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## The True Cost of Sound Recording Piracy to the U.S. Economy

by Stephen E. Siwek | Publications | Policy Report



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### Executive Summary

There is little debate that U.S. sound recordings are "pirated" in vast numbers in the U.S. and in international markets. Piracy of these works harms the intellectual property owner, who loses the revenue that would have been gained had the legitimate recording been purchased. These "direct" losses, however, represent only part of the story. Piracy also causes significant and measurable harm to the "upstream" suppliers and "downstream" purchasers who also would have benefited from the sale of legitimate, copyright protected sound recordings. Indeed, the harms that flow from pirate activities produce a cascading effect throughout the economy as a whole. These harms include lost output, lost earnings, lost jobs and lost tax revenues.

In order to alert policy makers to the magnitude of these ripple effects, this paper estimates the true impact of piracy in the sound recording industry on the overall U.S. economy. Using the RIMS II mathematical model maintained by the U.S. Bureau of Economic Analysis (BEA), this study estimates the impact of piracy in the sound recording business on the U.S. economy as a whole. The effects of music piracy on the U.S. economy are quantified in terms of lost economic output, jobs, employee earnings and tax revenue.

The true cost of sound recording piracy far exceeds its impact on U.S. producers and distributors of sound recordings. Piracy harms not only the owners of intellectual property but also U.S. consumers and taxpayers.

Specifically, the analysis demonstrates that:

- a. As a consequence of global and U.S.-based piracy of sound recordings, the U.S. economy loses \$12.5 billion in total output annually. Output includes revenue and related measures of economic performance.
- b. As a result of sound recording piracy, the U.S. economy loses 71,060 jobs. Of this amount, 26,860 jobs would have been added in the sound recording industry or in downstream retail industries, while 44,200 jobs would have been added in other U.S. industries.
- c. Because of sound recording piracy, U.S. workers lose \$2.7 billion in earnings annually. Of this total, \$1.1 billion would have been earned by workers in the sound recording industry or in downstream retail industries while \$1.6 billion would have been earned by workers in other U.S. industries.
- d. As a consequence of piracy, U.S. federal, state and local governments lose a minimum of \$422 million in tax revenues annually. Of this amount, \$291 million represents lost personal income taxes while \$131 million is lost corporate income and production taxes.

As policy makers turn their attention to the viability of the U.S. economy in the global marketplace, it seems obvious that the problem of music piracy should be afforded a high place on the policy agenda in coming years.

### Introduction

Widespread piracy of copyright protected works through both physical and electronic media harms the companies that create and sell these products. Since many of these companies are U.S. firms, the harm of global piracy falls disproportionately on U.S. companies, their stockholders and employees, and on U.S. federal and state governments.

The U.S. companies that are most directly affected by piracy have long sought to increase understanding of the scope of this problem and to encourage government-wide efforts to address this threat. However, until recently, there has been little reliable economic information available to U.S. policymakers to assist them in balancing the importance of enforcing intellectual property rights as against other priorities. In order to address this issue, in 2005, I published a study entitled *Engines of Growth: Economic Contributions of the U.S. Intellectual Property Industries*.<sup>1</sup> In that study, I analyzed the contributions to the U.S. economy of the U.S. "IP industries" - industries that rely most heavily on copyright or patent protection to generate revenue,

employ and compensate workers and contribute to real growth. The study found, among other things, that these IP industries are the most important growth drivers in the U.S. economy, contributing nearly 40% of the growth achieved by all U.S. private industry and nearly 60% of the growth of U.S. exportable products. It also found that the IP industries were responsible for one-fifth of the total U.S. private industry's contribution to GDP and two-fifths of the contribution of U.S. exportable products and services to GDP.

Subsequently, in September 2006, the Institute for Policy Innovation (IPI) published my new study entitled, "*The True Cost of Motion Picture Piracy to the U.S. Economy.*"<sup>2</sup> In that study, (hereinafter, the "*Motion Picture Piracy*" study) I measured the true cost of motion picture piracy to the U.S. economy as a whole. I concluded that global piracy of motion pictures resulted in \$20.5 billion annually in lost output among all U.S. industries, \$5.5 billion annually in lost earnings for all U.S. workers and 141,030 U.S. jobs that would otherwise have been created. In addition, as a result of piracy, governments at the federal, state and local levels are deprived of at least \$857 million in tax revenue each year.

The *Motion Picture Piracy* study was an initial effort to measure the economic impact of motion picture piracy on the U.S. economy as a whole.

In the current study, the basic methodology and approach that was pioneered in the *Motion Picture Piracy* study will be applied to another industry—the U.S. Sound Recording industry. In this analysis, as in the motion picture study, estimates of sound recording industry losses to piracy will be used in conjunction with industry-specific multipliers from the U.S. Bureau of Economic Analysis to derive economy-wide losses in output, employee earnings and jobs. In addition, these estimates, in conjunction with other data, will be used to derive estimates of the tax receipts that are lost as a result of sound recording piracy.

The analysis of the impact of sound recording piracy that is presented here will also serve as an essential input in yet another upcoming IPI study that will consider the *combined* effects of piracy in four separate copyright-dependent industries. The industries to be included in this broader effort will include the U.S. sound recording industry as well as the U.S. motion picture, business and entertainment software and video games industries.

## **I. Background: Measuring the Harm Caused by Sound Recording Piracy**

### **U.S. Sound Recording Industries**

In this study, the principal focus of analysis will be the U.S. Sound Recording Industries that are identified in the North American Industry Classification System as a four-digit industry group - NAICS 5122.<sup>3</sup> This industry group "comprises establishments primarily engaged in

- producing and distributing musical recordings,
- in publishing music,
- or in providing sound recording and related services.<sup>4</sup>

NAICS 5122 is part of the broader Motion Picture and Sound Recording Industry sub sector (NAICS 512) which is, in turn, part of the "Information" industry sector (NAICS 51).

According to the U.S. Census Bureau, the "employer firms" in NAICS 5122 generated revenue of \$18.7 billion in 2005.<sup>5</sup> This total represented an increase of \$2.2 billion or 13.7% over 2004. In that year, (2004), the Census Bureau also found that the Sound Recording Industries had 25,101 paid employees in 3,405 establishments.<sup>6</sup> These employees received a total payroll of \$1.965 billion.

Within the four-digit Sound Recording Industries group, the largest five-digit NAICS industry is NAICS 51222—integrated record production and distribution. In 2005, the NAICS 51222 industry reported revenues of \$12.866 billion. Of this total, 87 percent or \$11.242 billion was generated through the sale of recordings.<sup>7</sup> In 2005, the NAICS 51222 industry reported total expenses of \$11.122 billion. This total represented an increase of 24.6% or \$2.194 billion over total expenses in 2004.<sup>8</sup> Personnel costs alone rose from \$1.631 billion in 2004 to \$2.173 billion in 2005.

### **U.S. Recording Retail Trade**

The full impact of sound recording piracy is not limited to the U.S. companies that create and sell copy protected music products. In particular, U.S. retailers of compact disks face reduced sales and lower profits as a result of pirate activities that occur in the United States. The International Federation of the Phonograph Industry (IFPI) has reported that in 2005, U.S. sales of recorded music generated record company "trade" revenues of \$7.012 billion.<sup>9</sup> At the retail level, however, these same sales of recorded music in the U.S. cost consumers \$12.270 billion. Clearly, in the U.S., recorded music piracy hurts both producers and retailers of recorded music.

### **Our Interlocking Economy**

In fact, the impact of music piracy flows throughout the U.S. economy. Piracy in one segment of the economy can affect other industries because the economy is an "interlocking" system. Changes in supply or demand in one industry can and do affect supply and demand in other industries.

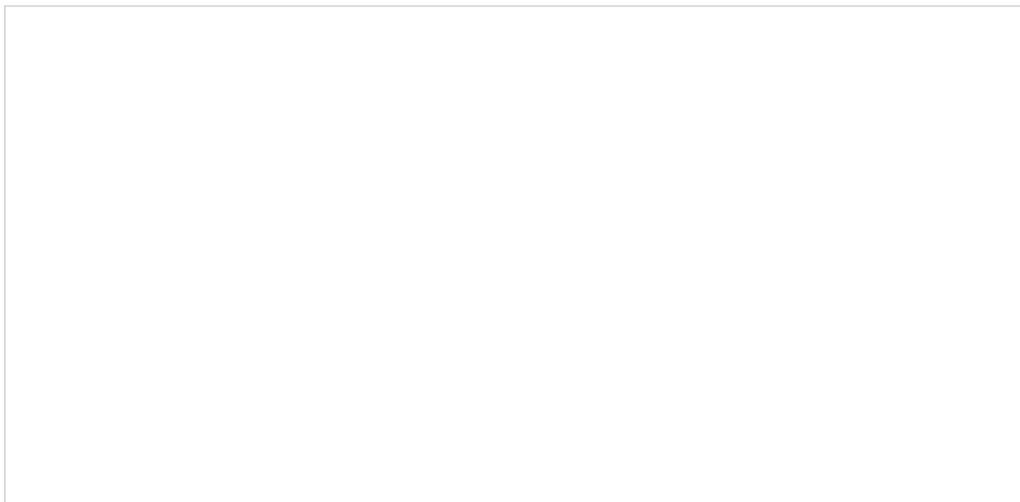
For example, assume that personal watercraft suddenly become very popular and shortages develop. In this situation, the price of personal watercraft will rise and so will the profits of the manufacturers. However, in order to continue to earn these higher profits, the manufacturers will have to make more personal

watercraft. In the process, they will buy, among other things, more waterproof seats from seat manufacturers.

Of course, it doesn't stop there. In order to produce more seats, the seat manufacturers will have to buy more plastic and more padding. And the plastic and padding manufacturers will have to buy more of the particular materials that they need.

The cascade does not even end with the suppliers of personal watercraft manufacturers but continues downstream as well. The retail sellers of personal watercraft who buy from the manufacturers will also be able to earn more money by raising prices or by increasing volume. These kinds of interactions among industries are captured in input-output tables. Input-output tables measure the interrelationships that exist among different industries. With this information, one can estimate what impact a specific change in one industry will have on other industries.

What is true for personal watercraft is equally true for recorded music. If the revenue generated by making and selling recorded music increases (In this case, not by higher demand but by a decrease in piracy), record companies will make more recordings, invest in higher quality, broader distribution or marketing, or some combination of these activities in order to capture more profits. (See sidebar "A Decrease In Piracy Expands Production").



## II. Methodology: Piracy Loss Estimates for the Sound Recording Industry

### Global Losses from Physical Piracy

In the *Motion Picture Piracy* study, estimates of the global losses to the U.S. industry from motion picture piracy were available from the extensive piracy survey analysis conducted for the Motion Picture Association of America by L.E.K. Consulting. At this writing, no such comprehensive analysis of piracy exists for the recorded music industry. However, many of the underlying building blocks of such an analysis do exist in a variety of industry and trade publications. For this study, the most important of these sources was *2006 Global Recording Industry in Numbers* which is published by the International Federation of the Phonogram

Industry (IFPI).

The IFPI report contains detailed, country-by-country information on actual sales of recorded music by year and as between physical and digital media. The report also establishes two separate measures of value for the recorded music that is sold in each country. These measures are record company "trade" value and the "retail" value paid by the consumer for the purchase of a music product. The IFPI report shows, by country, the number of physical units sold by medium (i.e. CD, DVD etc.) and the number of single units sold (i.e. songs) by physical and digital media. Finally, the IFPI report publishes an estimate of the physical piracy rate for each market analyzed.<sup>10</sup> Country-by-country data from the IFPI 2006 report are reproduced in Appendix A.

In this report, physical piracy refers to manufactured pirate CDs, copied CDs and manufactured or copied music video DVDs. The calculations used to derive worldwide losses from physical piracy of recorded music are shown in Table 1. The calculations begin with an estimate of the losses sustained by the worldwide recorded music industry from physical piracy. As set forth in Appendix A, the IFPI provides estimates of the physical piracy rates experienced in all major markets of the world. These calculations are used, in conjunction with legitimate sales quantities to derive the number of pirate units sold by market. As shown in Table A-3 of Appendix A, this quantity was 1.398 billion units in 2005. If these units could have been sold at the average retail price that prevailed in each market, the global industry would have earned an additional \$6.460 billion (Table A-3).

#### **Substitution of Legitimate Product for Pirate Product--Physical Piracy**

However, unlike the calculations in Table A-3, in this analysis it is conservatively assumed that absent piracy, there would be a significant loss of pirate quantities as former consumers of those products would likely have to pay higher (legitimate) prices. Unfortunately, there is no precise measure of the degree to which consumers of pirated CD would continue to purchase those CDs at legitimate prices. In this analysis, we have reviewed results of several surveys of consumers of both pirated and legitimate CDs in different markets. We have also reviewed surveys of home video consumers in markets around the world. These surveys generally conclude that if counterfeit channels were not available, many buyers of counterfeit CDs would purchase CDs legally. While the degree to which these legitimate purchases would occur differs by market, it appears nevertheless, that such purchases would comprise a very significant fraction of the total number of pirated CDs now purchased. Indeed, the "substitution" rates cited by survey respondents range from approximately 40% to 70%.<sup>11</sup> In this study, the weighted average substitution rate used for the physical piracy of recorded music is 65.7%. A calculation of the implied substitution rate for physical piracy is shown in Table 2.

With a weighted average substitution rate of 65.7%, the estimated global loss from physical piracy falls from \$6.460 billion (100% substitution at retail prices) to \$4.068 billion. (See Table 1) This value must then be divided between the music retailer and the music producer. For this purpose, we again use the IFPI data to derive the weighted average world trade price (\$8.58) and the weighted average world retail price (\$14.13).<sup>12</sup> The ratio of the trade price average to the retail price (60.7%) is used for this purpose. (See Table 1)

Finally, we must determine the share of piracy losses that represents U.S. recorded music. In its Special 301 filings with the U.S. Trade Representative's office, the U.S. industry develops an "estimate of the local pirate market that is classified international repertoire and takes, on average, 60% of this as U.S. repertoire. This figure is based on legitimate market repertoire data."<sup>13</sup> In this analysis, we increase this percentage by 10% (to 66%) to reflect the belief that greater investment in the development and marketing of U.S. product (relative to non-U.S. product) increases the likelihood that U.S. product will be pirate.

Based on these assumptions, the total loss to U.S. sound recording producers from physical piracy is estimated as \$1.630 billion. (See Table 1)

#### **Global Losses from Download Piracy**

The U.S. recorded music industries sustain losses not only from physical piracy but also increasingly from illegal downloads of recorded music. Many of these songs are downloaded from peer-to-peer (P2P) networks whose users increasingly are responsible for recent declines in the number of legitimate CD sales in the U.S. IFPI estimates that in 2005, 20 billion songs were illegally downloaded worldwide.<sup>14</sup> In this report, the calculations used to derive the recorded music industries' losses from download piracy are provided in Table 1.

#### **Substitution of Legitimate Product for Pirated Product--Download Piracy**

As reported in Table 1, the calculation begins with the IFPI estimate of 20 billion illegal downloads worldwide. For reasons set forth above in connection with the physical piracy estimates, it is further assumed that 66% of all illegal downloads represent downloads of U.S. recorded music. It is then assumed that only 20% (1 in 5) of these downloaded songs would have been purchased legitimately if piracy did not exist.<sup>15</sup>



For the 20% of downloaded U.S. songs that, absent piracy would be purchased legitimately, it is then necessary to derive the legitimate price that these consumers (who formerly downloaded recorded music illegally) would now pay. Since these consumers are all familiar with the Internet and capable of downloading computer files, it is reasonable to assume that most (but not all) of their substitution efforts would occur in the form of legal downloads from legitimate web sites.



For these downloads, we assume a legitimate price of \$0.99 per song. (See Table 2) We further assume that 90% of these songs would ultimately be acquired through legitimate music downloads while the remaining 10% of songs would be purchased on a legitimate CD. <sup>16</sup> The weighted average legitimate price used for worldwide downloads of U.S. music is \$2.30. (See Table 2)

As shown in Table 1, the legitimate price of \$2.30 times the net return to the record producer (60.72%) times the total estimated song substitutions (2.640 billion) yields total download piracy losses to U.S. firms of \$3.703 billion. When combined with the physical piracy losses of \$1.630 billion, the total piracy loss to the

sound recording industries from global piracy equals \$5.333 billion. (See Table 1)

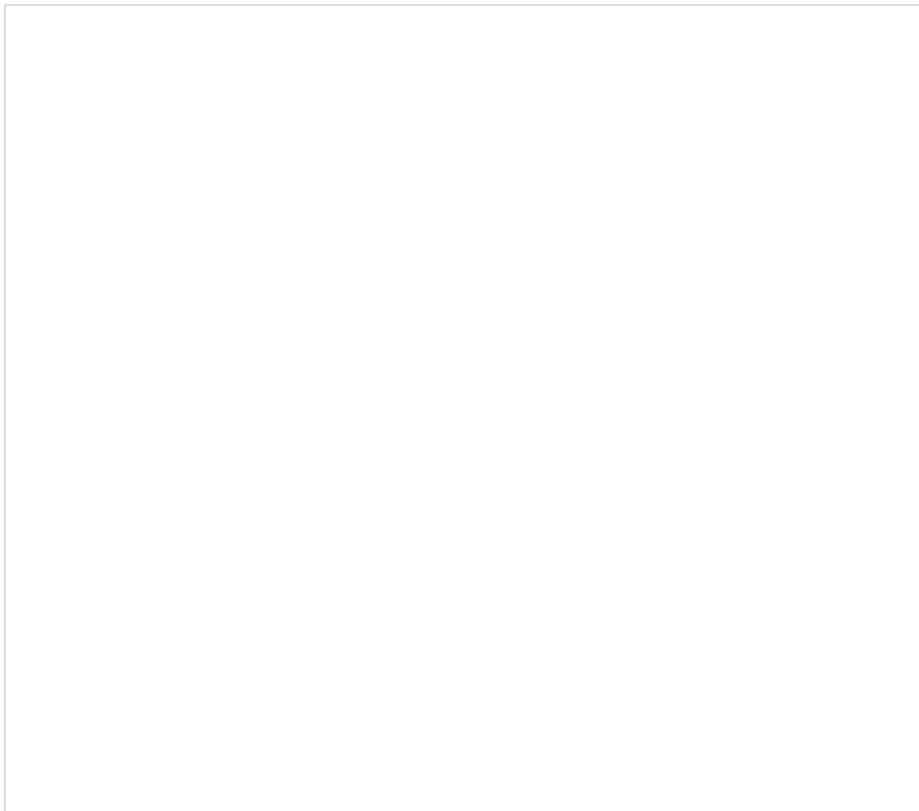
### U.S. Retail Losses from Sound Recording Piracy

As noted earlier, piracy losses to U.S. industries are not limited to the losses sustained by U.S. producers of recorded music. Recorded music is sold through a wide variety of retail distribution channels and U.S.-based music piracy reduces those legitimate sales. Calculations in support of the piracy losses estimates for U.S. retail industries are provided in Table 3.

The calculations in Table 3 follow on from the calculations provided in Tables 1 and 2. As shown in Table 3, U.S. retail sales and profits are affected by both physical and download piracy. The physical piracy loss estimate begins with the U.S. losses from physical piracy that occur within the United States. As shown in Table 3, this value is \$335 million as per IFPI. (See Table A-4, Appendix A). This value is then adjusted to reflect only the retail portion of these losses. The net U.S. retail loss from physical piracy is shown as \$151 million. (Table 3)

The download piracy losses to U.S. retailers are calculated using an assumed value of 4.0 billion illegal downloaded songs in the U.S. in 2005. This value (based primarily on a review of confidential sources) implies that of the 20 billion illegal songs downloaded globally in 2005, some 20% or 4 billion were downloaded to U.S. consumers.

Again assuming a 20% substitution rate, these 4 billion downloaded songs translate into 800 million lost legitimate sales. This figure is then adjusted for the weighted average price of legitimate purchases for download consumers and by the retail margin. These calculations lead to download piracy losses to U.S. retailers of \$890 million and total U.S. retail losses (from both download and physical piracy) of \$1.041 billion. See Table 3.



### The Applicable RIMS II Multipliers--Production

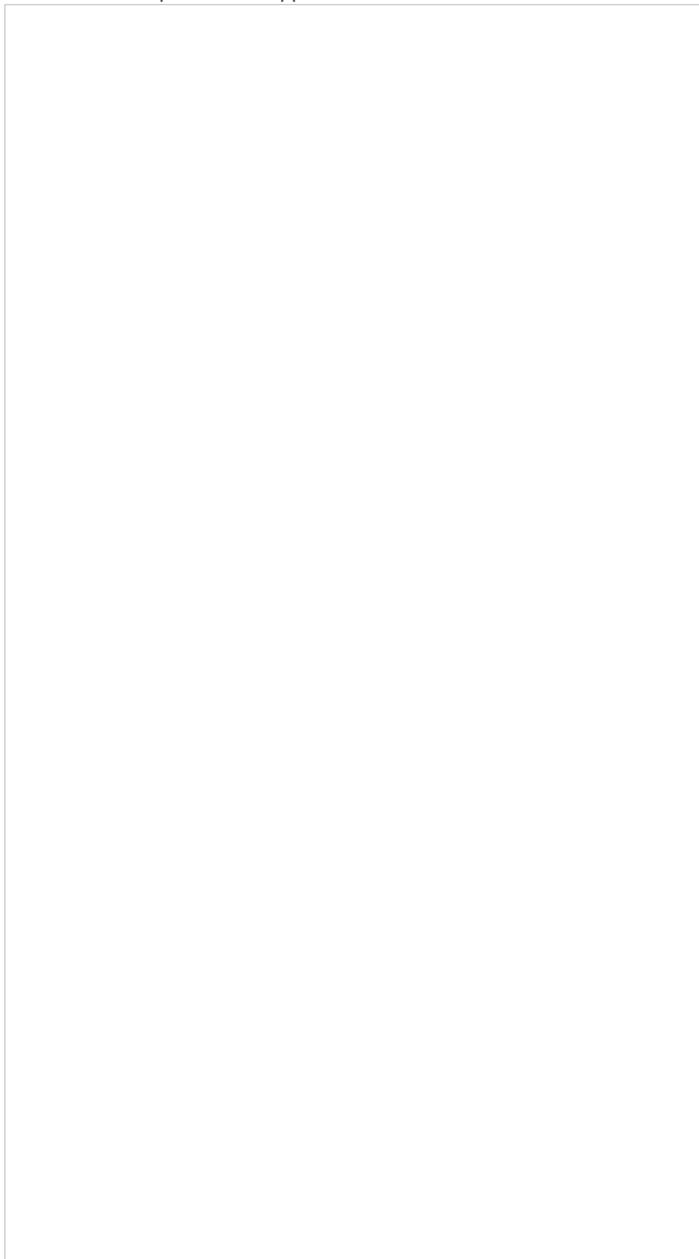
The recording industry production and retail losses calculated above reveal only the direct impact of piracy on the sound recording industry and its retail trade. To derive and estimate additional losses throughout the economy, we use multipliers from the RIMS II model.

The RIMS II model contains five types of multipliers for many U.S. industries. For each industry, there are three "Final Demand" multipliers for output, earnings, and employment and two "Direct- Effect" multipliers for "direct" earnings and employment. In this analysis, the Final Demand multipliers tell us the total effects of sound recording piracy on the output, earnings, and employment of all U.S. industries. The Direct Effects multipliers tell us the specific effects of piracy on the sound recording industries themselves. This analysis uses all five types of multipliers.

The RIMS II model defines industries based on the North American Industry Classification System (NAICS), a classification system maintained by the U.S. Government that tracks increasing levels of specialty within each classification. As noted earlier in this report, the U.S. Sound Recording Industries are classified in NAICS 5122.

A total of five multipliers were acquired from the Bureau of Economic Analysis for NAICS 5122. The three Final Demand multipliers are designed to estimate the changes in total economic output, total earnings (of workers), and total employment that result from a specified change in Final Demand. The two Direct Effect multipliers are used to derive the changes in earnings and employment levels only for workers who are directly employed in the industry under study. In Table 4, all five multipliers are reported for the states of California, New York, Tennessee, Florida and Texas. A detailed discussion of the reasons for this

determination is provided in Appendix B.



### **The Applicable RIMS II Multipliers--Retail**

As noted previously, sound recording piracy affects other U.S. industries in addition to the industries that are classified in NAICS 5122. In particular, U.S. retailers of compact disks face reduced sales and lower profits as a result of piracy. However, the inter-industry relationships that affect these industries differ from the inter-industry relationships that exist in the sound recording industries. As a result, the multipliers that apply to the retailing of compact disks should also differ from the multipliers that were calculated for NAICS 5122. In this study, the economic effects of piracy on U.S. sound recording retailers are measured using multipliers for U.S. retail trade (NAICS 44-45).

The five multipliers used in the retail calculations in this study are shown in Table 5. Multipliers are reported for eight states: California, New York, Texas, Ohio, Pennsylvania, Illinois, Florida, and New Jersey. In the U.S., the retail industries that sell compact disks to consumers are less geographically concentrated than the industries that produce sound recordings. In this study, it is assumed that the retail multipliers for these eight states appropriately and reasonably capture the economic relationships that exist for the U.S. sound recording retailing sector as a whole.

More detailed information on the RIMS II multipliers used in this analysis may be found in Appendix B.

### **III. Findings: The Impact of Sound Recording Piracy on the Overall Economy**

#### **Total Lost Output, Employment and Earnings**

To produce industry-specific estimates of the impacts of piracy on the U.S. economy, the estimated losses from piracy for the sound recording industry are combined with the appropriate multipliers. The three "Final Demand" estimates of the overall impact of piracy on the U.S. economy are reported in Table 6.

As shown in Table 6, as a result of piracy, the sound recording industries have sustained a reduction in Final Demand for their products in the amount of \$5.333 billion in 2005. Using the relevant industry multipliers, this loss is converted into an estimate of the total loss in U.S. output. This total loss figure is \$10.211 billion. In addition, the "direct" loss sustained by retailers of U.S. sound recordings (\$1.04 billion) would provide an additional \$2.290 billion in total lost output to the U.S. economy. As a result, the full impact of sound recording piracy on U.S. output was an overall loss of \$12.501 billion.

With regard to lost earnings of U.S. workers, the comparable loss figures are \$1.997 billion that stem from the losses sustained by the sound recording production and distribution industries and \$699 million from the losses of retail sales of legitimate music CDs. Thus, the total loss in earnings to workers in 2005 was \$2.697 billion.

Finally, in terms of losses in employment that would have been created, the effects of piracy on the sound recording industries in NAICS 5122 cost the United States 46,114 jobs and the effects on U.S. retail distribution cost 24,946 jobs. Thus, the total loss in U.S. employment that has resulted from piracy of U.S. sound recordings in 2005 was 71,060 jobs.

#### **Direct Lost Employment and Earnings**

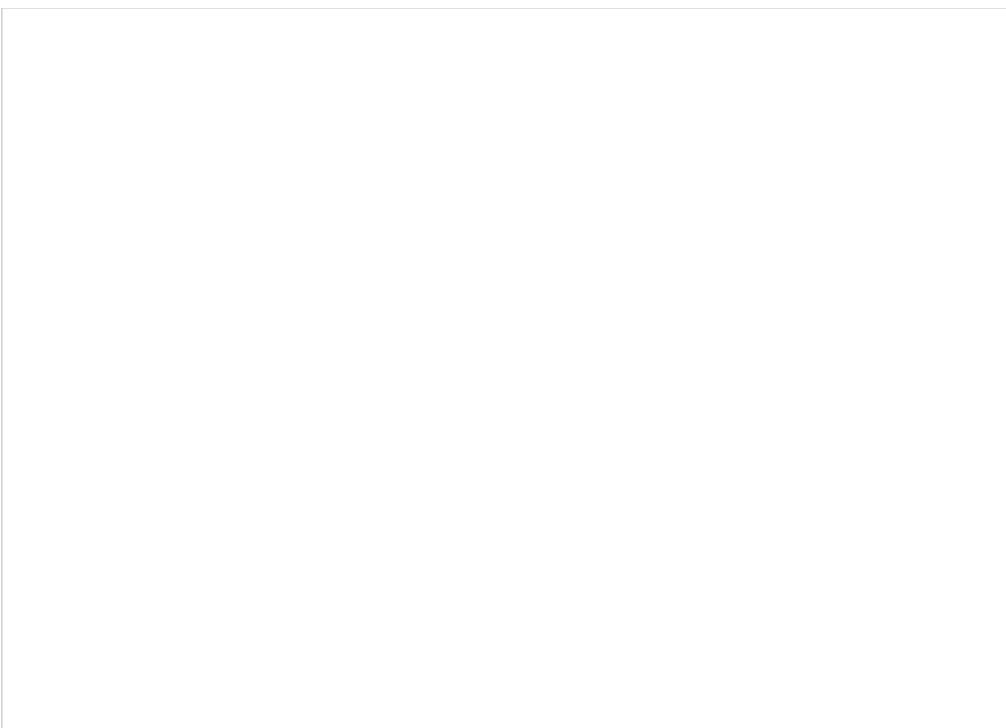
As noted above, the RIMS II model also provides multipliers that measure the economic effects of a change in final demand solely on the industries that are directly affected by that change. Using these multipliers, as shown in Table 7, we estimate that the direct loss in employee earnings in the U.S. sound recording and retail industries that results from pirate activities is \$1.056 billion. The direct loss in employment at these industries was 26,860 jobs.



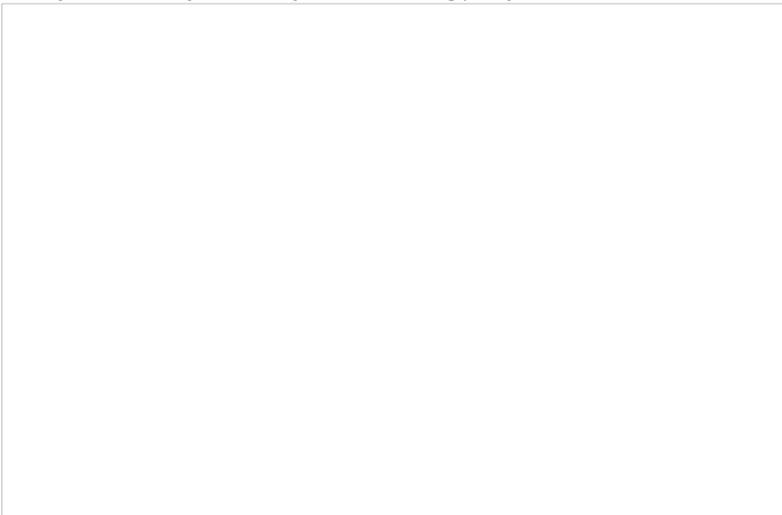
### **Lost Tax Revenues**

In total, sound recording piracy costs government at all levels, conservatively \$422 million annually.

Tax multipliers are not provided in RIMS II. For the tax loss estimates presented in this study, the methodology previously used in the Motion Picture Piracy study was again applied to the sound recording industry.



As in the *Motion Picture Piracy* study, in this study, tax loss estimates are developed for three categories of taxes. These are lost personal income taxes that would have been paid by sound recording industry employees, lost corporate income taxes and lost production and other business taxes. In Table 8A, we calculate the income taxes that would have been paid on the employee earnings that would have been paid absent piracy in sound recordings. As shown in Table 8A, these personal income taxes would have exceeded \$113 million from sound recording employees alone and more than \$291 million from the total employees directly and indirectly affected by sound recording piracy.



In Table 8B, we estimate other tax losses that result from pirate activities in the sound recording industry. For example, focusing only on corporate income taxes, we estimate that the sound recording industry alone would have generated additional taxes of \$81 million each year. In addition, lost "production" taxes from the U.S. sound recording industry would have exceeded \$50 million annually.



It is important also to recognize that the tax loss estimates presented here do not encompass a full accounting of all tax losses attributable to piracy. The estimates for both corporate income tax losses and production tax losses reflect only the direct losses sustained by the sound recording industries themselves. The estimates do not include additional tax losses that would result from lower income and lower sales in those U.S. industries that supply inputs to the U.S. copyright industries. *Thus the corporate income tax and production tax estimates do not include tax losses sustained at U.S. industries that are indirectly affected by piracy.*

### **Conclusion**

As set forth in this report, the U.S. sound recording industries are now sustaining approximately \$5.33 billion in losses as a result of global and U.S. piracy. In addition, U.S. retailers are losing another \$1.04 billion. These estimates suggest total "direct" losses to all U.S. industries from music piracy that exceed \$6.37 billion.

These direct losses then cascade through the rest of the U.S. economy and the losses of economic output, jobs and employee earnings "multiply."

Based on the analyses set forth in this paper, because of music piracy, the U.S. economy loses a total of \$12.5 billion in economic output each year.

Furthermore, the U.S. economy also loses 71,060 jobs. Of this amount, 46,114 jobs are lost at the U.S. production level for sound recordings while 24,946 jobs are lost at the U.S. retail level.

Because of global piracy in recorded music U.S. employees lose \$2.7 billion in total earnings annually. Of this total, \$2.0 billion is lost at the U.S. production level while \$700 million is lost at the U.S. retail level.

Finally, as a consequence of piracy in sound recordings, U.S. federal, state and local governments lose a minimum of \$422 million in tax revenues annually. Of this amount, \$291 million represents lost personal income taxes while \$131 million is lost corporate income and production taxes.

### **Appendix A--IFPI Reference Data**

The International Federation of the Phonographic Industry (IFPI) is an international organization that represents the recording industry worldwide. Its membership comprises some 1,400 major and independent companies in more than 70 countries. It also has affiliated industry national groups in 48 countries.

The data shown in Tables A-1 through A-5 were obtained from an IFPI report entitled: *2006 Global Recording Industry in Number*.









## Appendix B--Sound Recording Industry Multipliers

The estimates in this report are based on an analytical framework known as an *input-output* (I-O) table. For every industry in the economy, an I-O table shows the distribution of the inputs purchased and the outputs sold. Using this framework, the U.S. Bureau of Economic Analysis (BEA) has developed a method for estimating I-O *multipliers*. Using multipliers, it is possible to measure not only the direct effects of piracy (i.e. the lost 1st round of output) but also the indirect effects (i.e. the lost 2nd and subsequent rounds of output) as piracy reduces the need for inputs from factor suppliers in other industries. In addition, the BEA multipliers also consider the "induced" economic effects that arise from the piracy-driven loss in labor income that is borne by workers in the legitimate industries and which results in a consequent decrease in household consumption.

In this analysis, the multipliers used to estimate the full effects of sound recording piracy were derived using BEA's Regional Input-Output Modeling System or (RIMS II). The RIMS II model produces industry-specific "final demand" multipliers for output (in dollars), employment (in numbers of employees) and earnings of those employees (in dollars). The RIMS II model also provides industry-specific "direct effects" multipliers for employment and earnings. The actual multipliers that were used in this analysis are shown in Table 4 (U.S. Sound Recording Industries). In this analysis, the multipliers used to estimate the full effects of sound recording piracy were derived using BEA's Regional Input-Output Modeling System or (RIMS II). The RIMS II model produces industry-specific "final demand" multipliers for output (in dollars), employment (in numbers of employees) and earnings of those employees (in dollars). The RIMS II model also provides industry-specific "direct effects" multipliers for employment and earnings. The actual multipliers that were used in this analysis are shown in Table 4 (U.S. Sound Recording Industries - NAICS 512200) and in Table 5 (U.S. Sound Recording Industries: Retail Trade - NAICS 44-45).

### Defining Regions by Industry

The RIMS II model produces industry-specific final demand and direct effects multipliers. However, the RIMS II model is fundamentally a regional model that estimates multipliers within a pre-defined geographic

area. Thus, for example, an analyst might be tasked with estimating the economic effects of building a new sports stadium within a given metropolitan region. In this example, the analyst would first pre-specify the relevant metropolitan region for which the RIMS II model should be calibrated. Subsequently the analyst would select the relevant industry multipliers to be derived within that region. The pre-specification of a region directly effects the RIMS II multipliers because, all else equal, the smaller the region, the greater the chance that that necessary inputs will be obtained from outside the region. When inputs are obtained from outside of the pre-specified region in RIMS II, they may no longer "count" as in-region effects of the initial change in final demand. Thus, with a narrowly defined area, the indirect economic effects of a given change in final demand might be too low.

This study differs from the more typical RIMS II analysis in that the economic effects of sound recording piracy are generally not focused on one or a few small geographic areas. For example, according to the U.S. Census Bureau, in 2002, the U.S. Sound Recording Industries (NAICS 5122) employed workers in 43 different states. For this reason, further analyses were conducted of the state-by-state employment patterns in the U.S. Sound Recording Industries.

### **Multipliers for U.S. Sound Recording Production Distribution**

A review of the sound recording industry's employment levels on a state-by-state basis revealed that in 2002 only five states: California, New York, Tennessee, Florida and Texas employed 74.3% of all U.S. workers in NAICS 5122. Forty-one percent of the workers in this subset were located in California while 39.1% were employed in New York. The remaining three states employed the following shares: Tennessee - 10.0%; Florida - 5.4% and Texas - 4.0%.

In certain instances, sound recording industry centers may specialize in particular music genres. The sound recording industry in Tennessee, for example, has long been associated with country music while sound recording centers in Florida and Texas increasingly emphasize Spanish language music. In this analysis, it is assumed that absent piracy, legitimate sound production would increase in those geographic regions that already specialize in the production of sound recordings. However, if piracy were eliminated, other regions that already specialize in particular music genres would also see growth in their production of sound recordings in those genres. For these reasons, the final multipliers used to analyze the sound recording production and distribution industries in NAICS 5122 include multipliers for both the major production states of California and New York and for the states of Tennessee, Florida and Texas where the sound recording industries are both smaller and more genre-specific.

Five categories of multiplier were acquired from the Bureau of Economic Analysis in order to analyze the effects of piracy in NAICS 5122. The three Final Demand multipliers related to output, earnings (of workers) and employment. The two Direct Effect multipliers also related to earnings (of workers) and employment. These multipliers were specific to both NAICS 5122 and to the states of California and New York. As noted above, the actual multipliers that were used in the analysis of NAICS 5122 are shown in Table 4.

### **Multipliers for U.S. Sound Recording Retail Trade**

As noted previously, sound recording piracy affects other U.S. industries in addition to the industries that are classified in NAICS 5122. In particular, U.S. retailers of music CDs and of legitimate downloads face reduced sales and lower profits as a result of pirate activities that occur in the United States. However, the inter-industry relationships that affect these industries differ from the inter-industry relationships that exist in the sound recording industry itself. As a result, the multipliers that apply to the retailing of recorded music should also differ from the multipliers that were calculated for NAICS 5122. In this study, the economic effects of piracy on U.S. sound recording retailers are measured using multipliers for U.S. retail trade (NAICS 44-45).

In this study, the five multipliers used to assess the effects of music piracy on U.S. retailers were obtained for eight U.S. states. These states were: California, New York, Texas, Ohio, Pennsylvania, Illinois, Florida and New Jersey. In the US, the industries that sell music CDs directly to consumers are far less geographically concentrated than the industries that produce and distribute sound recordings. Nevertheless, all states are not equal even with regard to CD sales and. In 2002, the U.S. Census Bureau calculated state-by-state figures for the number of U.S. establishments and paid employees in NAICS 45122 - Prerecorded Tape, Compact Disk and Record Stores. For both establishments and employment, eight states were responsible for 49.1% of the U.S. totals within this industry.<sup>17</sup> Those states were the eight states shown in Table 5. In this study, it is assumed that the retail industry multipliers for these eight states appropriately and reasonably capture the economic relationships that exist for the U.S. sound recording retail sector as a whole.

### **Appendix C--References for Tax Calculations**

The principal calculations that support the estimates of lost taxes that are set forth in this report are reported in the text at Tables 8A and 8B. Those calculations reflect the application of estimated tax rates to the employee earnings loss estimates that were derived elsewhere in this report. This Appendix provides the supporting calculations that were used to determine the appropriate tax rates for use in these estimates.

Table C-1 provides the calculations used to determine the average tax rates to be applied to the employee compensation and corporate profits that are lost as a result of sound recording piracy. These calculations rely on U.S. National Accounts data. For personal income taxes, the total amount of personal current taxes reported for the economy is divided by total U.S. Personal Income. These calculations suggest an average personal income tax rate of 10.8%.

In Table C-1, for corporate income taxes, the total amount of U.S. taxes on corporate income is divided by both corporate profits and "U.S. Other Gross Operating Surplus" or "GOS." This calculation is required

because national estimates of corporate profits are not, to our knowledge, broken out by specific industries. By contrast, the Bureau of Economic Analysis does provide data on Other GOS figures for individual industries. This derived tax rate is then applied to the Other GOS values reported for NAICS 512, the U.S. Motion Picture and Sound Recording Industries combined. Subsequently, (in Table 8B) these calculations are then adjusted to reflect tax payments solely from sound recording industry firms.

The supporting calculations that reflect the Other GOS values for NAICS 512 are reported in Table C-2.



## Endnotes

1. [http://nbcumv.com/corporate/Engines\\_of\\_Growth.pdf](http://nbcumv.com/corporate/Engines_of_Growth.pdf)
2. Siwek, Stephen, E., *The True Cost of Motion Picture Piracy to the U.S. Economy*, Institute for Policy Innovation, Policy Report 186, September 2006.
3. In the RIMS II model, the U.S. Bureau of Economic Analysis does not publish multipliers for sound recording industries at the five digit or six digit levels.
4. See Executive Office of the President, Office of Management and Budget, *North American Industry Classification System: United States 2002*, National Technical Information Service and Bernan, a Division of The Klaus Organization Ltd., page 662.
5. U.S. Census Bureau, 2005 Service Annual Survey, Table 3.0.1.
6. U.S. Census Bureau, Statistics of U.S. Businesses: 2004, U.S., Sound recording industries.
7. U.S. Census Bureau, 2005 Service Annual Survey, Table 3.2.5.
8. U.S. Census Bureau, 2005 Service Annual Survey, Table 3.2.5.
9. IFPI, *2006 Global Recording Industry in Numbers*, page 26.
10. The piracy rate (or level) is measured as a percentage of total (legitimate and pirate) unit sales.
11. For example in U.K., 45% of counterfeit CD purchasers would "definitely" purchase legitimate titles if counterfeit CDs were unavailable while 69% of counterfeit CD purchasers would "definitely" or "probably have bought" such titles. See: BPI Market Information, No. 274, August 25, 2006, page 4.
12. Table A-1, A-2.
13. See International Intellectual Property Alliance, *2006 Special 301: Methodology*, page 5.
14. IFPI, *2006 Global Industry in Numbers*, "The key figures in 2005," page 9.
15. A number of academic studies have attempted to estimate the impact that file sharing has had on sound recording sales. The specific estimate of 20% is taken from Pietz, M. and Waelbroeck, P., *The Effect of Internet Piracy on Music Sales: Cross Section Evidence*, Review of Economic Research on Copyright Issues, 2004, vol. 1(2), pp 78.
16. Based on confidential survey data, it appears that many consumers of pirated sound recordings also purchase significant quantities of legitimate sound recordings.
17. 3,431 out of 6,987 establishments and 30,742 out of 62,647 employees in NAICS 45122 were located in the eight states listed above.

## About the Author

Stephen E. Siwek is Principal at Economists Incorporated, a research and consulting firm with offices in Washington D.C. and in the San Francisco Bay area. Active in research and consulting for over 30 years, Mr. Siwek specializes in the analysis of economic, financial, and accounting issues. He has testified as an expert witness before regulatory bodies and courts on more than 80 occasions.

Mr. Siwek has particular expertise in the economic analysis of the U.S. entertainment industries and of the related U.S. industries that depend on the effective protection of their copyrights. Since 1990, Mr. Siwek has published eleven studies on behalf of the International Intellectual Property Alliance ("IIPA") that analyzed

in detail the economic importance of the U.S. "copyright" industries (including the sound recording industry) to the U.S. economy. In these studies, Mr. Siwek quantified the substantial contributions made by the copyright-based industries to U.S. economic growth, employment and foreign trade.

Mr. Siwek has also been instrumental in furthering the efforts of the World Intellectual Property Organization ("WIPO") to encourage other nations to measure the economic contribution of copyright-based industries in their own countries. In this regard, Mr. Siwek has been closely associated with the development of the WIPO "Guide" for the measurement of copyright industry contributions and he has directly assisted a number of foreign governments in the preparation of their own studies.

Mr. Siwek is co-author of *International Trade in Films and Television Programs* (American Enterprise Institute/Ballinger Publishing Company, 1988) and *International Trade in Computer Software* (Quorum Books, 1993).

In 2005, Mr. Siwek authored a widely reported study entitled *Engines of Growth: Economic Contributions of the U.S. Intellectual Property Industries* (Commissioned by NBC Universal, 2005). In that study, Mr. Siwek quantified the substantial contributions made by the IP sector as a whole to real U.S. growth. More recently, Mr. Siwek authored a study on the effects of motion picture piracy on the U.S. economy as a whole. That study was entitled *The True Cost of Motion Picture Piracy to the U.S. Economy*, (Institute for Policy Innovation, Policy Report 186, September 2006).

In February of 2007, Mr. Siwek participated as a panelist in the Motion Picture Association of America's first-of-its-kind industry symposium entitled, *The Business of Show Business*. In May 2007, he also served as a panelist for the launch of the Copyright Alliance, a non-profit education group whose 29 member organizations represent an estimated 11 million Americans working in the copyright sector.

Mr. Siwek earned his undergraduate degree at Boston College and his M.B.A. at George Washington University.

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