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Before the
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In the Matter of	)	**Docket No. 2006-1 CRB DSTRA**
Adjustment of Rates and Terms for Preexisting Subscription and Satellite Digital Audio Radio Services	)	

REBUTTAL TESTIMONY AND EXHIBITS JOINTLY SUBMITTED BY SIRIUS SATELLITE RADIO INC. AND XM SATELLITE RADIO INC.

VOLUME 1 OF 3

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Woodbury

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Rebuttal Testimony of Dr. John R. Woodbury
July 24, 2007

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I. Introduction and Summary

1. My name is John R. Woodbury and I previously submitted written direct testimony in this matter on behalf of XM Satellite Radio and Sirius Satellite Radio evaluating the reasonable royalty to be paid by the services for the use of sound recording performance rights over satellite radio.[1] I have been asked by counsel for XM and Sirius to respond to queries made by the Court during the course of my trial testimony and to consider a number of the rate proposals and underlying analyses offered by SoundExchange's economics experts, Dr. Janusz Ordover and Dr. Michael Pelcovits. In preparing this rebuttal testimony, I reviewed the written direct testimony submitted in this proceeding by SoundExchange and its experts, including Drs. Ordover, Pelcovits, and Wind and Mr. Butson; by XM and Sirius; and by Music Choice. I also reviewed the deposition and trial transcripts for these and other witnesses. To the extent that I relied on these materials, they are cited directly in my report. In addition, as I describe in more detail later in my report, I also rely on forecasted financial data for the years 2007 through 2012 that was provided at my request by XM and Sirius, and data from XM and Sirius on their average number of compensable plays of sound recordings. Finally, I reviewed various contracts between webcasters and the labels.

2. In my testimony, I recommended a 0.88% rate for the sound recording performance rights to be levied on the gross domestic revenues of the two satellite digital audio radio systems ("SDARS"). The 0.88% rate is based on a benchmark

[1] Woodbury WDT.

7.25% rate that was freely negotiated between SoundExchange and the pre-existing subscription services ("PSS") —Music Choice, Muzak and DMX. Because each of the parties, and the PSS in particular, had the option of asking the Court to determine a rate that incorporated the 801(b) factors as they applied to the PSS, the freely negotiated rate would have also reflected those factors. Thus, the PSS-SoundExchange benchmark is particularly informative for this proceeding because it encompasses the application of the 801(b) factors as they apply to these three PSS. In addition, I understand that Section 114(f) of the Copyright Act permits the Court to consider as a benchmark freely negotiated rates, such as the 7.25% PSS rate, that already reflects the statutory standard.[2]

3. I also concluded that the PSS rate cannot be applied directly to the revenues of the two SDARS because of functional differences that account for substantial cost differences between the two types of services. Consequently, I made the necessary adjustments to translate the PSS rate into one that could be levied on the SDARS' revenues. The adjustment required estimating the costs of what I have referred to as the hand-off provider component of XM and Sirius (i.e., the part of XM and Sirius that creates and packages programming for delivery to XM and Sirius subscribers) as distinct from the end-to-end costs of the two SDARS. In addition, I accounted for the fact that unlike that of the PSS, the programming package offered by the SDARS consists of a substantial non-music component. The resulting

[2] According to Section 114(f)(1)(B), "In establishing rates and terms for preexisting subscription services and preexisting satellite digital audio radio services, in addition to the objectives set forth in section 801(b)(1), the Copyright Royalty Judges may consider the rates and terms for comparable types of subscription digital audio transmission services and comparable circumstances under voluntary license agreements described in subparagraph (A)." Subparagraph A begins by noting that "Proceedings under chapter 8 shall determine reasonable rates and terms of royalty payments for subscription transmissions by preexisting subscription services and transmissions by preexisting satellite digital audio radio services..."

translation of the 7.25% rate of the PSS yielded a rate of 0.88% to be levied on the gross revenues of XM and Sirius, the equivalent of about $14 million in payments to SoundExchange based on the combined 2006 revenues of the SDARS.

4. As I highlighted in my direct examination, this approach is equivalent to imputing the revenues that would have been earned by the hand-off component of the SDARS as if that hand-off component offered a package of digital music services to the SDARS. The payment to SoundExchange would then be calculated as 7.25% of those imputed revenues. In 2006, those imputed revenues at the hand-off provider level would have totaled approximately $191 million for both SDARS combined.

5. In this rebuttal testimony, I address two general questions that have been raised about my approach. One question relates to the validity of the PSS benchmark in light of the suggestion that the provision of residential music services via cable television or direct broadcast satellite ("DBS") providers may not be viable because of the supposed lack of demand to support such services. A second question arose regarding the reasonableness of my approach in accounting for the functionality differences between the hand-off provider component of the SDARS and the end-to-end service of the SDARS and whether that accounting was valid for the period of the license, 2007-2012.

6. I conclude that the characterization of the residential music business as a declining industry is without foundation. I also conclude that the assumption regarding the relationship between costs and revenues underlying my methodology is sound, both as a conceptual matter as well as a factual matter over the term of the license period. In the process of examining the stability of the relationship, I have

modified my recommended rates to reflect financial projections provided to me by the SDARS. Based on these projections, the percentage-revenue rate that would be applied to the end-to-end revenues of the SDARS for use of the sound recording performance rights would be 1.20%.

7. At the request of the Court, I also consider how these revenue-percentage rates could be translated into a per-play payment and the advantages that such a payment might have over a percentage-of-revenue payment.[3] The advantages are substantial enough to recommend that this Court adopt a reasonable royalty rate using this metric. As I discuss below, I recommend that a per-play rate of $1.20 be paid by the SDARS for the use of the sound recording performance rights.

8. Finally, I have also been asked by counsel to evaluate a number of rate proposals and underlying analyses offered by Dr. Ordover and Dr. Pelcovits, both of whom have endorsed the SoundExchange proposal of a rate ramping up to 23% of the SDARS revenues. None of the rate proposals account for the statutory 801(b) factors. With respect to Dr. Ordover, I evaluate his use of payments made by content providers for DBS television systems and his use of rates contained in selected webcasting contracts as benchmarks for a reasonable royalty fee. I also evaluate Dr. Pelcovits' use of the payments made to Howard Stern as a benchmark for the share of revenues due to SoundExchange and some of the assumptions that gird his estimation of a Shapley surplus share for music.

[3] Throughout, I use the term "per-play" to conform to the definition used by XM and Sirius in their proposed amended rates and terms. Broadly speaking, a play occurs whenever the SDARS transmit a sound recording to their subscribers, regardless of the number of listeners, for which the labels are entitled to compensation under the statutory license for the sound recording performance right.

9. I find that both of Dr. Ordover's approaches are conceptually flawed. Neither is based on the section 801(b) factors; both involve rights and buyers that are different from those in this case and the DBS benchmark further involves sellers and works that are different from those in this case; and his webcasting benchmark ignores the substantial differences in cost structure and functions performed between the SDARS and webcasters. In addition, I find that the rates that result from his selection of various webcasting contracts can change markedly if other contracts were considered. A further concern is that Dr. Ordover's own data suggest that prices of these kinds of services may be changing too rapidly to provide a reliable basis for setting rates over the entire license period.

10. I also find numerous conceptual problems with Dr. Pelcovits' use of the Howard Stern benchmark. Importantly, Dr. Pelcovits ignores substantial non-content benefits provided to Sirius by the Stern deal, including brand-equity, and credibility with OEMs and retailers. He also ignores the opportunity costs to Stern of making the exclusive deal with Sirius, and the unique circumstances facing Sirius at the time it made the Stern deal.

11. Similarly, even assuming for the sake of argument that Dr. Pelcovits was correct to use the Shapley value cooperative game in this context,[4] and that there is a surplus to divide, Dr. Pelcovits relies on assumptions that likely inflate the surplus share estimated for SoundExchange. In particular, I discuss the anomalous results generated by his assumptions, indicating that his estimate of the Shapley surplus share is not appropriate for rate-setting purposes.

[4] I have not examined this question; I understand that Professor Roger Noll is testifying that it was not.

12. The remainder of my testimony is organized as follows. The next section addresses the concerns that were raised during the course of my trial testimony. The subsequent sections provide a methodology for a use-based fee and address Dr. Ordover's DBS and webcasting benchmarks, Dr. Pelcovits' Stern analysis, and Dr. Pelcovits' Shapley analysis. Finally, I offer a brief conclusion.

II. The Methodology Used to Estimate a SDARS Rate of 0.88% Is Sound and Generally Applicable for the 2007-2012 License Period

A. Use of the negotiated PSS rate

13. During the course of my examination, there were questions raised about the appropriateness of the PSS rate in light of the claim that the offering of residential music service by the PSS to cable operators and DBS providers is a declining industry. That characterization was suggested by the observation that two of the three PSS had exited the residential music market; the assertion that the remaining PSS, Music Choice, was essentially a failing firm; and that XM and Sirius both essentially gave their music service away to the DBS providers.[5] In addition, questions were raised about the value of the Music Choice service itself and therefore the relevance of the PSS rate to the SDARS. For a number of reasons, I believe that any concerns raised by these questions are misplaced.

1. Residential music services as a declining industry

14. First, with respect to the provision of PSS-type services generally, the clearest evidence that these services are not a declining industry is that of the entry of

[5] 6/13/07 Tr. 52:14-59:10 (Woodbury).

MTV into this business. That announced entry indicates that market participants expect to at least recover their costs (including a normal return to capital) over the longer run if the fee for the sound recording performance rights is reasonable. Indeed, I understand that MTV has penned a deal with at least one large multi-channel video program distributor (MVPD). Thus, at best, any claims that this is a dying industry are undermined by the fact of MTV's entry.

15. In addition, there is no evidence that at the time it entered into the SoundExchange agreement on which this analysis is based, 2003, Music Choice was in a precarious financial position. Indeed, during the negotiations over the resulting rate, RIAA Senior Vice President, Steven Marks, went to great pains to highlight the economic well-being of Music Choice in particular. He noted that "[r]egardless of what economic yardstick one chooses to use, it is clear that Music Choice is succeeding, and that it continues to do so even in today's difficult economic climate."[6] Mr. Marks went on to highlight Music Choice's actual and expected increase in subscribers, in revenues, and in cable system affiliates.

2. Music Choice as a low-valued service

16. A related concern that has been raised with regard to the PSS benchmark is that the Music Choice service itself may be a low-valued service because, as SoundExchange suggested during the course of my cross-examination, it carried an average monthly per-subscriber price of [[ ]] in 2006.[7]

[6] Exhibit 24 (Letter from Steven Marks to Fernando LaGuarda (October 25, 2002), SE0021724-6 at 724).
[7] Del Becarro WDT at 28.

17. The above-cited observations of Mr. Marks do not suggest that the RIAA considered Music Choice a low-valued service. Indeed, the record industry's own actions belie the suggestion that Music Choice is low-valued. In his written direct testimony, Damon Williams of Music Choice described the efforts of the labels to persuade Music Choice to play particular recordings.[8] A recent Sony BMG survey specifically asked respondents **[[**

]][9]

18. It was also suggested during my examination that because Music Choice is not sold directly to subscribers, reliance on the payments made by cable operators to Music Choice cannot be a reasonable indicator of the value that consumers place on the sound recordings performed on Music Choice. According to this view, because Music Choice is bundled with other services and consumers pay a price for the bundle, there is no separate charge paid by consumers from which to infer the value of Music Choice to those consumers.

19. This view is incorrect. The demand by cable operators for Music Choice (or for any other PSS or for any other cable programming service) is a derived demand—i.e., it reflects the value that the ultimate consumers place on the service as well as the cost of the service to the cable operator (among other factors). This is an

[8] Mr. Williams describes how the labels have aggressively sought to have their music played on Music Choice and how they have used evidence of airplay on Music Choice to influence the programming of terrestrial stations. Since 2001, the labels have greatly increased servicing of Music Choice with promotional materials and discussion of promotional strategy. Williams WDT at 15-16.
[9] Sony BMG survey, SE 0107372- SE 0107395 at 387.

observation shared by SoundExchange's own expert economists.[10] Thus, the payments made by the cable operator to Music Choice reflect the value that the ultimate cable subscribers place on the service because the cable operator's demand for the service is derived from the consumer demand for the service. As a result, the payments earned by Music Choice do reflect that value.

20. But suppose that, for some reason, the revenues earned by Music Choice have been systematically (say) 10% lower than the consumer value of the service throughout its existence. If that were the case, one would expect SoundExchange to insist on a rate about 10% higher than otherwise to account for that depressed revenue, so that the payment to SoundExchange would be the same as if Music Choice's revenues had reflected the value of the service to consumers. Hence, when the higher rate is applied to the lower revenue base, SoundExchange is made whole. It is the PSS rate, not the revenues to Music Choice, which is the focus of my analysis.

21. In a related vein, the claim that the so-called mobility of the SDARS increases the underlying value of the music offered by the PSS is without basis. As I noted in my written direct testimony, Music Choice, Muzak, and DMX were unable to profitably offer an à la carte premium music service to cable subscribers. It was only the injection of mobility, a nationwide footprint, and the investment in non-music services by XM and Sirius, not any effort on the part of the record industry or any change in the underlying characteristics of the music, that enabled XM and Sirius to succeed in launching and marketing their direct-to-consumer services. There is no

[10] Ordover WDT at 18-19.

reason to believe that the underlying value of the music offered on XM and Sirius is any different from that offered on Music Choice. The value added—the nationwide footprint, the ability to listen to content seamlessly in moving cars, and the non-music alternatives—all reflect investments and innovations on the part of XM and Sirius to which the record industry has made no contribution.

B. The conceptual reliability of the functionality adjustment

1. Economic support

22. In estimating a reasonable rate for the SDARS, the focus of my approach has been the relationship between these two ratios: (a) the costs incurred by the hand-off provider component of the SDARS divided by the end-to-end costs incurred by the SDARS ("cost ratio"); and (b) the imputed revenues earned by the hand-off provider component of the SDARS divided by the actual end-to-end revenues earned by the SDARS ("revenue ratio"). In my original testimony, I assumed that the ratio of hand-off provider costs to end-to-end costs serves as a suitable proxy for the corresponding revenue ratio.

23. As a matter of economics, expected revenues must at least cover expected costs (including a return on investment) as a firm decides whether or not to undertake the investment necessary to enter; over the longer run, earned revenues must at least cover costs incurred or the firm will exit the market; and in a competitive or monopolistically competitive market (i.e., one with differentiated products), revenues will just equal costs.

24. The proposition that revenues reflect underlying costs is an intuitive notion that is generally confirmed by every-day experience. The price of airline

tickets and cab rides increase when the price of fuel increases. The price of medical service increases as malpractice insurance costs rise. The price of computers falls as the cost of processors fall.

25. Thus, the assumption that revenues reflect costs is a natural one, not only for economists, but for a common-sense understanding generally of why prices change or are high or low. Of course, at any point in time, revenues may differ from costs. There may be unexpected increases in demand that raise the market price or unanticipated increases in costs that are not immediately reflected in the prices charged or the revenues received. But these deviations are "noise" in a compelling central tendency in competitive markets for revenues to reflect costs.

26. It is also true that deviations from this central tendency may persist for more or less time. In particular, revenues may diverge from costs over the period of the license at issue in this proceeding, and so it may appear that my functionality adjustment could understate or overstate the appropriate rate for the use of the sound recording performance rights to be levied on the SDARS revenues. But my approach does not require an exact equality between revenues and costs; instead it requires only that the revenue ratio tends to equal the cost ratio. Thus, revenues at the hand-off provider and end-to-end levels can diverge from their respective costs substantially and my assumption would still be valid (or approximately so) if the percentage divergence between revenues and costs for the hand-off provider and between revenues and costs of the end-to-end provider were approximately the same. While I cannot test this relationship directly, the discussion below provides substantial

evidence that my adjustments have not resulted in understating the royalty rate for the SDARS.

2. Empirical corroboration

27. As a result of data provided during the course of this proceeding, I have been able to test whether my functionality adjustment overstates or understates the percentage-of-revenue rate that forms the basis for the per-play rate I later recommend for the SDARS' use of the sound recording performance rights. I can use the 7.25% PSS rate, data disclosed during the direct phase on the revenue per subscriber earned by Music Choice and estimates of the amount of time spent listening to the services to compute a per-subscriber rate that would be applicable to the SDARS. I can then translate that per-subscriber rate into a revenue-percentage rate.

28. The methodology used here is essentially the methodology used by Dr. Pelcovits to establish his recommended fee for Music Choice in this case by accounting for differences in listening time across services. Specifically, I understand, based on information supplied by Music Choice in the course of this proceeding, that Music Choice receives an average of [[ ]] per subscriber per month in revenues for supplying its digital audio service to cable television providers.[11] Applying the 7.25% royalty rate to these revenues gives a monthly royalty payment of [[ ]] per subscriber. I note in passing that [[

[11] Del Becarro WDT at 28.

]].[12]

29. Dr. Pelcovits estimates that cable television subscribers listen to Music Choice for two hours per week, on average, based on a survey commissioned by SoundExchange for this litigation.[13] As noted in my earlier testimony, a Sirius survey reported that its subscribers, on average, listened to [[ ]] of music per week in the second quarter of 2006.[14] Using [[ ]] hours per week as an average number for XM and Sirius, the per-subscriber payment for Music Choice should be adjusted upward to [[ ]] per subscriber per month (([[ ]] / 2) × [[ ]]).

30. This per-subscriber number can be converted to a percentage of revenue basis by dividing by the average revenue per user per month (ARPU) for XM and Sirius. The 2006 ARPU for XM was $10.09, while for Sirius it was $11.01.[15] Taking $10.55 as the average ARPU, the per-subscriber fee computed above represents 0.46% of revenue. This rate would have generated sound recording license fees of $7.22 million from the SDARS in 2006.[16] This rate is reasonably close to, although lower than, both the 0.88% rate that I originally computed based on the 7.25% PSS

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[12] Strong WDT at 12. In 2003—the year the PSS negotiated the 7.25% rate with SoundExchange, Music Choice earned [[ ]] per subscriber. In 2004, it earned [[ ]] per subscriber, and in 2005 as in 2006, it earned [[ ]] per subscriber.

[13] Pelcovits WDT at 40. I express no opinion on the reliability of this study, but observe that it is one that SoundExchange itself relies on. Moreover, the level of its precision is not critical for my purposes here, insofar as the computation it enables is one designed to generally corroborate the fee methodology that I have developed using other data.

[14] Woodbury WDT at 32.

[15] 2006 Form 10-K, XM Satellite Radio Holdings Inc., p. 37; 2006 Form 10-K, Sirius Satellite Radio Inc., p. 32.

[16] Annual revenues in 2006 for Sirius were $637.235 million, and for XM were $933.417 million. See 2006 Form 10-K, Sirius Satellite Radio Inc., p. 32; 2006 Form 10-K, XM Satellite Radio Holdings Inc., p. 32.

rate in my earlier testimony and the revised rate of 1.20% that I discuss below. That the 0.46% rate is lower than both likely reflects the numerous conservative assumptions I made in my calculations of the functionality adjustment.

31. This more direct calculation indicates that, as a general matter, I have correctly adjusted the PSS rate of 7.25% that is levied on the gross revenues of the PSS into one to be applied against the gross revenues of the SDARS. (However, this calculation also suggests that my functionality adjustment may result in a rate to be paid by the SDARS to SoundExchange that is inappropriately high.)

C. Empirical reliability of the functionality adjustment

32. In his testimony, Dr. Pelcovits purports to compute the license fee for each year of the license term to be decided in this proceeding.[17] However, he does so by constructing "steady state" costs that bear no relation to actual cost forecasts for the SDARS. In this section, I apply my functionality adjustment to each year of the license term using financial analyst projections of actual costs. This also addresses a related issue raised by the Court, which is whether the cost ratios that I have used in my functionality adjustment based on 2005-2006 data are likely to remain stable over the period of the license, 2007-2012.[18]

33. To address the Court's concern, I requested that XM and Sirius provide me with revenue and cost projections for the license period. Because I understand from both SDARS that neither as a matter of course prepares projections that would span the entire license period, each SDARS had undertaken a special effort to generate those data using financial analyst projections.

[17] Pelcovits WDT at 30-32.
[18] 6/13/07 Tr. 35:19-37:20; 88:2-22 (Woodbury).

34. As shown below, those data suggest that for both XM and Sirius, the functionality adjustment is expected to be quite stable during the period of the license. However, for XM, the estimated functionality adjustment is greater than that which I had estimated in my original testimony. Consequently, I have revised my revenue-percentage rate estimates as the revenue-weighted average of the average of the XM and Sirius rates for each year during the license period. The revised revenue percentage is 1.20%, a rate that appears particularly conservative in light of the preceding analysis of the new Music Choice data suggesting a rate of 0.46%.

1. Sirius projections

35. Sirius retained the firm of InSync Analytics to compile averages of analyst forecasts of subscriber additions, additions by distribution channel (e.g., OEM, retail, and Hertz), and advertising revenue for the years 2007-2012. Using these consensus estimates, Sirius projected its variable costs and revenues for the period of the license based on its most recent internal forecast model. Fixed costs were also projected on the basis of Sirius' most recent internal forecast model. Exhibit 25 contains a memorandum provided by Michelle McKinnon of Sirius that describes the methodology that Sirius used in generating these forecasts. As explained by Ms. McKinnon, Sirius' forecast model currently does not project beyond 2011, and so Sirius extended the projections to 2012 based on what it regards as a reasonable set of assumptions regarding changes in Sirius' costs between 2007 and 2012.

36. The methodology used to identify which of Sirius' costs should be allocated to the hand-off provider equivalent service is very similar to the methodology described in the appendix to my testimony during the direct phase of

this proceeding. The forecast data provided by Sirius is based on its internal financial model and so contains a comparable level of detail as the financial data contained in Exhibit 14 of my original testimony.

37. Using the forecasted data, the calculated functionality adjustments for each of the license years are contained in Exhibit 26. As that exhibit details, the ratio of hand-off provider costs to end-to-end costs is quite stable throughout the license period, ranging between [[and [[ ]] over the period 2007-2012.[19] The levels of the ratio are slightly higher in Exhibit 26 than in Exhibit 14 of my original testimony, where the ratio was about [[ ]].

2. XM projections

38. XM also retained the firm of InSync Analytics to compile an average of analyst forecasts for major line items of revenues and costs for XM. Exhibit 27 contains a memorandum provided by XM that explains the InSync averaging methodology and a few modifications made to that methodology. The methodology used to identify which of XM's costs should be allocated to the hand-off provider equivalent service is generally the same as that used in the appendix to my prior testimony during the direct phase of this proceeding.

39. However, a difference between the data provided to me for my original testimony and that provided to me by InSync is the level of aggregation—the InSync data is more aggregated than the data contained in Exhibit 13 of my original testimony. For example, InSync provided me with only an aggregate dollar number

[19] Note that even if one excluded the 2012 forecasts not generated by Sirius' internal financial model, the remaining years display the same pattern of stability.

for revenue share and royalties whereas in my original testimony, this line item had four components—engineering and technology revenue share, distribution channel revenue share, content provider revenue share, and performance rights royalties. To mitigate these aggregation issues, I (or my staff) discussed with XM what it might deem a reasonable allocation of InSync's consensus estimate of the aggregate line item into its components.[20]

40. There were some line items in InSync's consensus estimates that contained both hand-off provider and strictly end-to-end costs, but the data did not allow that distinction. For those line items, I used the fraction of that line item accounted for by the hand-off provider level in Exhibit 13 of my original testimony to allocate the comparable line item in the InSync data.

41. As shown in Exhibit 28, the ratio of hand-off provider costs to end-to-end costs is quite stable throughout the license period, rising about 3 percentage points between 2007 and 2012, and ranging between **[[ ]]** and **[[ ]]**.

42. The levels of the ratio are higher in Exhibit 28 than the roughly **[[ ]]** reported in Exhibit 13 of my original testimony, which was based on XM's costs for 2005 and the first half of 2006. Much of the increase in the ratio is related to changes in XM's costs that occurred between 2005 and the full year 2006, rather than changes in XM's costs that are projected to occur between 2006 and 2007. That is, the ratio increases between 2005 and 2006, but then is relatively stable through 2012.

[20] The fourth line item in the category, performance rights royalties, are the revenue-based payments that would be made by XM to ASCAP, BMI, and SESAC (based on the rates currently paid) and to SoundExchange, based on the imputed rate after adjusting for the ratio of hand-off provider to end-to-end costs.

43. I determined this to be so by taking the aggregated cost line items from XM's 2006 10-K and disaggregating them using a methodology similar to the methodology I used for the 2007-2012 data I described above.[21] The ratio of hand-off provider to end-to-end costs for 2006 using this methodology is approximately [[ ]], which is similar to my estimate using the 2007 forecast data, but is higher than the estimate of [[ ]] contained in Exhibit 13 of my original testimony.

44. I understand from XM that the key cost differences that are driving this change are that (1) programming and content costs (a hand-off provider cost) increased significantly from 2005 to 2006, and (2) sales and marketing costs (largely a subscriber distribution and acquisition cost) decreased from 2005 to 2006. I understand from XM that the increase in programming and content costs from 2005 to 2006 was largely attributable to [[

]].[22]

45. Sales and marketing expense decreased from 2005 to 2006 for two reasons. First, the costs of subsidies and distribution declined, largely because the number of gross subscriber additions to XM declined from 4.1 to 3.9 million.[23]

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[21] The methodology differs slightly from the methodology I used for the forecast data in that for 2006, I was able to obtain from XM the actual breakdown of the revenue share and royalties line item into its four components, and the breakdown of marketing expense into its three components, subsidies and distribution, advertising and marketing, and retention and support.
[22] Email from Steven Fay to Mark Vendetti, 7/20/2007.
[23] XM 10-K 2006, p. 37.

Advertising and marketing expense also declined from 2005 to 2006, in part because the number of gross subscriber additions declined, and in part because of my understanding that XM had increased its advertising and marketing expenditures at the end of 2005 to atypically high levels in response to the publicity surrounding Howard Stern's contract with Sirius.

3. Summary

46. I have revised my proposed rates to take into account both the difference in the level of the XM functionality adjustment and the projections provided by XM and Sirius. In particular, I used the functionality adjustment in the projections combined with the programming adjustment used in my initial testimony to estimate a rate for XM and a rate for Sirius for the years of the license period. Those rates appear in Exhibit 26 for Sirius and Exhibit 28 for XM. The revenue-weighted average of the rates over the entire license period is [[ ]] for XM and [[ ]] for Sirius. The revenue-weighted average of the two rates is 1.20%.[24] In calculating these rates, it is important to bear in mind that the programming adjustment is static in that it pertains only to subscriber attachments as they were in 2006. Over time, I would expect that non-music programming will become more significant for the two SDARS and therefore my estimate is likely to result in excessive payments to SoundExchange over the license period.[25]

47. In sum, the XM and Sirius projections support a conclusion that the functionality adjustment will remain quite stable for the duration of the license.

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[24] The 1.20% rate is rounded up from 1.1955%.
[25] Karmazin WDT at 14-17; 6/5/07 Tr. 133:18-134:12 (Logan).

Because of the increasing significance of non-music programming during that same period, my recommendation is likely to result in an increasing overstatement of the amounts to be paid by the SDARS to SoundExchange.

III. A Use-Based Per-Play Rate Can Be Easily Calculated

48. During the course of my trial testimony, the Court asked whether my recommended royalty rate as a percentage of the SDARS revenues could be converted to a per-play rate.[26] I undertake the necessary calculations below. In addition, I have had the opportunity to consider the relative advantages of a rate so calculated in light of this Court's intervening Webcasting II decision, the extraordinarily high level of the SoundExchange fee proposal, and testimony provided during the direct phase concerning how SoundExchange itself distributes the royalties it receives. In combination, as I discuss, these factors lead me to conclude that the preferable formulation of a reasonable rate for the SDARS in this proceeding is a per-play rate calculated in the manner I recommend.

49. I begin with the rationale for fee payments by the SDARS on a per-play basis. There are two key advantages to this approach versus a percentage-of-revenue approach. First, it allows the SDARS to respond to any substantial increases in fees by economizing on the use of music so as to reduce their payments or otherwise pursuing direct licensing alternatives to the SoundExchange blanket license.

[26] 6/13/07 Tr. 120:12-124:11 (Woodbury). Other usage-based measures, such as listener-songs (e.g., the number of listeners who listen to a particular song) are not routinely available for the SDARS because unlike, say, webcasting, the SDARS connection is one-way, which means that real-time electronic monitoring of listening is not possible. As I understand it, the SDARS would have to design and implement a survey to measure listening patterns on a going forward basis. However, such measurements would be inherently less reliable than data derived from electronic monitoring of listening.

50. Second, consistent with observations made by this Court in its recent Webcasting ruling, a per-play rate would preserve the incentives of the SDARS to improve the quality of their service. If the revenue of the SDARS were to increase because the SDARS incurred the costs to acquire more attractive non-music programming or to improve the quality of their radios, SoundExchange would share in that revenue increase via a revenue-percentage rate even though SoundExchange made no contribution to these revenue-enhancing improvements. As this Court, drawing from Dr. Jaffe's testimony, stated: "[R]evenue merely serves as 'a proxy' for what 'we really should be valuing, which is performances'" and that "'the revenue that a licensee derives, even from its music-related activities can be influenced by a variety of factors that have nothing to do with music.'"[27]

51. A countervailing consideration is the administrative cost to the SDARS of implementing a per-play rate. A payment based on compensable plays would require that the SDARS maintain records to identify compensable plays, an effort that I understand the SDARS do not currently undertake. Further, a use-based fee could increase the complexity and cost of any payment-related audits that may arise during the license period and that may also weigh against a per-play rate. If the required performance rights payments to SoundExchange were small relative to these administrative costs, then a revenue-percentage metric that avoids the costs of such recordkeeping may make economic sense. However, it is my understanding that at anything above a very low revenue percentage, these administrative costs would be outweighed by the advantages of a per-play fee outlined above.

[27] *Webcaster II* at 21-22.

52. As for the conversion itself, the percentage rate that I have proposed for the SDARS can be translated into a per-play rate in a reasonably straightforward fashion. Levying a 1.20% rate on the total 2006 SDARS revenues of [[ ]] would generate a dollar payment to SoundExchange of [[ ]] dollars.

53. Based on counts conducted by XM, I estimate the average number of sound recordings played per day on XM was [[ ]] in 2006, of which [[ ]] were recordings made since 1972 that require a payment by XM for the use of the sound recording performance rights.[28] On an annual basis, that totals [[ ]] compensable plays on XM in 2006. Sirius has performed similar counts of its broadcasts, and the corresponding numbers are [[ ]] plays per day, of which [[ ]], or [[ ]] in 2006, were compensable.[29] Together XM and Sirius broadcast [[ ]] compensable plays in 2006. Dividing the SoundExchange payments of [[ ]] by [[ ]] annual plays yields a per-play rate of $1.20. This use of a single fee per play is consistent with the way that SoundExchange distributes the royalties it collects from SDARS.[30]

54. The per-play payment does not account for any changes in aggregate music listening time during the license period. I recommend accounting for such changes in an approximate way by increasing the per-play rate by the actual annual percentage change in the number of SDARS subscribers. For example, suppose that the rate for 2007 is set at $1.20 per play, and suppose that year-end 2007 subscribers

[28] The XM performance count data is in Exhibit 29.
[29] The Sirius performance count data is in Exhibit 30.
[30] 6/19/07 Tr. 59:5-60:22 (Kessler).

were 10% higher than in 2006, the basis for the 2007 rate. Then the rate for 2008 would be 10% higher than the 2007 rate (or $1.32 per play).

55. In short, I recommend a per-play rate of $1.20 for 2007, to be adjusted by the actual annual percentage change in the number of SDARS subscribers.

IV. Dr. Ordover's DBS Benchmark Should Not Be Used to Infer a Reasonable Rate for the SDARS Payment for the Sound Recording Performance Rights

56. In his written direct testimony, Dr. Ordover calculates the percentage of DBS revenues accounted for by DBS payments to the various program services (e.g., HBO, ESPN, The Weather Channel) as between 40% and 49%.[31] Using Dr. Wind's survey indicating (according to Dr. Ordover) that music accounts for 55% of the value of all programming offered by the SDARS, he concludes that (after paying composers and publishers 3.5% of the SDARS revenues) the percentage fee paid by the SDARS for the use of the sound recording performance rights should be between 18.5% and 23.5%.[32] Based on the DBS experience, Dr. Ordover also calculates a per-subscriber fee range of between $2.17 and $2.70 per month.[33]

57. I regard the DBS based-benchmarks as flawed because they involve different buyers and different sellers from the SDARS; they involve substantially different rights; the DBS services provide a substantially different experience for subscribers than do the SDARS; the DBS services lack the promotional value of

[31] Ordover WDT at 40.
[32] Ordover WDT at 41-2.
[33] Ordover WDT at 42.

music airplay that apply to the SDARS[34]; and none of the agreements between DBS operators and program services reflect the 801(b) factors. In short, there is a general lack of comparability in the demand for and cost of DBS services and the SDARS services. As one example, the array of alternatives for consumers who are considering DBS (including cable and over-the-air television) is different than those purchasing a mobile audio-only service (terrestrial radio being a key alternative).

58. Similarly, the costs of providing the program services to DBS subscribers are likely to be substantially different in a relative sense than the costs of providing music to SDARS subscribers. On the programming side, the prices charged by HBO, ESPN, and MTV include (among others) the costs of exclusivity and the production cost of original programming in addition to the talent used on the program services. The primary means for recovering these costs are the revenues received from DBS and cable providers. In contrast, the labels recover their costs primarily through the sale of CDs and increasingly through digital downloads, not payments for sound recording performances on the SDARS. Consequently, the payments made by DBS providers to content suppliers are not analogous to those to be made by the SDARS to SoundExchange.

59. On the infrastructure side, I understand (for example) that XM and Sirius have incorporated innovations that go beyond the technology used by DBS

[34] The promotional value of airplay on the SDARS was confirmed by various SoundExchange witnesses during the direct case hearings. For example, Lawrence Kenswil, the executive vice president of Universal Music Group, agreed that, "satellite radio can play a role in promoting Universal label artists" and that "XM and Sirius play music that listeners don't normally hear on terrestrial radio." 6/27/07 Tr. 99:2-9 (Kenswil). When recording artist manager Simon Renshaw was asked, "And in terms of the satellite radio services playing records of your artists, you view that as a good thing. Right?" he responded, "Absolutely." 6/21/07 Tr. 41:5-9 (Renshaw). See also 6/21/07 Tr. 71:13-72:5 (Renshaw). See also 6/26/07 Tr. 36:11-37:14 (Chemelewski).

providers.[35] Thus, the DBS revenue percentage would have to be adjusted (downward) to apply that rate to the SDARS to reflect the cost of these additional innovations.

60. As a consequence of these kinds of differences, there is no reason to believe that the ratio of program expenditures by DBS to their revenues should be the same as that for the SDARS mobile audio service. Dr. Ordover makes no attempt to adjust for any of these factors. Moreover, Dr. Ordover is relying on averages for his calculation, i.e., he is relying on the calculation that the average program service is paid 40% of the revenues it generates. There are some cable program services that likely capture a much smaller share of the revenues they generate, which may be more analogous to the SDARS use of non-exclusive sound recording rights.

61. Indeed, given the difficulties in analogizing the video services to the audio services, even Dr. Ordover is reluctant to put much weight on his DBS comparison, noting that it provides only "limited insight" into what the appropriate rate should be for the sound recording performance rights.[36]

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[35] XM and Sirius had to develop satellite, antenna, repeater, and radio technology that would enable broadcasts to mobile car receivers (6/7/07 Tr. 43:9-44:1, 45:20-50:7, 66:17-68:12, 70:7-72:20 (Smith); Masiello WDT at 10-11). For Sirius, part of the solution for maintaining a continuous signal to mobile receivers (in contrast to stationary DBS antenna) was to employ innovative, highly inclined elliptical orbits (6/7/07 Tr. 51:13-53:13 (Smith)).

[36] Ordover WDT at 37. In addition, Dr. Ordover's use of the Wind 55% result (actually, 56% for Sirius and 59% for both services) is incorrect. The survey asks respondents whether they would cancel their service or purchase the service at a lower price if music were deleted from the service; if news were deleted from the service; if talk/entertainment were deleted from the service; and if sports were deleted from the service. The results are 59% for music, 35% for news, 34% for sports, and 35% for talk and entertainment. See Wind WDT at 22. Summing up the percentages of subscribers that would cancel or pay only a reduced amount if any one of these were deleted generates a figure of about 163% At best, the "value" of music relative to the three non-music alternatives would be (59 / 163) =36%, not 55%. See also Pelcovits WDT at 26. This alone would have the effect of reducing Dr. Ordover's percentage range to 10.9%-14.1%, not 18.5% to 23.5%.

V. Dr. Ordover's Revenue Percentage Benchmarks Should Not Be Used to Infer a Reasonable Rate for the SDARS Payment for the Sound Recording Performance Rights

62. In his testimony, Dr. Ordover offers seven different examples of revenue-percentage payments made by various "music" services for various rights. One of these—deals between iTunes and the labels—he rejects as too different.[37]

63. Two others involve downloads to cellular phones, whose retail rates are changing and there is some expectation that the label payments will also change. As I understand it, Universal has [[

]] Sprint now pays Universal the same amount per download as does iTunes.[38] In such a rapidly evolving marketplace, these changes highlight the fragility of Dr. Ordover's webcasting-based fee estimates, a fragility he does not address.[39] That leaves four services—two subscription music video services (interactive and non-interactive) and two subscription interactive music services (portable and non-portable) on which Dr. Ordover relies.

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[37] Ordover WDT at 46.

[38] 6/27/07 Tr. 110:3-15 (Kenswil); see also 4/26/07 Dep. Tr. 11:21-25 (Ordover).

[39] There have, for example, been significant changes in just the last two years in the interactive on-demand subscription market on which Dr. Ordover relies. Among leading services, Yahoo! Music Unlimited has increased its subscription price from $6.99 to $8.99 per month, Music Match on Demand is being discontinued as of August 31, 2007 and merged into Yahoo!. Rhapsody Unlimited has increased its subscription price from $9.99 to $12.99. Virgin has discontinued its service and AOL MusicNow subscribers have been migrated to Napster. See Yahoo! Press Release, 8/2/06 at http://yhoo.client.shareholder.com/press/releasedetail.cfm?releaseid=206022; "Yahoo! MUSIC™ Unlimited" at http://music.yahoo.com/ymu/default.asp?; Yahoo! Musicmatch letter at http://www.musicmatch.com/YMJ/welcome.htm; RealNetworks Press Release, 10/5/06 at http://www.realnetworks.com/company/press/releases/2006/rhap4.html; "Get to know Rhapsody" at http://www.rhapsody.com/rhapsody_faqs; Napster Press Release, 1/04/07 at http://investor.napster.com/releasedetail.cfm?releaseid=224294; and Napster Press Release, 1/12/07 at http://investor.napster.com/releasedetail.cfm?ReleaseID=225440.

A. Conceptual flaws

64. These rates are not for services obviously analogous to those offered by the SDARS. The buyers are different, the rights are different, the user has a substantially different experience than with the SDARS, and the negotiated rates do not reflect the 801(b) factors. In the case of music videos, the experience is obviously not an audio experience only. In the case of the interactive music services, that interactivity itself—the ability to choose what song is listened to— increases the labels' opportunity costs of providing music to the services and distinguishes those services from the SDARS where there is no interactivity. In addition, the infrastructure/delivery costs and the mobility characteristic of the SDARS are further differences that suggest that these percentages cannot be applied without adjustment to the revenues of the SDARS. In his discussion, Dr. Ordover makes no such adjustments (although Dr. Ordover does attempt to account for interactivity in the per-subscriber benchmarks discussed below).

65. The likely cost differential is particularly critical for evaluating Dr. Ordover's revenue-percentage assessment. If one regards the value of the sound recording performance rights on each of these services to be the same, then applying the same percentage to the SDARS revenues without accounting for what is likely the higher costs of the SDARS relative to those music services will result in an excessive dollar payment made by the SDARS to SoundExchange, for the same reasons as applying the PSS rate to the SDARS revenues would result in excessive royalty payments to SoundExchange.[40]

[40] In his *Webcaster II* testimony, Dr. Pelcovits dismissed the SDARS as a benchmark for the webcasters in part because: "The SDARS have a high proportion of fixed costs, relative to the webcasting business. This

66. This point can be shown more formally using economic theory. To begin with, the inherent similarity in the value of sound recording performance rights means that the underlying derived demand curve (that is, the demand for sound recordings by music content providers who package and resell the music to customers) should have the same elasticity of demand for different music content providers.[41] It is straightforward using economic theory to show that the ratio of the fee charged for an essential input with negligible incremental costs to the price of the final product is equal to the inverse of the elasticity of demand for the final product.[42] The connection between the elasticity of derived demand and the elasticity of final consumer demand is given by the Hicks factors, which are described in Dr. Ordover's deposition testimony.[43] According to these factors, the larger the share of costs accounted for by inputs other than music, the larger the ratio of customer demand elasticity to derived demand elasticity. If the derived demand elasticity for the SDARS and other services such as webcasting are similar, and the SDARS have a much larger share of costs going to inputs other than music, then the final product demand elasticity for the SDARS is much larger than the final product demand elasticity for webcasting and other services. Since the ratio of music fee to product price is inversely related to that demand elasticity, the payment to music as a percentage of revenues for the SDARS would be considerably smaller than it is for

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means the willing buyers would appraise the effect of a copyright license fee structure in a different manner." Pelcovits Rebuttal Testimony, Docket No. 2005-1 CRB DTRA at 7.

[41] Dr. Ordover makes the same point in his testimony: "One would expect *a priori* that the derived demand elasticities for satellite radio do not differ substantially from the analogous elasticities in other distribution channels for sound recordings." Ordover WDT at 19.

[42] The underlying model and the connection to customer demand elasticity are described by Dr. Pelcovits in his testimony in the 2005-1 Webcasters proceeding, pp. 31-36. Dr. Pelcovits referred to the inverse elasticity relationship in his testimony before the Court. See 3/2/06 Dep. Tr. 152:14-153:3 (Pelcovits).

[43] 4/26/07 Dep. Tr. 315:22-317:25 (Ordover); Hicks, J.R., *The Theory of Wages*, New York: Macmillan, 1932, p. 241-246.

other services that do not have nearly the level of other costs in delivering a final product. This adjustment for the magnitude of other costs is exactly what the functionality adjustment described in my previous testimony accomplishes.

67. In what follows, I illustrate the kind of effect that this adjustment could have on a reasonable rate for the SDARS based on these kinds of services, but I also highlight the use of alternative webcasting rates that were not used by Dr. Ordover.

B. Sensitivity testing

68. There is at least one notable contract negotiated between the labels and customized Internet radio stations with percentage rates far less than the **[[ ]]** that Dr. Ordover regards as typical. This contract can be used to test the sensitivity of Dr. Ordover's results: what is apparently the current contract between Yahoo! and Sony for non-interactive customized radio specifies a percentage rate of **[[**

69. While these non-interactive customized radio services provide the content to the subscriber, the subscriber is responsible for providing the means for listening to the music, whether it is a computer plus an Internet connection or a player. In this sense, these services are more like hand-off providers than end-to-end distributors. And as hand-off providers, the costs of compiling the music and delivering the music via a server may be substantially less than the uplink costs for a hand-off provider. On the other hand, these services also perform billing functions and may engage in

[44] This contract applies to Yahoo's LAUNCHcast subscription non-interactive customized radio service. Subscribers can provide their preferences to Yahoo!, which can affect whether they hear more or less of certain content. However, customized radio is not on-demand. Instead, I understand that Yahoo! apparently agreed to be bound by the sound recording performance complement so that subscribers cannot hear specific artists or albums more than they would on a SDARS. See 4/27/07 Dep. Tr. 172:6-22 (Eisenberg); and 5/11/06 Tr. 66:1-22 and 68:2-22 (Eisenberg).

some marketing and customer care efforts that I am not able to account for. However, it seems likely that as a percentage of revenue, these costs are likely far less than those incurred for the SDARS. For example, the subsidization of the radio handsets and the financing of OEM relationships by the SDARS are not costs that would be incurred by customized radio.

70. With that caveat, and as an illustrative calculation, I treat the [[ ]] rate as one that could be levied on the revenues of the hand-off provider component of the SDARS (although differences between the SDARS and the Yahoo! service would not warrant that outcome). To translate this rate into one that can be levied on the revenues of the SDARS, I use my attachment index as the basis for the music/non-music adjustment to account for the availability of non-music as well as music on the SDARS, and I use the ratio of hand-off provider costs to total SDARS costs over the license period to account for the greater costs incurred by the SDARS. The translated rate that could be levied on the end-to-end revenues of the SDARS is 2.57%.[45] Of course, this rate is still excessive in that it does not reflect the section 801(b) factors and Yahoo!'s custom radio allows the listener to interact with the service, a characteristic not available on the SDARS.

71. In summary, Dr. Ordover's suggestion that the revenue percentages of the various services provide evidence of an empirical "regularity" that supports the SoundExchange rate recommendations is incorrect.[46] His results are sensitive to the selected contracts and that sensitivity raises questions about the reliability of his

[45] As noted in my earlier testimony, as a mechanical matter, the 7.25% PSS rate that I used in my primary benchmark can be replaced with an alternative hand-off provider rate, and the functionality and programming adjustments can then be applied to that rate to obtain an equivalent rate for the SDARS. Woodbury WDT at 15.

[46] 6/21/07 Tr. 158:6-160:3 (Ordover). Also see Ordover WDT at 44.

estimates. Had he used a contract between a substantial provider of a web-based audio service, Yahoo!, as an alternative, and had he accounted for the cost differential between the SDARS and the Yahoo! service, he would have estimated a 2.57% rate to be levied on the SDARS revenues. While this is far closer to my recommended rate of 1.20%, it nonetheless is excessive because it is a rate for custom radio and a rate that does not reflect the 801(b) factors.

VI. Dr. Ordover's Per-Subscriber Benchmarks Should Not Be Used to Infer a Reasonable Rate for the SDARS Payment for the Sound Recording Performance Rights

72. Dr. Ordover provides yet another flawed webcasting benchmark for consideration by the Court, this time for a per-subscriber payment. Specifically, he observed that the portable subscription service Rhapsody To Go pays a fee to the labels of [[ ]] per subscriber per month for downloads by subscribers to a portable MP3 player.[47] However, because Rhapsody To Go is interactive, Dr. Ordover agrees that the [[ ]] needs to be adjusted to account for the lack of interactivity of the SDARS service. For that adjustment, he uses the ratio of payments to the labels made by a non-interactive music video service to those made by an interactive music video service, a ratio suggesting that a non-interactive music video service is "worth" [[ ]] of an interactive music video service.[48] Using

[47] Real Networks Rhapsody pays per-subscriber rates for portable interactive service between [[ ]] (UMG) and [[ ]] (EMI). See Amendment No. 4 to the Agreement for Universal Sound Recordings between RealNetworks, Inc. and UMG Recordings, Inc., August 1, 2006, SE 0148066; and Streaming Audio and Conditional Download Agreement between RealNetworks, Inc. and EMI Music, April 1, 2005, SE 0140841.
[48] Ordover WDT at 49.

that adjustment, he concludes that a reasonable monthly per-subscriber fee to the SDARS would be $1.41.[49]

A. Conceptual flaws

73. At the very outset, none of the services used by Dr. Ordover in this benchmark are "like" the non-interactive SDARS service. The Rhapsody To Go service involves different buyers than the SDARS and an exchange of different rights from the sound recording performance rights. It is also portable and interactive, both of which offer a different experience than the SDARS. And the rate itself does not reflect 801(b) factors.

74. With respect to portability, Dr. Ordover himself acknowledges that he regards the SDARS services as non-portable services and assumes such in another of his benchmark analyses.[50] Given the substantial difference in the per-subscriber payments made to labels between portable and non-portable interactive services, Dr. Ordover's benchmark based on portable interactive services arbitrarily inflates his estimate of the reasonable monthly per-subscriber fee for the non-portable SDARS.

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[49] This reflects [[ ]] of Dr. Ordover's Rhapsody To Go benchmark fee of [[ ]]. 6/21/07 Tr. 288:3-14 (Ordover). Dr. Ordover had also made an "immediacy" adjustment because he views the SDARS service as providing immediate access to music while Rhapsody To Go first requires a computer download. This adjustment was based on the fees paid to the labels by iTunes for computer downloads and by cell phones for direct downloads. As I noted previously, my understanding is that since the filing of his written direct testimony, the prices for these services have changed in a way that the immediacy adjustment has disappeared. 6/21/07 Tr. 186:13-187:8 (Ordover).

I understand that Dr. Ordover has described a "music intensity" adjustment to replace the now defunct immediacy adjustment; the basis for this new adjustment was not apparent and was not contained in his written direct testimony (4/26/07 Dep. Tr. 234:24-240:20 (Ordover)). However, to the extent that non-interactive services are used more intensively than interactive services, this should already be reflected in the negotiated license fees, obviating the need for an additional music intensity adjustment.

[50] Dr. Ordover has characterized satellite radio as a service that may be mobile (e.g., used in cars) but not fully portable. 6/21/07 Tr. 170:17-19 (Ordover); and 4/26/07 Dep. Tr. 246:20-24 (Ordover).

75. Dr. Ordover attempts to adjust for one of the differences—the interactivity difference—by using interactive and non-interactive music video services, but these too are not like the SDARS service. Those services involve different buyers than the SDARS; an exchange of different rights from the sound recording performance rights; and offer music videos, a different experience than the SDARS audio-only offering.

76. In particular, given how high the per-subscriber payments to the labels are for this interactive service—presumably because of the concern that downloads will cannibalize CD sales, it is critical that one can be confident in the precision of the interactivity adjustment.[51] In my view, one cannot have the necessary degree of confidence.

77. Importantly, Dr. Ordover does not explain why the value of interactivity on a music video service should reflect the value of interactivity on a music service. If (as seems reasonable) interactive music video services are less likely to lead to the

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[51] Indeed, in deposition, both Mr. Kenswil and Mr. Eisenberg observed that services that offer on-demand listening to music are more likely to displace the sale of CDs. The following exchange occurred during Mr. Kenswil's deposition:

" Q. ...Would you agree that to the extent there's any cannibalization that is less likely to occur with a non on-demand service?

MR. DeSANCTIS: Objection to form.

A. I'd say the extent of cannibalization of an individual would be greater on an on-demand service.

Q. And why is that?

A. Because an on-demand music service gives the consumer, if well implemented, which I don't claim it to be yet, if well implemented, the exact same experience they would get from buying the product. And thus giving no value to buying the product over and above what they're already getting from the subscription service."

4/25/07 Dep. Tr. 132:14-133-8 (Kenswil). In his deposition, Mr. Eisenberg made a similar observation when he stated that with respect to portable services, "If you can listen to a track whenever you want it has a substitutional effect for the purchase of that track on a permanent basis." 4/27/07 Dep. Tr. 151:5-8 (Eisenberg).

displacement of CDs than interactive music services, then, the opportunity costs (displacement costs) of the interactive music video services would be less than, and (other things equal) their prices would be lower than, the corresponding costs and prices for the interactive music services. Consequently, Dr. Ordover has likely and perhaps substantially understated the costs of music service interactivity by using his music video service proxy and so has likely understated the "discount" required for a non-interactive music service.

B. Sensitivity testing

78. The use of some current contracts that were not reviewed by Dr. Ordover illustrates the sensitivity of Dr. Ordover's estimates to reasonable changes in the data. Specifically, Dr. Ordover did not consider the fees paid by a large non-interactive, non-portable but customized subscription service, Yahoo!'s LAUNCHcast Plus.[52] The fees paid to labels for LAUNCHcast Plus are generally much lower than those set for interactive services. While the rates paid by LAUNCHcast Plus are not analogous to those rates that would be paid by the SDARS (because the Yahoo! service does offer consumers some interactivity while the SDARS experience is completely non-interactive), the different fees highlight the sensitivity of Dr. Ordover's recommendations to the contracts he considered.

[52] LAUNCHcast offers ad-supported free radio service and a subscription premium service called LAUNCHcast Plus that is ad-free. The service is non-interactive in that users cannot select the specific music they hear but can choose among dozens of pre-programmed channels or submit music preferences to customize the playlists. However, there are limitations to the extent that users can customize the playlist and the service has agreed to abide by the sound recording performance complement. See 5/11/06 Tr. 66:1-22 (Eisenberg); and "LAUNCHcast Radio Station Guide," at http://music.yahoo.com/launchcast/stations/default.asp.

79. For example, in its current agreement with Sony, Yahoo! pays Sony a pro-rata share of [[

]] for LAUNCHcast Plus.[53] Based on Yahoo!'s current $3.99 monthly subscription price for LAUNCHcast Plus, the [[

]].[54] Based on a separate contract with EMI for the LAUNCHcast Plus service, Yahoo! would pay a pro rata share of [[ ]] per subscriber per month.[55] Both fees are substantially less than Dr. Ordover's estimate of a monthly rate of $1.41 per subscriber, although still not appropriate for the SDARS as discussed above.[56]

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[53] In a similar agreement with UMG, Yahoo! agreed to pay [[

]] assuming UMG content accounted for over one-quarter of total LAUNCHcast performances. See 4/27/07 Dep. Tr. 172:6-22 (Eisenberg); and Agreement between UMG Recordings, Inc. and Yahoo! Inc. November 23, 2004, SE 0143710.

[54] [[ ]] Yahoo also offers an annual subscription that amounts to $2.99 per month. Based on this subscription price, Yahoo would pay Sony [[ ]] per subscriber per month. "LAUNCHcast Plus Radio" at http://music.yahoo.com/launchcast/subscription/default.asp.

[55] Yahoo! agreed to pay EMI a pro rata share of [[

]] Based on a $3.99 monthly subscription price and $2.99 monthly cost of an annual subscription, [[ ]]. Agreement between Yahoo! Inc. and EMI Recorded Music Holdings, Inc. September 19, 2003, SE 0140159.

[56] In his deposition, Dr. Ordover was asked why he did not consider the negotiated rates for customized radio in his evaluation of the reasonable royalty rate. He responded that "I consider custom radio to be in the gray zone between interactive and non-interactive, which is why I had a difficult time figuring out how to use information in these rates, in part because of the regulatory uncertainty in how to characterize them." (4/26/07 Dep. Tr. 332:15-20 (Ordover)). It is not obvious what "gray zone" Dr. Ordover is referring to. Dr. Ordover could mean that the rate negotiated between Yahoo! and Sony involved the possibility that Yahoo! could have made its service sufficiently non-interactive to enable Yahoo! to acquire the sound recording performance rights at statutory rates. While the availability of the statutory rates may have lowered the maximum rate that Yahoo! was willing to accept, that rate itself was premised, as I understand it, on a willing-buyer/willing-seller standard. That is, it was a rate that would have been expected to prevail in a competitive marketplace. Consequently, any rate "depression" perception of Sony would simply reflect ordinary market forces.

VII. Dr. Ordover's Retail Price Benchmark Adds Nothing to His Analysis

80. Dr. Ordover constructs one additional benchmark based on retail prices, but this discussion is nothing more than another variant of his percentage-of-revenue discussion.

81. For this benchmark, Dr. Ordover first imputes a portion of the SDARS retail price that is attributable to music: 55% of an average monthly price of $11.25, which is $6.19.[57] (Note that this uses the same unnormalized value of music that I criticized previously.) He also observes that the retail price for an interactive subscription service is $8.00 per month and that service pays the labels [[ ]] per subscriber per month. He then reasons that if the $8.00 service pays the labels [[ ]], then the payment to the labels by the $6.19 per month service—the music-only SDARS—should be $3.09 per subscriber per month ([[ ]] x ($6.19/$8.00)).

82. Note that this is mathematically equivalent to saying that every service should pay 50% of its revenues (i.e., $4.00/$8.00) to the labels, an argument that Dr. Ordover has already made. Then for an all-music SDARS service that costs $6.19, the payment would be $3.09.[58]

83. Thus, this approach is subject to the same flaws as I described earlier in my discussion of Dr. Ordover's revenue-percentage approach. Between the two services, the buyers are different, the rights at issue are different, the experience is different, the costs are different, and none of these rates reflect the 801(b) factors.

[57] Ordover WDT at 51.
[58] This equivalence was noted by the court during Dr. Ordover's testimony. See 6/21/07 Tr. 173:14-174:10 (Ordover).

Thus, there is no reason to believe that the ratio of fee to price is the same for the SDARS as it would be for an interactive music service.

84. Indeed, the sensitivity of Dr. Ordover's estimates can be illustrated in the same way as previously. Had we used the [[ ]] revenue percentage for the Yahoo!-Sony deal and adjusted for the functionality differences between the SDARS and the interactive service, we would apply the custom radio adjusted percent of revenue computed previously (2.57%) to the $11.25 average retail price used by Dr. Ordover, which results in a per-subscriber per month rate of $0.29. Of course, given the degree of interactivity for custom radio and the non-interactivity of the SDARS and the absence of the 801(b) factors, this rate is still too high to be relevant for the SDARS.

85. In short, this approach is not an additional approach. Dr. Ordover has simply "found" another retail rate to which the [[ ]] rate can be applied and then translated that percentage into a per-subscriber rate. This "new" approach is no less sensitive to reasonable changes in data than the previous revenue-percentage or per-subscriber benchmark approaches.

VIII. Summary of Dr. Ordover's Estimates

86. The benchmarks offered by Dr. Ordover to estimate a fee for use of the sound recording performance rights are all flawed in one way or another. A key flaw is that none reflect the 801(b) factors, but others abound. The DBS benchmark is not a service like the SDARS service, and there is no reason why the fraction of DBS revenues accounted for by payments to content providers should track payments by the SDARS for a content component. The music video services and the interactive

music services share a similar flaw: Given the demand and cost differences between these services and those of the SDARS, there is no reason to believe that the sound recording performance rights fee would bear any obvious arithmetic relationship to the fees paid by these services.

87. Moreover, even when relying on Dr. Ordover's general methodology, the sensitivity of his results to reasonable changes in his benchmarks is substantial and results in rates that are far lower than those he recommends to the Court. While those rates are still too high for application to the revenues of the SDARS, this sensitivity should reduce the confidence that one has in Dr. Ordover's recommendation because it calls into question the reliability of the estimates.

IX. Dr. Pelcovits' Inferences Regarding the Appropriate Sound Recording Performance Rights Fee from Sirius Payments to Howard Stern Are Incomplete and Therefore Misleading

88. In his written direct testimony and his amended testimony, Dr. Pelcovits estimates the appropriate fee for the use of the sound recording performance rights by relying on Sirius' payments to Howard Stern.[59] That reliance is misplaced and leads to an inflated estimate of what the appropriate fee should be.

89. In his methodology, Dr. Pelcovits' premise is that in a long-run equilibrium, a profit-maximizing firm will choose its inputs in such a way that the cost per unit of the marginal product of each input should be equalized across all inputs. By marginal product, economists mean the incremental output generated by a small increase in the use of that input, holding other inputs constant. Thus, Dr.

[59] Pelcovits WDT at 9-14; Pelcovits Amended Testimony at 4-8.

Pelcovits assumes that if the cost per unit of incremental output for one input is less than that for a second input, the firm can increase the amount of the first input used while reducing the amount of the second and so reduce total costs for producing any given level of output. This makes sense in terms of profit-maximization because it is less costly to the firm to use the first instead of the second input in production. The firm continues this substitution until the cost per unit of incremental output of an input is equalized across all inputs. But this is a long-run profit-maximizing condition because he assumes that all inputs are immediately variable.

90. Using that theory as the backdrop, Dr. Pelcovits calculates the subscriber and advertising revenues that were expected to be generated by Howard Stern and the costs incurred by Sirius to acquire and to provide facilities to Stern. (I elaborate more on the details of this calculation in my discussion below.) Dr. Pelcovits' premise is that the labels are entitled to a share of the SDARS revenues generated by music that would correspond to the share of the SDARS revenues generated by Stern that is paid to Stern. Assuming (among other things) that Sirius attracts an additional two million consumers who subscribe because of the Howard Stern programming, Dr. Pelcovits concludes that the payments made to Howard Stern over the lifetime of the Stern contract are 50% of the total subscriber and advertising revenues generated by the Stern programming.[60]

91. Because the Wind survey purportedly indicates that 56% of subscribers would cancel the Sirius service (or reduce the amount they are willing to pay for the service) if all music were removed from Sirius, Dr. Pelcovits concludes that 50% of

[60] Pelcovits Amended Testimony at 8.

those revenues (or 28% of total SDARS revenues) should accrue to the music related inputs. After deducting 2.35% for the musical works rights and another [[ ]] for what Dr. Pelcovits estimates would be the SDARS internal production costs for the music programming, Dr. Pelcovits concludes that 24% of the SDARS revenues should accrue to SoundExchange.[61]

A. Conceptual flaws

92. The conceptual approach used in Dr. Pelcovits' Stern analysis is flawed for at least two reasons (in addition to the fact that the Stern agreement does not incorporate the section 801(b) factors). First, Dr. Pelcovits relies on a long-run equilibrium condition that is not likely applicable to the payments made to Howard Stern. Second, Dr. Pelcovits mischaracterizes the payments made to Stern. A substantial portion of those payments are likely attributable to increases in the brand equity of Sirius and are unrelated to any direct increase in subscribership because of Stern.[62] These flaws result in an excessive estimate of the reasonable royalty fee to be paid to the labels. In addition, Dr. Pelcovits' use of the Wind survey leads to implausible results. I discuss each of these in turn.

1. Inapplicability of Dr. Pelcovits' long-run equilibrium condition

93. As a matter of economic theory, Dr. Pelcovits' use of the long-run profit-maximizing equilibrium condition that the cost per unit of incremental output of each

[61] Pelcovits Amended Testimony at 8. Dr. Pelcovits actually estimates that XM and Sirius pay 3.5% of their revenues for the musical works rights, but that estimate is incorrect. See 7/9/07 Tr. 240:1-241:16 (Pelcovits).

[62] In addition, I understand that some at Sirius held the view that at the time, Sirius was so lacking in credibility with OEMs and third-party providers that without Stern, Sirius might well have exited the market. See 4/23/07 Dep. Tr. 130:13-133:12 (Frear). If that were the case, then the number of subscribers that are attributable to Stern may be substantially greater than that used by Dr. Pelcovits.

input should be equalized across all inputs is misapplied. First, that theory requires that the firm (in this case, the SDARS) be able to adjust the usage of the inputs to maintain that condition. Thus, in this case, if the cost per unit of incremental output of Stern is a bit low relative to that of other inputs, the theory calls for Sirius to increase its usage of Stern by some small amount. Thus, the correct calculation for implementing this equilibrium condition would be to determine the incremental cost and subscribers if Sirius added (say) an additional hour of Stern.

94. Unlike music programming, where Sirius could adjust the amount of music offered by relatively small amounts, that is not possible with Stern. Sirius has contracted with Stern for a set amount of his time—the acquisition of Stern is a "lumpy" purchase that prevents such incremental adjustments. As a result, the cost per unit of incremental output for Stern may be higher than that for other inputs.

95. This general point about the inapplicability of this theory when inputs are "lumpy" is echoed by Dr. Ordover. In his deposition testimony, Dr. Ordover noted that the framework used by Dr. Pelcovits requires "continuity of the [cost] function, because otherwise you may not be able to calculate the marginal products, and the inputs, obviously, have to be granular in order to be able to change their amounts by the tiny incremental values."[63]

96. Second, the underlying economic theory used by Dr. Pelcovits answers the question of what the profit-maximizing combination of inputs to use should be *given* input prices. In this matter, it is the input prices that are at issue. If the Court were to decide that the royalty rate for the use of the sound recording performance rights

[63] 4/26/07 Dep. Tr. 345:20-25 (Ordover).

should be substantially increased, Sirius and XM would substitute away from music and towards other non-music alternatives—an outcome that would be more immediate if the rate were levied on (say) a per-play basis rather than as a percentage of revenue. In that case, the results of the Wind survey (even if taken at face value for the current programming configuration of the SDARS) would overstate the importance of music to subscribers. As a result, Dr. Pelcovits' rate estimates would be excessive because they would have overstated the equilibrium amount of music offered to subscribers by the SDARS at the higher rate proposed by Dr. Pelcovits.

2. Failure to account for the opportunity costs and brand equity value of the Stern programming.

97. In addition, two key differences between Howard Stern and the music programming are opportunity costs and the brand equity value of Stern to Sirius. With respect to the former, the payments to Howard Stern must be sufficient to recoup the payments he could have earned on cable, XM or other outlets had Stern not accepted the offer to be broadcast exclusively on Sirius. There are no such opportunity costs associated with music—the playing of music on XM and Sirius does not preclude it from being played at the same time on terrestrial radio.

98. Equally important, the compensation paid to Stern by Sirius will include compensation for the Sirius investments in brand equity that are not likely matched by any of the music channels. Thus, the compensation of Stern must be adjusted downward to exclude the brand equity portion of the Stern payments. During the course of this proceeding, numerous Sirius executives as well as trade press reports have described how the exclusive contract with Stern has altered the rivalry between

XM and Sirius.[64] Indeed, I understand from both SDARS that the acquisition of Stern by Sirius was nearly or completely unique in terms of the effect that the Stern deal had on Sirius' stature as a competitor.

99. Thus, in addition to drawing in new subscribers, the exclusive contract with Stern will enable Sirius to increase advertising sales on other non-music channels, to reduce churn and subscriber acquisition costs (including more effective advertising and reduced costs associated with OEM sales of Sirius), and to enable it to secure more talent for its music and non-music channels as well as to more easily retain the talent it does have. Moreover, the Stern deal and his move to Sirius garnered enormous publicity in the mainstream press, providing consumers with more exposure to Sirius than would have otherwise been the case.

100. As a consequence, even supposing that the Stern payments could be a useful indicator of the royalty fee to be paid by the SDARS to SoundExchange, the compensation to Stern for this key brand equity investment and his opportunity costs must be deducted from Stern's total compensation before using that payment as a basis for the fee charged for the use of the sound recording performance rights.

3. Dr. Pelcovits' methodology generates implausible predictions

101. One way of gauging the appropriateness of Dr. Pelcovits' Stern analysis is to ask what share of SDARS revenues would be accounted for by all content costs, if his Stern analysis were correct.

[64] See 6/6/07 Tr. 301:13-304:3 (Karmazin); 6/12/07 Tr. 16:22-17:19 (Frear), 195:11-22 (Frear). "Satellite Radio: Defying Gravity," Billboard Radio Monitor, February 3, 2006; "As His Sirius Show Begins, Radio Ponders the Stern Effect," New York Times, January 9, 2006.

102. To reprise his general calculation, Dr. Pelcovits calculates the royalty rate for all music as the fraction of the revenues of the Stern-attributed incremental subscribers that is paid to Stern multiplied by the fraction of subscribers who would cancel or reduce the amount paid without music. Dr. Pelcovits estimates that these two components yield a royalty rate of 28% (50% x 56%). To apply this methodology to non-music programming and content, I replace the 56% value of music with the analogous results of Dr. Wind's survey for talk and entertainment, sports, and news. I further assume that Sirius would have no non-music programming expense except for payments to these third parties.

103. Dr. Wind estimates that 37% of Sirius subscribers would cancel or reduce the amount they were willing to pay if talk and entertainment programming were dropped, 37% if sports were dropped, and 36% if news were dropped.[65] Based on these results, the implied payments to talk and entertainment, sports, and news programming and content providers are 18.5%, 18.5%, and 18%, respectively.[66] Accordingly, this methodology predicts that Sirius should pay a total of 83% (28 + 18.5 + 18.5 + 18) of its revenue on programming and content, which is obviously unrealistic. For example, using the forecasts for 2012, the year used by Dr. Pelcovits for his surplus calculation, Sirius' fixed costs associated with satellite and transmission, general and administrative, research and development, and depreciation expense are about 15% of Sirius' projected revenues, which, combined with Dr. Pelcovits' implied programming and content costs, would account for 98% of Sirius'

[65] Wind WDT Appendix K, p. 1.
[66] This is computed as 50% x 37% = 18.5% for sports as well as for talk and entertainment. For news, the calculation is 50% x 36% = 18%.

total revenue. Of course, in addition to covering its fixed costs, Sirius also needs to cover its variable costs and provide a return to its equity and debt holders.

X. The Implementation of Dr. Pelcovits' Shapley Model Gives Anomalous Results, Calling Into Question the Usefulness of the Analysis

104. In his written direct testimony, Dr. Pelcovits derives one estimate of the rate to be levied on the SDARS by first calculating the share of the surplus due to music that results from a Shapley model (62%) and then estimating the dollar surplus of the SDARS in 2012. The Shapley share times the estimated surplus yields the total dollar payment that Dr. Pelcovits believes should be paid by the SDARS for the use of the sound recording performance rights. He then uses that total dollar payment to derive a revenue-percentage rate and a per-subscriber rate.

105. I understand that in his written direct testimony, Dr. Roger Noll has addressed the relevance of the Shapley model for estimating a royalty fee to be paid by the SDARS. In this section, I illustrate how Dr. Pelcovits adopted assumptions that have the effect of inflating the surplus share due SoundExchange and so demonstrate how the set-up of the Shapley game can change the results quite dramatically, suggesting how sensitive the game results are to the underlying assumptions.

A. Anomalous results when assuming seven record labels

106. One questionable assumption in his implementation of the Shapely model is the way Dr. Pelcovits characterizes how record labels contribute content to a coalition of radio companies and other content providers. Specifically, Dr. Pelcovits

treats each of the four major record labels along with three representative independent labels as separate players in the Shapley game.[67] At the same time, he assumes that music content contributes nothing to the SDARS coalition and the SDARS coalition is not viable unless at least 75% of the music content is represented in the coalition.[68] This combination of assumptions leads to a counterintuitive result that, according to the Shapley game, a monopolistic provider of all music obtains considerably less surplus than seven independent music labels, each providing a fraction of the entire music library.

107. To illustrate the sensitivity of the model to these assumptions about music providers, I have run several variations of the Pelcovits model changing only these assumptions about music content. The starting point is the particular run of the Shapley value model that gives music a 62% share of the surplus, which Dr. Pelcovits uses as the basis for his subsequent analysis. The first variation treats the various record labels as a single monopolistic negotiating entity, rather than seven separate players. One would normally expect that the bargaining power of labels would increase if they negotiate as a single monopolist rather than separately. However, the result of the Shapley model is that the single music firm would only receive a 37% share of the surplus.[69]

108. If the seven separate record label players are retained but there is no minimum share of music content required to form a viable SDARS (while retaining Dr. Pelcovits' assumption that a viable coalition must assemble 50% of all content)

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[67] Pelcovits WDT at 24-5.
[68] Pelcovits WDT at 27.
[69] This result as well as subsequent Shapley value computations were obtained by rerunning Dr. Pelcovits' computer program using different parameters for the players and their contributions to the coalition.

then the music firms collectively receive 36% of the surplus. Thus negotiating as a monopolist leads to a small increase in surplus share in the absence of the 75% minimum music content requirement (note that the 75% requirement is meaningless with only a single negotiator for all music). It is only in conjunction with the minimum content requirement that the Shapley value produces the anomalous result that record labels do better negotiating separately rather than collectively.[70]

B. Anomalous results with a second SDARS

109. The assumptions of the model are also questionable with regard to the value of having a second SDARS in the coalition. In the real world, there may be value to content providers from negotiating with two satellite radio companies, whether from being able to offer exclusive content to one service or the other, or because each service seeks to provide differentiated content to customers. However, neither of these elements is present in Dr. Pelcovits' model of the SDARS negotiations and Dr. Pelcovits' assumption about the role of the second SDARS when these elements are not present leads to anomalous results.

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[70] The dramatic decrease in the share of surplus resulting from an increase in market power (effectively merger to monopoly) calls into question whether this particular cooperative game model gives any insight into actual market outcomes. Dr. Pelcovits himself seemed to question the probative value of the model when discussing the impact of this change in assumptions during his testimony in court.

"Q. Let me ask you to assume as a hypothetical that if you had run the Shapley value analysis with everything else equal, your Shapley value program with everything else equal, with a single seller of the sound recording rights instead of seven sellers of the sound recording rights that you would have gotten an outcome, a Shapley value outcome, of 37 percent of the surplus instead of 62 percent of the surplus. Assuming that is true, would you agree that that outcome has nothing to do with what you would expect to see in a competitive market?

A. I would have to say I don't really know what it would represent other than what you put into the model and the model is a cooperative game model and if that's the result of the model, it's telling something about a cooperative game model. It's not necessarily telling you what would happen in a particular market outcome with this hypothetical situation." 7/9/2007 Tr. 226:11-227:10 (Pelcovits).

110. In Dr. Pelcovits' model, if there are two SDARS in a viable coalition, all of the content in the coalition is broadcast on both of them. There is no exclusive content in the model. A second SDARS is assumed to contribute five percentage points of additional value regardless of how much content is available to the coalition.[71] Moreover, this additional value is 5% after costs are netted out, since the 50% minimum content requirement is implemented as if the SDARS had costs equal to half of the maximum possible revenues.[72]

111. Thus, if a second SDARS adds five percentage points of value, that has to be interpreted as 55% additional revenues before the incremental costs are deducted (i.e., 5% = 55%-50%). This 55% of additional value is somehow generated without adding any additional content, an outcome that does not seem plausible.

112. As another illustration of the implausibility of Dr. Pelcovits' assumption about the value of the second SDARS, if a particular combination of content providers collectively offers 48% of the programming content and is in a coalition with one SDARS, the coalition is not viable and has a value of zero. But if a second SDARS joins the coalition, the coalition becomes viable because Dr. Pelcovits essentially counts the SDARS as adding 5% of content to the coalitions. Both SDARS begin operations, requiring the expenditure of the sizeable operating costs for each,

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[71] Pelcovits WDT at 28.

[72] The 50% minimum content requirement is implemented in Dr. Pelcovits' model by assuming that a SDARS has avoidable costs equal to 50% of the total revenues generated by the coalition of all players in the game. If for a given coalition the joint content share is less than 50%, then revenues are less than avoidable costs, the SDARS does not begin operations, and the coalition has a value of 0. For a coalition with a joint content share of more than 50%, the coalition can form a viable SDARS and the net value of the coalition is then the joint content share minus 50. Thus the coalition of all firms has a net value of 100-50=50. To construct the Shapley value, the incremental value of each player to a coalition is rescaled (doubled) so that the Shapley values to all players add up to 100%.

even though they offer identical content that would not generate enough revenues for one SDARS alone.

113. None of these implications make any sense, and they do not contribute to the understanding of how a second SDARS changes real world interactions of satellite radio companies and the content providers. As an illustration of the sensitivity of the Shapley game to Dr. Pelcovits' *ad hoc* assumption, running the model with a single SDARS changes the music share of the surplus from 62% to 55%.[73]

C. Summary

114. The implementation of Dr. Pelcovits' version of the Shapley model is highly sensitive to the input assumptions used and Dr. Pelcovits adopted assumptions that inflate the surplus share due SoundExchange. Once I change just two assumptions of the model to eliminate anomalous outcomes, the surplus share due to music according to the model falls dramatically.

XI. Conclusion

115. Based on my consideration of concerns raised about the PSS rate as a benchmark and my consideration of some of the analysis of SoundExchange's expert economists in support of a 23% rate, I have reached the following conclusions.

[73] Note that in the Pelcovits model, assigning a 5% content share for the second SDARS means that aggregate shares for content providers are proportionally reduced so that they collectively contribute 95%. With only a single SDARS in this run of the model, the content provider shares are restored to their original levels.

116. First, my use of the PSS 7.25% as a benchmark is sound. The PSS are not in a declining industry; Music Choice is not a failing firm and is not a service offering low-valued music.

117. Second, my functionality adjustment is sound as a conceptual matter. Further, the soundness of that adjustment is confirmed by an alternative estimate of the SDARS rate based on the 7.25% PSS rate, the per-subscriber revenues earned by Music Choice, and music listening patterns on Music Choice relative to the SDARS.

118. Third, relying on financial projections provided by XM and Sirius, I have concluded that the ratio of hand-off provider costs to end-to-end costs will be quite stable during the license period, 2007-2012. However, I have increased my recommended percentage of revenue rate to 1.20% to reflect, in particular, XM's increased functionality adjustment.

119. Fourth, a per-play rate has some distinct advantages over a revenue percentage rate in that it permits the SDARS to better align the music offered with the cost of the sound recording performance rights. I recommend this approach to the Court, and in particular, recommend a per-play rate (consistent with my recommended revenue percentage rate of 1.20%) of $1.20 per play, to be adjusted annually by the actual growth in the SDARS subscribership.

120. Fifth, the DBS, webcasting, and Stern benchmarks advocated by Drs. Ordover and Pelcovits are so conceptually flawed that reliance on those benchmarks would be misplaced. These services are quite different from the SDARS and none of the rates offered by Drs. Ordover and Pelcovits reflect the 801(b) factors.

121. Finally, Dr. Pelcovits' implementation of the Shapley analysis is highly sensitive to the input assumptions he uses. Modifying the implementation only slightly results in a substantial difference in the results.

Before the
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LIBRARY OF CONGRESS
Washington, D.C.

In the Matter of	)	
	)	
Adjustment of Rates and Terms for Preexisting Subscription and Satellite Digital Audio Radio Services	)	**Docket No. 2006-1 CRB DSTRA**

DECLARATION OF JOHN R. WOODBURY

I, John R. Woodbury, declare under penalty of perjury that the statements contained in my Written Rebuttal Testimony in the above-captioned matter are true and correct to the best of my knowledge, information and belief. Executed this 24th day of July 2007.

John R. Woodbury

SDARS – Woodbury Ex. 24

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

SDARS – Woodbury Ex. 25

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

SDARS – Woodbury Ex. 26

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

SDARS – Woodbury Ex. 27

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SATELLITE RADIO

DATE: July 10, 2007

SUBJECT: 2007-2012 Analyst Consensus Financial Projections for XM Satellite Radio Produced by InSync Analytics

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Investor Relations has contracted with InSync Analytics to produce a consensus of securities analysts' financial projections for XM Satellite Radio (XMSR) for the years 2007 through 2012.

XMSR Investor Relations contracted with InSync Analytics to produce this analyst consensus financial projection running through 2012 because, for internal XM use, Investor Relations (IR) only maintains a consensus of analysts' financial projections through 2010. XMSR IR believes that InSync Analytics is well qualified to compile this consensus of securities analysts' projections given its strong standing and reputation in the financial arena. InSync's expertise runs the gamut of financial modeling and analysis including research/analytics, business intelligence and financial analysis as well as specialized projects ranging from simplistic data mining to complex analytics. The founding and managing partners of InSync are former Wall Street investment bankers and equity analysts. XMSR IR has used InSync for limited consensus related exercises since late 2006 and has found their output to be professional and objective. Lastly, we understand that InSync has been Sirius's main consensus supplier for some time.

In producing this consensus, InSync has taken Microsoft Excel Wall Street brokerage sell-side equity analyst models and averaged the output of those models for various income statement, balance sheet, and cash-flow statement items, as well as operating statistics. As such, this consensus roll-up should not be viewed as precise, as one might view any one model or a model built by the corporate finance department of XMSR, but rather as an averaging exercise of various forecasts and as a guidepost to external views on XMSR's future prospects. XMSR cannot vouch for the accuracy of the analyst forecasts or for the accuracy of the data-entry done by InSync. Heretofore, however, there has been no reason to doubt such accuracy (as mentioned above).

Presently, according to the Bloomberg financial service, there are 27 analysts with active recommendations on XMSR and 31 analysts with XMSR under coverage. The consensus produced by InSync incorporates up to 19 of these models for various metrics and financial items. InSync used the same analysts that it uses for Sirius in the ordinary course of Sirius business as well as the same format. The most influential analysts which are not included in the consensus are Credit Suisse and Sanford Bernstein. Certain analysts are not included in the InSync analysis because

- InSync or XM were unable to get their models in a timely fashion (Stanford Group)

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- In one instance, XMSR IR concluded a particular forecast was unrealistic and an extreme outlier (Miller Tabak had programming expenses in 2011 of $511M vs. average of $245M, ending subscribers in 2011 of 20.2M vs. average of 16.5M, CPGA of $34 vs. average of $85)
- InSync or XM did not have their models at all (Matrix USA, Oppenheimer & Co, CRT, Argus Research, Vintage Research)
- The analyst was restricted from covering XMSR (JP Morgan)
- The analyst had stopped covering XMSR (CIBC, Pacific Crest, William Blair)

XM Investor Relations believes that the securities analyst consensus file produced by InSync Analytics provides a reasonable view of analyst expectations to 2012. On the key metrics (SAC, CPGA, Net Additions, and Ending Subs), InSync's file was, for 2010, between 2% higher to (2%) lower than our internally generated analyst consensus, which, in our view, confirms that their consensus estimates are within a reasonable range. As mentioned earlier, XM IR does not generate 2012 statistics, but the nearness of the 2010 InSync and XM IR securities analyst consensus suggests that InSync's projected average consensus for 2012 is realistic.

In using a consensus of financial analysts, consider the following three elements inherent in consensus projections. While these items do not affect the legitimacy of the forecasts, they are important to interpreting the results of consensus projections properly.

1. In any given year the number of estimates per operating statistic or financial item may vary. Not all analysts forecast or make available all figures for all categories in the consensus. For example, InSync has 13 estimates for Net Adds in 2012 averaging 1.51M, but only 9 for OEM Net Adds (1.318M) and 9 for Retail Net Adds (144K) totaling 1.46M or ~ 50K less than the 13 analysts estimates for total net additions. Therefore, analysis based on the different OEM/Retail channels of net additions might end up with slightly different conclusions than overall net additions analysis.

2. From year-to-year, the number of analysts may vary. InSync has compiled 18 estimates of net additions for 2007-2008, 17 estimates for 2009-2010, 15 estimates for 2011 and 13 estimates for 2012. This changing number of analyst estimates creates difficulty, in this case, in reconciling ending subscriber numbers and net additions. For example, ending forecast subscribers in 2011 are 16.1M. Ending forecast subscribers in 2012 are 17.4M, suggesting net additions of 1.25M. However forecast consensus net additions are 1.51M. The 2012 numbers cannot be reconciled in this case to 2011 due to the different number of analysts in each year.

3. As with many long-term forecasts, estimates diverge quickly in the outer years. Standard deviation of forecast ending subs for 2007 is 62,000 subs for 2007 with a range of 9.0m to 9.37. Standard deviation of forecast ending subs for 2012 is 1.8M subs with a range of 14.8M to 20.0M.

SDARS – Woodbury Ex. 28

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

SDARS – Woodbury Ex. 29

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

SDARS – Woodbury Ex. 30

THIS EXHIBIT CONTAINS RESTRICTED INFORMATION PURSUANT TO THE DECEMBER 20, 2006 PROTECTIVE ORDER AND THEREFORE WAS OMITTED FROM THIS PUBLIC VERSION

Noll

PUBLIC VERSION

Before the
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Washington, D.C.

In the Matter of: Adjustment of Rates and Terms for Preexisting Subscription and Satellite Digital Audio Radio Services	Docket No. 2006-1 CRB DSTRA

Rebuttal Testimony of Roger G. Noll

Professor of Economics *Emeritus,* Stanford University

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PUBLIC VERSION

Before the
COPYRIGHT ROYALTY JUDGES
Washington, DC

In the Matter of: Adjustment of Rates and Terms for Preexisting Subscription and Satellite Digital Audio Radio Services	Docket No. 2006-1 CRB DSTRA

Rebuttal Testimony of Roger G. Noll

My name is Roger G. Noll, and I reside in Palo Alto, California. My educational background includes a B.S. with honors in mathematics from the California Institute of Technology and a Ph. D. in economics from Harvard University. I am Professor of Economics *Emeritus,* a Senior Fellow in the Stanford Institute for Economic Policy Research, and Co-Director of the Program in Regulatory Policy at Stanford University.

My primary area of economics scholarship is the field of industrial organization, which includes the economics of antitrust, regulation, intellectual property, and specific industries. I have taught the economics of antitrust and regulation at both the undergraduate and graduate level. I am the author, co-author or editor of thirteen books and the author or co-author of over 300 articles. Many of these publications deal with the economics of antitrust, price regulation, the entertainment industry or intellectual property. My complete *curriculum vita* is attached as Appendix A.

I have served as a consultant to the Antitrust Division of the Department of Justice, the

Federal Trade Commission, the Federal Communications Commission, and the Senate Subcommittee on Antitrust and Monopoly. I have served as an economic expert in previous litigation. During the past five years I have testified at trial in the following cases:

Metropolitan Intercollegiate Basketball Association vs. National Collegiate Athletic Association (U.S. District Court, Southern District of New York);

Gordon, et al., vs. Microsoft (Superior Court, Hennepin County, Minneapolis, Minnesota);

Seven Network v. News Limited (Federal Court, District of New South Wales, Sydney, Australia); and

In Re Tableware Antitrust Litigation (U.S. District Court, Northern District of California).

I also testified at an arbitration hearing in *Echostar Communications vs. News Corporation* pursuant to the process created by the Federal Communications Commission to resolve disputes over retransmission agreements between Fox television network and multi-channel video distribution systems.

In addition, I have submitted expert reports and/or been deposed without appearing in court in the following cases that are still pending or that concluded within the last five years:

Consolidated Compact Disc Litigation (U.S. District Court, Central District of California);

Coordination Proceedings Special Title, Microsoft Cases I - V (California Superior Court, San Francisco);

Gemstar Patent Litigation (U.S. District Court, District of Colorado);

In Re Napster Copyright Litigation (U.S. District Court, Northern District of California);

LensCrafter vs. Lockyer (U.S. District Court, Northern District of California);

Fran Am Partnership vs. Sports Car Clubs of America (U.S. District Court, District of

Colorado);

Intertainer vs. Time-Warner, et al. (U.S. District Court, Central District of California);

Joe Comes, et al., v. Microsoft (District Court for Polk County, Des Moines, Iowa);

In Re Dynamic Random Access Memory (DRAM) Antitrust Litigation (U.S. District Court, Northern District of California);

Brian Bock, 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);

Fleury vs. Cartier International (U.S. District Court, Northern District of California); and

Seiken vs. Pearle Vision (Superior Court, San Diego).

During this period I was the co-author of an *amicus* submission to the Federal Trade Commission on the FTC's strategic plan and an *amicus* submission to the U.S. Supreme Court in *Eldred vs. Ashcroft* on the economics of copyright.

I. ASSIGNMENT

Attorneys for Sirius Satellite Radio Inc. and XM Satellite Radio Inc. have asked me to review the reports, depositions and testimony of the economic experts for SoundExchange for the purpose of evaluating the merits of the evidence and analysis that they presented. For my work on this assignment, I am being compensated at the rate of $700 per hour.

In carrying out this assignment, I have read all of the expert reports and the exhibits to these reports, the depositions and oral testimony of Mr. Sean Butson, Professors Janusz Ordover and Yoram Wind, and Dr. Michael Pelcovits, the decision in the recent *Webcasting II* proceeding,

numerous other documents that have been submitted in this matter, trade publications about the recording and satellite radio industries, and scholarly publications that are relevant to this proceeding. I also have relied on four decades of experience as a professional economist who studies the entertainment industry, intellectual property, and antitrust policy.

II. SUMMARY OF CONCLUSIONS

This section of the report contains a summary of the main conclusions that I have reached. Subsequent sections contain more detailed elaborations of these conclusions as well as the evidence and analysis on which they are based.

A. SoundExchange's Theory of Rates Under Competition

1. The analysis by the SoundExchange economic experts assumes that the appropriate application of the statutory guidelines in section 801(b) of the Copyright Act is to set a statutory license fee equal to the one that would emerge in a workably competitive market, at least by the end of the current statutory period. I do not agree that the terms used in the statutory guidelines, as they are conventionally used in economic analysis, imply that statutory rates necessarily should equal competitive rates, so as an economist I analyze them within the context of scholarship in economics and related disciplines. Nevertheless, if the proper focus of the 801(b) analysis were to identify rates that would emerge in a competitive market, the SoundExchange experts do not use the correct methods to estimate competitive rates.

2. Rates in a competitive input market allow both the buyer and the seller to earn a competitive return on investment if such rates are feasible. I am aware of no evidence that record companies do not receive a competitive return on investment. Any positive license fee for

satellite radio would increase the profitability of record companies because satellite radio is primarily a substitute for terrestrial radio, which pays no sound recording royalties; however, rates substantially above zero would impose financial losses on SDARS operators. Although the financial analyses of the SDARS by Mr. Butson and Dr. Pelcovits are based on optimistic forecasts of subscribers, revenues and profits of the SDARS, nevertheless these analyses lead to the conclusion that the rates proposed by SoundExchange would make the SDARS operators financially unviable. Mr. Butson's analysis shows that the proposed rates would cause the cumulative deficit of SDARS operators to increase and their net equity to fall during the license period. The financial analyses by Mr. Butson and Dr. Pelcovits do not show a competitive return on SDARS' forward-looking investments in any year during the term of the license. Taking these estimates at face value, the rates proposed by SoundExchange amount to expropriation of the investments of the SDARS by the record companies to achieve super-competitive profits while causing the SDARS to have negative returns. Thus, the proposed SoundExchange rates fail the "competitive return" test for competitive prices.

3. In addition to the problem that SoundExchange's proposed rates do not permit the SDARS a competitive return on Dr. Pelcovits' estimate of forward-looking costs, his estimates are not a valid basis for evaluating rates. Dr. Pelcovits underestimates actual forward-looking costs by excluding investments in research and development, subscriber acquisition, and other intangible assets. An even more fundamental problem with his analysis is that the forward-looking cost standard would be especially bad policy for a start-up industry like satellite radio. The forward-looking cost standard is inappropriate for a start-up company because start-ups typically experience cash flow losses early in their lives. As Professor Ordover

recognizes, investors must expect to earn a competitive return on start-up losses or they will not be willing to finance these losses. 6/21/07 Tr. at 322-23 (Ordover). Investments in R&D, programming, subscriber acquisition, regulatory proceedings to obtain a license to operate, and some initial physical capital investments all must precede actual sales. The forward-looking cost standard does not include any return to these necessary initial investments. Adoption of forward-looking costs as a standard for rate setting not only would prevent the SDARS from earning a profit on these investments, but also would create an enormous financial disincentive for any future innovator to enter any industry that requires sound recordings as an input. The appropriate standard is whether a rate allows an SDARS to earn a competitive return on *all* of its investments, including the paid-in capital that has financed its early cash flow losses. Based on this standard, no sound recording fee above zero will enable SDARS operators to earn a competitive return on their investments at any time during the license period. Even if Mr. Butson's projections were accurate, no fee above roughly a quarter of SoundExchange's amended rates would enable the SDARS to earn a competitive return on just their forward-looking investments.

4. Rates in a competitive market reflect the cost of supply to the seller. Record companies have a small direct cost of providing sound recordings to satellite radio only because, for promotional reasons, they give their recordings away to the SDARS and engage in other activities to encourage the SDARS to play their recordings as part of their efforts to promote sales of sound recordings. A record company benefits from having its recordings played on satellite radio for two reasons: satellite radio is primarily a substitute for terrestrial radio, and radio increases sales of the sound recordings that receive radio playtime. Because the net cost to record companies of licensing their sound recordings to the SDARS is negative, the competitive

market price of license fees to the SDARS is very close to zero. For these reasons, I conclude that the competitive market test, assuming that it were relevant, supports rates that are roughly at the level proposed by the SDARS.

B. Rates under the Statutory Guidelines

5. SoundExchange's economic experts do not address the statutory guidelines other than to assert that in the long run they imply competitive rates. In particular, they take a much narrower view than is found in economics research of the requirement that rates under section 801(b)(1) of the Copyright Act must promote the availability of creative content to the public and provide a fair return to rights holders and a fair income to rights users, and they offer no economic analysis that pertains to the relative creative, technological, and financial contributions or the relative risk-bearing of licensees and licensors or of business disruption other than in the form of a phase-in of their ostensibly market-based rates over the term of the license period. All of these factors, properly analyzed, favor a much lower rate for the SDARS than the SoundExchange proposal and a rate that is at or below the level proposed by the SDARS.

a. *Availability.* SoundExchange's proposed rates would not maximize the availability of creative works. Availability refers to the ability of consumers to consume creative works, and so has two elements. The first is affordability, and the second is inducement. Consumer welfare is maximized if price is no greater than the amount necessary to induce supply. SoundExchange has presented no evidence that a higher royalty from the SDARS would induce the creation of more sound recordings. Moreover, the SoundExchange experts consider inducement of supply only from the perspective of record companies, but more than half of the creative content on satellite

radio is not created by record companies. Thus, a significant issue with respect to this statutory guideline is whether SoundExchange's proposed rates enable the SDARS to recover the cost of other creative content. I conclude that the SoundExchange rate proposal eliminates the incentive to create other forms of content on satellite radio by stripping away all of the net income derived from such content.

b. *Fair Return and Income.* SoundExchange's proposal also does not comport with the concept of fairness as it is conventionally used in economics. In economics, the test of whether returns or income are fair involves the effect of market prices on the welfare of consumers, especially those who are poor. Fairness is derived from conceptions of justice and typically implies that prices should be no greater than is necessary to induce supply. Fairness precludes both excess returns from the exercise of market power and returns to assets for which the supply of the asset imposes no cost or other sacrifice on the owner of the asset, such as returns arising from scarce endowments of nature. As an example, in public utility regulation, the fair return on investments by a public utility typically evaluates the land on which utility investments are located at acquisition cost, not at current competitive prices that reflect "windfall" gains as the scarcity of prime locations drives up the price of land. The SoundExchange experts do not consider these aspects of fairness, even though the entertainment industry generates incomes and returns to some investments that exceed the level necessary to induce supply.

c. *Relative Contributions, Technology, Investments, Creativity and Risk.* Regarding the relative contributions of rights holders and rights users, the Sound Exchange experts completely ignore the contributions of the SDARS. The SDARS

contribute creativity in the form of their delivery technology and the content on their channels that is developed and financed by the SDARS. The SDARS operators bear the financial risks of satellite radio and at present the cumulated losses of the SDARS run to billions of dollars; the record companies, by contrast, cannot lose a penny from satellite radio. By drawing analogies between satellite radio and other methods for digital distribution of sound recordings, the SoundExchange experts equate satellite broadcasting (which uses satellites, ground stations and repeaters that the SDARS created and paid for and radios that were developed by the SDARS and sold at a price below cost to induce subscriptions) to sending music over the Internet (which was developed by telecommunications firms and for which digital distributors bear no financial risk and to which they made no creative contribution) to a personal computer or a cell phone (which were developed by firms in the electronics industry and were purchased by consumers, and to which digital distributors make no financial or creative contribution). This factor clearly weighs in favor of rates that are lower for the SDARS than the rates for technologies that involve much less investment, innovation and risk.

d. *Disruption.* Disruption to an industry is best measured by asking whether a proposed rate affects its long-term viability. There is no evidence that record companies will not remain viable over the term of the license even if the SDARS rate were zero. In comparison, the financial analyses by Mr. Butson and Dr. Pelcovits reveal that at rates substantially below the rates proposed by SoundExchange, the SDARS would not be financially viable over the term of the license. This factor strongly favors low rates.

C. The Contribution of Sound Recordings to Satellite Radio

6. Several of the calculations by Dr. Pelcovits and Professor Ordover estimate rates for SDARS on the basis of the popularity of music on SDARS. The procedures they employ overestimate appropriate rates, partly because they rely on results from the survey by Professor Wind that are not useful for this purpose and partly because they are based on incorrect estimates of the revenues that are available for distribution to all stakeholders in the SDARS industry.

7. The survey conducted by Professor Wind that is used to estimate the relative contribution of music programming to the revenues of the SDARS is not useful for determining the appropriate rate due to design flaws. Professor Wind's survey applies to a specific time (October 2006) and involves a group of consumers (shoppers at a mall) who are not necessarily representative of the population of SDARS subscribers. By 2012, nearly all SDARS subscribers will not be current subscribers (the average duration of a subscription is 42 months compared to a license period of 72 months), and most of these subscribers will have become subscribers through obtaining a satellite radio as original equipment in a new car, whereas most subscribers in 2006 had a satellite radio retrofitted in their cars.

8. The design of Professor Wind's survey causes its results systematically to overstate the importance of music relative to other content by measuring the response of consumers to an "all or nothing" decision about music content, while breaking non-music content into a series of sub-categories. Had the choice been "all-or-nothing" for all other content, the proportion answering that they would not subscribe very likely would have been higher than the sum of the proportions for the subcategories. The appropriate measure of the contribution of sound recordings to satellite radio is the *incremental* contribution of content from each distributor,

assuming that product from other distributors already is available. The incremental contribution of a single record company is the upper bound on the price that would emerge from a competitive market. Because sound recording rights are not sold by a monopoly, in a market transaction the sellers cannot make a collective take-it or leave-it offer for all sound recordings. If record companies could make one all-or-nothing offer for all content, which they cannot because such an offer would be collusion, they would receive a much larger rights fee than if they bargain individually. To the extent that Professor Wind's survey answers any question, it pertains to identifying the collusive monopoly rate for sound recordings, not the competitive rate.

9. Professor Wind's survey also is not designed to measure the effect on SDARS subscriptions of most of the technological features of satellite radio. The signal quality and ubiquitous availability of satellite radio broadcasts is given a zero share of value contribution, whereas in reality subscribers would have little reason to subscribe to SDARS for music alone if the quality and availability of its signals were no different than that of terrestrial radio. Professor Wind actually had the necessary tool – conjoint analysis – to use a survey to determine the incremental value of music to SDARS subscribers. A more appropriate survey design would have been to vary in a precise quantitative way the quantity and types of music content that respondents were asked to evaluate. Although Professor Wind expresses enthusiasm for conjoint analysis, his survey does not make use of this method to estimate the competitive rate for sound recording performance rights. Instead, he uses a method that leads to systematic over-estimates of the contribution of music to the success of satellite radio.

D. Usage-Based Rates

10. SoundExchange proposes and its experts estimate rates that are expressed as either a fraction of revenues or as a fixed fee per subscriber. For a service that can and does offer substantial content that is not covered by the statutory license, rates expressed as a proportion of gross revenue or a fee per subscriber do not make economic sense unless the rate is very low. Rates based on gross revenues or per-subscriber fees unduly reward record companies with a fraction of the revenues that are created from other program content or advances in distribution technology. Such rates also prevent rights users from efficiently substituting away from licensed content to minimize the financial impact of rates that are too high. The fact that many contracts between record companies and digital distribution services specify rates as a fraction of revenues or a fee per subscriber is irrelevant because these contracts generally pertain to services that offer only music and do not require innovation and investments in the distribution technology (the Internet and consumer electronics). Regardless of the rate level that is selected by the Copyright Royalty Judges, rates based on revenues or subscribers should not be adopted unless the rates are low enough that this distortion becomes unimportant.

E. The "Surplus" and Shapley Values

11. The calculation by Dr. Pelcovits of the "fair shares" of the "surplus" created by the SDARS is not useful because it systematically overstates the contribution of record labels to the SDARS' revenues. One source of overestimates arises because Dr. Pelcovits adopts Mr. Butson's overly optimistic estimates of the future of the SDARS. Another source of high shares for record companies is the assumption that a satellite radio operator creates no value unless either all four large record companies or three large companies plus all of the smaller ones participate in

SDARS (thereby giving the record companies monopoly power). Finally, the surplus is calculated on the basis of Dr. Pelcovits' estimate of forward-looking costs, which is inappropriate as a method and in any case underestimates true forward-looking costs. Simply estimating forward-looking costs correctly would cut Dr. Pelcovits' calculation of the surplus and the Shapley Values for the record companies by 75 percent.

12. Even if the surplus estimates were reasonable, Dr. Pelcovits does not apply the Shapley method correctly. The premise of the Shapley method is that *all* parties that add value to a group are included in the division of the surplus. In the case of the SDARS, Dr. Pelcovits excludes from his calculations the electronics companies that produce SDARS equipment, the auto companies that pay part of the cost of the SDARS in return for receiving payments based on subscribers, and consumers who create the surplus by paying for subscriptions. If consumers do not "join" the coalition (i.e., do not buy the product), all of the remaining group members produce nothing of value (i.e., there is no surplus to divide). Dr. Pelcovits' implementation of the Shapley procedure implicitly assumes that consumers already have joined and that their share of the surplus has been determined. This procedure is inconsistent with the assumptions underlying the calculation of Shapley Values.

13. Beyond these implementation issues, Shapley Values are not an appropriate basis for setting rates for sound recordings under any interpretation of the statutory standard. Shapley Values are not competitive prices, do not necessarily represent a stable outcome of a market process, and do not satisfy standard fairness criteria in economics and philosophy. For these reasons, I conclude that the Shapley Values calculated by Dr. Pelcovits provide no useful information about the appropriate SDARS royalty rates.

F. Benchmarks

14. The benchmarks offered by Dr. Pelcovits and Professor Ordover are not appropriate guidelines for the rates at issue in this proceeding. The usefulness of a benchmark depends on the extent to which it represents the sale of comparable rights by comparable sellers to comparable buyers for comparable purposes and on the reliability of the estimate of the actual transaction price in the benchmark. All of the proposed benchmarks fail at least one element of this test in ways that are likely to affect the rate that is appropriate for this proceeding. In addition to involving different types of rights and either different buyers or different sellers or both, the benchmark analysis generally does not take into account whether the rights are exclusive, whether the non-content costs of the benchmark services are similar to the non-content costs of SDARS, the extent to which the licensee adds value to the content that is covered by the right or combines sound recording content with other content, or the opportunity cost to rights owners, including the extent to which the licensed use of the right substitutes for or promotes other uses of the rights that are financially remunerative to the record companies. In particular, none of the proposed benchmarks pertains to an audio service that combines music with other content (as do SDARS) and that uses a new method for delivery of content that was developed by the service provider.

15. The Howard Stern benchmark is not useful because the Stern rights are exclusive and because it involves precisely one data point, which is unreliable as an estimate of the value of the class of such contracts. The values of the actual revenues and costs of the Stern deal to Sirius are known only very imprecisely, and small changes in assumptions produce big differences in the ratio of the benefits to the cost of the contract. Even if content involving personalities were a useful benchmark, the analysis should include all of this content – Oprah

Winfrey, Martha Stewart, Bill O'Reilly, Opie and Anthony, etc. – to generate a more reliable estimate of the relationship between content costs and revenues.

16. Program costs for satellite television are not an appropriate benchmark because both buyers and sellers are different, and most of the rights acquired by satellite television are not available to terrestrial television (unlike music, which is available to both SDARS and terrestrial radio). Moreover, satellite television is in the same market (for multi-channel video program distribution) as cable television, which pays a much lower fraction of its revenues for content than does satellite television. If there is a plausible benchmark in this industry, one candidate is retransmission of terrestrial television stations on multi-channel video program distribution (MVPD) systems (because music, like TV stations, is widely available for free via terrestrial broadcasts and because the SDARS license recorded music on a non-exclusive basis, just as MVPD systems have non-exclusive licenses to retransmit terrestrial TV stations). Retransmission fees were one percent of content costs for MVPD systems in 2005, and are at most a few percent today.

17. Professor Ordover lists several digital distribution services as plausible benchmarks: permanent audio downloads, cellular downloads and ringtones, interactive and non-interactive video streaming, and portable and non-portable interactive streaming. None of these services is analogous to SDARS, and so none is a useful benchmark. Digital distribution services use the consumer's Internet connection, personal computer, cell phones, and playback devices. These other services do not pay for these systems' costs, so that content can be a much higher fraction of their total costs and still leave them financially viable. Finally, these services offer only content that is created for other distribution channels, whereas SDARS operators offer

substantial original content. Moreover, services that allow permanent downloads of audio content are much closer substitutes than SDARS for the main product of the record industry: physical recordings (mainly CDs). Hence, rights fees for permanent downloads must be sufficient to offset their effect on CD sales. All of these factors point to a much lower price for usage rights as a fraction of revenues and costs for SDARS than for digital distribution services.

* * *

For all of these reasons, I believe that the SoundExchange experts have produced estimates of rates that are not useful for determining an appropriate rate in this proceeding. Not only should the rate be based on actual use of licensed products, the rate should be much lower than the rate implied by the revenue-based rates that are proposed by SoundExchange, which would expropriate the capital investments of the SDARS operators and make their continued financial viability dubious during the term of the license. To the extent these rates became precedents, adoption of the SoundExchange proposal would eliminate the financial incentive for any entity other than the record labels to invest in SDARS and other digital technologies in the future.

The remainder of this report explains the basis for my conclusions.

III. SOUNDEXCHANGE'S PROPOSAL TO SET MARKET RATES

SoundExchange and its economic experts have argued that the "willing buyer, willing seller" standard satisfies the statutory guidelines that apply to this proceeding once SDARS becomes a mature industry. See, e.g., 7/9/07 Tr. 131-133 (Pelcovits). They incorrectly

assume – contrary to another of their experts, Mr. Butson – that maturity will be reached by the end of the license period, from which premise they conclude that the statutory directive to avoid disruption is satisfied by phasing in market rates until maturity supposedly is reached by that point in time. SoundExchange experts Mr. Butson and Dr. Pelcovits have undertaken financial analyses that they claim are useful for ascertaining whether the rates proposed by SoundExchange approximate competitive rates.

Even if determining the competitive rate is a relevant issue under 801(b) – an issue on which I, as an economist, do not offer an opinion – the SoundExchange experts do not demonstrate that the rates proposed by SoundExchange are a plausible competitive market outcome. To the contrary, correct application of the appropriate economic model of competition in the market for sound recording rights leads to the conclusion that competitive rates for SDARS would be at or near zero. Only if the sound recording industry were a monopoly or if the regulatory process for setting rates were a device for establishing a cartel price would the rates be substantially above zero.

A. SoundExchange's "Market Rate" Theory

SoundExchange argues that compulsory statutory rates should be based on prices that would be negotiated by a willing buyer and a willing seller in a functioning market. Even if competitive market rates were an *aspect* of the section 801(b) standard, the SoundExchange experts do not apply the standard tools of economic analysis to estimate these rates.

On its face, the "willing buyer, willing seller" proposition is not much of a constraint. Every voluntary market transaction, regardless of whether the price reflects monopoly, competition, or monopsony, involves a willing buyer and a willing seller. The effect of market

concentration is to alter the price of the product and the amount sold, not to coerce market participants. In all voluntary transactions, neither the buyer nor the seller is made worse off than either would be if no deal had been made. The Financial Accounting Standards Board defines the imputed "fair value" of an asset that is not exchanged in a market transaction as the price that would emerge from "an orderly transaction between market participants" that reflects the "most advantageous market for the asset."[1] This definition implies that FASB "fair value" incorporates the full exploitation of any market power that is enjoyed by the seller or the buyer.

I agree with the consensus among economists that, in the context of setting royalties for performances of sound recordings, the "willing buyer, willing seller" standard implies a price that would transpire in the long run in a workably competitive market, i.e., a market in which each buyer and seller acts independently and competitively, within the limits to competition that are imposed by the nature of the products that they sell and the demand for those products. In the case of licenses for intellectual property (IP), as Dr. Ordover explains at length in his written testimony, the standard conditions of competitive pricing – that price equal incremental (marginal) cost – cannot be satisfied in the long run for two reasons. First, the object being sold has a high fixed cost and a very low (perhaps zero) marginal cost, so that the seller must maintain a margin of price over marginal cost to recover fixed costs. Second, in IP-intensive industries, firms rarely sell homogeneous products that are perfect substitutes. Instead, products are differentiated. Even if barriers to entry are low, sellers are likely to have some market power in some products.

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1. Financial Accounting Standards Board, "Summary of Statement No. 157: Fair Value Measurements," September 28, 2006.

Despite these characteristics, firms in a differentiated product industry will earn roughly the competitive return if barriers to entry in the market are low and firms act independently and competitively. In this case, firms will introduce new products if the expected revenue from a new product is greater than its cost. If the expected profitability of products is uncertain and if products continue to be introduced until the expected excess net revenues from an additional product is zero, then firms, on average, will earn roughly the competitive return on investment. Even though product prices exceed the marginal cost of production and some products – the ones for which *ex post* success exceeds *ex ante* expectations – generate substantial profits in excess of competitive returns, other products, for which expectations are not realized, generate losses that offset the profits of the successful products. For the competitive outcome to arise, each firm must compete, i.e., act unilaterally, to maximize profits.

The implications of the foregoing for sound recording performance rights are that price should not be less than marginal cost (including possible opportunity costs and benefits arising from substitution and promotion affecting other distribution channels) and that the regulated rate should not cause the profitability of rights holders to be above the returns that rights sellers would receive if they behaved competitively and unilaterally.

In reviewing the analyses by SoundExchange's experts, I conclude that they have not applied the standard methods of economic analysis for competitive differentiated product industries as outlined in the preceding paragraphs. In particular, they have not appropriately taken into account the following. (1) In long-run competitive equilibrium, firms on both sides of the market must earn at least a competitive return on investment if such returns are feasible. (2) Record labels have an incentive to maximize satellite radio penetration if it is mainly a

substitute for terrestrial radio and pays a royalty while terrestrial radio does not. (3) Unilateral competitive behavior by record companies (as opposed to cartel behavior by the industry) would cause rights fees to reflect the promotional value of radio on sales of recorded music. These factors taken together imply a performance rate for satellite radio that is at or near zero for the period at issue in this proceeding.

B. Competitive Return

A competitive rate allows both sides of the market to earn at least a competitive return on investment if such a rate is feasible. In practice, the demand for the copyright user's product plus the costs of the user and of the rights holder may make such a rate infeasible, in which case the rights holders or the users (or both) are not financially viable.

1. *Viability of Record Companies*

The viability of the record companies is not at issue here in that the ability of record companies to earn a competitive return on investment does not depend on the choice of a rate for performance rights on SDARS. Whereas the revenues of record companies have declined since 1999, there is no evidence that these companies are not earning a competitive return on investment, or, as is discussed elsewhere in this report, that satellite radio presents a sufficient threat to other sources of revenue to undermine the future viability of the record companies. The SoundExchange economic experts have not argued that the record companies are not profitable. As a practical matter, one indicator that the rights fees charged by the record companies are above the competitive price high is that high rights fees have led to the reformation of defunct pop music groups from decades past. Record companies offer rights to old recordings for many purposes, including digital downloads, streaming audio, ring tones, and

background music for advertising. Once the contract between a recording artist and a record company has expired, the artist is free to re-record the same tunes (but in a new version) for someone else, although typically the artist still receives half of the royalties from rights sales by the old label. In the last few years, several rock groups have reformed to re-record their old songs and then offered rights to these songs at a lower price than the record companies charge. If the price for these rights is sufficiently high that these artists can make money after paying the cost for making a new recording and forgoing half the royalties on the old recording, then the old rights are priced above the competitive level.

Among the groups that have re-recorded their old songs are Aerosmith, Wang Chung, Twisted Sister, Foreigner, and Simply Red.[2] Of course, many artists of the past cannot make recordings because they have died or lost their musical skills, so in these cases the record companies are safe from this form of competition. But the competition that does take place is highly inefficient. Reassembling old groups to record exactly the same songs is not creative output; it is a waste of resources. Setting prices so high that they create incentives to remake old records is costly but creates no new social value.

If the record companies are charging super-competitive prices for digital rights, the concern about financial viability properly should focus on the SDARS: whether the rate from this proceeding allows both buyers and sellers to be financially viable hinges on its effect on satellite radio.

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2. Jeff Leeds, "Remaking Old Hits to Earn New Money," *New York Times*, April 18, 2007, pp. B1-B4.

2. *Current and Prospective Viability of SDARS*

If SDARS operators are not financially viable, eventually at least one firm will exit the market, but this will not occur unless the operating income of the SDARS – revenue minus variable production costs – is negative.[3] For purposes of this section, in determining the ongoing financial viability of SDARS operators, I assume that the relevant input price for sound recording performance rights is the competitive price. To address the viability of SDARS, I first estimate the maximum rate that would make them financially viable, and then estimate whether this maximum rate is above or below a plausible competitive rate.[4] As part of this process, I show that the amended rate schedule proposed by SoundExchange is far above a plausible outcome in a competitive rights market and would prevent SDARS from being financially viable during the entire six-year term of the license. In short, if the SoundExchange proposal were adopted, SDARS would likely be put out of business before the compulsory license expires.

SDARS operators are not profitable at the current rate for sound recording performance rights. In 2006, Sirius had revenues of $637 million, an operating loss (excluding depreciation) of $960 million, a net loss of $1.1 billion, and a cumulated deficit of $3.8 billion.[5] XM had revenues of $933 million, an operating loss of $235 million, a net loss of $719 million, and a

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3 As used here, operating costs include costs arising from long-term contracts for content, but exclude depreciation and interest expenses. A firm still may go bankrupt if it cannot pay interest on its debt.

4. In his written testimony, Professor Ordover states that a competitive return on investments is the appropriate standard for evaluating the impact of a rate on SDARS. Ordover WDT at 31-34.

5. Sirius *Form 10-K*, March 1, 2007.

cumulated loss of $3.5 billion.[6] As is apparent, neither service is anywhere near showing a profit, let alone a competitive return on investment.

The forecasts by Mr. Butson, which include the original SoundExchange rate proposals, do not anticipate that SDARS will have a positive net income until 2010, and even then net income in the last three years of the license will not offset the losses in the first three years. Mr. Butson forecasts that Sirius and XM will have an additional cash-flow loss of $783 million through the end of 2008. Indeed, he estimates that if the rate proposal by SoundExchange is adopted, during the license period the net equity of Sirius will fall from minus $411 million to minus $611 million, while the net equity of XM will fall from minus $489 million to minus $1.40 billion. Mr. Butson estimates that the cumulated losses of SDARS under this rate proposal will grow by $1.1 billion during the license period. He expects that the accumulated deficit of Sirius will grow from $3.8 billion at the end of 2006 to $4.0 billion at the end of 2012 (an additional loss of $170 million), while for XM the corresponding estimates are $3.5 billion and $4.4 billion (an additional loss of $890 million).

If this were not bad enough, Mr. Butson's analysis understates the negative profitability of satellite radio during the license period because he does not take into account the income that would be required to produce a competitive return on investment. The break-even profit rate for a SDARS operator includes a competitive return on the paid-in financial investments of SDARS investors since it was initiated. The true economic cost of these losses is not just the actual negative cash flow. Instead, the loss in any year is the operating loss plus foregone earnings on financial investments in the company that have financed these losses. The latter is

6. XM *Form 10-K*, March 1, 2007.

the opportunity cost of financial capital, which is the return that investors could have earned on an alternative investment. Thus, for each year in the history of each SDARS operator, the operating loss in that year should be brought forward to the next year by increasing it by the real return on investments having the same risk. Likewise, in each future forecast year, the total cumulated loss should be increased in the same manner.

For example, consider the cumulated losses as of the end of 2006, which stood at $7.3 billion, as a crude estimate of paid-in financial investment. This number substantially understates the opportunity cost of prior investments because it does not include foregone income from other investments in prior years. Ignoring these past opportunity costs, if the appropriate estimate of the competitive return on investment is the long-term average return on common stocks (which implies average riskiness) of about 14 percent, the net income that is necessary to earn a competitive return is over $1 billion per year. Even if one uses the cost of debt to SDARS of about 9 percent, which is too low, the required return is $657 million. Mr. Butson estimates that in 2012, when net income is highest for the license period, the net income of the SDARS operators will be $442 million, which is less than a competitive return on cumulated losses. In 2007, Mr. Butson forecasts an increase of cumulated losses of $537 million for Sirius and $474 million for XM, implying that net income will fall short of the competitive benchmark by between $1.7 and $2 billion.

These estimates hinge on the accuracy of Mr. Butson's forecasts. In his oral testimony, he acknowledged that his forecasts exceeded actual outcomes a few months after his testimony. 6/19/07 Tr. at 201-204 (Butson). Specifically, for the fiscal year ending December 31, 2006, Mr. Butson's written testimony from October 2006 over-estimated the net income of SDARS

operators by $66 million. He also overestimated the increase in subscribers from June 30, 2006, to year-end 2006 by 300,000 for Sirius and 331,000 for XM – forecasting errors of about 22 percent for Sirius and 45 percent for XM only a few months after the forecast was made. Butson WDT App. B.

3. *Dr. Pelcovits' "Surplus"*

Dr. Pelcovits bases his calculation of Shapley Values in part on the analysis of financial returns undertaken by Mr. Butson. Given the preceding analysis of the profitability of the SDARS, the meaning of the "surplus" that Dr. Pelcovits extracted from Mr. Butson's analysis is obscure. How can an industry with a cumulated deficit of $7.3 billion, and forecasts of an increase of $1.1 billion in its cumulated deficit by the end of the license period in 2012, be regarded as having a surplus?

The answer is that Dr. Pelcovits does not define the surplus as the excess profits to SDARS above a competitive return on investment. Instead, he estimates the risk-adjusted competitive return (which he estimates as 16.67 percent) on the depreciated book value of the physical assets of Sirius ($828 million at the beginning of 2006) plus physical investments in an additional satellite by Sirius during the license period. Dr. Pelcovits was unable to estimate physical investments by XM, so he assigned the Sirius values to XM. Using Dr. Pelcovits' numbers, the competitive profit requirement for each SDARS operator during the license period is 10.5 percent depreciation plus 16.67 percent return on the depreciated book value of these physical capital investments. Henceforth, in making illustrative calculations, I will use his estimates for sake of argument and assume that the net income of SDARS before depreciation but after interest payments must be 27 percent of investment to provide a competitive return.

In evaluating Dr. Pelcovits' estimate of the surplus, I consider three issues. The first is whether the appropriate competitive standard is the return on forward-looking investment. I believe that adopting this standard for evaluating the reasonableness of sound recording rights fees would be very bad public policy. The second is whether his definition of forward-looking investment includes the items that ought to be included if one were interested in using the competitive return on forward-looking investment as the appropriate standard for setting the rate. I conclude that Dr. Pelcovits seriously underestimates true forward-looking investments by excluding all investments in intangible assets plus all future cash flow losses. The third is whether his surplus actually is the excess profit above the amount that would be required to earn a competitive return on his definition of forward-looking capital investments. In fact, Dr. Pelcovits underestimates the net income that would be required to earn a competitive return on even his definition of forward-looking costs, and in so doing overestimates the available surplus.

a. Forward-Looking Investment as a Standard for Setting Rates

Considering only forward-looking investments to define the minimum profit requirement addresses only whether the industry will continue to operate, not whether the firms earn a competitive return on its actual investments. Assuming that the correct methods are used to measure forward-looking investments and the net income that is required to induce a firm to make these investments, the results of a forward-looking investment analysis address only whether an SDARS operator will continue to operate. This analysis does not address whether investors will ever receive a competitive return on their past investments. In so doing, this analysis implicitly assumes that whether future investors have an incentive to create new technologies for distributing and using sound recordings is irrelevant. For this reason, adopting

the forward-looking investment standard for setting rates would be very bad public policy.

In this section I explain the concept of forward-looking investment as it is used in economics and the implications of using a forward-looking investment standard to set rates. Forward-looking investments include future investments to keep a firm alive plus the opportunity cost of keeping its assets, rather than selling them one by one in assets markets. Dr. Pelcovits assumes that the future investments of SDARS operators consist only of the cost of future satellites that must be launched to keep the services in operation. He estimates the market value of the firm's historical assets as the book value of existing physical capital investments. This procedure implicitly assumes that the accounting definition of book value corresponds to the scrap value of the investments. Although, for reasons given in the next section, this procedure for estimating forward-looking investments is incorrect, I assume here that Dr. Pelcovits' method is reasonable and analyze the economic implications of adopting this standard for determining whether rates for sound recording performance rights represent a plausible minimum requirement for SDARS operators.

The alternative to the forward-looking investment standard is to inquire whether a firm earns a competitive return on the actual financial investments of its owners. This profitability standard asks whether investments in the firm in the past as well as in the future generate enough revenues to justify those investments. The profitability standard differs from the forward-looking investment standard because it does not ignore the financial history of the firm. The main implication of picking the profitability standard is that it allows investors to earn a return on all their investments, which preserves the incentive of investors to create other companies that will need to pay royalties for sound recording performance rights and who might

otherwise fear that statutory rates will be set so high that they can never recover their investments.

SDARS operators have endured over a decade as start-up firms. SDARS operators were required to make substantial investments before they were even granted licenses to operate. As is typical of start-ups, SDARS operators did not earn a competitive return on investment for several years as they built the business. Losses in early years are a form of investment that firms make because they expect later on to recoup these losses as their business grows. For start-ups, the expected time path of future operating profit – the excess of revenues over variable costs of production – is negative for a while, passes zero but is still less than the amount necessary to earn a competitive return for another period, and then finally exceeds the competitive return on investment thereafter by enough to offset the earlier shortfalls so that the firm will earn a competitive return on its earlier financial losses. The corresponding asset on the firm's balance sheet that represents the investment in building the business is "good will" or "going-concern value." If a firm does not expect eventually to earn a competitive return on investments in good will, it will never enter the business in the first place.

In reality, not all intangible assets have a stand-alone market value as great as the value to the firm that owns them. A well known feature of mergers and acquisitions is that stockholders frequently are paid substantially more than the accounting book value of the acquired firm. Each asset, sold separately, is valued by the market on the basis of its contribution to the value of another firm. When all of these assets are housed in a successful established firm, the total value of the firm exceeds the sum of the market values of each asset separately. That is, a successful firm is an enterprise that already knows how to combine its assets productively in a

profitable way. This know-how, or going-concern value, has no forward-looking market value because it cannot be sold separately as an asset without selling all the other assets of the firm as part of the package. Because firm-specific asset synergies have no separate market value, they are not rewarded by a method that relies solely on the separate opportunity costs of all assets.

A start-up is an entity that is in the process of building going-concern value by learning how to combine its assets in a productive way. The willingness to suffer start-up losses arises because investors expect the firm will become more than the sum of the acquisition costs of its assets. If at the end of the start-up period a firm is worth nothing more than the sum of the market values of its assets, the firm is a failure because its start-up costs will never be recovered.

More often than not a start-up proves to have been a mistake in that its going-concern value is less than its accumulated start-up losses. Markets do not guarantee that firms will succeed. But a regulatory procedure that ignores the going-concern value of a firm by recognizing only the sum of the market value of its assets *guarantees* that no firm will ever recover any of its start-up costs and so will never receive any reward for creating a successful going concern. That is why public utility regulators count the financial cost of covering losses as a legitimate part of the rate-base of a regulated firm for the purpose of setting prices.

Adopting the forward-looking cost standard as a procedure for setting regulated prices is a very bad idea. Doing so guarantees that no firms will be created because the initial losses of the unsuccessful start-ups will not be offset by the profits of the successful entrants. Whereas compulsory license fees for copyrighted works should not guarantee the profitability of users, they also should not guarantee that all start-ups will fail.

b. Application of the Forward-Looking Standard by Dr. Pelcovits

Dr. Pelcovits does not apply the forward-looking cost standard correctly because he substantially understates the actual amount of forward-looking investments by SDARS operators. Dr. Pelcovits' method mistakenly uses depreciated book value as the appropriate estimate of the opportunity cost of assets to the firm and provides no return on other types of investments. The analysis thereby implicitly assumes that SDARS operators are willing to continue to make other investments and to suffer cash losses without any expectation of earning a return on these expenditures in the future.

One major problem with Dr. Pelcovits' analysis is the use of depreciated book value as the market value (opportunity cost) of an asset. Depreciation and amortization are accounting concepts that seek to capture the limited useful life of an investment. Useful life can be (but is not always) limited because either a physical asset wears out and must be replaced, or because the technology embodied in the asset becomes obsolete. The market value of an asset is the present value of the future stream of profits that it is expected to produce. The present value of future profits falls if the useful life declines and the cost to maintain the asset in good working order increases. Accounting methods for estimating depreciation and amortization seek to approximate this decline in market value, based in part on historical experience for broad categories of assets among established firms.

Depreciation and amortization rates are not good indicators of the rate at which the returns to an asset decline for a start-up business. The reason is that for a start-up the relevant concept of future profit at the time of investment includes early years when little or no return is expected. If a start-up firm must make a sequence of investments over several years before it

can start selling a product, and then expects that a few more years must pass before it builds sufficient demand for its product to begin earning a profit, the value of its initial investments rises, rather than falls, in the early years of operation. As the date of profitability comes closer in the future, the discounted present value of the stream of profits emanating from these assets grows larger, and the market value of the assets rises rather than falls. As a result, the accounting book value, which is based on the assumption that the value of assets falls over time, understates the value of those assets after the commercial viability of the business use of the assets has been established. Hence, for a start-up, depreciated book value understates the scrap value of the assets if the start-up creates a market that is commercially viable.

Dr. Pelcovits also does not include the value of many firm assets in estimating forward-looking costs. By focusing exclusively on physical capital assets, he ignores intangible assets, primarily because conventional accounting procedures count the costs of these assets as current expenditures rather than capital investments. Whereas his approach always leads to an underestimate of the opportunity costs of the assets of a firm, the underestimate is especially great for a start-up that owns substantial intellectual property.

One example of an ignored investment is research and development (R&D). According to standard accounting procedures, R&D costs are treated as current expenditures (an implicit depreciation of 100 percent in the first year), but from an economic standpoint R&D is an investment because it generates assets in the form of intellectual property that can last for decades. These intellectual property assets have market value, even though they are carried at zero book value. XM and Sirius have yet to receive any return on R&D investments, and Dr. Pelcovits' procedure does not require that they earn any return on these investments in the future

because he ignores their asset value. Similarly, all future R&D expenditures are not treated as investments that must earn the competitive return for the same reason. Because these expenditures are expensed during a period when the SDARS are not profitable, Dr. Pelcovits' method does not count an eventual return on these investments as a part of forward-looking costs that SDARS operators must recover to stay in business.

Dr. Pelcovits also assigns a zero value to the costs of participating in the FCC proceedings that led to the creation of the SDARS and the assignment of spectrum rights to the current operators. These costs were not physical capital investments, and so are not included in his estimate of the current book value of the companies. Instead, to Dr. Pelcovits, these expenditures are just another component of cumulated losses. Standard accounting practices treat the costs of participating in a regulatory or legal process as current expenses (100 percent depreciation in the first year), so the costs are not counted as part of the investment of the operators. The FCC operating license is an asset, but it is ignored by Dr. Pelcovits in calculating the forward-looking opportunity costs of SDARS operators because it is not a physical investment. If these assets have a positive market value, then Dr. Pelcovits has under-estimated the opportunity cost of remaining in business for the SDARS operators. If a satellite radio system can be operated successfully, then the FCC license has positive value that should be included as part of the forward-looking opportunity cost of existing SDARS operators.

Dr. Pelcovits also ignores investments in marketing and other subscriber acquisition costs. Again, conventional accounting procedures count these as current expenditures, which implies 100 percent depreciation in the year the expenditure is made. From an economic perspective these are investments because they generate revenues over the expected life of a subscription,

which to date has been about 42 months. Because SDARS operators have been in operation for less than five years, nearly all historical subscriber acquisition costs have been spent on current subscribers and so are generating current income. Yet unrecovered subscriber acquisition costs have no book value because, for accounting purposes, they are not treated as investments, and so they are excluded from Dr. Pelcovits' analysis. Moreover, subscriber acquisition costs starting in the third year of the period covered by this proceeding will attract subscribers and generate income after the end of the license period (based on an expected subscription income of 42 months). Dr. Pelcovits' procedure not only does not permit SDARS operators to recover the operating losses arising from these efforts as they are experienced, but if his method were applied to calculate rates for the licensing period beginning in 2013, the remaining value of subscriber acquisition costs would not be counted as a forward-looking cost then and so the unrecovered losses on subscriber acquisitions as of 2013 would be excluded from the forward-looking income that is necessary to keep the firm in business.

Finally, in estimating the surplus, Dr. Pelcovits does not include any content costs. Instead, he assumes that each of the major categories of content will be rewarded according to their Shapley Values. This procedures ignores the fact that the most expensive content is paid according to contracts. Implicit in Dr. Pelcovits' procedure is the assumption that if content is paid more than its Shapley Value, either the contract can be ignored or the SDARS can simply swallow the cost. In reality, forward-looking costs include costs that cannot be avoided due to contractual commitments.

For these reasons, I conclude that Dr. Pelcovits has implemented the forward-looking investment standard incorrectly. By understating the opportunity cost component of

forward-looking investments, ignoring some future investments, and ignoring future contractual expenditures as forward-looking costs, Dr. Pelcovits understates the income that SDARS operators must expect to earn in order to stay in business during the license period.

To illustrate the main points of this section, imagine a hypothetical 2001 rate proceeding for SDARS sound recording performance rights that was intended to apply on the day that XM opened for business. At that point, XM's physical capital investments already would have been subjected to some depreciation. Dr. Pelcovits' method simply ignores the need for the firm to recover the depreciation and amortization that took place before the first customer was signed up, for it is concerned only with whether future customers paid enough to justify additional investments in the future, including the opportunity cost of simply selling off the assets at book value rather than staying in business. In addition, Dr. Pelcovits would not count the investments in R&D that were necessary to make satellite radio technically feasible, or the investments in legal costs to participate in the FCC proceedings that led to the creation of an opportunity for satellite radio to exist and then granted licenses to XM and Sirius.

This proceeding is not taking place in 2001, but the implications of using Dr. Pelcovits' approach in that hypothetical proceeding is relevant to this proceeding. Dr. Pelcovits systematically ignores not only sunk investments that have no separate market value, but systematically undervalues even forward-looking assets by ignoring operating losses, counting investments in intangible assets as operating expenditures, and assuming that for a start-up firm the book values of assets are valid measures of the market values of those assets. As a result, he substantially underestimates the forward-looking costs of the SDARS.

c. Minimum Returns Using Dr. Pelcovits' Definitions

In this section I estimate the required gross return on Dr. Pelcovits' version of forward-looking investment using a combined 27 percent gross return (depreciation plus competitive return). I also quantify the extent to which Dr. Pelcovits under-estimates forward looking costs, although I do not believe that even when correctly implemented forward-looking costs are an appropriate criterion for setting rates in this proceeding. In estimating the revenue requirements for the SDARS operators under a forward-looking cost standard, I use as an estimate of 27 percent as the required gross return (profit plus depreciation) on investment, which is based on Dr. Pelcovits' assumptions. The principle message of this section is that the rates proposed by SoundExchange do not even allow SDARS operators to recover their forward-looking costs as estimated by Dr. Pelcovits.

On January 1, 2007, each SDARS operator had a book value of physical investments of about $740 million (after depreciating the 2006 figure by 10.5 percent), and so in 2007 required a net income before depreciation of about $200 million to recover its costs of capital. By 2008, the book value of investments would fall to $675 million, and the required net income before depreciation would be $182 million. In 2009, the depreciated book value of old assets would be $600 million, but the total book value of investment would increase by $260 million for new satellites. The necessary gross return on $860 million would be $232 million. In the remaining three years the required gross return falls 10.5 percent per year from this value.

Putting all of this together, Dr. Pelcovits' procedure for estimating forward-looking investments implies that the minimum net income before depreciation that is needed to provide a competitive return on just forward-looking physical capital investments (as identified by Dr.

Pelcovits) is about $1.2 billion per operator over the license period. Because both firms need this net income to realize a competitive return, the industry requirement is a net income before depreciation of $2.4 billion.

Recall that Mr. Butson estimates that the cumulated deficit of Sirius and XM will grow by $1.1 billion by the end of the license period under the original rate proposal by SoundExchange. Adding back the depreciation of the investments that are included in Dr. Pelcovits' analysis, this is a cumulated net loss before depreciation of about $600 million, compared to a net income before depreciation of $2.4 billion that is needed to recover Dr. Pelcovits' version of forward-looking investments. Thus, the net income of the SDARS under the proposed rate will fall $3 billion short of recovering even Dr. Pelcovits' version of a minimum forward-looking competitive return.

To put these calculations in perspective, I have used SoundExchange's amended proposed rates and Mr. Butson's subscribers forecasts to estimate royalty payments to the record companies for the license period.[7] The estimated payments are approximately $4 billion. To produce a $3 billion change in Mr. Butson's estimate of net income for the SDARS, the rates need to be about one-fourth of the amended proposal for the SDARS operators simply to earn a competitive return on the book value of physical assets during the next six years. Put another way, a rate greater than 25 percent of the proposed rates will put the SDARS operators out of business because they will have no incentive to make even the required forward-looking

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7. Here I use the per-subscriber rate, rather the rate based on a percentage of revenues. The procedure is to multiply the monthly number of subscribers by the proposed rate, which varies from $1.10 to $2.75 as the number of subscribers grows from under 11 million to over 19 million. Using the beginning and ending number of subscribers for each year as reported by Mr. Butson, I use a straight-line method to approximate the monthly number of subscribers.

investments that Dr. Pelcovits includes in his analysis.

The alternative to Dr. Pelcovits' approach is to enable the SDARS operators to earn a competitive return on their actual financial investments. Although the best measure of these investments is paid-in financial capital, including the opportunity cost of this investment (valued at the competitive rate of return), the SoundExchange economic experts do not estimate this number. As a rough substitute, I will use Mr. Butson's estimate of the cumulated loss, which is less than the opportunity cost of paid-in capital because it ignores the opportunity cost of financial investment and because the SDARS have suffered significant additional losses since Mr. Butson made his forecast. Recall that as of the end of 2006, according to Mr. Butson's estimate, cumulated losses were $7.3 billion. Using Dr. Pelcovits' estimate of the appropriate risk-adjusted return, the net income before depreciation that would be required to generate a competitive return on cumulated losses is $1.22 billion per year, plus approximately another $80 million per year in depreciation. Over six years, required net income before depreciation is $7.8 billion.[8] Even if the license rate were zero, the net income of the SDARS operators as estimated by Mr. Butson would be about half the amount needed to generate a competitive return on cumulated losses.

I infer from these calculations as well as from the calculations by Mr. Butson and Dr. Pelcovits and the historical financial statements of Sirius and XM, that the SDARS operators are not likely to obtain a competitive return on their investments in any year that is covered by the

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8. This calculation is a rough, conservative estimate. The correct method is to estimate the discounted present value of net income before depreciation that is required to produce a competitive return over the next six years. Because SDARS income is growing during the period, the undiscounted amount that is required to produce a competitive return is greater than $7.8 billion.

license at issue in these proceedings, regardless of the rate for the sound recording performance license. Moreover, if the analytical methods of the SoundExchange experts are adopted and renewed after 2012, the likely result is that the SDARS will never earn a competitive return on even forward-looking investment as defined by Dr. Pelcovits. After 2012, the "surplus" analysis still will ignore investments other than the book value of physical capital investments, including the financial cost of capital on cash losses and intangible investments such as R&D and subscriber acquisition, and all contractual obligations to pay for content.

From the preceding analysis, notwithstanding Mr. Butson's enthusiasm, I infer that satellite radio will not be a viable industry if the rate that is adopted in the proceeding is even a fraction of the SoundExchange amended proposal and if the procedures that are used by Dr. Pelcovits become the precedent for determining future rates. The rates proposed by SoundExchange and supported by the methods employed by Mr. Butson and Dr. Pelcovits, even if calculated on a forward-looking basis, constitute an expropriation of the investments by Sirius and XM stockholders by the record companies. Because the record companies' benefits from the proposed rates exceed the forward-looking costs of the SDARS, they would experience a net benefit by continuing to operate the SDARS. No other potential owner could survive.

In addition, the rates proposed by SoundExchange offer a chilling prospect for the future of new digital technologies for delivering streaming sound recordings. To the extent this case becomes a precedent for future statutory licenses, adoption of the rate proposed by SoundExchange would make future innovations in digital technology that makes use of music by anyone other than the record companies extremely unlikely.

C. The Relationship Between Satellite and Terrestrial Radio

The analysis so far assumes that record companies already earn a competitive return on investment and that satellite radio does not affect the revenues of record companies from other sources. Here I consider one obvious way that this assumption may not be correct: satellite radio is a substitute for terrestrial radio for most of its users. If satellite radio is mainly a substitute for terrestrial radio, record companies will benefit from the existence of satellite radio as long as SDARS operators pay a fee to use sound recordings. Hence, no positive rate for these rights can cause the profitability of the record companies to decline. The amended SoundExchange proposal seeks far more than an increase in revenues. Instead, these rates are so high that, if applied to terrestrial radio, they would make broadcasting the most important source of revenue to the sound recording industry, which in turn would vastly increase its profits.

The SDARS averaged about 11 million subscribers per month in 2006 and ended the year with about 13.6 subscribers. Had the amended rate proposal from SoundExchange been in effect in 2006, payments to record companies would have been about $140 million. In 2006, the record labels had revenues of $206 million from all digital subscription services[9] (including SDARS fees), so fees from the SDARS at the rates proposed by SoundExchange would have caused a substantial increase – more than 67 percent – in revenues from this source.

If the SDARS rate were one percent of revenues, the record labels would receive $15 million from the SDARS in 2006 and $60 million in 2012. This is a distinct improvement over zero revenues that would have been generated had SDARS subscribers instead listened to

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9. "2006 Year-End Shipment Statistics," Recording Industry Association of America, available at http://www.riaa.com/keystatistics.php.

terrestrial radio stations.

Meanwhile, according to Arbitron, in 2006 the SDARS accounted for 3.4 percent of the radio audience.[10] By 2012, according to Mr Butson, the revenues of the SDARS will be $6.4 billion. SoundExchange proposes that it should receive about $1.1 billion of this amount. By that time, if Mr. Butson is correct, the SDARS will account for about 12 percent of the radio audience.

An indicator of the reasonableness of the proposed rates is their effect if they were applied to terrestrial radio. If terrestrial radio were subjected to the same rates that are proposed for the SDARS, the fee would be about $8 billion in 2012. By comparison, total gross revenues of record companies in 2006 were $11.5 billion. Clearly the rate proposals, if extended to all versions of radio (including webcasting and pre-existing subscription service), would roughly double the revenues to record companies – a good indication that these rates are unreasonably high.

IV. THE STATUTORY GUIDELINES

Section 801(b)(1) sets out four factors to take into account in setting rates for compulsory licenses:

> To maximize the availability of creative works to the public;
>
> To afford the copyright owner a fair return on his creative work and the copyright user a fair income under existing economic conditions;
>
> To reflect the relative roles of the copyright owner and the copyright

10. Katy Buchanan, "Arbitron: XM/Sirius Would Nab 3.4% of Listeners," *Mediaweek.com*, February 27, 2007.

> user in the product made available to the public with respect to the creative contribution, capital investment, cost, risk, and contribution to the opening of new markets for creative expression and media for their communication; and
>
> To minimize any disruptive impact on the structure of the industries involved and on generally prevailing industry practices.

As an economic expert, I do not attempt to explain what the statute means as a matter of law. Nevertheless, to the extent that the statutory factors call for considering the economic implications of a proposed rate, as an economist I must identify how the terms in the guidelines are used in economic analysis and relate the statutory factors to the economics of the industries in question. I assume here that the guidelines require that rates be set in part on the basis of the economic effects of licenses on the performance of both the record industry and the SDARS.

The economic experts for SoundExchange essentially ignore the statutory factors in their analysis. With two exceptions, their analysis generally equates the statutory factors with a competitive market outcome. The exceptions are interpreting "minimize any disruptive impact" as requiring a phasing in of competitive market rates until the end of the current statutory license period and arguing that a "fair return on his creative work" is satisfied by compensating content providers according to their Shapley Values. I disagree that the statutory factors require competitive market rates, that Shapley values embody standard concepts of fairness, and that the rates proposed by SoundExchange would not have "any disruptive impact" to the SDARS if they were phased-in in the manner of the amended rate proposal.

My analysis of these factors is as follows.

A. Availability

My understanding is that the availability criterion refers to the use of a service by

consumers and to the amount of creative product produced. Thus, maximizing availability is analogous to maximizing consumer welfare, or the difference between the value that consumers place on the service minus the amount that they pay for it, taking into account that the method of payment affects the production of creative product.

1. *Availability and Prices*

All else equal, the availability of works to the public is maximized if rates are as low as possible. Lower performance rates lead to lower prices to consumers, and lower prices to consumers increase penetration of the service. (The relationship between sound performance rates and the number of subscribers is discussed in the section on usage-based rates.) Satellite radio increases availability by offering more simultaneous choice of music than is available over terrestrial radio and by playing some music that is not available on terrestrial radio. According to Arbitron, subscribers report that satellite radio increases the total amount of time that they listen to the radio.[11] Thus, this factor favors rates that minimize retail SDARS prices so as to maximize the availability of satellite radio to consumers and thereby maximize the availability of music to them, within the limits imposed by the effect on inducing creative product and other statutory factors.

The economic experts for SoundExchange do not take into account the relationship between alternative rate proposals and consumer welfare, directly through price or indirectly through availability. They even ignore the simplest, most obvious economic implication of substantially higher rates – which is higher prices for consumers, hence fewer subscriptions, hence less availability of music to them. By focusing exclusively on benchmarks and the effect

11. Buchanan, *op. cit.*

of rates on the distribution of operating revenues between content providers and licensees, the SoundExchange experts give no weight to the availability of content to consumers.

In fact, the amended rate proposal from SoundExchange has a peculiar feature that will reduce availability. The proposed schedule increases the rate as satellite radio achieves higher penetration. The peculiar feature is that each new rate at each step in the schedule applies to *all* prior subscribers, not just to *incremental* subscribers. Thus, as an SDARS operator crosses each threshold, its total payments jump dramatically. Using the amended proposed fees per subscriber (not fraction of revenue), the cost of an additional subscriber at each level of the rate structure is shown below. I also show the operating margin in each interval of the price structure, for which I use Dr. Pelcovits' estimate of $7.50 (the average for the two services) less the rights fee. The break-even number of subscribers is the number in excess of the threshold that, when multiplied by $7.50 less the fee in that interval, equals the monthly cost in the second column. Thus, in the first row (11 million)($.20) = $2.2 million, and ($2.2 million)/($7.50 - $1.30) = 354,839.

Number of Subscribers	Monthly Cost of One More Subscriber	Net Gain Per Subscriber in New Interval	Break-even Number of Subscribers
10,999,999	$2.20 million	$6.20	11,354,839
12,999,999	3.90 million	5.90	12,661,017
14,999,999	5.25 million	5.55	15,945,946
16,999,999	6.80 million	5.15	18,320,388
18,999,999	7.60 million	4.75	20,600,000

The point of this exercise is to show that the amended rate structure causes an immediate short-term loss from an increase of subscribers over a threshold, and that this loss is not fully

recovered until the operator adds many more subscribers. At the 15 million threshold, the break-even number of subscribers is near the half-way point of the fee interval, and at 17 million the break-even threshold is well past the middle of the interval. For these two ranges combined, as the number of subscribers grows, the excess of revenues over operating costs for the upper part of the interval is less than the losses from new subscribers up to the break-even point. Then, once the 19 million threshold is passed, the SDARS make less money until they pass 20.6 million subscribers.

This rate structure gives the SDARS operators no incentive to add subscribers as they approach 15 million. If the annual growth rate in subscribers is constant during the license period and beyond, each SDARS will suffer a net loss by adding more subscribers from the time its subscribers pass 15 million until its subscribers pass 20.6 million. During this period every penny of revenue in excess of operating costs goes to the record companies.

Availability is not served by a rate structure that creates no incentive for the SDARS to increase their number of subscribers. This feature of the amended rate structure could be solved by making each new rate in the structure apply only to the increment of subscribers over that threshold. In this case, moving past a threshold would be profitable as long as the rate in the next interval did not cause the operating margin for adding new subscribers to be negative. I conclude that regardless of the rate levels that are adopted, if the adopted rate structure does have interval increases, higher rates should apply only to incremental subscribers.

2. *Inducement*

My understanding is that the availability factor is a proper place to consider the "inducement effect" – the extent to which the license for performance rights will lead to

increased investment in creative product. The economic experts for SoundExchange present no evidence about the relationship between the SDARS rate and creative output by the record labels, and completely ignore the effect of the sound recording rate on creative output from other sources of content, including satellite radio.

The SoundExchange economic experts state the standard economic theoretic argument that an increase in the returns to creative product can be expected to increase the quantity of such output. This argument is logically correct, but is purely qualitative. Theory provides no insight about its quantitative significance. Moreover, the argument as stated is incomplete because it overlooks an important part of the economic theory of popular culture industries, including recordings, motion pictures, television, professional sports, and mass market books.

a. The Market for Superstars

Popular culture markets have a "winner-take-all" feature.[12] In a pure winner-take-all market – which is useful as an analytic device to capture the logic of the concept – a large number of consumers agree about the quality of products and purchase only the best, and economic demand centers on the top products (the superstars), regardless of how many other products are offered. As applied to the sound recording market, consumers agree on the rank ordering of recordings by quality and purchase the current "hits" and older "classics." Suppose further that a relatively small group of artists – superstars – are capable of producing sound recordings that achieve widespread public acceptance, and that artists have upper limits to the number of recordings that they can make per year.[13] Suppose further that all of these artists are

12. Robert H. Frank and Philip J. Cook, *The Winner-Take-All Society*, Penguin, 1996.
13. This argument is from Sherwin Rosen, "The Economics of Superstars," *American*

willing to sign recording contracts upon entry into the sound recording industry in which nearly all of their reward is in proportion to the sale of their recordings. Record companies will then compete for new artists by offering them contracts that would give them the expected profits over a competitive return for making a recording. For established artists who are proven makers of "hits" the contracts will be more lucrative, but will satisfy this same condition – if record companies compete, the contract will give the artist the excess profits arising from the artist's greater probability of making a hit.[14]

Under these assumptions, the fraction of new artists who are offered a contract depends on the intensity of demand for "hit" recordings. Once demand exceeds the level required to sign all of the artists who are candidates to become superstars, further increases in demand do not increase the number of artists who have contracts or the number of recordings that they make. At that point, all further increases in demand lead, first, to price increases for sound recordings, and second, to higher payments to artists. In this case, the "inducement effect" from further increases in demand is zero.

The point of this argument is not that the economics of superstars and the concept of a winner-take-all market capture all that is important in recorded music. Clearly many artists

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Economic Review Vol. 40, No. 2 (June 1981), pp. 351-76. One study concludes that, at least for concerts, the relative importance of superstars has risen. See Alan B. Kreuger, "The Economics of Real Superstars: The Market for Concerts in the Material World," *Journal of Labor Economics* Vol. 23, No. 1 (January 2005).

14. In reality, artists' contracts typically include a fixed payment on signing the contract, all or part of which then counts against future royalties. This contract form arises because artists as individuals face more risk (output variance) concerning future sales of their records than a record company that signs many artists and issues many recordings. This complexity does not alter the basic insight that in a competitive market for artists, the expected value of payments to the artists equals the excess profits from their recordings.

who are not superstars sell some recordings and are played on the radio. But this theoretical argument states that the inducement effect, to the extent it is important, applies primarily to these secondary artists, and not to the artists who achieve great popularity and make best selling records. These lesser artists are not as likely to be known to the public, and are precisely the artists who stand to gain the most from exposure on radio.

The SoundExchange experts do not provide any empirical evidence about the magnitude of the inducement effect for record companies. Moreover they make an argument that would be equally applicable if music were a homogenous product, whereas music comes in many types and is subject to the superstar effect. Some of these types, such as jazz, folk and most international music are rarely if ever played on terrestrial radio. In these cases, exposure of this music plausibly provides new information to consumers and thereby generates interest that would lead to more record sales. One would expect that the inducement effect would be much greater for more obscure types of music that do not appear on radio than for popular forms that account for most record sales and most play on terrestrial radio. Thus, the appropriate way to analyze the inducement effect from satellite radio is to decompose it by type of music. This issue is not examined by the SoundExchange experts.

b. Inducement for the SDARS

The economic experts for SoundExchange also do not consider the fact that the inducement effect applies to satellite radio as well as to sound recordings. The content contributions by satellite radio are creative products for which satellite radio pays the cost of production. These include live performances, channels featuring superstar personalities, and the use of recording artists in music programs that feature not only their recordings but music

that influenced them. This creative product is available only because of investments in content, technology, infrastructure and promotion by the satellite radio companies. This content will continue to be induced only if the return on these investments to satellite broadcasters is at least the competitive return.

If the performance rate strips away most of the excess of revenues over forward-looking investments, it will reduce the return on past investments in content, such as live concerts organized by the SDARS. Moreover, as explained in the section on usage-based rates, the proposed high rate based on revenues would place a tax on new creative content in that, according to the proposed rate, over twenty percent of the *gross revenue* that is generated by new content will go not to the satellite radio company (the entity that financed the content), but instead will go to the record companies. Thus, I conclude that the inducement effect arising from SoundExchange's rate proposal is likely to be much more important for satellite radio than for record companies, and is likely substantially to reduce if not eliminate satellite radio as a source of creative product.

B. Fair Return and Fair Income

Two crucial terms in the statutory guidelines are "fair return" and "fair income." In the context of their role as experts and in the absence of further instructions from government officials, economists should use these terms as they are used in economics education and research. The economic experts for SoundExchange do not make use of the standard concepts of fairness as the concept is used in economics.

1. *Concepts of Fairness in Economics and Philosophy*

The concept of fairness in market performance is an interdisciplinary research topic to

which economists, legal scholars, philosophers and psychologists are the primary contributors. A great deal of economics research is devoted to identifying and even quantifying concepts of fairness. In industrial organization economics, a "fair return" is understood to be the risk-adjusted competitive return on investment. This standard has long been widely applied in public utility regulation[15] and publicly financed construction projects.[16] The concept of "fair income" is somewhat broader, in that while it incorporates a fair return on investment, it also includes other sources of income, such as land rent, fees for the rights to exploit natural resources, and wages. In all aspects of the entertainment business, including sound recordings, competitively determined prices are likely to be above the prices that would produce a "fair return" or "fair income" as these terms are conventionally used in economics.

Characterization of either "fair return" or "fair income" begins with the competitive prices of inputs, but competitive prices may be subject to further adjustment on the basis of principles of distributive justice. Whereas many competing views of distributive justice have been proposed, three predominate: egalitarianism, the difference principle, and just-desserts.[17]

Egalitarianism is associated with Jeremy Bentham and utilitarianism, although Marxism and some rights-based theories that are not a part of economics reach the same conclusion.

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15. Alvin K. Klevorick, "The 'Optimal' Fair Rate of Return," *Bell Journal* Vol. 2, No. 1 (Spring 1971), pp. 122-53; Hayne E. Leland, "Regulation of Natural Monopoly and the Fair Rate of Return," *Bell Journal* Vol. 5, No. 1 (Spring 1974), pp. 3-15; and Bruce C. Greenwald, "Admissible Rate Bases, Fair Rates of Return and the Structure of Regulation," *Journal of Finance* Vol. 35, No. 2 (May 1980), pp. 359-69.

16. Foad Farid, "Fair and Reasonable Markup (FaRM) Pricing Model," *Journal of Construction Engineering and Management* Vol. 111, No. 4 (December 1985), pp. 374-90.

17. For a succinct summary of the use and meaning of these concepts in economics and law, see Elizabeth Hoffman and Matthew L. Spitzer, "Entitlements, Rights, and Fairness: An Experimental Examination of Subjects' Concepts of Distributive Justice," *Journal of Legal Studies* Vol. 14, No. 2 (June 1985), pp. 259-97.

Egalitarian theories conclude that fairness favors equality. The utilitarian model is the centerpiece of micro-economics. Utilitarianism assumes that people selfishly maximize their own welfare as defined by a function that obeys the Law of Diminishing Marginal Utility, i.e. the increment to welfare that is derived from an additional dollar of income declines as income increases. As long as people have similar capacities for personal satisfaction, societal utility, which is the sum of individual utilities, is maximized if income is distributed equally.

The difference principle was proposed by John Rawls.[18] According to the difference principle, income inequality is fair only to the extent that it is necessary to provide incentives to improve the welfare of the least well off. The difference principle is consistent with utilitarianism but offers an important amendment to utilitarianism by taking into account plausible implications of production technology and the effects of incentives. According to Rawls, the implementation of a new production technology fairly can increase the incomes of those who are not poor if the income that they receive is the minimum necessary to cause them to use the new technology and if the output of the new technology benefits the poor.

Market prices for inputs do not necessarily satisfy the requirement that prices be no higher than is necessary to induce supply. Monopoly rents are not fair because they include returns to investment that exceed the competitive rate of return, which is the minimum return that is necessary to induce investment. Even in a competitive market an input price can exceed the price necessary to induce supply due to Ricardian rents. Ricardian rents are returns to inputs due to superior productivity. In a competitive input market, the market price is the return that is

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18. John Rawls, "Justice as Fairness," *Philosophical Review* Vol. 67, No. 2 (April 1968), pp. 164-94.

necessary to induce production from the least productive supplier. At this market price, more productive suppliers earn greater rewards than are necessary to induce production from them. Thus, Ricardian rents – such as the enormous incomes earned by music superstars – are not part of a fair return according to the difference principle.

"Just desserts," which is sometimes called the accountability principle, was originally proposed by John Locke.[19] Just-desserts theory concludes that income is deserved, and therefore fair, if it arises from sacrifice. As enunciated by James Konow, "this principle requires that a person's *entitlement* or fair allocation (e.g., of income) vary in proportion to the relevant variables which he can influence (e.g., work effort)."[20] In short, income is fair if it is earned through effort or sacrifice, but not if it emanates from an endowment that can be productively used without effort. As Locke argued, rent to a landowner who works to add value to land is just, but rent to a landowner who does nothing to improve or to protect the productivity of the land is unjust. Thus, as is the case with the difference principle, Ricardian rents – returns to superior productivity that arise without the necessity for sacrifice – are not fair.

A fourth theory, libertarianism, regards all coercive redistribution of wealth as unfair.[21] Libertarians accept the initial distribution of resources and endowments as inherently just, and accept all market outcomes as fair because they are voluntary and so presumably mutually beneficial. This view is advocated by few economists or moral philosophers. Only this theory supports the view that market outcomes, even competitive market outcomes, always are fair.

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19. John Locke, *Second Treatise on Civil Government*, Chapter 5.

20. James Konow, "A Positive Theory of Economic Fairness," *Journal of Economic Behavior and Organization* Vol. 31, No. 1 (1995), pp. 13-35.

21. The most important libertarian treatise is Robert Nozick, *Anarchy, State and Utopia*, Basic Books, 1974.

2. *Application to the Compulsory Rate for the SDARS*

For compulsory performance licenses, the egalitarianism view of distributive justice is likely to apply only to end-users who have low incomes, and not to performers or to owners of record companies or satellite radio systems. Pure egalitarianism does not regard the high incomes of performers as fair, nor does it regard incomes from investment as fair if these returns cause the distribution of income to depart from complete equality. To the extent that the fairness factor requires concern for the least well off, the implication is the same as the implication of the availability factor: keep consumer prices low, which means keep royalty rates as low as possible because that allows the lowest possible prices for satellite radio.

The difference principle tolerates inequality to the extent that individuals obtain higher income in a way that benefits the least well off members of society. This concept fits with the idea of a competitive return on investment, which is the minimum income necessary to induce supply. If low-income individuals benefit from the production of a good that earns competitive profits, inequality arising from this production is just because it is a necessary condition for improving their welfare. This concept applies both to sound recordings and to the SDARS. Rawls' conception of fairness argues for setting license rates and subscription fees as low as is needed to induce supply of content from both record companies and SDARS operators as well as to induce the provision of satellite radio service. To the extent that either record companies or SDARS operators earn profits in excess of the competitive level or returns from the scarcity of endowments of talent, this income is not fair.

The just-desserts principle is similar to the idea that input prices should be competitive. Effort and financial risk should be rewarded. But fair income according to just-desserts also

does not include economic rent, i.e., income in excess of that which is necessary to reward sacrifice and effort. The just-desserts principle is similar, but not identical, to the difference principle with respect to rewards from superior productivity. Just-desserts regards as a fair return the monetary measure of the sacrifice necessary to produce the input. If a person with greater innate productivity sacrifices more to develop that innate superiority, they are entitled to the incremental income from that sacrifice. But just-desserts does not include monopoly rents that are derived from market power or Ricardian rents (returns to superior ability or scarcity that are unrelated to effort or sacrifice).

Although the first three theories of distributive justice differ in some cases with respect to whether income is fairly distributed, they all regard income from market power and pure Ricardian rents as lacking fairness. Hence, an economically valid analysis of fairness must distinguish between income that is necessary to induce supply versus income that is some sort of rent. Applied to the SDARS, this analysis has two implications. First, the remuneration to an SDARS operator should be sufficient to enable the firm to earn a competitive return on investment, assuming that the service generates benefits to consumers at a price that recovers its costs. The income of an SDARS operator is fair to the extent that it is a competitive reward to effort and sacrifice, including sacrifices in the past as well as sacrifices that are incorporated into an estimate of forward-looking costs. Second, the rates for inputs to an SDARS operator should be prices that fairly reflect the rewards that are necessary to induce supply from artists and record companies. A fair royalty is at most the competitive price, and is less than the competitive price if artists would have sufficient incentive to create new works if they receives a lower income than they currently receive.

The SoundExchange experts discuss fairness only in the context of competitive market outcomes and the alleged fairness of Shapley Values. With respect to market outcomes, their view is too narrow. Professor Ordover, in discussing fairness, refers to the inducement effect (stimulating creative output) as a matter of fairness. The inducement effect, whether applied to record companies or to SDARS operators, is part of fairness only insofar as it is relevant to rewarding sacrifice and benefiting the least well off. Note that a policy that reduced the incomes of superstars would reduce the payments they would receive in a competitive market for their services, but it would not reduce the profits of record companies or the availability of superstars as long as payments to artists remained high enough to induce them to continue to entertain. To the extent income derived from creativity is a Ricardian rent to special talents, this income has no fairness value, even if the market for superstars is competitive.

With respect to Shapley Values, the concept of fairness that they satisfy is that a person's income should not depend on privilege – personal identity and the order in which collaborators join a cooperative effort to produce value. Returns to privilege are excluded from all theories of justice except libertarianism, which regards the injustice from confiscating income that is unearned as exceeding the injustice arising from uneven distribution of income. Shapley Values reflect market power and other forms of rent, and so do not have inherent fairness according to the criteria discussed in this section. The fairness properties of Shapley Values are discussed more fully in the section that deals with Dr. Pelovits' implementation of the Shapley procedure.

3. *Revenue and Profit Effects through Substitution*

The calculation of a fair return may require taking into account the effects of satellite radio on other sources of revenue to record labels. If the record companies now earn a competitive return (absent monopoly rents or Ricardian rents), and if the growth of satellite radio causes a reduction in profits from other distribution channels, fairness requires that the SDARS compensate record companies for the fall in their returns that is caused by satellite radio. Of course, there is no evidence that record companies do not earn a competitive return on investment. The only evidence is that their sales and profits are lower now than a few years ago, not that their current returns fail to satisfy the competitive standard. Nevertheless, for the sake of argument, I will assume that current and prospective profits of the record companies are at or below the competitive rate, and explore the implications of this assumption for the purpose of setting the SDARS rate.

Despite some unsupported statements to the contrary, the SoundExchange economic experts present no empirical evidence that satellite radio either increases or reduces the revenues, costs and profits of record companies. If satellite radio has no effect on record company profits, any positive rate for sound recordings will increase their return on investments, and so will pass this fairness test for rights holders; however, to the extent that a rate exceeds the amount necessary to induce supply, it does not have a fairness justification.

These conclusions shed useful light on SoundExchange's amended proposal to base fees on the number of subscribers to satellite radio. If satellite radio does not substitute significantly for other uses of rights that generate revenue for record companies, and if the record companies earn a competitive return on investment, then the "fair return" standard does not support

increasing the rate over time just because the SDARS operators and their customers have an increasing willingness to pay. If increased rates cause record companies to earn more than the competitive return while the SDARS earn less than the competitive return, then higher rates clearly are unfair. As shown in the previous section, if record companies would earn competitive returns at a much lower rate for satellite radio than is proposed by SoundExchange, the amended proposal would produce an unfair result for the SDARS (both services remain unprofitable).

The remaining issue is whether satellite radio is a sufficiently close substitute for other sources of revenue for the record companies that it plausibly could reduce their profits. Executives of record companies have stated their belief that such a substitution occurs, but they offer no supporting evidence.

The SoundExchange economic experts argue that substitution may occur, but their argument is purely theoretical. In essence, this economic theoretic argument has three steps. First, consumers have a limited amount of time to spend listening to music. Second, more time spent listening to satellite radio will cause less time to be spent listening to CDs, digital downloads, and other digital services that pay license fees. Third, because consumers spend less time (and therefore derive less value from) listening to sources of music that generate revenues for record companies, they will reduce their purchases of them.

The core assumptions for this argument to hold are that consumers have a fixed amount of time to listen to music, that the substitution that takes place due to satellite radio as against sources of music that generate revenues, and that one source of music cannot increase the demand for other sources by serving as a source of information about musical recordings. I will

address each of these assumptions separately.

In reality, time constraints pertain to all human activities, not to a particular type. There is no reason to believe that the time devoted to music is immutably fixed. Just as the invention of stereopticans, motion pictures and television increased the time people spent watching pictorial entertainment, so, too, innovations in the delivery of music can increase the amount of time spent listening to music. This possibility could explain why satellite radio subscribers spend more time listening to radio. In any case, there is absolutely no evidence that the assumption of fixed time devoted to music is true, and some evidence, discussed below, that it is false.

The second assumption is that music on satellite radio substitutes for sales of music through other channels of distribution. Implicit in this argument is another assumption: substitution arising from satellite radio is not solely for music on terrestrial radio, but for music from other sources. The survey results cited by SoundExchange's economic experts indicate that, in fact, most substitution is for terrestrial radio. Also implicit in this argument is an assumption that to the extent satellite radio substitutes for other sources of music, the substitution is caused by the content on satellite radio that is covered by the compulsory license. To the extent that older sound recordings, live performances, and content other than music are sources of substitution for revenue-generating distribution channels for sound recordings, the record companies have nothing to complain about, just as they had nothing to complain about concerning the invention of television. In this case, recorded music is just being replaced by other content that consumers value more highly.

The third assumption behind the substitution argument is that satellite radio does not

cause greater revenues for record companies by exposing consumers to music that they would not otherwise know about. All passive sources of music – terrestrial radio, satellite radio, non-interactive streaming music, televised music videos – decide which music a consumer will hear. If any of these distribution methods expose consumers to material that they otherwise would not know about, these distribution channels cannot possibly reduce sales of this music on CDs and interactive digital downloads, and may increase such sales.

In his deposition, Dr. Pelcovits opines that satellite radio may reduce the sale of CDs due to the predominance of the substitution effect. The only basis stated for this opinion is research by Stan Leibowitz on the effect of terrestrial radio on CD sales. Professor Leibowitz has written two papers, one published[22] and one not,[23] on the extent to which radio substitutes for sales of recorded music. The content of the published article is far removed from the claim Dr. Pelcovits makes. I discuss here the main points in the article that are relevant to the relationship between radio and record sales are as follows.

Professor Leibowitz's empirical analysis proceeds as follows. The article examines two historical "natural experiments" involving changes in radio coverage: the original introduction of radio in the 1920s and the introduction of commercial radio in the United Kingdom in the 1970s. (Before 1973, the BBC was the only authorized radio outlet in the United Kingdom.) He then examines record sales as a fraction of gross domestic product and expenditures per capita on

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22. I assume that the article he has in mind is Stan J. Leibowitz, "The Elusive Symbiosis: The Impact of Radio on the Record Industry," *Review of Economic Research on Copyright Issues*, Vol. 1, No. 1 (2004), pp. 93-118.

23. Stan J. Leibowitz, "Don't Play It Again Sam: Radio Play, Record Sales and Property Rights," Working Paper No. 06-02, Center for the Analysis of Property Rights and Innovation, University of Texas at Dallas, January 5, 2007.

recorded music in both nations to see if these natural experiments reveal a relationship.

The results of the empirical study of the U.S. are as follows. In the early 1920s, sales of recorded music fell precipitously, which is consistent with the argument that the substitution effect predominated. Professor Leibowitz argues that one reason for this decline was the low quality of sound recordings, which until the mid-1920s used crude acoustical methods instead of electronics. In the late 1920s, record sales partially recovered as the sound recording industry adopted electronic technologies that were developed from the technologies that were used by radio. This recovery points to another interesting interaction between the two mediums: technological progress in one spurs technological progress in the other. In this case, sound recordings were the beneficiaries of technical spillovers from radio.

This historical case has absolutely nothing to do with whether recorded music on the radio substitutes for recorded music sales. The reason is that early radio stations did not feature recorded music. Had they done so, they would have been forced to use the same low quality recordings that were available to consumers who owned record players. Instead, radio gained popularity from live programs, such as sports event, comedy shows, concerts, and variety programs. The names associated with the Golden Age of Radio are live performers, not disc jockeys. The first important disc jockey is generally regarded as Martin Bloch, whose first music broadcast was in 1935 and whose late 1930s *Make Believe Ballroom* was the first popular program featuring recorded music.[24] Not until the 1950s, when television siphoned most live programs from radio and the FCC created a large number of new, non-network radio stations, did

24. Donna L. Halper, "Radio in 1939," at www.old-time.com/halper/halper39.html.

recorded music become the staple of radio.[25] Thus, the substitution effect of radio for sound recordings in the early era was a substitution between types of content, not a substitution between two methods of delivering sound recordings.

Sound recordings took an enormous hit in the Great Depression, which had similar effects on most discretionary expenditures. But beginning in 1937 (with an interruption during World War II) record sales staged a recovery, precisely when Martin Bloch and other early disc jockeys began their rise to popularity. The share of record sales in GDP in 1947 was almost back to the level of 1920.

Record sales fell again from 1947 to 1954, which corresponds to the introduction and rapid growth of television. One can see a similar effect of television on motion picture and radio revenues during the same period. Again, the drop in sales of sound recordings was not because television was another channel for delivering sound recordings, but because consumers elected to substitute television content for sound recordings content.

The sound recording industry responded with technological progress by inventing vinyl recordings, and later audio tapes and CDs. The effect was another magnificent recovery. Between 1954 and 1960, recording industry sales as a fraction of GDP doubled, returning to the level of 1920, and by 1970 sales were substantially above this level. Radio's response to television in the 1955-60 period was vastly to increase the proportion of programming that was devoted to sound recordings, which also is when record sales began to recover.[26]

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25. Matthew A. Killmeier, "Voices between the Tracks: Disk Jockeys, Radio and Popular Music, 1955-60," *Journal of Communication Inquiry*, Vol. 25, No. 4 (2001), pp. 353-74.

26. *Ibid.*

Professor Leibowitz observes that the fact that record industry sales recovered does not prove that the substitution effect, when confined just to music on the radio, does not exist. In principle, sound recording sales could have been even higher had radio been banned from playing sound recordings. But to establish this proposition is a daunting empirical challenge that Professor Leibowitz characterizes as extremely difficult, if not impossible. The important point, however, is that *none of the empirical evidence in Professor Leibowitz's published paper establishes the point that Dr. Pelcovits attributes to him,* namely that in the U.S. radio broadcasts of sound recordings substitute for sales of sound recordings.

Leibowitz's study of the United Kingdom compares the ratio of sales of recorded music in the U.K. and the U.S. after the introduction of commercial radio in the United Kingdom. This analysis is not addressed to proving that substitution exists, but instead to proving that promotion is unimportant. The main result is that per capita record sales in the two countries exhibit the same time trends from 1973 through 1999, indicating that the entry of commercial broadcasters in the U.K. did not cause a change in per capita record sales relative to the U.S. This analysis is not without problems because it is not based on a structural econometric model of record sales, does not differentiate between the effects of music versus other content on the radio, and does not take into account the earlier effects of "pirate" broadcasters who beamed commercial radio signals into U.K. from boats off shore prior to the introduction of commercial radio. But taking the evidence at face value, *nothing in this analysis supports the inference by Dr. Pelcovits that music on the radio substitutes for record sales.* Professor Leibowitz's analysis indicates, to the contrary, that the growth of commercial radio in U.K. had no detectable effect on record sales.

Professor Leibowitz's unpublished paper attempts to address directly the effects on CD sales of music programs on the radio. The strategy of this paper is to undertake a statistical analysis to detect how the change in CD sales between 1998 and 2003 was affected by the change in audience of music format radio stations. Professor Leibowitz collected data on recorded music sales, audiences for talk radio and music stations, and socioeconomic variables for 99 of the 100 largest metropolitan areas. His core regressions include the change in per capita CD sales as the dependent variable, and the independent variables include socioeconomic variables plus the average hours per day spent listening to each type of radio station (music and talk). Because the definitions of record markets, radio markets, and government metropolitan areas differ, the underlying data refer to somewhat different populations. To correct for this problem, Professor Leibowitz used various schemes for weighting and censoring his data.

In the regressions reported by Professor Leibowitz the coefficient on the music radio audience is almost always negative and statistically significant in about half of the reported equations. Both music radio audiences and record sales declined in this period, while talk radio audiences increased, so the correct interpretation of his results, assuming that they are valid, is that in areas where music radio declined the most, recorded music sales declined the least.

I do not want to be harsh on this paper, for it is clearly labeled a draft. Typically scholars circulate early versions for comments and suggestions so that their work can be improved before submission for publication. In its present state, the paper does not contain reliable results. The estimated coefficients on radio music are highly unstable to specification – that is, the coefficients vary from +0.40 to -2.27 and the statistically significant coefficients vary from -0.60 to -2.27. Moreover, the explanatory power of the equations is small. The standard

measure of the explanatory power of an equation is R^2, which is the fraction of the variance in the dependent variable (here, CD sales) that is explained by the model. Professor Leibowitz's regressions to explain CD sales have values of R^2 between 0.37 and 0.07, with more than half falling below 0.20. Thus, unless buying CDs is primarily a random event in which about 90 percent of the record sales cannot be explained and predicted by economics, the regressions suffer from serious specification errors – that is, important causal variables (some of which may be correlated with listening to the radio) are excluded, and/or the functional relationship between the independent variables and CD sales is not linear as assumed. As the paper stands, much work needs to be done before one can conclude that the statistical results shed any light on whether playing recorded music on the radio substitutes for CD sales.

Although this paper in its current form does not produce reliable results, a more fundamental question is whether this approach could determine the extent to which radio substitutes for CD sales even if the data and estimation methods were perfect. I believe that the approach cannot work unless it addresses the substitution versus promotion issue more directly by seeking to measure the effect on CD sales of the amount of music available within a fixed population. The current study does not do this. A necessary condition for a study to achieve reliability is that it would extend over a much longer time period, including previous booms and busts in record sales.

Taking Professor Leibowitz's findings at face value, his approach determines whether consumers in cities where, on average, people listen to more music on the radio buy fewer CDs. This result does not say whether, for a given population, the amount of music played on the radio affects CD sales. To test the latter question requires observing the effect on both listening

patterns and CD sales when the same group of people are exposed to more or less music on the radio. The substitution mechanism, if it exists, is that if radio broadcasts more music so that people have more choice in listening to radio, then consumers buy fewer CDs. Professor Leibowitz's cross-section study relies on differences in exposure among different people, rather than differences in exposure to the same people over time, to estimate the effect of differences in exposure. This approach can be successful only if, first, the explanatory variables include measures of actual exposure (instead of listening time), and second, all other variables that have an important effect on either radio listening or CD sales are included in the model so that differences across cities in both listening and CD sales that depend on the characteristics of the people in those cities are fully accounted for. The paper by Professor Leibowitz does not do either of these things.

Notwithstanding the empirical relationship between listening to music on the radio and buying recorded music, the one clear fact about the promotional benefits of playing sound recordings on the radio is that record companies incur costs to get their audio recordings played on the radio. Dr. Leibowitz closes his published analysis with an examination of this fact, and in his deposition, Dr. Pelcovits expressed basically the same view that is contained in the article. The core argument is that radio can have a promotional value for a given recording but not for the industry as a whole. If consumers respond to radio broadcasts by buying fewer records, but if the records they buy are records that they hear on radio, an individual record company will want to have its records played on radio because so doing will increase its share of the reduced sales that arise from radio broadcasting.

One well-documented source of promotional costs is giving free CDs to radio stations, sending them promotional material about new recordings, giving radio personnel free concert tickets ands trips, and offering artists for interviews on radio stations. As executives from Sirius and XM testified, satellite radio similarly receives free recordings and other promotional material, and artists are willing to appear on satellite radio to promote their recordings. 6/5/07 Tr. at 209 (Logan); 6/11/07 Tr. at 69-70 (Blatter); 6/21/07 Tr. at 38-41, 49 (Renshaw); 6/25/07 Tr. at 48-49 (Navarro).

Another promotional cost is so-called "payola," whereby record labels pay disk jockeys to play their records.[27] Technically, payola is advertising that is illegal because it is not announced to listeners as such. No law or regulation prohibits labels from buying time on radio to play their products as long as the advertising nature of the agreement is clear to listeners. Payola is a real, contemporary phenomenon. Last April four multi-station networks (CBS, Citadel, Clear Channel, and Entercom) settled an FCC complaint about their employees accepting payola. As part of the settlement, these companies made "voluntary contributions" to the U.S. Treasury totaling $12.5 million and promised to stop the practice, in return for which the FCC dismissed its complaints with prejudice.[28]

According to Professor Leibowitz and Dr. Pelcovits, the fact that record companies engage in costly activities to get their recordings played on the radio does not support the notion that radio promotes sales of music overall because promotion can affect the distribution of sales

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27. The classic economic study is Ronald Coase, "Payola in Radio and Television Broadcasting," *Journal of Law and Economics* Vol. 22, No. 2 (October 1979), pp. 269-328.

28. Federal Communications Commission, "Broadcasters Pay $12.5 Million to Resolve Possible 'Payola' Violations," April 13, 2007.

among record companies without affecting total sales. While this argument is logically correct, there is no empirical evidence that it describes reality. But even if this argument were empirically true, it does not lead to the conclusion that the statutory rate should take into account the *industry* effect of playing music on satellite radio instead of the *firm-specific* effect.

In a competitive marketplace, each firm makes decisions based on its unilateral self-interest, not the effect on its competitors. Thus, in negotiating a license fee for a radio service, the record company would take into account the effect of the fee on its own sales, but not the effect on the sales of its competitors. Given that terrestrial radio pays no performance license and receives in-kind and financial payments (payola) from record companies, the competitive outcome in this milieu is a negative fee. The implication of the argument put forth by Dr. Pelcovits is that the job of the Copyright Royalty Judges is to enact a rate that the record companies would not and could not achieve acting independently. In short, Dr. Pelcovits sees the job of the Copyright Royalty Judges as protecting record companies against the natural outcome of the competitive process.

The upshot of this discussion is that there is no empirical basis for claiming that satellite radio is a substitute for the sale of sound recordings. The closest analog to satellite radio is terrestrial radio, and, with nearly 90 years of historical experience, there is no empirical evidence of substitution of radio for record sales. But even if there were, and if Dr, Pelcovits and Professor Leibowitz were correct in speculating that substitution occurs at the industry level but promotion occurs at the level of individual firms, then unilateral, independent behavior would be based on the promotion effect, not the substitution effect. Thus, I conclude that there is no basis for assuming that for an individual record company the opportunity cost of providing sound

recordings to any form of radio is positive, and every reason to believe that individual record companies face a market environment in which the promotional effect for their own recordings outweighs the substitution effect, in which case the rate that would arise from competitive, unilateral decisions among the record companies is negative.

4. *Rates and Subsidies*

Professor Ordover states that it is unfair to allow the SDARS "to pay less for the licenses than their value would command in the market" because such a rate "results in a subsidy to the SDARS." Ordover WDT at 29. This statement is incorrect in two regards: subsidies are not inherently unfair, and paying less than a market price is not necessarily a subsidy. Fairness is closely related to the concept of subsidy, but is not the same thing.

The concept of subsidy that has arisen here is to a buyer, with the idea being that the SDARS operators seek a subsidized price. Buyer subsidies can be direct (from the seller or a third party, like the government, which subsidizes education) or indirect (from other buyers). Economics contains a clear definition of whether a group of prices contains a subsidy. A system of prices is *subsidy free* if no buyer pays less than the incremental opportunity cost of the product and no more than the buyer would pay if it acquired the product from the least-cost alternative source of supply.[29] By the same token, there is no implication that a subsidy exists if either the seller sets different prices for different buyers, or if the decision to purchase by one buyer causes the price to other buyers to increase.

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29. Gerald Faulhaber and Stephen B. Levinson, "Subsidy-Free Prices and Anonymous Equity," *American Economic Review* Vol. 71, No. 5 (December 1981), pp. 1083-91.

The economic experts for SoundExchange do not apply the standard economic definition of subsidy-free prices in stating that rates substantially lower than the rate proposed by SoundExchange entail a subsidy of satellite radio. Using the standard definition of a subsidy in economics, the SDARS are subsidized only if the rate for sound recordings is below the opportunity cost of sales to the SDARS. The implication of the preceding analysis of substitution effects is that the opportunity cost of selling to the SDARS is zero, in which case no non-negative price can be a subsidy. Likewise, the fact that other buyers pay more than the SDARS for rights does not imply that the SDARS receives a subsidy from them. I have concluded that it is technically incorrect as a matter of economic analysis to regard any rate above zero as implicitly subsidizing satellite radio, and that the range of subsidy-free prices in this matter is so broad that the possibility of subsidization safely can be ignored.

C. Relative Contribution

The contributions of SDARS operators to "the product made available to the public" are the development of a technology for allowing mobile reception of a satellite broadcast, the investment in infrastructure necessary to provide service, the investments in programming, marketing and promoting the service, and the start-up losses while the service achieves scale economies. These contributions are well-documented in the record, and there is no corresponding contribution of technology nor investment from the record companies.

1. *Importance of Music to Satellite Radio*

The main focus of the SoundExchange economic experts on the issue of relative contribution is on the importance of music content to the success of satellite radio. In a nutshell, they argue that most satellite radio customers regard music as the most important content on

satellite radio, from which they conclude that the performance license should allocate most of the operating revenues (gross revenues minus forward-looking costs) of satellite radio to sound recording rights holders. This conclusion is unjustified for several reasons.

First, the survey methods for determining the importance of music to SDARS penetration are not designed to answer the pertinent question, which is the incremental value of music, holding constant the features of the service, including the quantity of music that is now available. In a competitive market, the price of an input is equal to the incremental value that is created by the last unit of output, which is less than the average value of all output. The surveys developed by Professor Wind ask vague questions about the willingness to subscribe if substantially more or less music were offered, but they do not attempt to determine the incremental value of music, let alone the music that is offered by a single record company. Professor Wind is an advocate of "conjoint analysis," which is a procedure that is suited to obtain fine-grained estimates of the values that consumers place on small changes in the attributes of products. Professor Wind did not actually use the power of conjoint analysis by asking consumers precise questions about how small changes in the availability of types of music (or any other content) would affect their willingness to pay for satellite radio. Questions in a well-designed survey for conjoint analysis would take the following form. "Suppose your satellite radio service eliminated one of the jazz channels. Would you cancel your subscription? If the answer is yes, what discount off of the current price would you require in order to be persuaded not to cancel your subscription?"

Second, the value of music that is derived from the surveys does not distinguish between music that is part of the license (e.g., recorded music from February 15, 1972, or after) and music that is not (e.g., recorded music before that date, or live performances recorded by the SDARS).

The surveys undertaken for the SDARS operators show that "oldies" channels featuring music that was recorded before 1972 are among the most popular music channels, yet the content of these channels is not covered by the license.

Third, the surveys are not designed to measure the contribution to the value of music that is due to the technical achievements and investments that have been made to provide satellite radio. If subscribers prefer listening to satellite radio rather than terrestrial radio because the former has better quality and is more ubiquitous, the cause of this preference is the innovation of the SDARS, not sound recordings. The surveys designed by Professor Wind and used in marketing research by the SDARS operators assume that the technology exists and do not seek to determine the amount that subscribers are willing to pay for high quality, ubiquitous service, as contrasted to a hypothetical service that featured the same content but had lower quality. By failing to attribute any subscriptions to satellite radio technology, the survey results as used by the SoundExchange experts systematically overstate the contribution of licensed audio content to SDARS revenues.

Fourth, the survey results reflect decisions to subscribe early in the history of the industry, not the decisions that will be made by future subscribers who already have decided not to subscribe on the basis of the content that was offered in 2006. Because music content was extensively available on satellite radio before any other form of content, music is more likely to be the primary reason that initial subscribers decided to acquire the service. As other forms of content are added, the fraction of subscribers who are attracted by this content is likely to grow. Estimating the relative contributions of different forms of content at a moment in time ignores this likely scenario, and in so doing overestimates the proportion of future subscribers who are

likely to subscribe due to music.

Fifth, most future subscribers are expected to obtain their radios as original equipment in a new car, whereas most legacy subscribers purchased radios separately. The survey did not attempt to determine whether respondents' answers to questions about the importance of music differ according to whether people acquired a satellite radio as original equipment, had a satellite radio retrofitted into an existing auto, or purchased a satellite radio for home use. If, as Mr. Butson argues, the future of the SDARS hinges on the success of original equipment car radios, a crucial issue is whether these consumers will subscribe for the same reasons as people who sought out a satellite radio to subscribe to the service. Professor Wind's survey was not designed to address this issue, even though he easily could have done so by constructing his sample to include a sufficient number of consumers who obtained an automobile with a satellite radio pre-installed.

Sixth, the fraction of time spent listening to music on satellite radio is not a good measure of the incremental monetary value of a channel.[30] The economics of broadcasting has long emphasized that listening patterns are a poor indicator of value because, once a listener has a receiver, the incremental cost of switching from channel to channel is zero. All one knows when a consumer listens to A instead of B is that either A is preferred to B or the benefit of B over A is not worth the effort to find B on the dial. In the case of music, the use of audience

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30. The arguments in this paragraph follow the accepted view of the economics of broadcasting, as stated in the classic work by Peter O. Steiner, "Program Patterns and Preferences, and the Workability of Competition in Radio Broadcasting," *Quarterly Journal of Economics* Vol. 66, No. 2 (May 1952), and A. Michael Spence and Bruce M. Owen, "Television Programming, Monopolistic Competition and Welfare," *Quarterly Journal of Economics* Vol. 91, No. 1 (February 1977), pp. 103-26.

shares overstates the *incremental* value of music on satellite radio to its subscribers.

In the absence of satellite radio, most music listening by satellite radio subscribers would be accounted for by terrestrial radio stations. Once a subscriber has a satellite radio, he has the choice – at zero cost – to switch back and forth between terrestrial and satellite channels. Because these choices are costless, they reveal nothing about whether one channel provides substantially more value than another. If consumers pick randomly among the 65 or so music channels on satellite radio and a similar number on terrestrial radio, the audience between them would be equally divided, but that division of the audience provides no information about whether music channels were sufficiently valuable that they attracted additional subscribers. The relevant issue for evaluating a channel is how much people would pay to keep that channel available, not how much time they spend listening to it, and none of the data, including Professor Wind's surveys, shed light on this issue.

D. Disruption

To the extent that the outcome of this proceeding can disrupt an industry, disruption is much more likely to occur in satellite radio than in sound recordings. The reason is that SoundExchange's proposed rate would be a substantial part of costs – indeed, enough to prevent satellite radio from recovering its investments – whereas the potential revenues to the record companies are a much smaller proportion of revenues. Dr. Pelcovits explicitly ignores all unrecovered sunk investments, and Mr. Butson concludes that the proposed rates will cause the cumulative deficit of the SDARS to increase. If the methods used by the SoundExchange experts were replicated in each license determination in the future, the resulting rates would prevent satellite radio services from ever recovering their start-up losses and most of their past

investments. Moreover, to the extent that the next generation of satellites, which is planned to be launched during the license period, fails to recover its annual depreciation and earn a competitive return in the initial years after its launch, the method proposed by Dr. Pelcovits would guarantee that the SDARS would never be able to recover those investments either. Hence, under plausible conditions, the adoption of the proposed rates would cause the SDARS not to launch these satellites and to withdraw from the industry when the current satellites fail. This outcome is far more disruptive than the effect of even a zero rate on the record industry. I therefore conclude that the disruption factor favors the SDARS.

* * *

For the reasons explained above, I conclude that the statutory guidelines favor the SDARS. The requirements that, if possible, all parties earn a fair return, that the rates maximize the availability of creative content, that the rates reflect unilateral competitive behavior by the market participants, that the rates take into account the relative contributions of rights holders and rights users to the success of the users' product, and that the rates not disrupt the industry all weigh in favor of a low rate. The rates proposed by SoundExchange are not consistent with any of these principles.

V. USAGE-BASED RATES

SoundExchange has proposed a rate structure in which the SDARS pay the larger of a per-subscriber rate and a rate based on revenues. If the SDARS royalty rate is set so that payments for performance royalties account for more than a small percentage of revenues, I conclude that the royalty should be based on the actual use of the sound recordings that are

covered by the license, rather than a fixed percent of royalties or a fixed fee per subscriber.

This section explains the underlying logic of this conclusion and uses conventional economic models of profit-maximizing behavior to demonstrate the validity of the conclusion. I recognize that mathematical arguments are not always exhilarating or transparent, so I also express these conclusions in words. The basic point is simple: if blanket rates for all music content are not related to usage, the record companies will collect the same amount of revenue regardless of the contribution of their content to subscriptions and revenues. Regardless of whether the rate is reasonable, neither record companies nor the SDARS will experience the appropriate financial reward based on a change in the contribution of their content to the success of satellite radio. Most importantly, if the rate is excessive, the SDARS will not be able to contain the damage by reducing their use of licensed product and increasing the use of other types of content.

The place to begin an analysis of license fees is the effect on the price and content of the satellite service. A substantial royalty rate will cause the profit-maximizing price of satellite radio to be higher, which in turn will reduce subscriptions. The next two paragraphs contains the mathematics that demonstrates this conclusion, and can be skipped by the trusting.

Suppose the demand for SDARS subscriptions Q, is a function of price P, the amount of licensed music content M, and the amount of other content C. Suppose that the royalty on M is some general function L(*,M), where * depends on the licensing regime, and the cost of other content is c per quality-adjusted unit of C. Suppose further that the remaining costs K of the SDARS that are unrelated to content are represented by a function K(Q). An SDARS operator's profit is then PQ(P, M, C) - L(*,M) - cC. All content is assumed to exhibit

diminishing returns – which means that dQ/dM and dQ/dC each decline as M and C, respectively, are increased.

Consider a licensing regime in which royalties depend solely on revenues, so that L(*, M) is some fraction r<1 of revenues. If content is fixed, the SDARS profits are (1-r)PQ - cC - K(Q). Under this regime, a profit-maximizing SDARS operator will set the subscription price such that (1-r)P(dQ/dP) + (1-r)Q - (dK/dQ)(dQ/dP) = 0. Rearranging terms to solve for P, this expression implies that profit-maximizing P = (dK/dQ)/(1-r) - Q/(dQ/dP). As long as dK/dQ is positive (that is, attracting subscribers is costly), P is larger if r is larger. The same basic result holds if the rate is based on the number of subscribers. In this case, L(*,M) = rQ, so that an SDARS operator maximizes (P - r)Q -cC -K(Q), in which case the subscription price will be set such that Q + (P-r)dQ/dp - (dK/dQ)(dQ/dP) = 0. Rearranging, this implies that P = r + dK/dQ - Q, which implies that an increase in r causes an increase in P.

The license at issue in this proceeding does not cover much SDARS content. A royalty based on actual use allows the SDARS to avoid some of the effect of a higher royalty on their prices, profits and subscriptions by reducing the amount of licensed material that they transmit, such as by eliminating music channels that account for few subscriptions. The SDARS could substitute other forms of content, including music that is not covered by the license, for post-1971 sound recordings. But SDARS operators can mitigate the effect of a high royalty rate by engaging in such substitution only if the royalty is based on actual use. The next two paragraphs demonstrate the basis for this conclusion.

In a regime in which royalties depend on revenues, the profit-maximizing use of music content is given by [(1-r)P - (dK/dQ)](dQ/dM) = 0, which implies that the SDARS will add

music content up to the point at which more music would generate no additional revenues beyond subscriber acquisition costs. Call this amount of Music usage M^r. For comparison, assume that the license fee L(*, M) is simply a constant usage rate b per unit of use that would generate the same total revenue for record companies as the revenue-based rate if M remained constant. The profit function for the SDARS then becomes PQ(P, M, C) - bM - cC - K(Q), and the profit-maximizing music content is given by [P - (dK/dQ)](dQ/dM) = b. The amount of music content M^r does not satisfy this equation. Clearly, dQ/dM cannot be zero in the second equation unless b = 0. To increase dQ/dM requires reducing music content, which also will reduce royalty payments bM.

Consider the profit-maximizing choice of C in two regimes. Under the revenue-based royalty system, the profit-maximizing use of C is given by the expression [(1-r)P - dK/dQ] (dQ/dC) = c. Call the amount of C that satisfies this requirement C^r. For the usage-based royalty, the profit-maximizing use of C is the amount that satisfies the expression [P - dK/dQ]dQ/dC = c. Clearly C^r does not satisfy this expression because (1-r)P is less than P, implying that [(1-r)P - dK/dQ] is less than P - dK/dQ for the same value of C. Hence, to cause a usage-based rate to be profit-maximizing, the use of C must be changed to cause dQ/dC to be smaller than it was when the usage of C was C^r. To achieve this result requires increasing the utilization of C beyond C^r.

Under usage-based licensing a profit-maximizing SDARS will use less music content and more other content in comparison to the revenue-based licensing regime. If the prices for music and other content represent true competitively determined rates, then the substitution of other content for music under the usage-based rate structure is economically efficient. By mitigating

the effect of the sound recording royalty rate on price increases to consumers, and by inducing more non-music content from the SDARS, a fee structure that permits such substitution serves the statutory goal of availability.

For reasons given above, a rate equal to a fixed percent of revenue or a fixed amount per subscriber amounts to a tax on revenues that are derived from content that is not covered by the performance license. Suppose that the providers of non-music content invest in an innovation that makes this content more productive. As a result, in the revenue-based regime, payments to record labels increase by their royalty rate times the revenue arising from the innovation in other content. Thus, a revenue-based rate generates returns to the record companies that are unrelated to their creative effort, while reducing the payments that SDARS are willing to make to support innovation by providers of other content. This outcome violates the statutory requirements regarding availability, fairness and relative contributions.

The increasing block rate schedule in the amended SoundExchange proposal is especially pernicious in reducing the incentive for the SDARS to create new programs. For example, suppose an SDARS service had 12,600,000 subscribers, and has the opportunity to create a new channel with a famous personality that is expected to add 2,500,000 subscribers – a new Howard Stern, for example. Assume that the rate schedule that applies is the fixed fee per subscriber in the amended SoundExchange proposal. If the new channel is created, monthly royalty payments to record companies will increase by 65 cents for all of the old subscribers plus $1.95 for the new subscribers. The resulting increase in payments to the record companies is $13 million per month or $156 million per year, which is comparable to the payments to Howard Stern, *even though the record companies contributed nothing to acquiring the subscribers that*

Stern added.

A royalty based on usage requires monitoring and enforcing the license. These costs make a usage-based rate undesirable only if the royalty rate is relatively small. A usage-based royalty requires that the SDARS provide program logs to license holders (or to their agent, SoundExchange) and, perhaps, that SoundExchange monitor SDARS channels to check the accuracy of self-reported use. In reality, both record companies and music publishers already have contracts for which payments are based on usage, so the cost of implementing a usage-based rate is not likely to make such a rate impractical.

VI. "SURPLUS" ANALYSIS AND THE SHAPLEY VALUE

Dr. Pelcovits proposes that the appropriate rights fees for content are Shapley Values because in his view they reflect a fair distribution of the "surplus" of revenues over forward-looking costs between rights holders and the industry. I believe the Shapley Value is not a useful approach to determining the rates in this proceeding for two reasons. First, the concept of "fairness" that is represented by the Shapley Value does not correspond to most aspects of fairness that is used in economics. Second, the Shapley Value is derived from a model in game theory that is based on assumptions that are not satisfied by the problem of determining performance rates. In addition, I have concluded that Dr. Pelcovits has not applied the Shapley Value correctly, even if one were to conclude that the model could be useful to determine the rate in this proceeding.

A. Calculating Shapley Values

The context in which Shapley Values were developed is a bargaining game in which a group acting cooperatively can produce a fixed amount of value. The crucial assumptions are that each possible subgroup (including a "group" of one member acting alone) can obtain some non-negative value by cooperating, that the value of collaboration does not fall as more members are added to any subgroup, and that the maximum payoff occurs if the entire group cooperates.

The calculation of the Shapley Value for a particular member of the group begins by calculating the incremental value that a player brings to every possible subgroup (including the group with no members and each group that contains only one member). A subgroup is defined by both the identities of its members and the sequence in which they joined the subgroup. The Shapley Value is then the average of the added contributions to all subgroups. Under the assumption that every sequence of adding members to the group is equally likely, Shapley Values can be interpreted as the expected contributions of each group member if the order in which members will be added is unknown in advance and is selected randomly, with every sequence having the same probability of occurring.

An example clarifies the procedure. Suppose two people, A and B, can act independently or form a coalition. Assume that A acting alone receives 1, B acting alone receives 2, and both acting cooperatively collectively receive 5. The coalition can form two ways: A is acting alone and B joins, or B is acting alone and A joins. In the first case, B adds a value of 4, and in the second case A adds a value of 3. Thus, A's average contribution is 1 (from joining the null coalition) + 3 (from joining B), for an average value of 2. B's average contribution is 2 (acting alone) + 4 (joining A), for an average value of 3. Thus, A receives 2

and B receives 3.

B. Fairness and Shapley Values

The asserted "fairness" of Shapley Values is attributed to the fact that Shapley Values uniquely satisfy the following properties:[31] *Efficiency*: allocations to all members sum to the total value of cooperation. *Symmetry*: If two individuals add the same value to every subgroup that does not include either of them, their payoffs are equal. *Anonymity*: The identity of the member (that is, the labels A and B associated with their contributions) do not affect the allocation of values. *Additivity*: If two negotiations are combined, the allocations from the combined negotiation equal the sum of the allocations from the separate negotiations. *Null payoff*: A player who adds no value to any subgroup receives no allocation.

Two of these properties are connected to concepts of fairness in normative economic analysis. Symmetry and anonymity rule out the possibility of privilege. Average expected contributions, not positions in society (as represented by the labels attached to contributions to a coalition or the sequence in which members join a group), determine allocations.

Notwithstanding this property of Shapley Values, this conception of fairness hardly exhausts all of the dimensions of fairness. Note that equal division, a "fair" rule under most theories of justice, satisfies all of these conditions except additivity and null payoff.[32] Thus,

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31. Different economists and mathematicians use different verbal characterizations of the same mathematical characterizations of the features of Shapley Values, and many authors collapse these characteristics to four. For clarity, I use five verbal characterizations instead of four.

32. Regarding additivity, suppose we add another group with members C and D. Neither add anything to A and/or B and vice versa, but C and D acting alone each could produce 1, and together can produce 3. If the group {A, B, C, D} is formed, under equal division everyone receives 2 = (5+3)/4, which makes A and B worse off (they would get 2.5 each under fair

Shapley Values are fairer than equal division only if one places value on avoiding payoffs to null players (i.e., people with no endowments) and satisfying additivity.

Shapley Values do not reflect other widely held conceptions of fairness. In normative economic analysis, fairness is a distinct source of value to society that is created by a method of allocating economic benefits. More or less efficiency also is a separate, distinct property of allocation mechanism. As a distinct source of value, fairness is not subsidiary to efficiency. Instead, achieving more fairness may require sacrificing some efficiency.[33]

The concept of efficiency that is represented in Shapley Values is very limited, and bears no relationship to either production efficiency (using inputs in the best proportions) or allocative efficiency (maximizing the total economic welfare of society, given the distribution of income). Instead the concept is whether the members of the coalition collectively are paid all of the surplus. The game that gives rise to Shapley Values assumes a fixed value of cooperation (the total value created by the group as a whole and by each of its subgroups). Participation by each group member is an "all or nothing" decision. The assumptions of the game preclude varying effort by each member of the group and allowing the group and each subgroup to decide how much value it will create. For example, if the players are firms and their customers, the firms cannot offer customers varying amounts or qualities of output. In short, production efficiency is assumed, rather than being determined by the process for paying input suppliers. An implication of this assumption is that inducement of production by group members through financial incentives is not part of the Shapley Values procedure. Because licensing regimes for

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division from the {A,B} coalition) than if they had kept C and D out of the coalition, while it makes C and D better off (2 each) than they would be in the {C, D} coalition (1.5 each).

33. Arthur Okun, *Equality and Efficiency: The Big Trade-off*, Brookings Institution, 1975.

intellectual property are evaluated on the basis of their inducement effect, the game that gives rise to Shapley Values is irrelevant to selecting a licensing regime because total creative output is assumed to be fixed by virtue of the assumption that the value of the surplus is fixed.

Allocative efficiency refers to whether a society is producing the most valuable combination of outputs. The competitive equilibrium has the property that, assuming all spill-over effects on other people from production and consumption activities are taken into account, the allocation of output among products is Pareto optimal – that is, one cannot change the relative amounts of production of any two products without harming some consumers. The procedure for calculating Shapley Values does not inquire into whether the surplus created by a coalition represents the maximum total economic welfare that this group can produce for society. Indeed, the surplus that is used to calculate Shapley Values can include monopoly rents, which arise because the monopolized industry has too little output relative to the efficient competitive equilibrium. The Shapley cooperative can be one in which a group of horizontal competitors engage in collusion and the surplus to be divided among them is the monopoly profit. Shapley Values are called "efficient" only because they enable the members of the collusive group to reap the maximum available gains from monopoly.

The properties of Shapley Values are not connected to the most prominent aspect of fairness, which pertains to income distribution. Shapley Values need not provide a minimum standard of individual welfare (violating egalitarianism). Some group members can receive nothing (violating the difference principle). Among members who make positive contributions, allocations are based solely on average contributions, without distinguishing between effort or sacrifice and rents (violating just-desserts).

One feature of Shapley Values is that they reward market power. A common illustration of Shapley Values arises from the "employer-employee" problem, in which several employees face a single potential employer. The problem assumes that employees, by themselves or in any combination, produce no output, but if the employer is part of a coalition each employee in the coalition produces one unit of output. The Shapley Values for this game allocate half of the total value of output to the employer and half to the employees. Each worker receives one-half a unit of output, which is half of the competitive wage (the value of the marginal product of labor). If the problem is redefined as the "seller-consumer" problem in which one seller offers a good to many buyers, the result is the same – half of the consumer surplus that would be generated by a competitive price goes to the monopoly supplier.

Shapley Values generally are not stable. Economists use two concepts of stability: individual and coalition. An allocation is individually stable if no member of the group can do better by withdrawing and operating alone. Coalition stability means that no subgroup can do better by withdrawing and forming a new group. Whether a set of Shapley Values is stable depends on the details of the game. If a set of Shapley Values is unstable, the group must have an enforceable agreement in order for these allocations to be implemented. In the context of an allocation game that involves horizontal competitors, making such an agreement is anticompetitive collusion.

Shapley Values also normally allocate net benefits in a way that requires price discrimination. For example, consider two consumers who each want one unit of a product. The first consumer values the product at $10 above the average total cost of production C (including a competitive return on investment), while the second consumer values the product at

$8 over average cost. Consumers cannot produce this product either individually or cooperatively, but a firm can produce it if consumers agree to join a coalition with the firm (a substitute for a market). The Shapley Values for this game are to allocate the "surplus" ($10 + $8) as $5 to the first consumer, $4 to the second consumer, and $9 to the supplier. That is, the implicit price is C+$5 for consumer #1 and C+$4 for consumer #2. Whereas these prices are below the monopoly profit-maximizing price of C+$8, they are also above the competitive price, C, and involve charging difference prices to different buyers.

Given these problems with Shapley Values, one might wonder why scholars refer to this allocation as "fair." One reason is that Shapley Values were not designed to deal with market allocation problems. The context of the cooperative games that were examined by Shapley is one in which no production decision is involved, and the sole issue is allocating a pre-determined benefit or cost among a group. Examples are allocating fishing rights to a fixed stock of fish, or the costs of an airport among the airlines that use it once all decisions have been made about the design of the airport and the number of airlines that will serve it. The only sense in which the Shapley Value is "fair" is that the allocation to a particular person does not depend on the order in which members joined the group. Thus, the fairness of Shapley Values bears no relation to choosing a fee for performance licenses for recorded music.

C. Departures from Appropriate Use of the Shapley Procedure

Dr. Pelcovits' application of Shapley Values begins with an estimate of the "surplus" from the SDARS that, for reasons given above, is not valid. Beyond this, even if he used the correct value of the contribution to economic welfare of the SDARS, his application of Shapley's procedure also is incorrect because reality does not conform to the assumptions behind the

procedure.

One important departure of Shapley Values from the reality of performance licenses is the assumption that the allocation has no effect on production and the value of output. In implementing the Shapley allocation, Dr. Pelcovits assumes that the "surplus" from satellite radio in each year of the license period is fixed. This assumption means that the nature of satellite radio, its prices, and its numbers of subscribers are unaffected by the prices that satellite radio pays for its inputs. The necessary implication is that the rate for sound recordings will have no effect on either prices or subscribers of satellite radio. As explained above, this assumption is inconsistent with profit-maximizing behavior by SDARS operators. Unless the demand for satellite radio is perfectly elastic – that is, even a tiny increase in the price for satellite radio service will cause it to lose all customers – an increase in rates will lead to an increase in subscription prices and will change the total value created by satellite radio.

The assumptions that underpin the calculation of Shapley Values also ignore the process by which value is produced. In essence, the problem that Shapley addresses is analogous to dividing a pie among several hungry eaters, with the object being to find a "fair" division. The only sense in which pie production is involved is a set of assumptions about how much each eater may have contributed to making the pie – assuming that one pie of fixed size and content is baked by the members of a coalition. By assuming a fixed "surplus" to begin calculating Shapley Values, Dr. Pelcovits implicitly assumes that the quantity and quality of output and the proportions of each input are predetermined. In making this assumption, Dr. Pelcovits also implicitly assumes that SDARS operators will not make program innovations over the course of the sound recording license and will not vary the content of channels.

Another important feature of Shapley Values is that they are the product of "all or nothing" effects of each member of the group. An important component of the economics of production is the Law of Diminishing Returns, which states that, if the use of one factor of production is held constant, additional units of another factor of production produce declining amounts of additional output. A firm then acquires an input up to the point at which its price equals the incremental output from the last unit that was acquired. Consequently, in market equilibrium the value that is created by prior units of input exceeds the input price.

By contrast, Dr. Pelcovits implements the Shapley Value by allocating 41.3 percent of the "surplus" to sound recordings, dividing this surplus among the record companies, and assuming that only coalitions involving 75 percent of all sound recordings can produce surplus. In following this procedure, Dr. Pelcovits repeals the law of diminishing returns – that the incremental revenue arising from adding more sound recordings falls as more records are used. In his analysis, the contribution of each record label to the surplus is its proportionate share of the surplus, regardless of whether it is the first or last source of music. In a real market, price formation is determined by a process in which each source of supply is rewarded as if it were the last. Dr. Pelcovits avoids this feature of how markets actually work by assuming that in this particular example, an SDARS operator is financially unviable unless it can access the entire catalog of either all major record companies or any six of the seven record companies. Dr. Pelcovits also assumes that the value added by each label is the total value of all of its records, not the incremental value of one more record, given that the rights to several million records already have been obtained.

This procedure leads to an overestimation of the value of the vast majority of sound recordings. Each record company holds the rights to a very large number of sound recordings, ranging from Elvis and the Beatles through the long list of one-hit wonders down to artists who have little or no following. The extent to which the artists of a record company are essential to the success of a satellite radio service varies from high to nothing, depending on the artist and the song. Suppose a record company decided to charge a price for every sound recording that equaled the average between the Beatles and Bob and Dottie Brown. In a real market, in which the price of rights was related to usage, the SDARS could respond to this price by buying only the company's handful of superstars and forgoing the rest. This behavior, in turn, would force down rights fees as record companies, acting independently, competed to induce the SDARS operators to play recordings by artists other than superstars. The procedure that Dr. Pelcovits uses to calculate Shapley Values simply assumes this possibility away by allowing only all-or-nothing, take-it-or-leave-it deals for the entire catalog of recordings by all the record labels. The term that is used to describe this in economics is perfectly discriminating monopoly.

Dr. Pelcovits' treatment of other content is not symmetric to his treatment of music. Whereas he assumes that 75 percent of all recorded music must be available to cause the SDARS to have any surplus, he makes no such assumption regarding other content. Instead, he breaks other content into three categories, and assumes that each makes a separate contribution that is proportional to the fraction of SDARS subscribers who would cancel the service or demand a large price reduction if all of that content were eliminated. Even though collectively this content would lead to more cancellations if all of it were eliminated than the number of subscribers who would cancel if music were eliminated, other content receives a much smaller

share of the surplus because he assumes that its contributions are separable and that its contribution is zero unless 75 percent of music content is already present in the coalition. These assumptions confer monopoly power on record companies and enable them to capture most of the surplus, even though collectively sound recordings account for fewer subscribers than other content. Thus, this assumption is rigged to maximize the value of sound recordings.

Finally, Dr. Pelcovits assumes that the surplus created by the SDARS consists only of the revenues of the SDARS and content providers such as record labels, Howard Stern, and sports leagues. He accepts other input costs as fixed at a projection of their current levels. In reality, to produce appropriate Shapley Values, the surplus should include the net benefits of satellite radio that accrue to every supplier and customer.

One group that is left out of his calculation is the automobile companies, who have agreed to install satellite radios as original equipment in return for a share of future revenues if, after a free trial, consumers decide to continue their subscriptions. The basis for the prediction that satellite radio penetration will grow substantially during the next few years is the belief that the contracts with auto manufacturers will prove to be very successful, which means that auto makers add value to the "coalition" that includes the SDARS and record companies. Because the contracts with auto makers reward them on the basis of the future revenues of the SDARS, they should be included in the calculation of Shapley Values. Their Shapley Values are likely to be large (collectively their contributions are comparable to record companies) because they account for a substantial proportion of the estimated future subscriptions by Mr. Butson. Of course, to the extent that they receive shares of the surplus, the shares of the record companies are reduced.

Another excluded group is consumers. One benefit of satellite radio is "consumers' surplus" – the difference between the maximum amount that all customers would pay to prevent the SDARS from going out of business and the amount that they currently pay. The correct definition of the surplus includes welfare to consumers as well as suppliers. Moreover, to generate *any* surplus for the SDARS or record companies, consumers must subscribe, which means that in all coalitions that already contain some record companies and at least one SDARS, adding consumers to the coalition creates all of the value of that coalition. Thus, consumers would have positive Shapley Values if they were included in the calculation.

By ignoring these participants, Dr. Pelcovits violates a basic assumption of cooperative game theory: that *every* sequence in which members join the group is considered and given equal weight. By taking existing contractual arrangements with other input suppliers as given and by assuming that SDARS output prices are fixed, Dr. Pelcovits accepts a sequencing of bargains in which other input suppliers have no choice whether to join (they are assumed to be part of the coalition) and the record labels always join near the end. This eliminates sequences of coalition formation in which the record companies add no value at all (as when consumers have not yet joined) or much less value (as when auto companies have not yet joined). To the extent that the SDARS cannot create significant value without including *all* group members in the coalition (equipment manufactures, auto companies, other content suppliers, customers, etc.), the last member in the sequence always will create a large share of the value. In this way, Dr. Pelcovits biases the Shapley Values in favor of the record labels.

VII. BENCHMARKS

The SoundExchange economic experts propose several benchmarks for informing the choice of a performance license for satellite radio. One that is emphasized by Dr. Pelcovits is the price of original content on satellite radio, such as Howard Stern. The others, which are discussed by Professor Ordover, are other licenses for digital music and video content. In this section I outline the basic economic principles for selecting appropriate benchmarks and apply them to the benchmarks that have been proposed by the SoundExchange experts.

A. Standards for a Valid Benchmark

In order for a benchmark to provide a close approximation to the appropriate license fee for satellite radio, several conditions must hold. First, the sellers and the products being sold should be largely overlapping or very similar, if not identical, especially if heterogeneous products are involved. This condition refers to such things as whether the rights are exclusive, have the same opportunity cost, and cover the same properties. Second, the buyers and the product that they produce, using the rights as an input, should be largely overlapping or very similar, if not the same. This condition covers matters such as whether the rights are used to produce the same retail product, whether the other costs of the rights users are roughly similar, and whether other content is used in producing the final product. Third, the benchmark should arise from the market conditions that reflect the statutory factors for a compulsory license. This condition includes whether the rights users sell to the same customers, whether the costs to those customers for using the product embodying the right are the same, and whether the product of the rights users is among those that are covered by section 801(b). Fourth, to avoid possible bias due to extraneous factors, a benchmark is more reliable if it includes multiple transactions

for essentially the same right. This condition relates to the issue of the reliability of estimates of the market value of the rights, and takes into account the number of data observations as well as the complexity of the statistical problem of estimating a reasonable rate for one input, realizing that more complicated estimation problems require more data to provide reliable estimates.

The benchmarks that have been proposed by the SoundExchange experts do not satisfy these conditions. Among the factors that are not considered are whether the rights are exclusive, how the rights user produces the service that it sells to consumers, and the costs consumers face to use the product that contains the acquired right.

1. *Exclusivity*

The value of rights to the buyer depends on whether the right is exclusive or non-exclusive. Non-exclusive rights convey value to the market as a whole by contributing to overall demand for the product. Exclusive rights also can shift market demand, but they also confer competitive advantage on the rights holder, shifting business from competitors. Exclusivity also gives the rights user a stronger incentive to promote content, for only then will the rights holder be the only beneficiary of promotion. If rights users are more effective than rights holders at identifying the potential customers of a service, exclusive rights will lead to more effective promotion and hence greater overall sales of content to consumers.

The performance rights for sound recordings that are used by the SDARS are not exclusive. SDARS operators and radio stations have exactly the same performance rights. By contrast, some benchmarks used by the SoundExchange experts include fees that are paid for exclusive rights. The SoundExchange experts do not adjust these rates for the value of

exclusivity, and in some cases do not even note whether the rights at issue are exclusive. This failure undermines the value of these benchmarks.

2. *Production of the Service*

A difference among rights buyers is whether they act solely as a distribution channel for the product of the rights holder or whether the acquired rights are one of several inputs to producing a distinct final product. A firm that simply offers the wholesale product to final consumers uses only physical distribution inputs in addition to sound recordings, whereas a firm that combines sound recordings with other inputs necessarily faces higher costs.

In many of the proposed benchmark transactions, including those involving permanent digital downloads, digital streaming, and ringtones, the rights user is purely a distribution channel. The value added by the rights holders arises exclusively from marketing licensed product over an established distribution channel, using computer hardware and Internet connections acquired from others. To the extent the rights user innovates, the innovations are restricted to how recorded music is presented and sold to consumers.

By contrast, the SDARS use licensed sound recordings as one input in producing a product that contains many other types of content as well as a unique, dedicated technology for distributing the product. All of these other inputs are the result of innovation and investment by either other types of content providers or the SDARS. As a result, the rights fee must enable the SDARS operator to recover the costs of other inputs and must reflect the possibility of substitution of other inputs for licensed sound recordings, whereas no significant other inputs or substitution is plausible for many other licensees. In general, market prices for an input will be higher if users cannot easily substitute for it. Thus, a failure to take into account whether a

transaction reflects substitution possibilities biases the benchmark rate in favor of record labels and undermines the value of the benchmark.

In analyzing proposed benchmarks, the SoundExchange experts did not take into account the differences among services in the costs of inputs other than content. Their approach is to ascertain the sound recording rights fee that would increase the royalty costs of SDARS to the same share of costs or revenues that is accounted for by the content costs of the benchmark services. But if SDARS operators have higher costs for other inputs than the benchmark services, this method overstates the amount that the SDARS practically could pay for sound recordings. In fact, the SDARS have higher costs than other digital distribution systems: the distribution system (as opposed to delivering music over the Internet on a high-speed access line that the customer pays for separately), the subsidized reception device (as opposed to a personal computer and possibly a portable device that consumers bought at an unsubsidized price), and the cost of other original content (most other digital distribution services offer only music from sound recordings). By ignoring cost differences among services, the SoundExchange experts overestimate plausible sound recording fees for satellite radio.

3. *Final Product Usage by Consumers*

The digital audio products that are made available to consumers differ in terms of the specific nature of the product that the consumer receives. One difference is whether the consumer acquires a permanent or temporary copy of audio content. Temporary content, all else equal, is less valuable. Another difference is whether the service is interactive in that consumers can control the content that they receive, or passive in that consumers receive content that is selected by the service. Interactive content, all else equal, is more valuable. Still

another difference is whether the content is made available on a mobile technology, such as a car radio, or a technology that can be used conveniently only in a specific location, such as a copy-protected download to a personal computer. A mobile service, all else equal, is more valuable. Another difference is the ability of the consumer to control the amount of content (and hence the cost of the service). Subscription services offer less consumer-driven choice of the quantity of product than do services that price each unit of audio content separately. All else equal, systems that enable consumers to control the quantity of content and hence the cost of the service are more valuable.

Satellite radio offers temporary, passive, mobile service that is offered as an all-or-nothing subscription. All of these factors except mobility lead to less value, and the mobility of satellite radio via car radios is solely the result of research and development by SDARS operators and their equipment suppliers in their distribution systems. The record companies played no role in this innovation. Any attempt to reward the record companies for this source of value reduces the returns to the innovations by SDARS operators and thereby reduces the incentive for others to innovate in creating new distribution technologies. The SoundExchange economic experts make no attempt to measure the cost of providing any of the valuable attributes of any distribution technology in calculating the relationship of fees to these attributes. In so doing, they implicitly assume that all distribution technologies must have the same cost and require the same innovation. Because this assumption is patently false, their benchmarks are useless.

The remainder of this section applies these arguments to the benchmarks that are proposed by the SoundExchange experts.

B. Howard Stern

Dr. Pelcovits uses the Howard Stern contract with Sirius as a benchmark. Dr. Pelcovits argues that efficiency requires that every input price should bear the same relationship to the income that is created by the corresponding inputs, citing the classic textbook result that for a profit-maximizing firm with market power in its final goods the ratio of the marginal revenue product to price will be the same for every input. (If the firm lacks market power, the ratio is the value of the marginal product to the price.) From this Dr. Pelcovits concludes that the ratio of revenues attributable to music to the license revenues for performance rights should equal the ratio of Howard Stern's contribution to revenues divided by his payments from Sirius.

This benchmark is valueless for three reasons: unreliable data; improper application of economic theory; and differences in the rights that were acquired.

1. *Unreliable Data*

Even if conceptually this approach made sense, which, as will be discussed below, it does not, as a practical matter the Howard Stern situation produces a highly imprecise estimate of the target ratio of attributable revenues to costs. The figures from various public and private sources about the effect of Howard Stern on subscriptions seem more drawn from a hat than emanating from reliable, systematic analysis. The number varies from one million to four million.

In Dr. Pelcovits' amended written testimony he states that he picked two million because in 2006 Sirius added 2.7 million subscribers, most Stern subscribers would subscribe in 2006, and not all the 2.7 million were due to Stern. The underlying premise of this assumption is that the only effect of hiring Howard Stern was the number of Stern fans who signed up for Sirius.

The problem is that Sirius provides two additional reasons for signing Stern. The first is the free advertising that the signing generated among potential subscribers who were not Stern fans but who followed the publicity surrounding Stern's battles with the FCC and his employers, culminating in his decision to abandon more heavily regulated terrestrial radio in favor of satellite radio. The second is the effect of hiring Stern on concluding deals with automobile manufacturers to include Sirius radios as original equipment in new cars. Prior to the Stern deal, XM was more successful than Sirius in obtaining agreements with OEMs, and Sirius believed that the Stern deal could help turn this around. Dr. Pelcovits ignores these points, but provides no basis for doing so.

Notwithstanding the absence of analysis to underpin his assumptions about the ultimate number of Stern subscribers, Dr. Pelcovits' revised estimate, at best, refers to *ex post* results, rather than *ex ante* expectations by Sirius. The relevant basis for a benchmark is the revenue Sirius expected to receive, not what it actually received. The actual results are not helpful in answering whether Sirius expected two million new subscribers, or whether it expected to obtain all Stern subscribers in a few months or a few years. Thus, Dr. Pelcovits' amendment answers the wrong question.

In his cross-examination testimony Dr. Pelcovits could not give a coherent reason for picking his earlier number of Stern subscribers, which was near the bottom of the range of the numbers that appear in the materials he consulted. 7/9/07 Tr. at 248-59 (Pelcovits). Likewise, even the cost of the Stern deal is not easy to estimate. Part of Stern's reimbursement involves rights to common stock rather than strictly cash payments, which raises the issue of how to evaluate the value of those rights at the time the contract was signed (as opposed to the time the

stock was issued). Moreover, Stern's contract [[

]]. In estimating the revenues from the Stern deal, Dr. Pelcovits counts only Stern's effect on subscriptions, not on [[ ]], but in estimating the cost, he included [[ ]]. In so doing Dr. Pelcovits `overestimates the fraction of gross revenue from Stern that is accounted for by payments to him.

The Stern benchmark is highly sensitive to the choice of an estimate for both revenues and costs. From the particular revenue and cost number he picked in his original written testimony, Dr. Pelcovits estimates that Stern is paid half of the net revenue he generates. But suppose that the revenue effect of Stern is twice as high as the number used by Dr. Pelcovits in his original written testimony (which is well within the range of estimates found in the documents) and the costs to Sirius (because of the effect of paying Stern in stock rather than cash) were one-third lower than the estimate used by Dr. Pelcovits. Under these assumptions, instead of Stern being paid half of the value he brings, he is being paid one-sixth of his incremental income. I do not claim that this estimate is better than any other, because it is based on the same uncertain and unreliable information as the data that were used by Dr. Pelcovits. What is clear is that the Stern example illustrates the pitfalls of creating a benchmark out of a single transaction for which both the costs and the benefits are not reliably estimated and so are subject to great uncertainty. As an economist, I simply would not use the Stern case as a benchmark for anything under the well-known principle of garbage in, garbage out.

The evidence shows that the Stern deal was complicated, both in its actual terms and in its original motivations. Consequently, many variables are likely to have influenced this deal,

as well as the deals that SDARS operators have made with other personalities who are highly popular with a segment of SDARS consumers. The proper way to deal with this complexity is to gather more data in the hopes of being able to make a reasonable overall estimate of the relationship between anticipated revenues and costs for content of this form.

Sirius and XM have many other contracts with star performers, such as Oprah Winfrey, Martha Stewart, Bill O'Reilly, and Opie and Anthony. The advantages of looking at these deals as a group are that information would be available for both services (not just Sirius – the Stern contract contains no information about how XM values this form of content), and the presence of several observations would reduce the impact of unusual features of any one deal that are difficult to quantify. Dr. Pelcovits had access to personality-driven content deals, but he made no attempt to undertake a comprehensive analysis of these contracts. Instead, he picked only the contract that was most expensive and most complex, and made it a benchmark.

2. *Improper Application of Theory*

Beyond these data problems, the equation of Howard Stern to all music content is an erroneous application of the theory of efficient factor use. The result that Dr. Pelcovits cites concerning the ratio of marginal revenue product to factor price is not a theory of price formation for factors, but a theory of efficient use of competitively priced factors by a firm. That is, if the price of an input is, say, P, a profit-maximizing firm will increase use of that input until the marginal revenue product of that input equals P. This result is true whether P is high or low. For a single firm, this optimizing behavior has no effect on the market price of the input unless the firm has buyer power in the input market, which clearly is not the case for the SDARS.

The equality of the ratios to which Dr. Pelcovits refers involves the concept of the *incremental* (marginal) use of an input. Dr. Pelcovits does not use the *marginal* revenue product of music in calculating the ratio for music content. Instead, he uses the ratio of *total* revenue from all uses of music to the total payment of license fees. This mistake is easily seen from Figure 1, which shows a standard demand curve, line A-D, for an input by a firm. The demand for an input by a firm is the curve that traces out the marginal revenue product as the quantity of inputs increases. This line is drawn to reflect the law of diminish returns (the marginal product of a factor declines as more of it is used, holding all other inputs constant), which produces a standard negatively sloped factor demand curve.

In Figure 1, I have assumed for simplicity that there are two inputs that each have the same demand curve and hence, for the same amount of each that is used in production, make the same contribution to the value of the acquiring firm's output. The ratio Dr. Pelcovits seeks to equate is (PQ+triangle)/PQ revenue.[34] In the example, the ratio Dr. Pelcovits uses is obviously far lower for the input with the higher price because the triangle ABP_{hi} is tiny, whereas the ratio for the cheaper input is much larger because the triangle is large. Yet according to the textbook analysis of firm input choices, both inputs are used efficiently. Put another way, in this example Dr. Pelcovits' procedure recommends an increase in the price from P_{low} to P_{hi}, which

34. Note that Dr. Pelcovits forms this ratio for all record companies taken together, rather than for the incremental revenue of each record company assuming that the others already provide content. This approach follows from the assumption that satellite radio would have zero revenues unless they had access to all of the content from all major record companies, which is the same that was used to calculate Shapley Values. This assumption has the effect of conferring monopoly power on the record companies for the purpose of estimating rights fees.

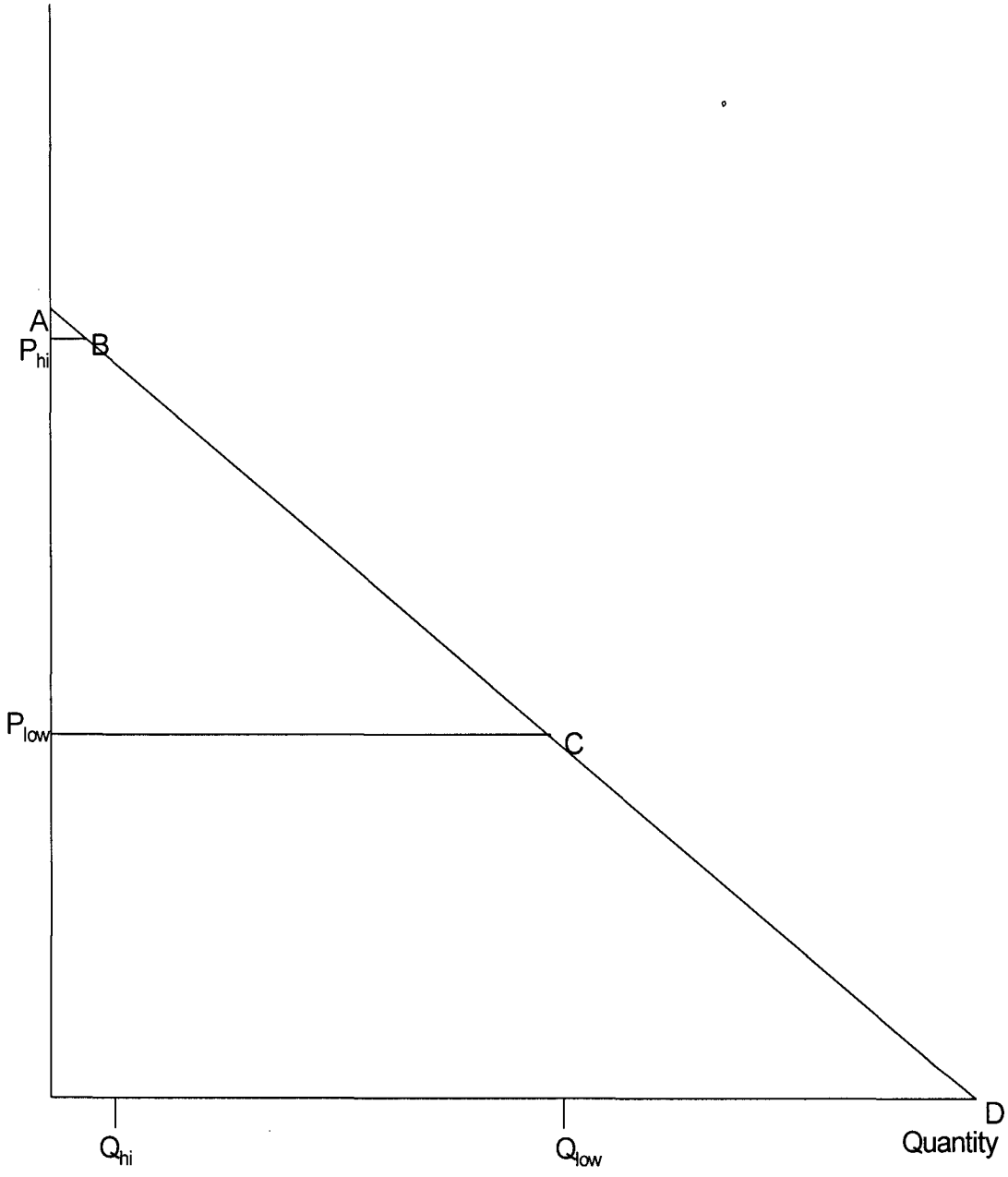

Figure 1: Demand for an Input (Music)

causes inefficiency if P_{low} is the actual competitive market price of the corresponding input.[35]

35. Professor Ordover makes the same argument in his written testimony. He states that 55

This analysis is related to the opportunity cost and competitive price of inputs. Howard Stern's opportunity cost was giving up his job in terrestrial radio and television, for which he was highly paid. To sign Howard Stern, Sirius had to outbid terrestrial radio and its SDARS competitor, XM. Regardless of whether Sirius paid too much, the fact that Stern had high opportunity costs for signing with Sirius implies that he would be paid a P_{hi}. By contrast, for a record company the opportunity cost for making recorded music available to satellite radio is very close to zero, while granting rights to the SDARS has other benefits (substitution for terrestrial radio and promotional value). The low net opportunity cost for the record labels implies a competitive price like P_{low}. If both P_{hi} and P_{low} represent true opportunity costs, then these are efficient prices, and the ratio of total revenue generated by the high-priced input to its price will be less than the same ratio for the low-priced input. This outcome is efficient. Moreover, only a legal/regulatory process could ever impose a different result; the market would never operate in a way to equate the ratio of total revenues from an input to total payments for all inputs unless the market were monopolized.

3. *Differences in Rights*

Another reason the Stern benchmark is inappropriate is that the rights are not the same.

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percent of the value of satellite radio is due to music, and because this is much larger than the contribution of other content, sound recordings should receive "a substantial share of the SDARS' value." Notwithstanding that 55 percent is incorrect, the major mistake here is comparing the *total* contribution of sound recordings (the area under the demand curve for this input) with the *marginal* contribution of each of several other types of content. If instead one broke down sound recordings into all of the categories of music channels on Sirius and XM, each of these categories would have single digit percentages of subscribers who would cancel service, and Howard Stern's contribution to subscriptions would loom very large compared to any music category. The point here is more than adversarial economics – making one side or the other in a dispute appear to be important. Instead, the point is that the conceptually correct way to proceed is to look at marginal, not total, contributions.

The Stern contract is a payment to create all of the programming on the Stern channel. Moreover, this right is exclusive. Neither XM nor any other broadcaster can carry the Stern channel without obtaining the rights from Sirius. Exclusivity is the factor that creates a substantial opportunity cost for Stern to agree to the deal from Sirius, as compared to Oprah Winfrey and Martha Stewart, who did not give up their programs on terrestrial television.

Sound recording rights are for an input to channels that include sound recordings as well as other content. The decisions about which content to use are made by employees of Sirius, not by the record companies. And the rights are not exclusive. The lack of exclusivity is one important reason that granting rights to SDARS operators has essentially no opportunity cost for the record companies. All of these factors cause the value of the sound recoding rights to satellite radio to be a smaller proportion of the value of a music channel than the value of the Stern agreement in proportion to the value of the Stern channel. Thus, equating the two leads to an overestimate of the appropriate fee for sound recordings.

C. Satellite Television

Professor Ordover offers satellite television as a possible benchmark for satellite radio. The essence of the argument is that the costs of content should be about the same for satellite TV and satellite radio. Professor Ordover proposes two benchmarks: the fraction of total satellite revenue accounted for by program costs (40 percent) and the fraction of "premium" channel revenues accounted for by content costs (49 percent).

I will not belabor the obvious reasons why satellite television does not satisfy the requirements for a good benchmark. Suffice it to say that neither the buyers nor the sellers are the same, the product at issue in this proceeding is an input to the production of channels

whereas the product sold to cable television companies is a fully compiled channel or group of channels, and satellite television broadcasting is a more mature industry that reaches about 25 percent of all households,[36] compared to the SDARS as start-ups with a penetration of four percent. Here I focus on two points: the decision to use satellite TV instead of cable TV and the issue of which pay-TV channels represent the closest analog to music channels that feature sound recordings.

1. *The MVPD Market*

Satellite television is part of the multi-channel video program distribution (MVPD) industry. Originally satellite TV was primarily a service for rural areas and small communities where the population was too small or insufficiently dense to make cable television viable. While satellites and cable competed on the margins, for the most part they served different geographic areas.

The nature of the industry changed in 1999, when Congress passed legislation that allowed satellite TV services to retransmit the signals of local television stations. Since that time, most of the growth of satellite services has been in areas served by cable television systems, and as a result of this competition cable television companies have increased the channels they offer and lowered their prices.

Cable television today accounts for about two-thirds of all MVPD subscribers. Cable also does not pay anywhere near half of its revenues for content. In 2004, the last year for which FCC data are available, revenues for cable television services (excluding high-speed

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36. Federal Communications Commission, *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, MB Docket No. 05-255, March 3, 2006.

Internet access and other non-broadcasting items) were $45.1 billion, and programming content costs were $12.7 billion, or 28 percent of revenues.[37] Even if one thought the pay-TV analogy were valid and that sound recordings deserved half of total content costs, the benchmark from cable would be 14 percent of revenues rather than the 23 percent sought by SoundExchange.

2. *Appropriate Channel Benchmarks*

Professor Ordover provides two possible benchmarks: premium channels (because most do not contain advertising) and total program costs of all channels. I do not think either is a proper choice.

The problem with premium channels is that satellite radio, unlike pay-TV, does not have tiering (groups of channels for which a subscriber pays separate fees). Content cost as a fraction of revenues for premium channels is not comparable to satellite radio channels because in the former case *all* revenue is due to the premium channels in their separate tiers, whereas the revenue from music channels on satellite radio is *part* of revenues for all channels. Subscribers to premium tiers must subscribe to the "extended basic" tier (the main incremental service beyond re-transmitting local television stations), so that from the perspective of a pay-TV system and its subscribers, premium channels are not substitutes for other channels. The price for extended basic covers the costs of the pay-TV service that are not incremental to the premium tier, including infrastructure, non-premium content, marketing and administration. The decision to offer a premium channel is based on whether the cost of premium content plus metering and billing are less than the price. For other channels, the price must be sufficient to recover the satellite reception system (or, in the case of cable, the connection between the

37. *Ibid.*

customer and the external cable) and all other non-content costs. Because these other costs are not trivial, I conclude that premium channel costs on pay-TV are irrelevant as a benchmark.

To use the content cost of all channels as the benchmark for one group of channels on satellite radio hides an important fact: both satellite and cable MVPD systems pay very different rights fees for different channels; the average price per channel has little practical meaning. Hence, one needs to ask which MVPD channels are the closest analog to music channels on satellite radio. Aside from his discussion of premium channels, Professor Ordover does not address this issue. If pay-TV does provide a useful benchmark, it is the content costs of channels that are most like the music channels on satellite radio.

One possible analog to music channels on satellite radio is re-transmission of terrestrial television signals by MVPD system. The primary reasons this is analogous are as follows: (1) sound recordings are not exclusive to satellite radio just as terrestrial television stations are not exclusive to MVPDs; (2) the main source of revenue for covering costs (including content costs) for both terrestrial television and sound recordings is not distribution through pay systems; and (3) both sound recordings and terrestrial television derive benefits from being included on satellite systems.

This analogy to satellite radio is not perfect because sound recordings are inputs to SDARS channels whereas a terrestrial television station offers a full channel of finished content. One strength of the comparison is that sound recordings are available over terrestrial radio stations, as are a few other SDARS inputs such as news channels, whereas some SDARS music programs that do not use sound recordings and most other SDARS channels are not available over terrestrial radio stations. The other strength of the comparison is that terrestrial television

channels generate nearly all of their revenue from advertising, which depends on audience size. A terrestrial television station must be carried on pay-TV systems to have access to most television households, and experiences no additional direct costs from allowing its signal to be retransmitted. Thus, just as record labels benefit through added sales of sound recordings from being played on satellite radio, so, too, do television stations benefit from having their programs carried on MVPD systems.

Just as music is important to satellite radio, local terrestrial television stations are important to the success of pay-television systems. Although terrestrial television is declining as a share of total television viewing, TV stations still draw about half of the television audience.[38] The most popular regularly scheduled network programs still can command audience shares of over 25 percent, while special programs like the Super Bowl can hit 50 percent. In the history of cable television, "signal improvement" (providing better pictures for terrestrial stations) was the primary reason for subscribing to cable television in cities with a full complement of network affiliates plus one or two independent stations. Research at the time concluded that this motivation alone was sufficient to cause cable penetration to achieve 15 to 20 percent penetration in large urban areas.[39] Signal improvement is analogous to the higher quality and ubiquitous accessibility of satellite radio.

In 1999, Congress passed legislation allowing direct-to-home satellite television systems to carry local television stations. Over the next few years satellite broadcasters added more and

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38. As of July 8 the combined 2006-7 share of the four major networks plus CW Network was 44 percent. See tv.zap2it.com/tveditorial/tve_main/1,1002,272%7C%7C%7Cweekly,00.html.

39. Roger G. Noll, Merton J. Peck, and John J. McGowan, *Economic Aspects of Television Regulation*, Brookings Institution, 1973.

more local stations. By the end of 2005, 96 percent of households inside local television markets could receive local channels from at least one satellite broadcaster.[40] The ability to carry local TV signals enabled satellite pay-TV to become a significant competitor to cable in major metropolitan areas. The market share of satellite broadcasters in MVPD grew from 19 to 28 percent between 2001 and 2005, and most of which is attributed to carrying local TV signals.

Initially cable television systems were subject to the "must carry" rule, which required that they carry all local television stations that were available in the area that they served. Eventually this rule was replaced by the current system, in which a station can exercise "must carry" rights, but it can also deny the right to carry the signal unless the cable system obtains "retransmission consent," which entails paying a rights fee to the station.[41] For the most part, independent and non-commercial stations are carried for free under the "must-carry" provision, while affiliates of the four major commercial networks are paid a retransmission fee. For satellite TV, stations have no "must carry" rights.

The important point about retransmission fees is that they account for a far lower proportion of pay-TV content costs than of the pay-TV audience. Although most retransmission fees are confidential, some information about them has appeared in both the press and FCC proceedings because of recent intense battles between pay-TV operators and network affiliates, especially affiliates that are owned by the four major networks.[42] Today network

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40. FCC, *Annual Assessment*, *op. cit.*

41. Joel Timmer, "Broadcast, Cable and Digital Must Carry: The Other Digital Divide," *Communications Law and Policy*, Vol. 9, No. 1 (Winter 2004), pp. 101-50.

42. I was involved in the arbitration proceeding between Fox and DishTV over retransmission fees for network-owned Fox affiliates, which gave me access to actual fees; however, these data were provided on a confidential basis, so I cannot use them here. For public sources about

affiliates receive less than fifty cents per subscriber per month from pay-TV systems, and some much less.[43] Because pay-TV pays nothing for other stations, the total cost to pay-TV systems for carrying all local TV stations is less than $2 per subscriber per month.

By comparison, in 2004 – when retransmission fees accounted for only about $132 million – content costs on cable were $12.7 billion, or about $16 per subscriber per month.[44] The retransmission fees are probably higher than one percent of content costs and 1/4 of one percent of revenues today, but a realistic estimate is that today TV stations, although they account for half of the audience, receive only a few percent of all payments for content. If pay-TV is a benchmark, the retransmission analogy implies that fees for sound recordings should be more like one percent of revenues than 18.5 percent (Professor Ordover's estimate for satellite content). Indeed, the fraction should be lower than this because licensed sound recordings are an input to music channels, not the entire content.

The implication of this analysis goes beyond simply producing a much lower benchmark for the SDARS rate. The more important point is that in pay-TV the importance of a source of program material as measured by audience ratings is not proportional to the fraction of revenues and content costs that are paid for rights to that material. This fact undermines the core of all of

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these battles, see, for example, Anne Becker, "Northwest Station Pulls Plug in Retransmission Battle," *Broadcasting and Cable*, January 1, 2007 (www.broadcastingcable.com); Michael Malone, "CBS Demands – and Gets – Cash," *Broadcasting and Cable*, February 26, 2007; Linda Moss and Mike Farrell, "Dueling for Dollars," *Multichannel News*, March 5, 2007 (www.multichannel.com); Michael Malone, "Carriage Spat Rages in Spokane," *Broadcasting and Cable*, May 28, 2007; and American Cable Television Association, "Comment," MB Docket No. 05-225.

43. Federal Communications Commission, *Emergency Retransmission Consent Complaint and Complaint for Enforcement for Failure to Negotiate Retransmission Consent Rights in Good Faith*, CSR-7058-C, January 4, 2007.

44. FCC, *Annual Assessment*, *op. cit.*

the analysis by Dr. Pelcovits and Professor Ordover, which assumes without proof a linear relationship between the importance of a category of content (e.g., music or talk, or terrestrial TV stations and mass entertainment channels that are only available on pay-TV) and the rights fees that are paid to content in that category. This assumption is demonstrably false.

D. Other Music Distribution Channel Benchmarks

Professor Ordover considers seven examples of digital distribution rights as benchmarks for satellite radio: permanent audio download, cellular download, cellular ringtone, non-interactive video streaming, interactive video streaming, interactive portable streaming, and interactive non-portable streaming. In addition to describing the percentage-of-revenue rates across all these categories, he calculates a per-subscriber benchmark for the SDARS rate from interactive portable webcasting and non-portable interactive subscription streaming.

In analyzing the differences among these services, Professor Ordover considers several factors that might explain the differences in the value that consumers place on different types of services, such as whether the service is portable, interactive, and immediately accessible. From this analysis, he reaches two conclusions: (1) all of the services pay similar rates, "[[ ]]," and, (2) after taking account of the fact that satellite radio is portable, non-interactive, and immediately accessible, he settles on a comparable rate of either [[ ]] or [[ ]] per subscriber per month, based on portable interactive webcasting and subscription non-portable interactive streaming services, respectively.

I recognize the validity of the benchmarks hinges, in the first instance, on whether the statutory guidelines are consistent with the use of market outcomes for setting the rate. In considering Professor Ordover's benchmarks, I assume here for the purposes of analysis that

market transactions are relevant. I address only whether these market transactions bear sufficient similarity to satellite radio to constitute a basis for estimating the competitive market rate for the SDARS license. In fact, I do not believe that Professor Ordover has taken into account all of the factors that would cause the SDARS rate to differ from these benchmarks.

As in the case of satellite television, these services differ from satellite radio in several obvious ways: the buyers are not the same; the benchmark services offer only content that is acquired from rights holders (they do not create significant content); and the products being sold are different (video downloads, cellular ringtones, permanent downloads, interactive streaming). Here I focus on three issues: (1) similarities among the services in other costs; (2) the validity of an approach that is based solely on demand; and (3) selectivity in the choice of services.

1. *System Costs of Benchmarks*

A major difference between satellite radio and the benchmarks proposed by Professor Ordover is that all of the benchmarks are incremental to services and equipment that consumers already have purchased. As a result, the benchmark suppliers do not pay for important inputs to their service. If all services are offered in a competitive market, prices will converge to average cost of service. Price differentials among the services will be due to differences in average cost.

All of the benchmark services make use of the telecommunications infrastructure to deliver content. To acquire the service, consumers need to purchase high-speed Internet access. The download services pay only for their own Internet connections, not the Internet connections of their customers. None of the benchmarks developed a dedicated delivery system like the ground stations, satellites and terrestrial repeaters that are used by satellite radio. As a result, the costs of the SDARS include distribution costs that are not part of the costs of the other

providers.

All of the benchmark services also make use of equipment – a personal computer or a cellular telephone – that was purchased by consumers for another purpose. In the case of the computer, the consumer typically receives no subsidy. In the case of a cellular telephone, sometimes the phone is subsidized, but by the cellular carrier with the expectation of recovering the subsidy in usage charges. Vendors who sell ringtones for cellular telephones do not subsidize cell phones, and vendors who sell digital downloads do not pay part of the cost of their customers' PCs.

By contrast, the cost of the SDARS includes the development of a specialized radio, which is sold to consumers below cost in order to encourage consumers to try the product. SDARS revenues must recover part of the cost of the radio through subscription fees. Thus, for all rights users to earn a competitive return, the share of content in total costs must be lower for the SDARS than for any of these services, and likewise the gap between retail price and average content cost per subscriber must be much greater for the SDARS. Any procedure for establishing SDARS rates that is based on the assumption that the SDARS' content fees can stand in the same proportion to total revenues or total costs as these benchmarks is sure to overestimate the appropriate rate.

Professor Ordover does not examine the costs experienced by any of these benchmarks for items other than content, nor does he examine the costs that are born directly by consumers. Likewise, he does not take into account that every single benchmark sells an incremental service for consumers who already have purchased the equipment that they need, including high-speed access to the Internet. Thus, these benchmarks amount to assuming that the satellite

distribution system and the radio receivers of the SDARS are free.

One benchmark offered by Dr. Ordover compares interactive webcasting with satellite radio. The only differences between the two that he considers are that satellite radio has interactivity and immediate accessibility. He does not consider as relevant the differences in non-content costs between a webcaster and the SDARS. Yet the former reaches customers over the Internet on a high-speed access line to a PC, and the files are then transferred to a portable listening device, all of which the customer has purchased separately. The latter reaches the consumer over a dedicated satellite system that is paid for by the SDARS to a radio that is sold below cost. Given these differences, it is fantasy to pretend that content as a fraction of total costs would be the same for these two services. Assuming all of these services are provided in competitive markets, adopting a rate for satellite radio that caused content to account for the same fraction of costs as in services with lower non-content costs is equivalent to confiscating the investments of the SDARS and giving them to the record companies.

When making retail price comparisons, the benchmarks used by Professor Ordover are permanent audio downloads and interactive non-portable subscription services. These examples, too, are for services in which infrastructure and equipment costs are largely paid by consumers as opposed to part of the cost structure of the service. Again, if there are substantial differences in non-content costs between interactive and non-interactive services, the fraction of revenues that are accounted for by content will differ at least in part because of differences in the average cost of non-content inputs.

Because Professor Ordover did not take into account differences in average costs among services, and because the failure to take these into account systematically over-value content on

satellite radio, his benchmarks are not useful.

2. *Adjustments Based on Differences in the Services*

Professor Ordover's basic approach is to begin with a benchmark fee and then to adjust that benchmark fee according to attributes of the benchmark service that are valuable to consumers but that differ from the attributes of satellite radio. The idea is to find two services that are identical except for one attribute, and then to impute a value to that attribute on the basis of the difference in prices charged by record companies to the two services. The validity of these estimates depends on whether everything else about the two services is truly held constant, and whether the value of a feature is the same for satellite radio and for the benchmark service that is used to estimate the value of the attribute. If the services differ in the costs paid by the service provider, other costs that are born by the consumer and not part of the transaction with the content service, or the quality of the listening experience, then the price differential will not be solely due to the measured attribute.

For example, to obtain the value for interactivity, Professor Ordover examines interactive and non-interactive video services. The premise is that someone values picking a video over watching a pre-programmed video in exactly the same proportion as the relative values of picking one's own audio music versus listening to a pre-programmed music channel. Assuming that the relative costs of these services to the supplier and consumer are the same, a necessary assumption is that interactivity has the same value for a product that involves close attention (watching a video) as for a product that often involves passive, background entertainment (sound recordings over the radio), and that the differences in relative value do not depend on context (sitting at home watching a television or PC versus riding in car while music is playing).

To obtain a value for accessibility, Professor Ordover's written testimony compares downloads to a computer for transfer to a portable device with downloads to a cell phone. In addition to assuming that the services have the same non-content costs to both suppliers and consumers, which they clearly do not (cell phones are far less expensive than PCs), another assumption necessary to make the imputation valid is that the quality of reproduction for downloading a song is the same for portable music players (like iPods) and for cell phones.

In cross-examination, Professor Ordover stated that the adjustment for immediacy may no longer be valid because new information about license fees for mobile downloads from Universal shows [[ ]]. 6/21/07 Tr. at 308 (Ordover). In his original testimony, the "immediacy" adjustment [[ ]] resulted in an increase in the benchmark rate of over [[ ]]; if no adjustment is made for accessibility, the benchmark rate for sound recordings becomes [[ ]] instead of [[ ]] per subscriber per month.

Putting aside the issues of cost and context, a fundamental issue is whether price differences reflect value differences that are useful for rate setting. The underlying economic argument has two components. The first is that at a given set of relative prices, some consumers are indifferent between two sources of music, and in fact may consume some of both, in which case relative prices measure relative values for the last unit consumed by those consumers. The second is that firms with market power will set prices in relation to the elasticity of demand. That is, record companies generally will set higher prices for services for which demand is less price sensitive. The premise of Professor Ordover's adjustments is that all of the differences in prices between services are due to differences in the elasticity of demand

arising from the attributes that he examines.

If the benchmark services are competitive, their relative prices reflect cost differences, not differences in demand. Consumers respond to price differences by deciding which service to acquire. If the relative price of one service increases, some consumers will switch to the service with the lower price. Thus, *relative value to consumers adjusts to changes in relative price*, rather than price adjusting to relative value. Consumers who remain as customers after an increase in the relative price of a service are those who value it most highly; the other consumers simply switch to another service.

Before one can conclude that relative price differences are measures of the intensities of demand for attributes, one needs to adjust for cost differences. A product with more price-sensitive demand can still be priced above a service with less price-sensitive demand if the latter has much lower costs. Again, consider Figure 1, where two inputs with identical demand curves have different market prices. If these prices are competitively determined and reflect only cost differences, relative prices convey no information about relative values to consumers as measured by demand elasticities. Because it is implausible that all services have the same costs (other than content), it is implausible that price differences are due only to differences in demand intensities. As a result, the imputations of value to these attributes are not reliable.

3. *Selective Choice of Benchmarks*

To the extent that digital distribution provides any useful benchmarks, they would be the services that are most like satellite radio. These are non-interactive subscription streaming services that offer multiple channels of content. Of course, even these services are problematic as benchmarks because they do not involve new distribution technologies and generally offer

only channels that feature music. Nevertheless, they are closer to satellite radio service than any of the other benchmarks.

Professor Ordover rejects these and several other potential benchmarks – various forms of non-interactive services – because the rates either are determined in the "shadow" of statutory licenses (such as Music Choice) or, as with custom radio, pertain to services that might be subject to statutory rates if a deal were not struck (some of these contracts were set at 125 percent of another statutory rate). These services tend to pay lower rates than the services that Dr. Ordover uses. He rejects them because statutory rates, or rates under the shadow of a statutory proceeding, are not market rates. In particular, his argument against the benchmark that was proposed by Dr. Woodbury is that it was a regulated rate, not a market rate.

I see no economic basis for rejecting rates as benchmarks just because they are regulated. Research in economics on the effects of regulation concludes that regulation is much more likely to set rates that are too high rather than too low.[45] Indeed, the propensity to set rates that are too high even has a name – the "capture" theory – and has been recognized in George Stigler's Nobel Prize in economics. Strictly in terms of applying the scientific body of knowledge in economics, an economist has no basis for concluding that regulation causes prices to be lower than the prices that would emerge in a competitive market.

This proceeding illustrates the genesis of capture. As explained herein, the rates proposed by SoundExchange are more likely to represent the collusive price than the competitive

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45. For summaries of the research on the economic effects of regulation, see Clifford Winston, "Economic Deregulation: Days of Reckoning for Microeconomists," *Journal of Economic Literature* Vol. 31, No. 3 (September 1993), pp. 1263-89, and Paul L. Joskow and Roger G. Noll, "Economic Regulation," in *American Economic Policy in the 1980s*, Martin Feldstein, ed. University of Chicago Press, 1994.

price. Dr. Pelcovits uses methods – forward-looking costs and Shapley Values that confer monopoly power on record companies – that transfer most of the value of the satellite radio business to record companies. The SoundExchange experts recommend considering the promotional value of radio at the industry (cartel) level, rather than at the firm (competitive) level, knowing that at the industry level the evidence is ambiguous whereas at the firm level the evidence in favor of promotional effects is strong. None of their economic experts estimates competitive prices in light of realistic assumptions about opportunity costs and the viability of the SDARS. Thus, SoundExchange seeks to achieve super-competitive prices by regulation, as economists have found in many other settings where prices in competitive industries are regulated.

I do not argue that all statutory rates are cartel rates. My point is more modest. To claim that regulated rates are below competitive prices and expropriate the capital of regulated firms has no basis in economics, and is inconsistent with historical facts. This argument cannot be the basis for an economist to exclude the rates that Professor Ordover did not consider.

In any event, just as Dr. Ordover was selective in the channels he advanced as benchmarks from satellite television, he has been selective in offering benchmarks from digital distribution, rejecting the services that are most like satellite radio without a justification that is based on economic analysis.

I declare under penalty of perjury that the foregoing is true to the best of my knowledge and belief. Executed at Palo Alto, California, July 17, 2007.

Roger G. Noll

APPENDIX A

CURRICULUM VITAE
ROGER G. NOLL

PERSONAL

Date and Place of Birth: March 13, 1940; Monterey Park, California

EDUCATION

East High School, Salt Lake City, Utah, 1958
B.S. (Math, Honor), California Institute of Technology, 1962
A.M., Ph.D. (Economics), Harvard University, 1965, 1967

SCHOLARSHIPS, FELLOWSHIPS AND AWARDS

National Merit Scholarship 1958-62
National Defense Education Act Fellowship 1962-66 (declined)
Harvard Prize Fellowship 1962-63
National Science Foundation Fellowship 1963-64
Guggenheim Fellow 1983-84
Rhodes Prize for Undergraduate Teaching, Stanford University, 1994

POSITIONS HELD

Teaching Fellow, Harvard University, 1964-65
Instructor, California Institute of Technology, 1965-67
Assistant Professor, California Institute of Technology, 1967-69
Senior Staff Economist, Council of Economic Advisers, 1967-68
Associate Professor, California Institute of Technology, 1969-71
Senior Fellow and Co-director of Brookings Studies in the Regulation of Economic Activity, Brookings Institution, 1970-73
Professor, California Institute of Technology, 1973-82
Visiting Professor, Graduate School of Business, Stanford University, 1976-77
Chairman, Division of the Humanities and Social Sciences, California Institute of Technology, 1978-82
Reuben Gustavson Lecturer, University of Chicago, April 1981
Institute Professor of Social Sciences, California Institute of Technology, 1982-84
Donald Gilbert Memorial Lecturer, University of Rochester, December 1982
Fellow, Center for Advanced Study in the Behavioral Sciences, 1983-84
Professor of Economics, Stanford University, 1984-2006 (*Emeritus* 2006-)
Visiting Scholar, Hoover Institution, 1984-85
Professor by Courtesy, Department of Political Science, Stanford University, 1985-
Professor by Courtesy, Graduate School of Business, Stanford University, 1986-
Veblen-Clark Lecturer, Carleton College, May 1986
Director, Public Policy Program, Stanford University, 1986-2002
David Kinley Lecturer, University of Illinois, May 1987
Sunderland Fellow, Law School, University of Michigan, Fall 1988
Morris M. Doyle Centennial Professor in Public Policy, Stanford University, 1990-2002
Jean Monnet Professor, European University Institute, May 1991
Associate Dean, Humanities and Sciences, Stanford University, I991-92
Visiting Professor, University of California, San Diego, 1993
Visiting Fellow, Brookings Institution, 1995-96

Nonresident Senior Fellow, Brookings Institution, 1996-99
Director, American Studies Program, Stanford University, 2001-02
Director, Stanford Center for International Development, 2002-06

TEACHING EXPERIENCE

Undergraduate: Introductory Economics, Intermediate Microeconomic Theory, Statistical Methods in Economics, Economic History of Medieval Europe, Contemporary Socioeconomic Problems, Advanced Topics in Microeconomics, History of Economic Thought, Economic Policy Analysis, Politics of Government Reform, Economics of Sports, Antitrust and Regulation

Graduate: Public Policy Analysis, Antitrust and Regulation, Applied Microeconomic Theory, Experimental Methods

RESEARCH INTERESTS

Applied Microeconomics, Antitrust and Regulation, Technology Policy, Political Economics, Legal Institutions

MEMBERSHIPS ON COMMITTEES AND BOARDS

President's Task Force on Communications Policy (CEA Staff Representative and Alternate Member), 1967-68
Commerce Technical Advisory Board Panel on Venture Capital, 1968-69
Committee on the Multiple Uses of the Coastal Zone, National Council on Marine Resources and Engineering, 1968
Secretary, President's Interagency Task Force on Income Maintenance, 1968
Task Force on Application of Economic Analysis of Transportation Problems, National Research Council (NAS/NAE), 1970-73
Committee on Technological Forecasting on Behalf of the Environment, Office of Science and Technology, 1970-71
Board of Economic Advisers, Public Interest Economics Foundation, 1974-84
Executive Committee, Caltech Environmental Quality Laboratory, 1970-71
Faculty Board, Caltech, 1974-76
Advisory Commission on Regulatory Reform, Senate Committee on Government Operations, 1975-77
Chairman, Fourth Annual Telecommunications Policy Research Conference, 1975-76
Committee on Satellite Communications, National Academy of Sciences, 1975-76
Advisory Council, Jet Propulsion Laboratory, 1976-82
Chairman, Committee to Monitor the Desegregation Plan of the Los Angeles Unified School District, Los Angeles Superior Court, 1978-79
Advisory Council, National Aeronautics and Space Administration, 1978-81
Advisory Council, National Science Foundation, 1978-89
Board of Advisers, National Institute of Economics and Law, 1978-84
Research Advisory Board, Committee for Economic Development, 1979-82
President's Commission for a National Agenda for the Eighties, 1980
Board of Directors, Economists, Inc., 1981-
Review Panel, NSF Regulation and Public Policy Program, 1981-84
Board of Editors, Journal of Economic Literature, 1981-90
Advisory Board, Solar Energy Research Institute, 1982-91
Board of Directors, Cornell Pelcovits and Brenner, Inc., 1982-1988
Chairman, Advisory Panel on Information Technology R&D, Office of Technology Assessment,

Memberships on Committees and Boards, cont'd

1983-84
Supervisory Board of Editors, Information Economics and Policy, 1982-88
Coordinating Editor, Information Economics and Policy, 1988-92
Advisory Committee on Integrated Environmental Management Program, Environmental Protection Agency, 1983-85
Commission on Behavioral and Social Sciences and Education, National Academy of Sciences, National Research Council, 1984-90
Advisory Panel, NSF Policy Research and Analysis Division, 1984
Director, Program on Regulatory Policy, Stanford Institute for Economic Policy Research, 1984-
Science Advisory Board, Panel on Clean Air, Environmental Protection Agency, 1985-86
Board of Editors, Review of Economics and Statistics, 1985-2002
Contributing Editor, Regulation, 1986-93
Energy Research Advisory Board, Department of Energy, 1986-89
President & Chairman of the Board, Telecommunications Policy Research Foundation, 1986-87
Board of Directors, International Telecommunications Society, 1988-92
Advisory Board of Editors, Journal of Risk and Uncertainty, 1988-
Acid Rain Advisory Committee, Environmental Protection Agency, 1990-91
Secretary of Energy Advisory Board, 1990-95
International Board of Editors, International Journal of the Economics of Business, 1993-
Faculty Senate, Stanford University, 1993-95, 98-02, 04-06
California Council on Science and Technology, 1995-2001
Panel on Universities, President's Committee of Advisors on Science and Technology, 1996
Committee on Intellectual Property and the Information Infrastructure, National Research Council, 1998-9
Board of Editors, Journal of Sports Economics, 1999-
Board of Associate Editors, Economics of Governance, 1999-
Board of Advisors, American Antitrust Institute, 2000-
Board on Science, Technology and Economic Policy, National Academies, 2000-2006

SPONSORED RESEARCH

"Opinions of Policemen." International Association of Chiefs of Police, 1969
"Studies in the Regulation of Economic Activity." Brookings Institution and Ford Foundation, 1970- 3
"Government Policies and Technological Innovation." National Science Foundation National R&D Assessment Program, 1973-4
"The Social Consequences of Earthquake Prediction," National Aeronautics and Space Administration, 1974-6
"Nuclear Safety Regulation." National Science Foundation RANN Program, 1975-7
"The Public Television Station Program Cooperative." National Science Foundation RANN Program, 1975-7
"The Station Allocation Game." Federal Communications Commission, 1977
"Energy Policy Studies." Various donors, 1978-84
"Economics of Oil Leasing" and "Issues in Utility Pricing." Department of Energy, 1978-9
"The Economics of Boxing, Wrestling and Karate." California Athletic Commission, 1978
"Implementing Tradable Emissions Permits." California Air Resources Board, 1979-82
"Social Science and Regulatory Policy." National Science Foundation, 1980-2
"The Political Economy of Public Policy." National Science Foundation and Center for Economic Policy Research, Stanford University, 1983-4
"CEPR Program on Regulatory Policy." various donors, 1987-2006
"The Economics of Research Universities and Scholarly Communication." Brown Center for

Education Policy, Brookings Institution, 1995-6
"Coordination of Regulatory Reform," Organization for Economic Cooperation and Development, 1996
"The Future of the Research University," Carnegie Foundation, 1996
"SCID Program in Economic Policy Reform," Various donors, 2002-06

CONSULTANTSHIPS

President's Task Force on Suburban Problems, 1968
President's Committee on Urban Housing, 1968
Special Assistant to the President, Ford Foundation, 1969
Space Technology Applications, Jet Propulsion Laboratory, 1969
Panel on the Abatement of Particulate Emissions, National Research Council (NAS/NAE), 1971
Sloan Commission on Cable Communications, 1971
President's Commission on Government Procurement, 1971
Senate Antitrust Subcommittee, 1972
MCI, Inc., 1972-73, 1983, 1986
National Science Foundation, 1973, 1975
Department of Justice, Antitrust Division, 1974-77, 1979-81, 1993-97
Internal Revenue Service, 1976-77
RAND Corporation, 1974-82
Los Angeles Lakers, 1974-75
National Football League Players Association, 1974-76, 1987-93.
Office of Telecommunications Policy, 1975-77
National Basketball Association Players Association, 1975-76, 1987-88, 1994
Naval Ordnance Test Station, 1975
Commission on Law and the Economy, American Bar Association, 1977-78
Aspen Institute Program on Communications and Society, 1977
National Commission on Electronic Funds Transfer, 1977
Business Round Table, 1978
Federal Communications Commission, 1977-81
Food and Drug Administration, 1978
Carnegie Commission on the Future of Public Broadcasting, 1978
Department of Energy, 1979
Office of Technology Assessment, 1980
Kerr-McGee Corporation, 1980
CBS, Inc. 1982-83
Environmental Protection Agency, 1982-83
Showtime/The Movie Channel, 1983, 1985
Harlequin Books, 1984
Lake Huron Broadcasting, 1984
National Collegiate Athletics Association, 1984
National Medical Enterprises, 1985, 1987-88
Camilla City Telecasters, 1985-86
Brown and Root, Inc., 1985-86
McDermott, Inc., 1985-86
Major League Baseball Players Association, 1985, 1994
United Cable Television and American Television and Communications, 1985
United States Football League, 1985-86
City of Anaheim, 1986
Technicolor, 1986
Metro-Mobile, 1986-89

Consultantships, cont'd

Hewlett-Packard, 1986-1990, 1991
Echostar, 1987, 1994-95, 2002-03, 2004-05
Continental Airlines, 1987-88
Home Box Office, 1988-89
Bell South Cellular, 1989
Western Union, 1989
Minnesota Twins, 1989
Northwest Airlines, 1989
Pepsico, 1989
Yellow Phone, 1989-91
Dialog, 1990-91
California Public Utilities Commission, 1989-90
American Newspaper Publishers Association, 1990
Humana, 1990-91
Powell, Goldstein, Frazer and Murphy, 1990-93
South Coast Air Quality Management District, 1990-91
Federal Trade Commission, 1990-91
Delta Airlines, 1991
California Cable Television Association, 1991
Bureau of Competition Policy, Government of Canada, 1991
R&D Business Systems, *et al.* 1991-95
International Entertainment Group, 1992-93
Nike, Inc., 1992
World Bank, 1992-
Gemini, Inc. 1992-94
Servicetrends, Inc., 1993-94
William Sullivan, 1993-95
Sure Safe Industries, 1993
Department of Justice, Civil Division 1994-95
Kopies, Inc., *et al.* 1995-1999
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