic.

The Business Software Alliance publishes piracy estimates based on a set of annual surveys it conducts in different countries.¹⁹ Based on its survey results, the industry association estimated the U.S. piracy rate at 20 percent for business software, carrying a loss of \$9 billion in 2008. This study defined piracy as the difference between total installed software and legitimate software sold, and its scope involved only packaged physical software. While this study has an enviable data set on industries and consumers located around the world from its country surveys, it uses assumptions that have raised concerns among experts we interviewed, including the assumption of a one-to-one rate of substitution and questions on how the results from the surveyed countries are extrapolated to nonsurveyed countries.

Another example of the use of surveys is the study by the Motion Picture Association, which relied on a consumer survey conducted in several countries.²⁰ This study found that U.S. motion picture studios lost \$6.1 billion to piracy in 2005. It is difficult, based on the information provided in the study, to determine how the authors handled key assumptions such

¹⁹Business Software Alliance (BSA), *Sixth Annual BSA-IDC Global Software 08 Piracy Study*. (Washington, D.C.: BSA, May 2009).

²⁰L.E.K. Consulting, *The Cost of Movie Piracy*, sponsored by the Motion Picture Association, 2006.

as substitution rates and extrapolation from the survey sample to the broader population.

In a smaller-scale example of a survey method, Rob and Waldfogel²¹ surveyed students in American universities during parts of 2003 and 2004, asking not only about the amount of music albums they purchased and illegally downloaded, but also the titles and their valuation for the albums they purchased and illegally downloaded. Their main findings are: (1) downloading reduces legitimate purchases by individuals by 20 percent in the sample, that is, every five music downloads substitute one legitimate purchase; (2) on average, respondents downloaded music that they valued one-third to one-half less than their legitimately purchased music, suggesting that some of the music that was downloaded would never have been purchased as an album; and (3) while downloading reduces per capita expenditures by \$25, it raises per capita consumers' surplus by \$70. The study indicated that downloading illegal music can have a positive effect on total consumer welfare. However, as explained by the authors, this experiment cannot be generalized; the data consist of a snapshot of undergraduate students' responses, which is not representative of the general population.

As previously discussed, Commerce recently conducted a survey of 387 companies and organizations participating in U.S. defense and industrial supply chains and reported that almost 40 percent of them encountered counterfeit products between 2005 and 2008.²² The report focused on basic electronic parts and components, including microcircuits and circuit boards, throughout the entire electronics industrial base in the United States. The report noted that these parts are key elements of electronic systems that support national security missions and control essential commercial and industrial operations. Information provided by these companies and organizations also demonstrated an increase in the number of reported counterfeit incidents from 3,868 in 2005 to 9,356 in 2008. Some of these counterfeit incidents could include DOD-qualified parts and components.

²¹Rafael Rob and Joel Waldfogel, *Piracy on the High C's: Music Downloading, Sales Displacement, and Social Welfare in a Sample of College Students*. *Journal of Law and Economics*, vol. XLIX, April 2006.

²²Commerce, Bureau of Industry and Security, Office of Technology Evaluation, *Defense Industrial Base Assessment: Counterfeit Electronics* (Washington, D.C., January 2010).

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.²³ 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.

In the case of estimating the effect of counterfeiting and piracy, RIMS II economic multipliers are applied to U.S. industry loss figures, which have been derived from other studies, and used to calculate the harm on employment and output due to reduced investments. Using the RIMS II multipliers in this setting does not take into account the two-fold effect: (1) in the case that the counterfeit good has similar quality to the original, consumers have extra disposable income from purchasing a less expensive good, and (2) the extra disposable income goes back to the U.S. economy, as consumers can spend it on other goods and services.

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.

The Institute of Policy Innovation has commissioned three studies in the audiovisual industries using economic multipliers; the most expansive of the studies covers motion pictures, sound recordings, business and

²³Commerce, 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.

Other Data Collection and Modeling Methods

entertainment software, and video games for the year 2005.²⁴ This study found that losses in the U.S. economy due to piracy accounted for \$58 billion in output, over 370,000 jobs, and \$2.6 billion in tax revenue. It was calculated by taking industry estimates of loss revenue and applying the RIMS II multipliers to these figures.²⁵

Several additional studies that we reviewed provided alternative data collection and modeling techniques to quantify the effect of counterfeiting on a specific industry or, in the case of the OECD, on world trade. The OECD, for example, adopted an approach of combining different methodologies to develop a single estimate. The OECD triangulated a combination of data sets: extrapolating seizure data provided by national customs authorities, comparing the seizure data to international trade data, and using these data in an econometric model. The seizure data were used to develop a model that would measure the magnitude of global counterfeit trade.

The OECD estimated that the magnitude of counterfeit and pirated goods in international trade could have accounted for up to \$200 billion in 2005, and later updated this estimate to \$250 billion based on 2005-2007 world trade data.^{26, 27} As noted by the OECD, most of the international trade data were supplied by national governments and relevant industries, and the OECD did not independently assess the reliability of the figures. Its methodology is based on matching, to the best of its knowledge, the industry data with customs seizure data from the OECD members, acknowledging the limitations of working with customs seizure data. OECD heavily qualified this estimate, however, reporting that “the overall degree to which products are being counterfeited and pirated is unknown and there do not appear to be any methodologies that could be employed to develop an acceptable overall estimate.” A second phase of the OECD project covered digital piracy, but did not attempt to quantify the effects.

²⁴Stephen E. Siwek, *The True Cost of Copyright Industry Piracy to the U.S. Economy*, Institute for Policy Innovation (IPI), IPI Center for Technology Freedom, Policy Report 189, (October 2007).

²⁵In some cases, the author adjusted the industry estimates of loss revenue in order to make them comparable across industries.

²⁶The OECD estimate was limited to internationally traded hard goods and did not include digital piracy or counterfeit goods produced and consumed within the same country.

²⁷OECD, *Magnitude of Counterfeiting and Piracy of Tangible Products: An Update*, Paris: OECD, November 2009.

In a more narrowly focused study on downloads of music, Oberholzer-Gee and Strumpf²⁸ used modeling to determine that illegal downloads have no effect on record sales. They concluded that, in contrast with industry estimates, declining sales over the period of 2000-2002 were not primarily caused by illegal downloads. The results were found after compiling a data set of illegal downloads from a prominent server and testing the variation between illegal downloads and legal sales in the United States of specific albums on a weekly basis for 17 weeks in the second half of 2002. This was done by modeling album sales as a function of the quantity of album downloads and other album specific characteristics. While this is an enviable data set of actual illegal downloads, the study has two main limitations: first, the study uses a static model which does not reflect the effect of downloads apart from the week the download occurred. Second, the study only observed the supply side of music. Thus, it is not clear if consumers who are illegally downloading music would have purchased the genuine albums.

Hui and Png's²⁹ study provided another example that used modeling. This study estimated that piracy in the music industry caused revenue losses of 6.6 percent in 1998. The authors stated that their estimate is significantly less than the industry loss estimate. In particular, for the year 1998 in the United States, legitimate sales of CDs were 3.73 CDs per capita, and the average loss in sales per capita due to piracy was 0.044 CDs. The data set included CD prices, music CD demand, piracy level and country-specific characteristics for 28 countries, mostly provided by the International Federation of the Phonographic Industry.³⁰ The main limitation for this study was that it only covered physical piracy. While digital piracy was not a major concern during the time period sampled, it has become so for at least the last decade due to the Internet. Another limitation is that the study used piracy rates that assumed a one-to-one substitution rate, including those used by the Business Software Alliance.

²⁸Felix Oberholzer-Gee and Koleman Strumpf, *The Effect of File Sharing on Record Sales: An Empirical Analysis*. *Journal of Political Economy*, vol. 115, no. 1, 2007.

²⁹Kai-Lung Hui and Ivan Png, *Piracy and the Legitimate Demand for Recorded Music*, *Contributions to Economic Analysis & Policy*, Volume 2 Issue 1, Article 11, 2003.

³⁰The piracy rates used in the study were provided by the International Federation of the Phonographic Industry and Business Software Alliance for music cassettes and business computer software, respectively.

Many experts we interviewed also agreed that general or partial equilibrium models would offer useful insights if the input data existed. These involve modeling the supply and demand of a good and simulating the effect of how counterfeiting affects the market for that good (in the case of a partial model) and the economy as a whole (for a general equilibrium model). The approach allows a systematic analysis of the problem, but depends on the quality of the data used to develop the models. The benefit of an equilibrium model is that assumptions can be tested based on the results obtained and modified if the results fall outside of established parameters. Experts agreed on the potential benefits of this approach, but recognized that data limitations make it currently close to impossible to implement. Officials from the International Trade Commission and other industry experts said that this would be their preferred approach to think of the problem in question, but they also acknowledged that data reliability is a major concern, as with the other methodologies.

“Rule of Thumb” for Measuring Counterfeit Trade as a Proportion of World Trade

According to experts we interviewed and the literature we reviewed, there is no evidence to support a “rule of thumb” that measures counterfeit trade as a proportion of world trade to estimate the amount of counterfeit trade that occurs in a local economy. The advantage of finding a so-called “rule of thumb” for counterfeit trade is that it can be applied generally and does not try to take into consideration the different rates of counterfeiting and piracy for each of the different industry sectors. However, as noted earlier, piracy rates differ enormously across industries, so it is not possible to generalize findings. Moreover, not all goods from world trade can be counterfeited or pirated.

The most commonly cited “rule of thumb” is that counterfeit trade accounts for 5 to 7 percent of world trade, which has been attributed to the International Chamber of Commerce. The Office of the Comptroller of the City of New York used this rule of thumb in its 2004 study to estimate the total dollar exchange of counterfeit goods in the United States and in New York State.³¹ This study first applied a 6 percent rule (an average of 5 to 7 percent “rule of thumb”) to the total value of world trade in 2003 (\$7.6

³¹William C. Thompson, Jr., *Bootleg Billions: The Impact of the Counterfeit Goods Trade on New York City*, (New York City Office of the Comptroller, November 2004).

trillion) to calculate the value of world trade that is made up of counterfeit goods, arriving at \$456 billion.³²

This rule of thumb was widely spread by a 1998 OECD report, although OECD and experts cautioned that this estimate was not verifiable and the source data were not independently calculated. In its 2008 report, *The Economic Impact of Counterfeiting and Piracy*, the OECD commented that the “metrics underlying the International Chamber of Commerce’s estimates are not clear,” nor is it clear what types of IP infringements are included in the estimate. In a 2009 update to the report, the OECD estimated the share of counterfeit and pirated goods in world trade as 1.95 percent in 2007, increasing from 1.85 percent in 2000. Many of the experts we interviewed also expressed skepticism over the estimate that counterfeit trade represents 5 to 7 percent of world trade.

Economy-Wide Impact of Counterfeiting and Piracy Is Unknown

While experts and literature we reviewed 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 example, as previously discussed, OECD 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.” One expert characterized the attempt to quantify the overall economic impact of counterfeiting as “fruitless,” while another stated that any estimate is highly suspect since this is covert trade and the numbers are all “guesstimates.”

To determine the net effect, any positive effects of counterfeiting and piracy on the economy should be considered, as well as the negative effects. Experts held different views on the nature of potentially offsetting effects. While one expert we interviewed stated that he did not believe there were any positive effects on the economy due to counterfeiting and piracy, other experts stated that there were positive effects and they

³²This study does not specify which industries are covered or whether it includes piracy, and does not explain the linear proportion between trade and counterfeiting for the world or the United States.

should be assessed as well. Few studies have been conducted on positive effects, and little is known about their impact on the economy. Although some literature and experts suggest that negative effects may be overstated, in general, literature and experts indicate the negative effects of counterfeiting and piracy on the U.S. economy outweigh the positive effects. Since there is an absence of data concerning these potential effects, the net effect cannot be determined with any certainty.

The experts we interviewed also differed regarding the extent to which net effects of counterfeiting and piracy could be measured in certain parts of the economy. For example, one expert we spoke with has conducted research that found that employment numbers may be lost to the U.S. economy when copyright industries lose business due to piracy. Other experts we interviewed stated that, in their view, employment effects are unclear, because employment may decline in certain industries or rise in other industries as workers are hired to produce counterfeits. Another expert told us that effects of piracy within the United States are mainly redistributions within the economy for other purposes and that they should not be considered as a loss to the overall economy. He stated that “the money does not just vanish; it is used for other purposes.” Other experts we spoke with focused more on the difficulties of aggregating the wide variety of effects on industries into a single assessment.

We are sending copies of this report to interested congressional committees; the Secretaries of Commerce, Health and Human Services, and Homeland Security; the Attorney General; the Chairman of the International Trade Commission; the U.S. Trade Representative, and the Intellectual Property Enforcement Coordinator. This report will also be available at no charge on GAO’s Web site at <http://www.gao.gov>.

If you or your staffs have any questions about this report, please contact me at (202) 512-4347 or yagerl@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report.



Loren Yager
Director, International Affairs and Trade

Appendix I: Objectives, Scope, and Methodology

The Prioritizing Resources and Organization for Intellectual Property Act of 2008 (PRO-IP Act) directed GAO to conduct a study on the quantification of the impacts of imported and domestic counterfeits on the U.S. manufacturing industry and the overall economy of the United States. After conducting initial research, we determined that the U.S. government did not systematically collect data and perform analysis on the impacts of counterfeiting and piracy on the U.S. economy, and concluded that it was not feasible to generate our own data or attempt to quantify the economic impact of counterfeiting or piracy on the U.S. economy based on the review of existing literature and interviews with experts. In addition, we noted that many of the existing studies and literature on economic effects address both counterfeiting and piracy. Based on discussions with staff from the House and Senate Judiciary Committees, we agreed that we would (1) examine existing research on the effects of counterfeiting and piracy on consumers, industries, government, and the U.S. economy; and (2) identify insights gained from efforts to quantify the effects of counterfeiting and piracy on the U.S. economy. To address both of these objectives, we interviewed officials and representatives from industry associations, nongovernmental organizations, academic institutions, and U.S. government agencies and the multilateral Organization for Economic Cooperation and Development (OECD). We also reviewed documents and studies quantifying or discussing the impacts of counterfeiting and piracy on the U.S. economy, industry, government, and consumers.

Specifically, we reviewed quantitative and qualitative studies published since 1999 of the economic impact of intellectual property (IP) infringements to examine the range of impacts of counterfeiting and piracy on various stakeholders (both positive and negative) and to identify other insights about the nature of counterfeit markets, approaches to developing estimates, and the role IP plays in the U.S. economy. We identified these reports and studies through a literature search and discussions with representatives from industry associations, nongovernmental organizations, academic institutions, U.S. government agencies, and the OECD to obtain their views on the most relevant studies to review. Our literature review also included the OECD studies that examined the economic impact of counterfeiting and piracy. Although the OECD studies are global in scope rather than focused on the U.S. economy, their unique nature and prominence as the most comprehensive attempt to quantify the impacts of counterfeiting and piracy warranted their inclusion within our scope. See the bibliography for a partial list of references we consulted. We did not assess or evaluate the accuracy of quantitative estimates or other data found in these studies. We reviewed the studies primarily to obtain information on the range of effects from counterfeiting and piracy,

different methods and assumptions used in determining effects, and insights gained from these efforts. In selecting studies for review, we sought to include a range of industries and methodologies. In some cases, we interviewed the authors of these reports to obtain additional information.

We conducted structured interviews with subject matter experts to obtain their views on efforts to quantify the economic impacts of counterfeiting and piracy and methodological approaches, the range of impacts of counterfeits and piracy, and insights on counterfeiting activities and markets. We identified experts through a literature review and discussions with relevant government officials, industry and consumer representatives, academics, and other stakeholders. These subject matter experts were selected from a population of individuals from government, academia, industry, and professional organizations. More specifically, our criteria for selecting experts to interview included:

- type and depth of experience, for instance, whether the expert had authored a widely referenced study or article on the topic, and whether the expert was referred to us by at least one other interviewee as someone knowledgeable about the topic;
- relevance of published work to this engagement;
- representation of a range of perspectives;
- representation of relevant organizations and sectors including, where applicable, representatives from government, academia, industry, and professional organizations; and
- other subject matter experts' recommendations.

We developed a common list of structured interview questions that we asked of each of the experts. We pretested our questions with two of our initial respondents and refined our questions based on their input. The structured interviews included questions on definitions of counterfeit and pirated goods; effects of counterfeiting and piracy; and their views on methodologies and studies that quantify the effects of counterfeiting and piracy, as well as assumptions used. Individuals or organizations that we met with for these structured interviews are listed below:

- Business Software Alliance (BSA)
- Peggy Chaudhry, Villanova University
- International Trade Commission
- Joe Karaganis, Social Science Research Council
- Keith Maskus, University of Colorado
- OECD
- Felix Olberholzer-Gee, Harvard University
- Stephen Siwek, Economists Inc.
- John Spink, Michigan State University
- Thorsten Staake, ETH Zurich, Department of Management, Technology, and Economics
- Office of the U.S. Trade Representative
- Alan Zimmerman, City University of New York

We also met with representatives from other industry associations and other organizations outside of the structured interview process in order to gain more in-depth information and additional perspectives on both of our objectives. In addition, we interviewed U.S. agency officials and reviewed documents from the Departments of Justice, Homeland Security, Commerce, and Health and Human Services, the Office of the U.S. Trade Representative, and the International Trade Commission. U.S. agency documents that we reviewed included counterfeiting and piracy studies, press releases, and other documents. For background purposes, we updated CBP data on counterfeit seizures and costs to store and destroy seized counterfeit goods from our 2007 report, *Intellectual Property: Better Data Analysis and Integration Could Help U.S. Customs and Border Protection Improve Border Enforcement Efforts* ([GAO-07-735](#)). To assess the reliability of the seizure data, we reviewed our prior work that reported on seizure data, examined them for internal consistency, and discussed with CBP how the data are collected and reviewed. We found the data to be sufficiently reliable for background purposes of reporting trends in law enforcement seizures. We shared a copy of the draft report with officials from the Departments of Commerce, Justice, Homeland

Security, Health and Human Services, the Office of the U.S. Trade Representative, the International Trade Commission, and the Office of the U.S. Intellectual Property Enforcement Coordinator to obtain technical comments. We received comments from the Departments of Homeland Security and Justice, and the Office of the U.S. Intellectual Property Enforcement Coordinator and made changes as appropriate.

The PRO-IP Act also directed us to report on the nature and scope of IP statutory and case laws and the extent that they are being used to investigate and prosecute acts of trafficking and counterfeits. As agreed with Congressional committees, this part of the mandate was addressed by our 2008 report, *Intellectual Property: Federal Enforcement Has Generally Increased, but Assessing Performance Could Strengthen Law Enforcement Efforts* ([GAO-08-157](#)).

We conducted our work from April 2009 to April 2010 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations to our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions in this product.

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

Loren Yager, (202) 512-4347 or yagerl@gao.gov

Staff Acknowledgements

In addition to the contact named above, Christine Broderick, Assistant Director; Jeremy Latimer; Catherine Gelb; Pedro Almoguera; Shirley Brothwell; Karen Deans; Matthew Jones; and Diahanna Post made key contributions to this report. In addition Virginia Chanley and Ernie Jackson provided technical assistance.

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