UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

—————————————————————

In re DIGITAL MUSIC ANTITRUST
LITIGATION

MDL Docket No. 1780 (LAP)

—————————————————————

DECLARATION OF ROGER G. NOLL

My name is Roger G. Noll, and I reside in Palo Alto, California. I am Professor
Emeritus of Economics at Stanford University and a Senior Fellow at the Stanford
Institute for Economic Policy Research, where I am the Director of the Program on
Regulatory Policy. I have a Ph.D. in economics from Harvard University and a B.S. in
mathematics from the California Institute of Technology. My primary field in economics
is industrial organization, which includes antitrust economics and the economics of
specific industries, including the entertainment industry and the information technology
industry. I have taught antitrust economics to both undergraduate and graduate students
for 50 years.

I have published over 300 books, articles and reviews, including books and
articles on the entertainment industry and/or the information technology sector of the
economy. My complete *curriculum vita* is attached to this declaration as Appendix A.

I have served as a consultant to the Antitrust Division of the U.S. Department of
Justice, the U. S. Federal Trade Commission, the Federal Communications Commission,
and the Senate Subcommittee on Antitrust and Monopoly. I also have participated on
committees of the National Research Council that investigated antitrust and intellectual

PUBLIC VERSION

property issues associated with the rise of digital information technology and the delivery

of entertainment products over the Internet, including the Board on Science, Technology

and Economic Policy and the Committee on Intellectual Property Rights and the

Emerging Information Infrastructure. As a member of the latter, I was co-author of *The*

Digital Dilemma, a study of the implications of developments in information technology

for the traditional publishing and entertainment industries. I also was a member of the

California Council on Science and Technology, for which I organized a study of

disparities in access to computers and the Internet that was published by CCST as

Bridging the Digital Divide.

I have been an economic expert in the following cases that are in process or came

to conclusion during the past five years, some of which involved economic issues

associated with digital entertainment technologies and the Internet.

Testimony at Trial

Bernard Parish, et al., vs. National Football League Players Association (U. S.

District Court, San Francisco);

In re Application of MobiTV Related to U.S. vs. ASCAP (U.S. District Court, New

York City);

Reggie White, et al., v. NFL: Lockout Insurance & Lockout Loans (U.S. District

Court, Minneapolis);

SmithKlein Beecham d/b/a GlaxoSmithKline vs. Abbott Laboratories (U.S.

District Court, Oakland);

Novell vs. Microsoft (U. S. District Court, Salt Lake City);

PUBLIC VERSION

DVD CCA vs. Kaleidescape (Superior Court, San Jose);

In the Matter of Adjustment of Rates and Terms for Pre-existing Subscription and Satellite Digital Audio Radio Service (Copyright Royalty Board, Washington, D. C.); and

In re Application of Pandora Media, Inc. Related to U.S. vs. ASCAP (U.S. District Court, New York City).

Declarations, Expert Reports and/or Depositions

National Association of Optometrists and Opticians, et al., vs. Lockyer, et al., (U.S. District Court, Sacramento);

In re Dynamic Random Access Memory (DRAM) Antitrust Litigation (U. S. District Court, San Francisco);

Joel I. Roos and Tom Santos, et al., vs. Honeywell International (Superior Court, San Francisco);

Vincent Fagan and Anthony Gianasca v. Honeywell International (Superior Court for Middlesex County, Boston, Massachusetts);

John McKinnon v. Honeywell International (Superior Court for York County, Alfred, Maine);

Eric Seiken vs. Pearle Vision (Superior Court for San Diego County, San Diego);

Jason White, et al., vs. National Collegiate Athletic Association (U. S. District Court, Los Angeles);

In re Static Random Access Memory (SRAM) Antitrust Litigation (U. S. District Court, San Francisco);

Fair Isaac, et al., vs. Equifax, et al. (U. S. District Court, Minneapolis);

PUBLIC VERSION

Apple iPod iTunes Anti-Trust Litigation (U. S. District Court, San Jose);

Minority Television Project vs. Federal Communications Commission (U. S. District Court, San Francisco);

In re Flash Memory Antitrust Litigation (U. S. District Court, Oakland);

In re Applications of AT&T Mobility, Ericsson and Verizon Wireless, Related to U.S. vs. ASCAP (U.S. District Court, New York City);

Sarah Perez, et al., vs State Farm Mutual Automobile Insurance Co., et al. (U.S. District Court, San Jose;

Federal Trade Commission vs. Cephalon (U.S. District Court, Philadelphia);

In re Text Messaging Antitrust Litigation (U.S. District Court, Chicago);

In re NCAA Student Athlete Name and Likeness Licensing Litigation (U.S. District Court, Oakland);

City of San Jose, et al., vs. Office of the Commissioner of Baseball, et al. (U.S. District Court, San Jose);

Thomas Laumann, et al., vs. National Hockey League, et al., and *Fernanda Garber, et al., vs. Office of the Commissioner of Baseball, et al.* (U.S. District Court, New York City); and

In re Electronic Books Antitrust Litigation. (U.S. District Court, New York City).

Amicus Submissions

I am a co-author of the following amicus submissions.

PSEG Fossil, et al., vs. Riverkeeper Inc. (U.S. Supreme Court);

American Needle vs. National Football League (U.S. Supreme Court); and

PUBLIC VERSION

Petition to Reconsider Sports Blackout Rules (Federal Communications

Commission).

ASSIGNMENT

Attorneys for the plaintiffs in this litigation have asked me to analyze the

plaintiffs' allegations to determine whether the methods of antitrust economics that

would be used to prove liability and to calculate damages involve evidence and economic

analysis that are predominantly common to class members. In undertaking this task I

have read the *Conformed Third Consolidated Amended Complaint* (henceforth

Complaint) and numerous discovery documents. In reviewing documents and analyzing

the evidence I have been assisted by economists at OSKR. Appendix B contains a list of

the materials that I have relied upon or that have been examined by others at OSKR under

my direction. Finally, I have made use of information that has been collected from public

sources and my experience in studying the entertainment industry for over 40 years.

This report contains the results of my analysis. For carrying out this assignment, I

am being compensated at the rate of $800 per hour.

SUMMARY AND CONCLUSIONS

On the basis of the analysis that is contained in this report, I have concluded that

the methods of antitrust economics that would use to analyze the plaintiffs' allegations of

anticompetitive conduct by the defendants would be predominantly common to members

of the injunctive class, and that the methods of antitrust economics that would be used to

calculate damages produce a common formula that would be common to all members of

PUBLIC VERSION

the damages class.

Proof of liability requires establishing that anticompetitive conduct caused the defendants to set higher prices than otherwise would have been charged had the defendants acted independently. The key point in establishing liability is that physical copies of digital sound recordings and digital downloads of sound recordings over the Internet are close substitutes because, for the large majority of consumers who own computers and high-speed Internet connections, the two products are functionally equivalent. ███

██

████████████████   █████████████████████████████

██

██

███

██████████████████████████████████████

██████████████

The evidence and analytic methods that are needed to prove this argument pertain to the technical characteristics of the products and the structure and conduct of the market. ██████████████████████████████████████

██

████████████   ███████████████████████████████

██

████████ Consequently, the methods for defining the relevant market, measuring market power in the relevant market, determining that one source of market power is price

PUBLIC VERSION

collusion, and showing that collusion caused anticompetitive injury to all class members are common to all members of both classes.

The method for calculating damages is derived from a structural model of competition in the industry, under the assumption that the market for physical copies of digital recordings – primarily compact disc albums – is a valid competitive benchmark. The wholesale overcharge is calculated by constructing a hypothetical "before" period in which ██ ████

██

██

████████████████████████ The overcharge is then calculated as the expected price reduction that would occur if the digital downloads were supplied in a competitive market. A conservative estimate is that half of the cost reduction would be passed on to consumers, in which case the total wholesale overcharge is half of the percentage decline in costs as a fraction of wholesale revenue from digital downloads. Thus, the competitive benchmark wholesale price for every digital download product is a percentage price reduction over the existing price equal to one half of the difference in the profit margins between physical copies and digital downloads.

The last step in the analysis is to examine the extent to which wholesale prices are passed on to consumers in retail prices. An econometric analysis of retail pricing by ██,

██. This result establishes the pass-through rate of the overcharge on retail prices. Retail overcharges are then applied to the defendants' data on revenues from the sale of digital downloads to produce an estimate of

PUBLIC VERSION

total damages. For each consumer in the damages class, damages reduce to that

consumers expenditures on digital downloads multiplied by the percentage overcharge in

retail prices. For each consumer in the injunctive class, proof of anticompetitive injury

consists of applying exactly the same formula, regardless of whether the consumer lives

in a state that permits indirect purchaser antitrust claims and so whether the consumer is a

member of the damages class. Specifically, the antitrust injury to any member of the

injunctive class includes the overcharge on all digital download products that the

consumer purchased.

The defendants have produced transactions records and product-specific income

statements ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮. The damages formula has been

applied to both data sets. ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮

▮▮▮▮▮▮▮▮▮▮▮ In these years, the total amount of overcharges were about $140

million using the transactions data and $200 million using the income statements. These

over4charges are not disaggregated by state because no information n has been provided

from either the defendants or e-retailers about the geographic location of their customers.

The best solution to this problem is to obtain more data. Failing better data, the damages

could be allocated to states on the basis of the fraction of the population that has high-

speed Internet access.

ALLEGATIONS IN THE COMPLAINT

The relevant market that plaintiffs allege is "sales of Digital Music" in the United

States *(Complaint*, p. 9). In the terminology of the *Complaint* (p. 1), digital music is

"music sold as digital files" and includes both compact discs (CDs) and downloads of

PUBLIC VERSION

music from the Internet ("Internet Music"). Here I interpret the term "digital music" as

referring to sound recordings that are stored and sold as digital files, which includes a

small proportion of recordings that do not contain music (notably, comedy recordings).

The anticompetitive conduct that the plaintiffs allege is that the defendants

"conspired to restrict the output of and fix both the prices and the terms under which

Internet Music would be sold," which caused members of the class to pay higher prices

for CDs and downloads (*Complaint*, p. 1; see also p. 14). Plaintiffs also allege

(*Complaint*, p. 9) that the defendants collectively enjoy a sufficiently high share of sales

in the relevant market that jointly they posses market power.

The plaintiffs define two classes (*Complaint*, p. 10). The *injunctive class* consists

of all consumers[1] in the U.S. who purchased digital downloads that were "produced,

manufactured, licensed, distributed and/or sold" by the defendants. The significance of

this class definition is that the defendants distribute digital recordings for independent

record labels as well as for the labels that they own. The *damages class* consists of all

consumers in the U.S. who purchased digital downloads for their own use directly from

the defendants and all consumers in selected states who purchased digital downloads for

their own use that were distributed by the defendants but acquired from an independent

Internet retailer. For both classes, the class period is defined as beginning on December

4, 2001, and continuing to the present.

ECONOMIC ANALYSIS OF LIABILITY ISSUES

In the case of alleged price fixing, I understand that the plaintiffs need not define

---

1. The classes exclude certain employees of the defendants and their affiliates, the families of these employees, and government entities.

PUBLIC VERSION

the relevant market in which collusion occurred. Instead, my understanding is that

plaintiffs must show the following: (1) prices were determined by collusive conduct

rather than by unilateral independent action by each defendant, and (2) collusive conduct

caused harm to competition. Nevertheless, I describe the analysis that an economist

would undertake to establish that, for purposes of antitrust economic analysis, the sale of

digital sound recordings constitute a relevant market. In the process I describe features of

the sound recording industry that assist in understanding the evidence that an economist

would use to prove that price collusion harmed competition and damaged class members.

Market Definition

Plaintiffs have alleged that digital sound recordings that are sold in the United

States constitute a relevant product market for purposes of antitrust economic analysis.

The purpose of this section is to describe how an economist would determine whether

digital sound recordings constitute a relevant market for purposes of antitrust economic

analysis and to assess whether the methods and facts that an economist would use to

define the relevant market are predominantly common to members of the class. Because

market definition depends on the extent to which products compete with each other in a

market (rather than for sales to any particular customer), the issue of market definition

requires analysis of the conditions under which products are sold, and so is common to all

members of each class. This section explains the basis for this conclusion.

Principles of Market Definition

A relevant antitrust market consists of a group of products that buyers regard as

close substitutes. The procedures that economists use to identify a relevant market are set forth in the *Horizontal Merger Guidelines* (henceforth *Merger Guidelines*) of the U.S. Department of Justice and Federal Trade Commission, the most recent version of which was issued on August 19, 2010.

In antitrust economics market definition "is not an end in itself"[2] but is a tool that is valuable to the extent that it sheds light on whether the conduct at issue caused harm to competition. Conduct harms the competitive process if it leads to higher prices, lower quality or less product variety by either increasing market concentration or enabling a group of independent sellers to reduce the intensity of competition among them. A relevant antitrust product market is a group of products that, hypothetically, could profitably be monopolized under a common owner, but that would be competitively priced if sold by separate owners.

The starting place for defining a relevant market is a "reference product" – a product or set of products that is sold by the defendants and is the subject of the alleged anticompetitive conduct. In this litigation the reference product is sound recordings from the defendants that are sold as digital downloads. The process of market definition consists of determining whether different digital downloads are competitive substitutes and identifying whether other products impose a competitive constraint on the price of digital downloads.

The concept that underpins market definition is economic substitution. Products are close economic substitutes for a reference product if a "small but significant non-transitory increase in price" (SSNIP) of the reference product would cause a sufficient

---

2. *Merger Guidelines*, p. 7.

amount of its sales to shift to sales of the other products that the price increase would be unprofitable.[3] A relevant market for purposes of antitrust economics is the reference product plus the smallest group of other products for which a SSNIP would be profitable if all products were sold by a "hypothetical monopolist" that controlled all of the products. The "smallest market principle" implies that not all economic substitutes for the reference product necessarily must be included in the relevant market.

The SSNIP test as a method for defining a relevant market is closely related to the economic concept of elasticity of demand. The elasticity of demand, e, is the absolute value of the percentage change in quantity that arises from a one percent change in price:

$$e = |(dQ/Q)/(dP/P)|,$$

where Q is sales quantity, P is price, and dQ and dP are the changes in Q and P.[4]

Although market definition is based solely on identifying products that are substitutes on the demand side of the market, the principle of substitution applies to both demand and supply responses to a change in relative prices. *Demand substitution* refers to actions by consumers to switch purchases among products. *Supply substitution* refers to a reallocation of production of other products to increase the availability of close substitute products that are available to buyers in the relevant market.

In identifying a relevant product market, economists use several types of evidence. The starting place is to identify products with descriptions and functions that are similar to the reference product. This procedure is useful for identifying the set of products that are most likely to be close competitive substitutes for the reference product.

---

3. *Ibid.*, pp. 8-9.

4. Because higher prices generally lead to lower sales, $(dQ/Q)(dP/P) < 0$. Taking the absolute value of this ratio causes e to be positive.

PUBLIC VERSION

In many circumstances competition arises among so-called "differentiated products," i.e., products with different qualities and technical characteristics. Normally differentiated products are not close substitutes for all buyers. Whether one differentiated product is in the same relevant market as another depends on whether a large enough number of buyers regards them as sufficiently close substitutes that somewhat different products impose a substantial competitive constraint on the price of the reference product. In this litigation two forms of product differentiation arise: differences in the songs and artists among different recordings, and differences in technologies for delivering sound recordings to consumers (CDs, analog physical recordings, digital downloads, etc.).

In the end, whether products are in the same market is not simply a matter of functional definition and technical description, but whether customers regard the products as sufficiently close substitutes that a change in the price of one product would cause them to switch purchases to the other. The process of deciding which products actually are competitive substitutes is fact driven, and the evidence that is used depends on facts about the characteristics of the products and the nature of competitive interactions among participants in the market.

The core underlying fact that economists seek to uncover in defining a relevant market is the cross-elasticity of demand between a reference product and a product that is a possible close substitute. The cross-elasticity of demand is the percentage change in sales of one product arising from a one percent change in the price of another product.[5] If the cross-elasticity of demand is high, an attempt by the producer of a product to increase

---

5. If product #1 is the reference product and product #2 is a candidate for inclusion in the relevant market, then the cross-elasticity of demand, e_{12}, is $(dQ_1/Q_1)/(dP_2/P_2)$. If products are substitutes, then $e_{12} > 0$.

PUBLIC VERSION

price will cause a loss of sales to the other product, assuming that the price of the other product remains unchanged.

In some cases econometric models can be used to estimate the relevant cross-elasticities of demand among the products that are candidates for inclusion in the relevant market. The basic idea is to estimate the relationship between the price of the reference product and variables that capture the supply and demand conditions that determine its price, such as its technical features, its marginal cost of production, and the prices of its most plausible substitutes.[6] Unfortunately, an econometric analysis of price behavior rarely is feasible because estimating cross-elasticities of demand among several plausible substitutes can be very difficult and often is impossible.[7] For example, the task of estimating cross-elasticities of demand is not possible if all firms in a market engage in price collusion. If all competitors set the same collusive price, there is no information on which to determine whether an increase in the relative price of one product would cause increased sales for another product.

---

6. The seminal research in estimating cross-elasticities of demand for purposes of antitrust analysis is Jonathan B. Baker and Timothy F. Bresnahan, "The Gains from Merger or Collusion in Product Differentiated Industries," *Journal of Industrial Economics* Vol. 33, No. 4 (December 1985), pp. 427-44, which applies this method to the beer industry. The proposed merger between Staples and Office Depot is examined in Orley Ashenfelter, David Ashmore, Jonathan B. Baker, Suzanne Gleason and Daniel S. Hosken, "Empirical Methods in Merger Analysis: Econometric Analysis of Pricing in *FTC v. Staples*," *International Journal of the Economics of Business* Vol. 13, No. 2 (July 2006), pp. 265-79.

7. Unbiased estimation of cross-elasticities of demand in product-differentiated markets requires estimating the demand and supply equations for all products that might be in the relevant market, which requires that each equation be "identified." While the precise conditions for identification are quite complicated, they approximately are that each separate equation – one for price and one for quantity for each product – must contain at least one unique explanatory variable. For markets with many products, this condition normally is impossible to satisfy.

PUBLIC VERSION

Due to the difficulty of estimating cross-elasticities of demand in econometric models, economists frequently employ other indicators of the degree of competition between two products to determine whether they are in the same markets. The *Merger Guidelines* list the kinds of evidence that bears on defining the relevant market.[8] This evidence includes documents from buyers, sellers and informed third parties that contain information about which products are commonly regarded as competitive substitutes, whether buyers shift or consider shifting purchases in response to changes in relative prices, whether sellers base business decisions on the prospect of buyers shifting purchases in response to relative price changes, the nature and extent of downstream competition in the buyers' output markets, and the costs of switching products.

One potentially useful indicator is the understanding of experienced observers of the industry. Here, the most useful evidence is the opinions of experienced individuals, preferably when expressed outside the context of the litigation, as to which products are close competitors of other products. The relevant evidence is not opinions about market definition as such, for business executives and their customers are unlikely to know the technical requirements for including a product in a relevant antitrust market. Instead, the kind of information that is useful is a supplier's or a buyer's sense of principal competitors and a buyer's sense of the reasonably close substitutes for a product.

Another useful indicator is the presence of market power. Antitrust analysis separates market definition from market power, but evidence that a firm has substantial market power is pertinent to market definition. If many suppliers offer products that are close substitutes and make independent pricing decisions, prices will be driven to the

---

8. *Merger Guidelines*, pp. 3-6.

PUBLIC VERSION

competitive level. If products are broadly similar but the supplier of one product is able

to sustain its price substantially above its average total cost of production and thereby to

earn profits in excess of the competitive level, the highly profitable product must be sold

in a relevant market in which either there are few competitive substitutes or suppliers set

prices collusively.

Submarkets

Because the reference products in this litigation are differentiated, a plausible

possibility is that sound recordings can be divided into a series of *submarkets*.   A

submarket refers to a group of products that are part of a larger relevant market because

they are substitutes, but may constitute a relevant antitrust market by themselves because

they may be uniquely affected by anticompetitive conduct.

The methods that economists use to identify submarkets were elaborated in

Brown Shoe, which cited indicators to detect whether one or more submarkets, by

themselves, constituted relevant antitrust markets, despite commonalities and substitution

between products in and out of the submarket:

> "The boundaries of such a submarket may be determined by examining
> such practical indicia as industry or public recognition of the submarket
> as a separate economic entity, the product's peculiar characteristics and
> uses, unique production facilities, distinct customers, distinct prices,
> sensitivity to price changes, and specialized vendors."[9]

Antitrust scholars have struggled with bringing clarity and concreteness to the

concept of a submarket, and as a result the term is controversial in antitrust economics.[10]

---

9. *Brown Shoe Co. vs. U.S.*, 370 U.S. 294 at p. 325.

10. The *Merger Guidelines*, *op. cit.*, do not address the issue of submarkets, but capture
the concept by explaining (Section 4) that, if products are geographically or qualitatively

The seven "practical indicia" in *Brown Shoe* have been interpreted by economists and other antitrust scholars as referring to four distinct conditions that could cause a subset of products in a market to be atypically affected by anticompetitive conduct:[11] (1) the possibility of price discrimination; (2) extensive product differentiation that causes some products to be closer substitutes than others for some buyers; (3) differential ability among sellers to engage in "supply substitution" (i.e., to switch production from one variety of the product to another); and (4) the presence of some unilateral market power by one seller that is partly but not fully constrained by competition from other sellers.

Application to Sound Recordings

The reference product in this litigation is a digital sound recording, by which is meant an audio recording of a complete performance of a composition that is recorded and sold in a digital format. Other products that are sold by record companies are physical recordings that use older analog technologies, music videos, snippets of audio recordings for use as ringtones or ring-back tones on mobile phones, and licenses for Internet music services that deliver streams of sound recordings to consumers. The main issues in defining the relevant market are, first, whether digital downloads and physical digital copies (CDs) are part of the same market or separate product markets, and second, whether other sound recording products are close enough competitive substitutes for CDs and digital downloads to be part of the same product market.

---

differentiated, some products that are weak substitutes for the reference product properly should be excluded from the relevant market because a hypothetical monopolist that did not control these products could still implement a profit-enhancing price increase.

11. See Jonathan B. Baker, "Stepping Out in an Old *Brown Shoe*: In Qualified Praise of Submarkets," *Antitrust Law Journal* Vol. 68, No. 1 (2000), pp. 203-18.

PUBLIC VERSION

Before proceeding to analyze market definition, three important factors must be taken into account.

First, ███

███

███

████████████████████   ████████████████████████████████████

███

████████████   To implement a reliable econometric model for estimating the cross-elasticity of demand between two products requires variation in the relative prices of these products within the observable transactions records.

Second, regardless of whether the various sound recording products comprise a single product market, separate submarkets within the same product market, or separate product markets, both the recordings being sold and the identity of the sellers are the same for all types of products. Consequently, pricing decisions by a firm for different sound recording products are not independent, but would take into account the firm-specific cross-elasticities of demand among products, even if these cross-elasticities are not sufficiently large to cause product types to be in the same product market. One implication of this fact is that even if types of products are in separate relevant product markets, caution must be exercised in using one product as a competitive benchmark for another because prices in the two markets are not set independently.[12]

Third, the prices of one group of products – licenses for non-interactive digital

---

12. The "smallest market principle" requires excluding a product from a market, even if it has a positive cross-elasticity of demand with the reference product, when the product is unnecessary for a hypothetical monopolist of the reference product and some other substitutes to be able to impose a profit-enhancing price increase.

streaming services – are regulated by the Copyright Royalty Board.[13] Whereas the

statutory mandate that governs CRB rate decisions adopts the likely competitive market

outcome as a guiding principle for setting rates, the rates that emerge are the result of an

administrative process, not market competition. In principle record companies and pre-

programmed digital streaming services can negotiate separate agreements that override

the rates that are promulgated by the CRB, but as a practical matter the major record

distribution companies, which also are the defendants in this litigation, have relied on the

regulatory process, rather than individual negotiations, to set royalty rates for these

products.[14] Because non-interactive digital streaming services have regulated prices, they

are not valid competitive benchmarks for an unregulated sound recording product.

The first issue in defining the relevant market is whether digital physical copies

and digital downloads are close competitive substitutes. Identical recording content is

sold either as a physical digital recording (e.g., a CD) or a digital files that can be

downloaded over the Internet onto a computer, a mobile telephone, or a portable digital

media player. Both forms of digital sound recordings allow the consumer to keep a

permanent copy of the recording for unlimited use at any time. A physical copy of a

digital sound recording on a CD also can be loaded, stored and played on a computer, and

once the audio files from a CD are stored on a computer, these files can be stored and

---

13. The most relevant regulatory decisions pertaining to licenses for the use of sound
recordings are three decisions pertaining to new non-interactive Internet streaming
services (*Webcaster I, II and III, with Webcaster IV currently in progress*) and to pre-
existing digital services (satellite radio and audio cable services). The results of these
proceedings are posted at http://www.loc.gov/crb/.

14. A discussion of the problems associated with direct licenses with record companies
can be found in the CRB's decision in *Determination of Rates and Terms for Preexisting
Subscription Services and Satellite Digital Audio Radio Services, Docket No. 2011-1
CRB PSS/Satellite II*, which is posted at http://www.loc.gov/crb/.

PUBLIC VERSION

played on smart phones and portable digital media players. Likewise, audio files that have been downloaded over the Internet can be "burned" (recorded) on a CD and played on a traditional stereo CD player. Thus, if a consumer has the necessary electronic devices, a CD and a digital download are functionally equivalent in that either can be converted to the other at a small cost. For this reason, CDs and digital downloads are functional substitutes.

The extent to which the functional substitutability of physical digital recordings and digital downloads implies that the two types of sound recordings are close competitive substitutes depends on the extent to which consumers have access to both technologies. To use a CD requires possession of electronic equipment for playing a CD, which can be a computer. To use digital downloads requires a computer, smart phone, or a portable digital media player than can access the Internet, plus Internet access at a sufficiently high speed to allow convenient downloads. Early in the class period, the penetration of home computers and wireless devices with high-speed Internet access was low, raising concerns about a "digital divide" among consumers, but in recent years Internet access at sufficient speeds to download a digital music file (200 mbps or more[15]) has become widespread. The number of residential wireless connections (either fixed or wireless) exceeded the number of households in 2010 and exceeded half of the residential U.S. population by 2012.[16] Thus, by the end of the class period, most consumers could

15. By comparison, FM radio and satellite radio deliver music at rates of less than 50 mbps, and the highest quality digital download streaming services are below 200 mbps.

16. Industry Analysis and Technology Division, Wireline Competition Bureau, *Internet Access Services: Status as of June 30, 2011*, Federal Communications Commission, June 2012, p. 16, shows that the number of residential wireless connections was 117 million in December 2009. In the 2010 census, the number of households was 117.5 million. See http://www.census.gov/ compendia/ statab/2012/tables/12s0061.pdf. Of course, because

access digital recordings through either physical copies or downloads.

Sound recordings also were sold during the class period in two older, analog technologies, audio tapes (called cassettes) and vinyl records, although cassettes had essentially stopped being produced by 2006 and sold by 2009.[17] Analog recordings cannot easily be converted into a digital format and stored on a computer or a CD, and so are not as interchangeable with either CDs or digital downloads as the latter two formats are with each other. Thus, other forms of physical copies are unlikely to be as close a competitive substitute for either CDs or downloads as either of the digital formats are with each other.

Sound recordings can be sold as individual tracks or as a bundle of separate songs. Physical recordings of popular music can contain one or two songs (both confusingly called "singles"), but more commonly are sold as a bundle of as many as ten or more separate songs on a single physical recording ("albums"). Physical recordings also sometimes are packaged as multiple CDs or vinyl long-playing records (LPs) that contain 50 or more songs ("compilations"). Digital downloads also are sold as individual songs or as albums and compilations.

Typically not all of the songs that are included in a physical album or compilation are offered for sale separately as singles, but typically all songs that are included in an album or compilation are for sale as individual tracks for digital download over the Internet. As a result, single tracks account for nearly 60 percent of sales of digital

---

some households have multiple high-speed connections, these data do not imply that all or even nearly all households enjoy high-speed Internet access.

17. New recordings on cassettes are now limited to releases by independent artists. Marc Hogan, "This Is not a Mixtape," *Pitchfork*, February 22, 2010, accessed March 12, 2014, at http://pitchfork.com/features/articles/7764-this-is-not-a-mixtape/.

PUBLIC VERSION

downloads, but less than one percent of sales of physical copies. Thus, the substitution of downloads for physical copies is also a substitution of single tracks for bundles.

Exhibit 1 shows the distribution of estimated retail sales in the U.S. among the different technologies for sales of sound recording according to data that are collected by the trade association for the record industry, the Recording Industry Association of America (RIAA).[18] Exhibit 1 covers the years 2001 to 2012, the last year for which RIAA data are available, and so spans nearly all of the class period. At the beginning of the class period (December 2001), virtually all sales of sound recordings were accounted for by physical copies, and digital recordings (CDs and audio DVDs) constituted 95 percent of total sales of physical copies. Thus, by the beginning of the class period the sound recording industry was almost completely fully digital, as it remains today.

Exhibit 1 shows the dramatic shift in record company sales away from physical copies during the class period. Combined sales of physical copies in all formats declined by nearly 80 percent from 2001 to 2012. Most of the fall in sales of physical copies was a net loss of revenue to the industry as total industry sales in all formats fell roughly in half between 2001 and 2012.[19] But increased sales of sound recordings in various digital formats, totaling about $4 billion in 2012, offset about 40 percent of the decline in revenue from the sale of physical copies.

The most important new source of revenue is sales of permanent digital

---

18. RIAA also reports the quantity of shipments, but quantity comparisons among the different formats are of limited usefulness for purposes of economic analysis. RIAA does not collect the actual dollar value of retail sales, but estimates them based on estimates of retail prices.

19. The appearance of "synchronization" (which refers to adding background recorded music to the sound tracks of film and video productions) in the RIAA data in 2009 does not represent a new source of revenue, but simply reflects the fact that RIAA began collecting data on this source of revenue in 2009.

PUBLIC VERSION

downloads. Significant sales of digital downloads over the Internet did not begin until

April 2003, when Apple launched the iTunes Music Store, later called the iTunes Store

(iTS). Apple's iTS was the first legal web site to offer permanent digital downloads of a

reasonably comprehensive selection of sound recordings from the major record

distributors. In the fall of 2003, the major distribution companies allowed other e-

retailers to offer a large catalog of sound recordings as digital downloads. RIAA did not

begin to collect data on sales of digital downloads until 2004, although in that year

downloads still accounted for only about 1.5 percent of sales. Since 2004, sales of digital

downloads have risen steadily, and by 2012, for the first time, sales of permanent digital

downloads exceeded sales of physical copies.

These data reveal that over the course of the last decade digital downloads have

substituted for sales of physical copies. Together physical digital copies plus permanent

digital downloads account for over three-quarters of total industry sales, and downloads

have risen from close to zero percent of these combined sales to over half of the

combined sale of physical copies plus digital downloads.

These data show that digital downloads have substituted for physical copies in

general and CDs in particular, but that this process has been protracted over a decade and

so both CDs and digital downloads continue to exist in the market. While these facts

imply that at current prices digital downloads are close competitive substitutes for CDs, it

does not necessarily imply that CDs are part of the relevant market that includes digital

downloads. To reach the conclusion that the market for digital downloads includes CDs

risks the *cellophane fallacy*. Suppose a new product (here, digital downloads) can be

produced substantially more cheaply than an old product (here, physical copies of sound

recordings) for which the new product is a substitute. If the new product is produced by several independent competitors, the price of the new product will be driven down to its average cost, which is lower than the price of the old product and so may cause the new product completely to replace the old. But if the new product is monopolized, profit-maximizing monopoly conduct may require setting the monopoly price high enough so that the cross-elasticity of demand with the old product is positive and the old product continues to be sold. In this case, the price of the new product constrains the price of the old, but does not force the price of the old product to the competitive level.[20] If this circumstance pertains to the relationship between CDs and digital downloads, then digital downloads should be regarded in the relevant market that includes CDs, but if the reference product is digital downloads, then the latter are sold in a distinct relevant submarket that does not include CDs. Whether this conclusion is warranted hinges on whether the price of digital downloads can be accurately characterized as a monopoly price, which would be the case if the plaintiffs' allegation about price fixing among the defendants are true.

Three other new sources of revenue are shown in Exhibit 1: mobile, subscription, and royalties. The issue is whether these products are substitutes for digital recordings and so should be considered in the same relevant market. All of these products have become important only after wireless communications technology became sufficiently advanced that it could support reasonably high-speed Internet access using wireless

---

20. The cellophane fallacy refers to an erroneous decision that the market in which cellophane was the reference product also included other flexible wrapping material such as wax paper and aluminum foil. See W. Kip Viscusi, Joseph E. Harrington, Jr., and John M. Vernon, *Economics of Antitrust and Regulation*, 4th Edition, MIT Press, 2005, pp. 297-98.

PUBLIC VERSION

devices, which occurred in the second half of the first decade of the 21st Century.

RIAA classifies several types of dissimilar digital recordings as "mobile," but the unique component in this category is another form of digital download: an excerpt of a sound recording that is used as a ringtone (to indicate that a call is being received) or a ring-back tone (played for a caller while waiting for a call to be answered). Shortly after the introduction of mobile telephones that could access the Internet, and especially after the release of the first Apple iPhone in 2007, mobile sales of sound recordings became an important source of industry revenue, exceeding ten percent of industry revenues and approaching the sale of full digital downloads in 2007. But the era of significant ringtone and ring-back tones was brief as software applications ("ringtone makers") were introduced that enabled consumers to make and use excerpts from their own libraries of digital recordings.[21] These apps caused ringtones to move from a separate product to just another use for digital recordings. In any event, these products never were functional substitutes for complete sound recordings, and so were not in the relevant market for digital recordings even when they were important.

The RIAA category "subscription" also is heterogeneous, but it includes an important new product: interactive Internet streaming services. The original idea that record companies had for streaming services was that a consumer would pay a fixed fee to listen to a given recording (an Internet version of the juke box). This product was not successful, but another subscription service that did become a popular consumer product is on-demand streaming. The defining characteristic of an interactive service is that a

---

21. Bob Tedeschi, "From Tunes to Tones, Apps Bridge the Gap," *New York Times*, February 22, 2012, accessed March 11, 2014 at http://www.nytimes.com/2012/02/23/ technology/personaltech/from-tunes-to-tones-apps-bridge-the-gap.html?_r=0.

PUBLIC VERSION

consumer can construct a self-programmed Internet radio station in that the consumer

constructs the play list and then listens to this self-created program on a computer or a

mobile wireless device.[22] A popular example is Spotify, which describes its services as

follows:

> "Think of Spotify as your new music collection. Your library. Only this
> time your collection is vast: millions of tracks and counting. Spotify
> comes in all shapes and sizes, available for your PC, Mac, home audio
> system and mobile phone. Wherever you go, your music follows you.
> And because the music plays live, there's no need to wait for downloads
> and no big dent in your hard drive."[23]

As Spotify's self-description suggests, on-demand interactive subscription

services are plausibly competitive substitutes for buying a permanent copy of a recording,

either as a CD or a digital download, because functionally they are used for the same

purpose – to allow a consumer to play a specific group of recordings at a time of the

consumer's choosing. Based on the belief that these services substitute for sales of

recordings, two top-selling artists, Coldplay and Lady Gaga, refuse to allow their new

releases to be offered on interactive services.[24] In 2012, Taylor Swift withheld her album

Red from Spotify and other on-demand services.[25]

A recent joint study by NPD Group and the National Association of Recording

---

22. Interactive services also allow a user to listen to channels that are programmed by another user.

23. At http://www.spotify.com/us/about/what/.

24. Graeme MacMillan, "The Day the Music Died: Why Labels Are Abandoning Streaming Music Services," *Time*, November 22, 2011, at http://techland.time.com /2011/11/22/the-day-the-music-died-why-labels-are-abandoning-streaming-music-services/.

25. The album had the highest first-week sales of any album in a decade. See Zoe Chace, "The Secret Genius of Taylor Swift," *NPR Planet Money*, November 9, 2012, at http://www.npr.org/blogs/money/2012/11/09/164742426/the-secret-genius-of-taylor-swift.

PUBLIC VERSION

Merchandisers (NARM) concluded that on-demand music services detract from sales of sound recordings.[26] The NPD/NARM study specifically mentioned Spotify. In response to this study, ST Holdings, which owns about 200 record labels, notified Spotify as well as Napster, Rdio, and Simfy, that it no longer would allow its recordings to be included in their services due to their detrimental effect on sales.[27] This evidence indicates that interactive Internet streaming services impose a competitive constraint on the sale of digital sound recordings. Nevertheless, subscription services do not appear to have substituted for digital downloads. Between 2004 (the year before subscription services entered) and 2012, subscription revenues have grown from zero to $571 million annually, but digital download revenues grew from $184 million to $2.85 billion. Thus, at current prices subscription services cannot be a close substitute for digital downloads, although they could be a close substitute for physical copies. Thus, subscription services may be in the relevant market for CDs, but they are not in the relevant submarket for digital downloads.

The third new service that has emerged in recent years is non-interactive Internet streaming services, also known as webcasting. Two types of non-interactive services are available: fully preprogrammed services that operate like over-the-air radio stations, and customized non-interactive services that create unique play lists for each customer, based upon the customer's expressions of preferences for songs and artists. Live 365 is an

---

26. "Study: Spotify is Detrimental to Music Purchasing," *Digital Music News,* November 15, 2011, at http://www.digitalmusicnews.com/permalink/2011/ 111115cannibal#VIZ3-3IxRZUcRMwuQcs_9g.

27. Corey Tate, "Rdio, Spotify and Napster Lose 200 Record Labels Due to NARM Study," *Spacelab,* November 19, 2011, at http://www.thespacelab.tv/spaceLAB/2011/11November/ MusicNews-064-Rdio-Spotify-Napster-NARM-NPD.htm.

PUBLIC VERSION

example of a non-interactive service that contains literally thousands of pre-programmed

channels that have been programmed by third parties seeking Internet audiences. An

example of a customized non-interactive service is Pandora, which is by far the most

popular Internet-based service for delivering music to mobile wireless devices.[28] A

Pandora subscriber can initiate a channel be entering the name of a favorite song or artist.

A computer algorithm that seeks to identify other songs that the customer might like. By

indicating whether a song is liked or by simply skipping the song, the customer then can

improve the fit of selections by the algorithm to the consumer's musical tastes.

Non-interactive streaming services are similar to terrestrial radio stations in that

they introduce consumers to new songs, which in turn is widely regarded as promoting,

rather than depressing, sales of sound recordings. Play time on terrestrial radio is known

to create promotional benefits to artists and record companies. For decades record

companies have encouraged terrestrial stations to play their sound recordings by giving

them free copies of recordings, providing promotional materials for new releases, and

making artists available for interviews.

Record companies also have used "payola" – cash payments and other gifts to

disk jockeys and program directors – to induce terrestrial radio stations to play their

recordings.[29] FCC rules prohibit terrestrial broadcasters from accepting fees to promote a

particular sound recording or artist, or any other product or political position, without

disclosing that the promotion is an advertisement, regardless of whether the fee goes to

---

28. Claire Cain Miller, "How Pandora Slipped Past the Junkyard," *New York Times*,
March 7, 2010, at http://www.nytimes.com/2010/03/08/technology/08pandora.html.

29. The classic scholarly work on this practice is Ronald Coase, "Payola in Radio and
Television Broadcasting," *Journal of Law and Economics* Vol. 22, No. 2 (October 1979),
pp. 269-328.

PUBLIC VERSION

the station owners or to an employee who can influence program content.[30] These FCC rules are not mere window dressing. Enforcement actions for these rules occur regularly.[31] In 2007 the FCC settled complaints against four large groups of radio stations (CBS, Citadel, Clear Channel and Entercom) for accepting cash and other considerations from record companies in return for playing their sound recordings.[32] The four groups agreed to pay a total of $12.5 million to the FCC. In 2011, the FCC settled a complaint against Emmis Austin Radio Broadcasting for accepting payola from a record store, a concert venue and a booking agent to play recordings by a heavy metal rock band that was appearing locally.[33] Bribing radio station employees and risking FCC sanctions would make no sense if record companies did not believe that radio play time induced greater sales of sound recordings.

Because non-interactive services are relatively new, there are no definitive independent studies of their effects on sales of sound recordings. But one observable fact is that non-interactive services have not caused the same reaction from some artists and labels that has been experienced in response to interactive services. Hence, the most plausible conclusion is that non-interactive Internet services are not competitive substitutes for the sale of sound recordings.

---

30. The FCC's rules are described at http://www.fcc.gov/guides/payola-rules.

31 Since 2007, the FCC has undertaken 17 enforcement actions with respect to this rule. See http://transition.fcc.gov/eb/broadcast/sponsid.html.

32. Federal Communications Commission, "Broadcasters Pay $12.5 Million to Resolve Possible 'Payola' Violations," April 13, 2007, at http://transition.fcc.gov/eb/News_Releases/DOC-272304A1.html.

33. Federal Communications Commission, *Order: In the Matter of Emmis Austin Radio Broadcasting Company, L.P.*, File No. EB-06-IH-2944, July 22, 2011, at http://transition.fcc.gov/eb/Orders/2011/DA-11-888A1.html.

PUBLIC VERSION

Conclusion

The evidence that is available at this point in the litigation shows that digital technology has replaced other types of sound recordings, so that nearly all sales of sound recordings use digital technology. The preceding evidence also indicates that the price of CDs plausibly is constrained by the prices of subscription services and digital downloads, so that the relevant product market that includes CDs also plausibly includes these other methods for distributing sound recordings to consumers. Finally, ███████████████

███

███

███████████████████████████████████

For purposes of class certification, this evidence demonstrates that the methods that an economist would use to define the relevant markets in this case are common to members of both classes. Because all sound recording products are sold nationally at the same posted prices, the extent to which products are substitutes at current prices is analyzed using information that is common to all class members.

Market Power

In antitrust economics market power is the ability to control price or to exclude efficient competitors. Economists measure market power in two general ways. The first is *direct measures*, which refer to measures of profitability or evidence of circumstances in which a competitor was excluded from the market. The second is *indirect measures*, which refers to high market concentration in the presence of barriers to entry. The

second approach hinges on defining the relevant market, while the first approach does not

require an accurate definition of the market because it is based on directly measuring the

market power of a firm.

Direct Measures

Direct measures of market power are based on the idea that greater competition

causes prices to be closer to the average[34] or marginal[35] cost of production and so causes

profits to be lower. Thus, market power is detected by some measure of profitability.

The standard definition of profitability is the *Bain Index*, which is difference

between revenues and costs, where costs include the depreciation of capital investments

and a competitive return on the opportunity cost of investments.[36] The difficulty with

implementing this measure is that depreciation, the opportunity cost of capital, and the

competitive return on investment are extremely difficult to measure and not generally

---

34. Average cost is the ratio of total cost (including capital investments and product development) to the quantity of output. Average cost is difficult to measure in a period that is short compared to the useful life of capital investments and the fruits of research and development because it depends on developing an accurate way to allocate these long-term costs to short-term output. As a practical matter economists often use the accounting concepts of depreciation and amortization to calculate average costs, which can only be used with caution when measuring market power.

35. Marginal (or incremental) cost is the additional cost of producing one more unit of output. Like average cost, long-run marginal cost is difficult to measure if an increase in the rate of output requires additional capital investment. Economists normally use average incremental cost (a company's operating costs divided by the amount of output) to measure marginal cost, which is a useful enterprise since a profit-maximizing enterprise will base output and price decisions on short-run marginal cost.

36. See David L. Kaserman and John W. Mayo, *Government and Business: The Economics of Antitrust and Regulation*, Dryden Press, 1995, pp. 103-04, and Viscusi, Harrington and Vernon, *op. cit.*, p. 296.

PUBLIC VERSION

captured by standard methods of cost accounting.[37] Consequently, the *Bain Index* is not

widely used by economists to determine whether a firm has market power.

Another measure of profitability that is widely used by economists is the *Lerner Index*, *L*, which is the ratio of the mark-up on a product to its price:[38]

$$L = (P - m)/P,$$

where P is price and m is long-run marginal cost. The Lerner Index can never exceed one

and equals one only when marginal cost is zero. The maximum value of the Lerner Index

that is achievable by a monopoly in any industry depends on marginal cost and the

market elasticity of demand. If market demand is highly elastic, even an unfettered

profit-maximizing monopolist will not be able to exercise substantial market power.

Because of differences among industries in both the elasticity of demand and

marginal cost, comparisons of the Lerner Index are of limited use in ascertaining

differences in market power between firms in different industries. The Lerner Index is

more reliable as an indicator of market power in comparing firms that produce the same

or similar products or in detecting changes in market power for the same firms over time.

Because digital downloads and CDs have the same content and are produced by

the same firms, comparing the Lerner Indexes between CDs and digital downloads is a

reliable indicator of the differences in market power that the defendants enjoy between

the two technologies. Each defendant has produced income statements for some years

---

37. See Franklin M. Fisher and John J. McGowan, "On the Misuse of Accounting Rates of Return to Infer Monopoly Profits," *American Economic Review* Vol. 73, No. 1 (March 1983), pp. 82-97.

38. William M. Landes and Richard A. Posner, "Market Power in Antitrust," *Harvard Law Review* Vol. 94 (1981), pp. 937-96 at 938. See also David L. Kaserman and John W. Mayo, *Government and Business: The Economics of Antitrust and Regulation*, Dryden Press, 1995, pp. 101-02.

PUBLIC VERSION

during the class period from which the Lerner Index can be calculated by product line. Exhibit 2 contains the results of this analysis. The following data and procedures were used to produce these calculations.

39. ████████████████████████████████

---

42. ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮

▮▮▮▮▮▮

34

PUBLIC VERSION

PUBLIC VERSION

██

██

███

██

███

███

███

██

██

███

██

██

███

██

███

        ██

███

---

44. ██
██
██
██
██

PUBLIC VERSION

PUBLIC VERSION

[REDACTED]

45. [REDACTED]

PUBLIC VERSION

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Indirect Measures

The indirect approach to detecting market power uses a measure of the concentration of sales in a small number of firms as an indicator of market power. Economic theory concludes that, all else equal, prices and profit margins are higher in markets in which fewer firms compete. For example, in one widely used theoretical model of oligopoly, the *Nash-Cournot* model of firms that produce the same product, the Lerner Index equals the inverse of the elasticity of demand times the number of firms, N, in the industry:

$$L = (P - m)/P = 1/Ne.$$

This formula provides a direct link between profits per unit of sale and concentration as measured by the number of firms in the industry.

In most industries products are differentiated, so that each firm enjoys a degree of market power that arises from the distinct attributes of its products. In this more normal

circumstance, the inverse of the number of firms is likely to overstate the intensity of competition in the industry. The most commonly used measure of market concentration in antitrust economics is the Herfindahl-Hirschman Index (HHI), which is the sum of the squares of the market shares of the firms in the industry.[47] Here a "firm" refers to all entities under the same control, so divisions of the same firm are aggregated together to compute a single market share for that combination of sellers. Thus, the different record labels that are sold by each distribution company are counted as a single firm for the purpose of calculating the HHI for the sound recording industry.

The maximum value of the HHI arises when a firm enjoys 100 percent of the market, so the HHI = 10,000. The HHI approaches its lower bound of zero when a very large number of firms each possess a very small share of the market. An HHI above 2500 is regarded as sufficiently concentrated so that, in the presence of barriers to entry, large firms in the market are likely to enjoy substantial market power.[48]

47. The preference among economists for the HHI as a measure of concentration is that the HHI is connected to the Nash-Cournot model of oligopoly. In a market with N firms that produce the same product and have equal sales, the market share of each firm is $100/N$, so the HHI = $N(1/N^2)$ = $10,000/N$. Thus, the Lerner Index equals the HHI/10,000 divided by the market elasticity of demand.

48. *Merger Guidelines,* pp. 18-19.

49. In antitrust economics the preferred data for calculating market shares are sales revenues, not sales quantities, but the only estimates of revenue shares that are available are based on multiplying quantities by average price, thereby producing exactly the same market shares as are produced from the quantity data.

PUBLIC VERSION

_____

50. See http://us.eonedistribution.com/who-we-distribute?lang=en-GB.

PUBLIC VERSION

██

███

██████████████████████

The most important problem with the Nielsen data pertains to the treatment of independent labels. Some independent labels use one of the defendants to distribute their physical recordings but do not use one of the defendants to distribute their digital downloads. Notwithstanding this practice, Nielsen attributes all sales, both physical copies and downloads, of these independent labels to the distributor of the physical copies. Thus, the defendants' market shares in digital distribution are overstated, although the effect is not likely to affect the qualitative conclusion from the analysis.

██

███

██

██

███

███

██

████████████████████████████████

---

51. The trade association of independent record companies, the American Association of Independent Music, states that independent labels have a collective market share of 40 percent of sales as reported by SoundScan (see http://a2im.org/mission/). ███████

███

███

███

███

███

Barriers to entry are a fixed cost or institutional restriction (such as restrictions against international trade) that inhibit competitive entry. Typically high profits are s signal to outsiders that entry into an industry is attractive, but high profits are insufficient to attract entry if an entrant faces a barrier to entry that is either impossible to mover come (e.g., a legal prohibition) or so costly that even with a high post-entry profit margin, and entrant could not expect to recover the fixed cost of entry.

The most direct test of the presence of barriers to entry is actual patterns of entry and exist in the industry. Here huge differences have emerged between labels versus distribution companies. In the label component of the industry, literally hundreds of labels are present, and artists often create their own labels once they become popular, as, for example, was the case with the Beatles creating Apple records. By comparison, for decades the only change in the market structure in distribution has been exit, primarily through mergers and acquisitions.

Increasing consolidation may be motivated by the desire to increase market power, but that does not explain why consolidation with this motivation does not induce more entry, or even cause the largest independent distributors to expand. A plausible reasons for the growing concentration of the industry is that distribution involves high fixed costs associated with identifying and promoting new talent. ███████████

██

██

For example, promoting new sound recording may be less expensive per recording for companies that have a large number of artists to promote. The structure of the

---

███████████████████████████████████.

distribution companies is consistent with this explanation. Typically distribution companies own several labels that act independently to identify talent, and often specialize in a type of music, yet distribution of all labels, no matter how diverse, is handled by the distribution affiliate. Moreover, more than half of all sound recordings that are sold by independent labels are distributed by the major distribution companies. Consequently, the structure of the industry is only comprehensible if the barriers to entry in distri8bution are much higher than the barriers to entry in labels.

Conclusion

██

██

██.

For purposes of class certification, these calculations demonstrate that the methods of antitrust economics that would be used to establish the presence of greater market power in digital downloads use information that is common to members of both classes.

Anticompetitive Conduct

Market power can arise for two reasons. The first is that a firm may be more efficient, and the second is anticompetitive conduct. In the case of sound recordings, there is no reason to believe that the defendants are substantially more efficient in producing digital downloads than in producing CDs that have exactly the same content. Moreover, a well-established principle in economics is that in all markets a change in costs leads to a change in price in the same direction. In the case of sound recordings,

PUBLIC VERSION

digital distribution over the Internet is a cost-reducing innovation that can be expected to

cause prices to be lower. Thus, ████████████████████████████████████

████████████████████████████████████. This section lays out some of

the reasons for believing that the defendants compete less intensively in digital

downloads than in physical copies.

Economists have identified practices and conditions, sometimes called "plus

factors," that are indicators of the presence of price collusion.[52] The evidence in this case

reveals several practices and conditions that lead to the conclusion that the greater profit

margins for digital downloads are due to price collusion. All of these practices and

conditions pertain to the overall operation of the market, so that proving that the source of

the additional market power in digital downloads is due to collusion involves evidence

and analysis that is common to all members of the two classes.

Plus Factor #1: Incentive to Collude

The effectiveness of price collusion requires a combined market share that is high

enough to increase substantially the market power of the colluding firms, but a small

enough number of members of the cartel that coordination of pricing and defections of

firms from the collusive agreement are easy. The former consideration implies a

combined market share substantially in excess of 50 percent, while the latter implies an

industry with enough firms to be reasonably competitive but a small enough number of

firms to make implementation of effective collusion easy.

---

52. See, for example, Dennis W. Carlton and Jeffrey M. Perloff, *Modern Industrial Organization*, Third Edition, 2000, Addison-Wesley, pp. 126-141, and Robert C. Marshall and Leslie M. Marx, *The Economics of Collusion: Cartels and Bid Rigging*, 2012, MIT Press, pp. 213-39.

PUBLIC VERSION

██

██

██

███████████████████████████████████ that, with barriers to entry, would

permit the durable exercise of monopoly power.

Plus Factor #2: Commodity Product

Price fixing is much easier if all firms produce the same product at approximately

the same cost. If firms produce physically different products that differ substantially in

costs, the optimal collusive agreement is for prices to differ among products. Settling on

an agreement about the price of each product when all products are different and have

different costs is far more difficult that settling on a common price for a group of

products that are physically very similar and have about the same costs.

Sound recordings are differentiated products in that different sound recordings

have different content. But the process of manufacturing and distributing a CD or a

digital download is exactly the same for each sound recording. Hence, the costs of

products are close to the same for each of the major distribution companies. ████

██

██

In brief, sound recordings are priced as if they were commodities. Consequently, the

problem of a price-fixing cartel is simply to set a common price for all members of the

price-fixing conspiracy.

PUBLIC VERSION

Plus Factor #3: Joint Ventures and Trade Associations

Joint ventures and membership and control of trade associations provide a convenient forum for coordinating business activities, whether efficiency-enhancing or collusive. RIAA is the industry trade association for the sound recording industry, and a majority of its Board of Directors are executives from the major distribution companies.[53] And the major distribution companies all participated in joint ventures to sell sound recordings over the Internet.

At the beginning of the class period, the then-five major distribution companies formed two joint ventures, MusicNet and PressPlay, to sell the rights to distribute their recordings over the Internet to retail Internet sites.[54] Three of the major record distribution companies (BMG, EMI and Warner) were partners in MusicNet, while Sony and Universal were partners in PressPlay. A difference between these sites was that they used different digital file formats (one Rhapsody and the other Microsoft).

Two features that they shared were extremely limited selections of music and extensive restrictions on the use of files, leading them to be ranked 9th on a list of the worst tech products of all time.[55] Two important features of these joint ventures were that each had agreements to distribute sound recordings from all major distribution companies (not just the owners of the venture) and that each set the same wholesale and retail price for all distribution companies. Thus, these joint ventures not only presented

53. See http://www.riaa.com/aboutus.php?content_selector=who_we_are_board.

54. For a more complete discussion of the creation of MusicNet and PressPlay, see Roger G. Noll, "Napster's Copyright Misuse Defense and the Future of Internet Distribution of Music," which was derived from my expert report that was submitted by Napster in its copyright litigation with the major record distribution companies.

55. Dan Tyson, "The 25 Worst Tech Products of All Time," *PC World*, May 26, 2006, at http://www.pcworld.com/article/125772-3/the_25_worst_tech_products_of_all_time.html

PUBLIC VERSION

the opportunity to engage in collusion over prices for the distribution of sound recordings over the Internet, but created the reality of common pricing for all.

Plus Factor #4: Information Exchange

        One indicator of the presence of collusion is the exchange of competitively sensitive information, such as information about prices, costs and marketing plans, among competitors. Independent profit-maximizing behavior is not consistent with revealing these kinds of information to competitors.

Overview of Sources of Market Power

        The existence of price collusion sometimes can be proved by actual records of

---

56. Bates No. WMG-DM-00475504, p. 22, and UMG-MDL0001963, pp. 10-12.

57. Bates Nos. EMIBAG-10228985 and 10368939, UMG0014740 and 0174778, UNIDM003143, SME-DM-0156688, FINKELSTEINPRODUCTION0000723, WMG-DM-000195407, 00020927, and 000385461.

58. Bates Nos. FINKELSTEINPRODUCTION0000338 and SME-DM-054446.

meetings in which executives of competing companies agreed to common prices. But such evidence is rare, in part because executives that engage in price fixing are likely to know that such conduct is illegal and, if detected, likely to be punished. Hence, antitrust economists rely on methods for testing whether anticompetitive conduct is more likely than not to have been the cause of an increase in market power.

The conditions and practices in a market that point to collusion as the source of an increase in market power are all characteristics of firms and markets. When an industry sets common prices for all consumers, proof that high profit margins were the result of collusion necessarily is common to all customers of the colluding firms.

Harm to Competition

Collusion leads to higher prices. One form of anticompetitive injury that arises from collusion is the increase in prices that consumers pay. The next section calculates the overcharge on digital downloads arising from price collusion. The effect of collusion was to increase the wholesale price for each digital download. These price increases were then passed on to consumers in higher retail prices, thereby causing harm to every consumer who purchased a digital download. The magnitude of this harm is the amount of the unit overcharge for each download that was purchased.

The damages calculations are valid measures of anticompetitive impact for all members of the injunctive class, regardless of whether they are members of the damages class. Damages are calculated from a common formula that computes the overcharge arising from collusion on the price of digital downloads. This common formula is derived from a widely used method in economics for modeling price formulation in an

PUBLIC VERSION

imperfectly competitive market. Because digital downloads of a specific sound recording

are sold at a common wholesale price to all e-retailers, any increase in that price that

arises from anticompetitive conduct applies equally to all consumers, regardless of the

geographic location of either their residence or the e-retailer that sold them the product.

In addition to the overcharge, collusion in the price of digital downloads causes

two other forms of anticompetitive harm. First is "dead-weight loss." Because the

number of units of a product that are sold is negatively correlated with the price of the

product, an increase in price causes a reduction in the quantity sold. The resulting loss in

consumer welfare is called dead-weight loss. If dP is the elevation in price and dQ is the

resulting change in sales quantity, dead-weight loss is approximately $(1/2)(dP)(dQ)$.

The analysis of damages concludes that a lower bound on the percentage

overcharge for digital downloads is half of the difference in the Lerner Indexes between

physical copies and digital downloads, or ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮. If the

current price of digital downloads is the profit-maximizing price, then the Lerner Index

equals the inverse of the elasticity of demand. ▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮

▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮

▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮▮

▮▮▮▮▮▮   The implied dead-weight loss, therefore, is $(1/2)(0.1P)(0.15Q) = 0.0075$

times total sales of digital downloads. As shown in Exhibit 1, total sales of digital

downloads in 2012 were roughly $2.85 billion, so that the dead-weight loss of price

collusion was approximately $21 million.

Another source of anticompetitive injury is that collusion on the price of digital

downloads would affect the price of CDs. Because digital downloads are functionally so

PUBLIC VERSION

similar to CDs, they are close competitive substitutes. Hence, the introduction of digital

downloads at a price substantially less than the price of CDs can be expected to have two

effects on the demand for CDs. First, at any given price, the demand for CDs will be

lower. Second, the price elasticity of demand for CDs will increase (that is, the quantity

sold will be more sensitive to changes in price). Both of these effects reduce the market

price of CDs. Unfortunately, the magnitude of this effect cannot be reliably measured

without the transactions data for CDs.

DAMAGES

The standard approach for calculating damages in antitrust economics is to

establish a competitive benchmark price, based on an analysis of a different product or

the same product in a period that was not affected by anticompetitive conduct, and to

calculate the difference between the actual price and the competitive benchmark price.

Damages per unit of sale are then equal to this difference, and total damages are the

product of this difference and the quantity of sales at the inflated price. Because this

calculation is based on the reduced sales that arise because of the overcharge, the

standard measure of damages avoids the dead-weight loss and so is an underestimate of

the harm to competition arising from anticompetitive conduct.

In the case of digital downloads, a "before-after" comparison is not feasible

because the alleged collusion by the defendants began before e-retailers were permitted to

sell digital sound recordings over the Internet. Hence, the best available benchmark for

prices of digital downloads are the prices that the defendants charge for CDs.

Because the price of CDs is constrained by the price of digital downloads, CDs

PUBLIC VERSION

are not a perfect benchmark for measuring the effects of collusion on the price of digital

downloads. In particular, as explained in the section of this declaration on harm to

competition, because digital downloads are substitutes for CDs, a reduction in the price

of digital downloads to the competitive level would cause a reduction in the price of CDs

as well. Consequently, implementing a damages model based on comparing prices of

CDs and digital downloads is inhibited by the absence of transactions data on CD sales.

The preferred method for analyzing the price effects of collusion in digital downloads is

to undertake an econometric analysis of price differences, but this cannot be done when

only prices for digital downloads are available. Because transactions data for CDs was

not produced by the defendants, my damages analysis cannot fully take this effect into

account and so produces and underestimate of damages.

The only viable alternative for estimating damages based on the data that have

been produced is to construct a structural model of competition in the sale of digital

downloads that is calibrated from aggregate data from CD sales concerning the profit

margins of CDs and then to apply the same structural model to digital downloads.[59]

The foundation for the structural model is the economic theory of a profit-

maximizing monopolist. As discussed elsewhere in this report, the profit-maximizing

price for a firm with market power satisfies the following equation for the Lerner Index:

$$(P - m)/P = 1/e,$$

where e is the price elasticity of demand of the firm-specific demand curve. Rearranging

---

59. For a detailed statement of this approach, see J. Douglas Zona, "Structural
Approaches to Estimating Overcharges in Price-Fixing Cases," *Antitrust Law Journal*
Vol. 77, No. 2 (2011), pp. 473-94. This procedure also is sometimes called the "mark-
up" method. See also John M. Connor, "Forensic Economics: An Introduction with
Special Emphasis on Price-Fixing," *Journal of Competition Law and Economics* Vol. 4,
No. 1 (2008), pp. 31-59.

PUBLIC VERSION

terms, this equation becomes:

$$P = [e/(e-1)]m,$$

which implies:

$$dP/dm = e/(e-1).$$

Based on the fact that physical digital copies and digital downloads have identical

content, the demand for each product is assumed to have the same elasticity of demand.

Hence, the price of digital downloads in a market that were as competitive as the market

for CDs can be calculated from this equation. As a simple example, if the Lerner Index is

0.5 and the firm-specific demand relationship has a constant elasticity, then $e = 2$ and

$dP/dm = 2$. The market equilibrium price in the Nash-Cournot model is than given by:

$$(P-m)/P = 1/Ne,$$

where N is 10,000/HHI. ████████████████████████████████████

████████████████████████████████████

Because a constant elasticity of demand over a large change in costs and prices is

implausible, a more realistic assumption is that the demand relationship is linear:

$$Q = A - bP,$$

where A and b are constants. The profit-maximizing monopoly price is:

$$P = A/2b + m/2,$$

implying that:[60]

$$dP/dm = ½.$$

Thus, under a monopoly half of a fall in costs would be passed on as a reduction in price,

while half would be retained as increased margins. Of course, under competition, more

60. See Jeremy I. Bulow and Paul Fleiderer, "A Note on the Effects of Cost Changes on
Prices," *Journal of Political Economy* Vol. 91, No. (1983), pp. 181-85.

than half of the cost savings would be passed on in lower prices, but there is insufficient

information in the data that have been produced to calculate reliably how much lower

digital download prices would have been.[61]

The data that defendants have produced permits the creation of an example of

how damages can be calculated using this approach. This general approach could be

modified to include the interaction between CD and digital download prices if additional

merits discovery generates more data on CD transactions.

The first step is to calculate the amount by which the marginal cost of a sound

recording differs between CDs and digital downloads based on the income statements

that the defendants have produced. ████████████████████████████████████

██

██. Hence, the

damages calculations are based on the average differences in marginal costs as a fraction

of revenues between physical copies and digital downloads for all of the defendants

during the period for which the defendants have produced cost data.

The second step in the procedure is to calculate the wholesale prices for digital

downloads that would be expected if pricing of digital downloads were as competitive as

the pricing for CDs. The starting place for this assumption is a hypothetical "before"

period in which the intensity of competition is the same for physical copies and digital

---

61. For example, a recent study of pricing in processed cheese used a structural model to calculate the difference in cost pass-through between a market characterized by imperfect competition versus a monopoly market, and found that under collusion, cost pass-through ranged between 21 and 31 percent, while under imperfect competition cost pass-through ranged between 73 and 103 percent. Donghun Kim and Ronald W. Cotterill, "Cost Pass-through in Differentiated Product Markets: The Case of U.S. Processed Cheese," *Journal of Industrial Economics* Vol. 56, No. 1 (March 2008), pp. 32-48.

PUBLIC VERSION

downloads, so that ███████████████████████████████

██

██

███████████████████████████████████████. The reduction in marginal

cost is then calculated as the increase in the Lerner Index. Competition is then assumed

to cause a fall in the price of digital downloads. As a conservative estimate, the reduction

in price, which also is the overcharge from collusion, is assumed to equal the amount of

the price reduction that would arise under monopoly, which is half of the cost reduction

would be passed on in lower wholesale prices. This assumption is conservative because

it understates the effect of competition. As a practical matter, the true value of the

overcharge lies somewhere between the monopoly price reduction (half of the reduction

in costs) and perfect competition (the full reduction in cost).

██

██

██

██

██

██

██

██

██

██

██

PUBLIC VERSION

███

███

███

████████████████████

The method for calculating total damages must then take into account the
variation in actual prices – ████████████████████████████████. The variation
in prices can be taken into account by recognizing that the Lerner Index expresses
margins (and implicitly marginal costs) as a proportion of price, and hence of revenue.
Hence, the decline in total incremental cost of all output (the sum of the marginal costs of
every product that is sold) is equal to the increase in the Lerner Index multiplied by total
revenue. The sum of all overcharges is then half of this amount, and the overcharge for
each digital download product equals one half of the change in the Lerner Index
multiplied by the wholesale price of that product.

The third step is to calculate the effect on a change in wholesale prices on retail
prices, or the pass-through rate of wholesale prices to retail prices. ███████████████

██

██

██

███

███████████████████████████ Thus, a regression analysis was undertaken in which the
dependent variable was retail price and the independent variables were the wholesale
price plus ██

███

54

The data that were used in the regression exclude all transactions at the most common retail prices ($0.99 for a single track and $9.99 for an album) to focus the analysis on non-standard prices. The regression is reported in Exhibit 4. The coefficient on the retail price was 1.39 with a t-statistic of over 700, indicating that the coefficient estimate is very precise. ████████████████████████████████████

████████████████████   ██████████████████████████████

█████████████████████████████████

Exhibit 5 contains the damages calculation, showing both the reduction in the unit retail price of a track and the total amount of damages for each defendant, which is calculated as the retail price reduction multiplied by the number of tracks sold in each year. Damages are calculating from two sources of data that were produced by the defendants: transactions records for digital downloads, and the income statements that were used to calculate the Lerner Index. These sources product somewhat different damages because they differ in the amount of revenue that they report.

The final issue is how to allocate damages between members of the damages class and members of the injunctive class who do not reside in states that permit the recovery of antitrust damages from indirect purchasers. Neither the defendants ████████ has produced information about the geographic distribution of their sales. In fact, e-retailers keep extensive records about their customers for the purpose of direct advertising and promotion, and geographic identification of their consumers has been produced in other antitrust cases.[62] Hence, in the merits phase, allocating the sales of digital downloads

---

62. I had access to retail transactions records ███████████████████████████████,
which I used to calculate damages separately for every state and territory in the e-book
antitrust litigation.

among the states is easily accomplished if the court orders such discovery. But failiong

such discovery, the damages could be allocated to the states based on records regarding

the distribution of other types of related activity, such as the population that has access to

high-speed Internet access, retail sales of computers, or even the distribution of e-book

sales (which also involve downloads of digital files ovee4 the Internet).
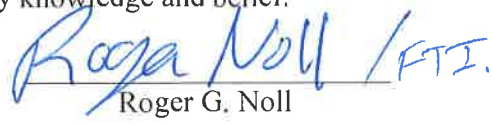
Damages also can be calculated based on the production of records from

consumers about their purchases of digital downloads. For each member of the damages

class, individual damages are calculated from the same damages formula that was used to

calculate aggregate damages in Exhibit 5. For each unit purchases, damages are one-half

of the change in the Lerner Index times the price of the product.

The preceding analysis demonstrates that proof of damages to members of the

damages class, and proof on anticompetitive injury to members of the injunctive class

who are not members of the damages class, can be established by a common formula that

applies to all purchases of digital downloads in the U.S.

PUBLIC VERSION

I declare that the foregoing is true to the best of my knowledge and belief.

Roger Noll /FTI.

Roger G. Noll

Executed at Stanford, California, on March 14, 2014.