

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

THOMAS LAUMANN, FERNANDA GARBER,
ROBERT SILVER, GARRETT TRAUB, DAVID
DILLON and PETER HERMAN, representing
themselves and all other similarly situated,

Plaintiffs

v.

NATIONAL HOCKEY LEAGUE, *et al.*

Defendants

FERNANDA GARBER, MARC LERNER,
DEREK RASMUSSEN, ROBERT SILVER,
GARRETT TRAUB, and PETER HERMAN,
representing themselves and all other similarly
situated,

Plaintiffs

v.

OFFICE OF THE COMMISSIONER OF
BASEBALL, *et al.*

Defendants

CA No. 12-1817 (SAS)
ECF Case

CA No. 12-3704 (SAS)
ECF Case

~~[FILED UNDER SEAL]~~

REDACTED VERSION

REPLY DECLARATION OF ROGER G. NOLL

My name is Roger G. Noll, and I reside in Palo Alto, California. Previously I submitted two declarations in this litigation. The *Noll Declaration* presents an antitrust economics analysis

of the liability issues in this litigation¹ and describes my professional background and qualifications. The *Noll Supplement* addresses class certification issues: whether for each class² the methods that an economist would use to prove anticompetitive harm and to calculate damages are common to class members.³

Attorneys for the plaintiffs have asked me to review the declarations and depositions of the defendants' economic experts⁴ to determine whether they cause me to revise my analysis and/or change the conclusions that I reached in the *Noll Supplement*. In undertaking this task I have considered the declarations, depositions and background support of defendants' economic experts, other submissions and discovery material in this litigation, and additional relevant scholarly and trade publications, as well as my prior reports. Appendix A lists the material that I have considered. I have been assisted in preparing this declaration by Professor Gregory Crawford of the University of Zurich, Professor Ali Yurukoglu of Stanford University, and economists at Bates White Economic Consulting.

OVERVIEW

The principal conclusion of the *Noll Declaration* is that each league, its member teams, and the Regional Sports Networks (RSNs) that televise live games of member teams have adopted restrictions on the distribution of live telecasts that cause anticompetitive harm to

¹ *Declaration of Roger G. Noll*, February 18, 2014.

² This litigation involves four classes of consumers, two each for Major League Baseball (MLB) and the National Hockey League (NHL). For each league, the two classes include consumers who purchased subscriptions to each league's bundle of out-of-market live telecasts of games over the Internet (the Internet class) or from Comcast or DirecTV (the television class). See *Amended Class Action Complaint, Fernanda Garber, et al., v. Major League Baseball, et al.* pp. 18-19, and *Second Amended Class Action Complaint, Thomas Laumann v. National Hockey League, et al.*, p. 17.

³ *Supplemental Declaration of Roger G. Noll*, September 19, 2014.

⁴ *Declaration of Daniel L. McFadden*, November 12, 2014 (henceforth *McFadden Report*), *Declaration of Janusz Ordover*, November 12, 2014 (henceforth *Ordover Report*), and *Declaration of Ariel Pakes*, November 11, 2014 (henceforth *Pakes Report*).

consumers by limiting access to live game telecasts, thereby causing anticompetitive injury. These restrictions elevate prices for access to live game telecasts of teams outside of the “home broadcast territory” that each league assigns to each team and curtail output by reducing the number of consumers who obtain access to “out-of-market” live game telecasts.⁵ The *Noll Declaration* reaches four other important conclusions. (1) Live telecasts of games in each major professional sports league in the United States are a relevant product market and each local television market is a relevant submarket. (2) Each league, team and RSN that holds local rights to televise live games of a team in either league enjoys market power. (3) The broadcasting policies of each league, including territorial TV rights, are a source of market power for each league, team and RSN defendant. (4) The information that is available at this stage of the litigation does not support the conclusion that defendants’ anticompetitive conduct has a reasonable business justification. The principal conclusion of the *Noll Supplement* is that the methods of antitrust economics that would be used to prove liability and to calculate damages are common to members of each league class.⁶

The *Noll Declaration* (pp. 99-105) and the *Noll Supplement* (pp. 23-40) address proof of anticompetitive injury and quantification of damages on a class wide basis by estimating demand equations for live out-of-market telecasts of each team and using the results of this analysis in a Bertrand model of competition among providers of live game telecasts to simulate prices and outputs for out-of-market live game telecasts that are provided by league bundles and stand-alone live game telecasts of each team, assuming that the territorial restrictions on out-of-market telecasts are lifted. The models that I use are derived from models that have been published in leading peer-reviewed economics journals, adapted to be appropriate to examine the issue of unbundling the out-of-market live game telecasts that are offered by MLB and the NHL, given

⁵ *Noll Declaration*, p. 6, and *Noll Supplement*, p. 3.

⁶ *Noll Supplement*, p. 4.

the limitations of the data that defendants have produced.⁷

The models in the *Noll Declaration* and the *Noll Supplement* use the generalized method of moments (GMM) applied to data on prices and viewing patterns of individual consumers to estimate a logit model of the demand for the league bundles of out-of-market telecasts and stand-alone out-of-market live game telecasts. The supply side of the model uses data on the costs of the league bundles and Bertrand competition under product differentiation to predict prices and outputs under the counter-factual assumption that home territorial restrictions are removed for live game telecasts of the team in the league. Both the demand model and the supply model are widely used by economists to study prices and outputs in imperfectly competitive markets. These models have been implemented for the Internet versions of out-of-market live game telecasts for baseball and hockey and for the DirecTV versions of MLB Extra Innings because data on viewing patterns that is sufficient to support an analysis of the effects of removing territorial restrictions have been produced only for these services.

Defendants' economic experts challenge the reliability of my analysis on the grounds that my implementation of these models does not accurately reflect all of the relevant supply and demand characteristics in markets for live game telecasts of MLB and NHL games. Defendants' economic experts directly challenge only the implementation of this model, not the analysis in the *Noll Declaration* or the *Noll Supplement* that is not based on these econometric models.

⁷ The models that I estimated are derived from Gregory S. Crawford and Ali Yurukoglu, "The Welfare Effects of Bundling in Multichannel Television Markets," *American Economic Review* Vol. 102, No. 3 (April 2012), pp. 643-685. The model that Professors Crawford and Yurukoglu developed is based in part on the first article to use the generalized method of moments to study product differentiated markets by Steven Berry, James Levinsohn, and Ariel Pakes, "Automobile Prices in Market Equilibrium," *Econometrica* Vol. 63, No. 4 (July 1995), pp. 841-890, and on a subsequent article by the same authors, "Differentiated Product Demand Systems from a Combination of Micro and Macro Data: The New Car Market," *Journal of Political Economy* Vol. 112, No. 1 (February 2004), pp. 68-105.

Analysis that Is not Challenged by Defendants' Economic Experts

Defendants' economic experts do not discuss most of the analysis in my prior declarations. This section summarizes my prior analysis that defendants' do not challenge. This section also discusses some of my modeling decisions that defendants' economic experts challenge but that are justified by the analysis in these declarations that defendants' economic experts do not criticize or even mention. Rather than take on the reasons that I gave for these modeling choices, defendants' economic experts simply assert that I failed to consider an issue that, in reality, is examined in my prior declarations.

Price Variation

Defendants' economic experts do not challenge my description and analysis of price differences among versions (or packages) of league bundles nor express disagreement with my conclusion that members of each class face a common menu of list prices that are not individually negotiated (*Noll Supplement*, pp. 9-15).⁸ The *McFadden Report* (pp. 17-18) asserts that I ignore price variations among consumers, but the *Noll Supplement* (pp. 9-15, 33-34) analyzes price variation in the data and concludes that the price variation that does exist is not useful for identifying the parameters of the demand system.

While Professor McFadden is incorrect to claim that I ignore price variation, the models that I estimate do not incorporate variation in average monthly prices among consumers. Professor McFadden's criticism amounts to the assertion that these models could and should make use of this price variation. The *McFadden Report* does not explain how the price variation that does exist usefully could be employed to produce more reliable estimates of the effect on the

⁸ The only price differences among different consumers are (1) whether a consumer is a returning customer who qualifies for a renewal discount, (2) whether a customer receives a discount for using a Discover card, and (3) whether a customer's address is in Connecticut and so is charged a sales tax. None of these sources of variation constitute a source of individualized differences in prices.

prices of league bundles of the elimination of out-of-market restrictions on the distribution of live game telecasts, and does not mention, let alone criticize, the discussion in the *Noll Supplement* of why the variation in the average monthly prices of the version of the bundle that a consumer purchased is not useful for analyzing demand.

The issue concerning the use of price variation is whether this variation is useful for estimating the responsiveness of demand to prices. All consumers who buy a league bundle from the same vendor (the league, Comcast, or DirecTV) face the same menu of list prices: an early purchase discount (early renewal or first-time early bird) for the full season and regular full-season, half-season, and end-of-season versions of the bundle. The model that I estimate uses the average monthly price of the most commonly purchased version of the bundle as the price variable.

As the *Noll Supplement* explains (p. 11 and Exhibits 1A, 1B, 2A, 2B, 3A, 3B), the vast majority of customers buy a full-season package at either the regular price or a discounted early purchase price. The difference between early purchase and regular purchase full-season prices accounts for most departures of the price that a customer pays from the price that is used in the model. Another important source of variation in prices reflects lower total prices for packages for a partial season, and most of this variation is eliminated by using the average monthly price, rather than the total price of a particular package, as the price variable. Nearly all of the remaining variation in prices arises from three sources: a higher price for consumers who pay monthly installments rather than a single up-front payment; a percentage adjustment for using a Discover card; and the surcharge for sales tax among Connecticut subscribers. Thus, for the vast majority of consumers purchase decisions are not driven by differences among consumers in the prices that they face or by differences in the prices for the same menu that are faced by the same consumers over time.⁹ Instead, purchase decisions among packages are determined by

⁹ The price variations do not reflect differences in prices for the same consumers at different times because the data cover only one season during which the prices of game packages did not

unobservable differences in consumers that cause different preferences for the duration of the package, the time of the purchase, and a single payment versus monthly installments. Relative prices probably play a role in the decision about which package to buy and how to pay for it, but without variation in these relative prices either through time for the same consumers or among different consumers at the same time, these data cannot shed any light on the responsiveness of demand to price.

The *McFadden Report* does not state how price variation could be included in the demand model or, if it was, why doing so would improve the model.¹⁰ Professor McFadden's criticism of my failure to take price variation into account in the model is too vague and non-specific to be of practical value, and ignores the fact that customers of the same bundle provider face the same menu of prices. Thus, I see no need to change my model of the demand for out-of-market live game telecasts based on these comments.

Market Definition and Market Power

The *Noll Declaration* (pp. 24-95) contains my analysis of market definition, market power, and the sources of market power, and the *Noll Supplement* (pp. 15-18) explains why this analysis is common to members of each class. This analysis is especially important because it

change. The price data also do not contain differences in prices for the same services for different consumers, like the price variation in the article by Professors Crawford and Yurukoglu, because the only usable MVPD data cover only one year of DirecTV data for baseball. The price variation in each data set mainly reflects differences within the same menu that all consumers are offered. Thus, because the data do not include substantial variation in the relative prices of the same packages among consumers, these price variations cannot inform an analysis of the demand for out-of-market live game telecasts.

¹⁰ Professor McFadden stated in his deposition that he has no "affirmative opinion" about how variation in monthly prices ought to be included in the model, but suggested that the model could include actual monthly price, the package that was purchased, and blackouts of the league package in the area in which the consumer resides. *Deposition of Daniel L. McFadden*, December 19, 2014, pp. 210-216. Professor McFadden testified that the price variation in the data was "substantial" (p. 211), that the first step in determining whether price variation was important would be to examine variations across packages in monthly prices (p. 213), and that monthly prices were actually used in the estimation (p. 213).

contains the basis for my conclusion that Internet distribution of telecasts of live games in a sport are in the same market as live game telecasts that are offered by MVPDs.¹¹ Defendants' economic experts do not criticize my analysis of market definition and market power, nor do they question the commonality of the methods that I use to define relevant markets, to ascertain whether the defendants have monopoly power, and to identify the defendants' sources of market power.

Defendants' economic experts criticize my modeling choices in a way that implies disagreement with my market definitions. Specifically, defendants' economic experts criticize my decision not to incorporate a bargaining model of the wholesale prices that RSNs charge to MVPDs. One basis for this criticism is the assertion that I have presented no evidence to support the assumption that the availability over the Internet of the league bundles and, hypothetically, out-of-market single-team live game telecasts would eliminate the monopoly power of MVPDs in both the wholesale and retail markets for out-of-market live game telecasts. This issue is discussed in detail in the section of this declaration on the wisdom of incorporating a bargaining

¹¹ The *Ordovery Report* (pp. 39-40 footnote 85) states that I offer no analysis to support the conclusion that Internet and MVPD distribution of out-of-market live game telecasts are competitive substitutes, even though the *Noll Declaration* (pp. 53-58) explains the reasons for this conclusion. The *Pakes Report* asserts that it is "clearly wrong" (p. 22) to claim that Internet and MVPD distribution of telecasts are competitive substitutes because the prices of MLB.tv (Internet) are lower than the prices of MLB Extra Innings on MVPDs (*Pakes Report*, pp. 21-22). Professor Pakes statement is incorrect as a matter of basic economics. Products in the same relevant antitrust market can have different prices if products have different costs and/or qualitative attributes or if a seller can engage in price discrimination, and MLB.tv and MLB Extra Innings have different costs and qualitative attributes. For example, an MLB.tv subscriber pays separately for Internet access and data usage, while an MVPD subscriber does not. The relevant price comparison is the total cost to the consumer (content plus access plus data), which Professor Pakes does not examine. Also, Internet telecasts can be viewed on wireless mobile devices, while telecasts over an MVPD can only be viewed at a fixed location where the consumer has MVPD service, which makes the products qualitatively different in ways that can affect consumer preferences. These differences enable a supplier with monopoly power to engage in price discrimination, whereas greater competition in a product differentiated market drives the price of each product towards its average cost. See Hal Varian, "Price Discrimination," in Richard Schmalensee and Robert Willig, *Handbook of Industrial Organization*, North-Holland (1989), pp. 597-654.

model into my analysis, but briefly one basis for the assumption that Internet distribution imposes a competitive constraint on distribution of the same program content over an MVPD is the analysis that supports the conclusion that Internet and MVPD distribution of the same content are in the same relevant product market.

Business Justifications

Defendants' economic experts do not challenge my analysis of the business justifications that defendants offer. The *Noll Declaration* (pp. 105-120) analyzes five business justifications. (1) Each league is a "single entity" that could not offer the products at issue in this litigation without territorial restrictions on live game telecasts by each member of the league. (2) Exclusive rights to telecast live games enhance efficiency by providing a financial incentive to broadcast more games, to improve production quality, and to promote game telecasts to increase audiences. (3) Territorial restrictions enable the league to create new national broadcasting products. (4) Territorial restrictions contribute to competitive balance among teams in the league. (5) Territorial restrictions contribute to the financial stability of teams in smaller local markets. The *Noll Declaration* concludes that these business justifications have no basis in economic analysis or the information that is available at this point in the litigation. The *Noll Supplement* (p. 6) concludes that the methods that an economist would use to evaluate these justifications are common to members of the classes.

The only issue that is related to business justifications that is raised by defendants' economic experts is the role of exclusivity in the production of live game telecasts. Defendants' economic experts claim that my analysis assumes that RSNs will lose their exclusive rights to in-market live game telecasts, and from this assertion reach other conclusions about the quality and viability of individual team telecasts and the league bundles. As discussed elsewhere in this declaration, the premise of defendants' economic experts that I assume that the leagues will no longer black out local in-market games is false, so that the analysis that is based on this premise

is irrelevant.

Appropriateness of Modeling Approach

Defendants' economic experts offer numerous criticisms of my econometric models of supply and demand in the markets for live out-of-market game telecasts of games in MLB and the NHL, but they do not argue that my general approach, if implemented as they would prefer, would not be reliable and/or common to members of each class. Indeed, defendants' economic experts use the core elements of my modeling approach, but with different assumptions and sometimes with hypothetical data that do not reflect the behavior of real people, to attempt to prove that not all class members suffered anticompetitive injury. The disagreements between defendants' economic experts and me are about how best to implement the modeling approach that I have adopted (whether to incorporate additional variables into the demand model and whether to use Nash bargaining rather than Bertrand competition on the supply side), rather than whether this modeling approach, if implemented properly, would produce reliable results about whether customers of the league bundles of out-of-market telecasts were harmed and, if so, whether reliable damages calculations on a class-wide basis are feasible.

Criticisms of My Analysis

Defendants' economic experts offer many criticisms of the models that were used in the *Noll Declaration* and the *Noll Supplement* to establish anticompetitive injury and to calculate damages. Limits of space and time prevent a detailed discussion of every point. The remainder of this declaration discusses the criticisms that I regard as most important in that, if true, they would support one of two conclusions: (1) the models I have used are unreliable for proving anticompetitive injury and/or calculating damages on a class-wide basis, or (2) under other plausible assumptions these models show that not all members of each class are injured by the

conduct of the defendants. My evaluation of the criticisms by defendants' economic experts is that they do not support the conclusion that my methods for proving anticompetitive injury and calculating damages are unreliable because their criticisms depend on unrealistic assumptions or inappropriate applications of the methods that I have used.

The criticisms of my analysis fall into three broad categories.

First, some criticisms are based on misunderstandings of the model or incorrect assumptions about the behavior of industry participants. For example, defendants' economic experts incorrectly assert that my counter-factual analysis assumes that league bundles would not black out in-market games. A related incorrect assertion is that my demand models ignore the effects of blackouts on viewing patterns. Another criticism is that in estimating prices and market shares I should have assumed that the marginal cost of a subscriber is at least as great for a stand-alone RSN as for the league bundle. While the true marginal cost of a subscriber is not known precisely, the proposition that marginal cost is at least as high for an RSN as the league bundle is inconsistent with the economics of the distribution of video products and the information that has been produced on the costs of the league bundles.

Second, some criticisms are based on changes in behavioral assumptions that are not valid. For example, using the model to identify the prices that would arise if a league and all 30 RSNs jointly set their prices proves the obvious: collusion is more profitable than competition. Likewise, the procedures used by defendants' economic experts to show that an RSN has an incentive to withdraw from the league package amounts to nothing more than a demonstration that, all else equal, an RSN would prefer to have more rights than it actually obtains from a team at no increase in rights fees, which is true for the status quo as well as any plausible counter-factual world in which leagues limit the scope of broadcast rights that a team can sell. And the exclusion of bargaining between teams and RSNs for the sale of broadcast rights and between RSNs and MVPD for carriage rights is not an error, but a correct procedure that is based on real-world agreements in which parties increase joint profits by avoiding "double marginalization," a

problem that defendants' economic experts ignore.

Third, some criticisms amount to proposals to change the models. Here I report the results of refining the model in four ways that respond to criticisms by defendants' economic experts.

The demand model has been refined by adding a procedure for separating consumers into three categories based on their viewing patterns. Professor McFadden studied the consequences of my modeling approach for two hypothetical types of consumers: "superfans" who want to watch only a single team and "fans of the game" who watch every team in equal measure.¹² While the assumption that either type could account for all – or even most – consumers is wildly inconsistent with the data on viewing times by bundle subscribers, the idea that fans can be separated into categories according to their viewing preferences is potentially useful. Thus, I have refined my models to separate consumers into three categories: "superfans" of a single team, fans of two teams, and fans of many teams (including, in the extreme, "fans of the game" who like all 30 teams). This procedure allows consumers who are interested in multiple teams to consider more than one single-team service and thereby incorporates more price competition among RSNs and the league bundle into the model.

Professor McFadden (pp. 19-21) argues that team viewing times are an inferior measure of consumer preferences because they "double count" viewing time. The problem, however, is that viewing times by team are not irrelevant for a demand analysis. A game involves two teams and research show that attendance and TV audiences depend on both participants.¹³ Nevertheless, consumers actually watch an RSN, so I have re-estimated the demand models after allocating viewing times to RSNs and have used these results to re-estimate the counter-factual

¹² *McFadden Report*, pp. 7-11, Appendix A, p. 29.

¹³ Professor McFadden apparently agrees that the identities of both teams are relevant because in Appendix A of the *McFadden Report* he recommends reorganizing the data so that viewing times are observed for all possible pairs of team. This proposal is unworkable because the number of such pairs is too large (435) to make such a model computationally practical.

prices and market shares for each league bundle and each stand-alone RSN. By switching the unit of analysis from a team to an RSN, double counting of viewing time is eliminated.

As discussed elsewhere in the declaration, defendants' economic experts are incorrect in claiming that my models ignore blackouts and therefore assumes the elimination of blackouts of in-market games. The correct characterization of my analysis (*Noll Declaration*, pp. 102-103) is that my models did not explicitly take into account the effects of blackouts on consumer viewing patterns and pricing decisions, but did take them into account implicitly through the effect that blackouts have on the distribution of viewing times among teams. The refined model calculates counter-factual prices and market shares in the manner described by Professor McFadden (pp. 11, 20, Appendix A p. 28) by making blackouts explicit. Consumers are divided into 72 television regions for MLB and 46 television regions for the NHL, and in-market RSNs in each region are removed from their choice sets.

Finally, defendants' economic experts criticize my assumptions that all costs of the league bundles are marginal costs of a subscriber and that the marginal cost of a subscriber to a single-team service is 1/30 of the marginal cost of the league bundle. Professor McFadden re-estimates counter-factual prices and market shares under the assumption that the marginal cost of a stand-alone RSN can take on any value up to double the marginal cost of a league bundle. I have re-examined the cost data for the league bundles to improve the estimates of the marginal costs of the league bundle and a single-team service, in each case adopting the preferred position of defendants' economic experts that costs are equal when the available information is insufficient to support a different assumption. This analysis concludes that the upper bound on the marginal cost of a single-team service as a fraction of the marginal cost of the league bundle is roughly ■ percent for MLB and ■ percent for the NHL. These costs are used to calculate counter-factual prices and market shares. While these results substantially overstate the true marginal costs of both the bundle and single-team service and understate the magnitude of the difference between them, they produce reasonable upper bound estimates of costs and of prices

for the league bundles in the counter-factual world.

These refinements to the model cause damages to increase. The counter-factual monthly price for the most popular package now falls by \$5.55 for MLB.tv, a reduction of 27.7 percent, (instead of \$4.63 and 23.1 percent, respectively, in the *Noll Supplement*). For NHL GameCenter Live, the fall in price is \$8.20 (31.2 percent), instead of \$6.20 (23.6 percent) in the *Noll Supplement*. For MLB Extra Innings on DirecTV, the price reduction is \$9.17 (27.3 percent) instead of \$8.34 (24.8 percent). Exhibit 3 shows the amount of damage for each of these services. Recalculated total damages are \$ [REDACTED] for subscribers to MLB.tv, \$ [REDACTED] for subscribers to GameCenter Live, and \$ [REDACTED] for subscribers to MLB Extra Innings on DirecTV.

The remainder of this declaration provides a more detailed discussion of the criticisms of my prior declarations by defendants' economic experts and of the refinements to the model.

BLACKOUTS AND RSN DEFECTIONS

Defendants' economic experts state that my counter-factual world assumes that league bundles would not black out in-market live game telecasts¹⁴ and, as a result, RSNs would stop allowing their telecasts to be included in the league bundles. These statements are incorrect. My analysis deals with the supply and demand of *out-of-market* live game telecasts. The model does not estimate prices and market shares of in-market live game telecasts, but assumes that subscribers to league bundles currently and in the counter-factual world can access these games

¹⁴ *McFadden Report*, p. 11 (“a Boston resident... will be more interested in the league bundle in Dr. Noll’s but-for world because the Bruins games will no longer be blacked out”); *Ordover Report*, p. 36 (“Dr. Noll’s model principally, if not exclusively, purports to estimate the effect... of allowing the BFW League Package and the component RSN standalone offerings to compete against each other across the United States”); *Pakes Report*, p. 11 (“the League will offer a bundle of all 30 teams to all viewers (i.e., there would be no ‘black-outs...’)” and p. 20 (“despite their loss of in-market exclusivity, the RSNs would still produce all of the games at the same quality as they do in the current world”).

only through in-market RSNs.

The models in the *Noll Declaration* and the *Noll Supplement* assume that fans subscribe only to a league bundle or a single-team website or channel that carries their favorite team. A fan's demand for live game telecasts of each team and the identity of a fan's favorite team are derived from subscriber viewing patterns among games that are included in the *existing* league bundles, which include only game telecasts in which both participants are *out-of-market* teams. Individual viewing times for a subscriber's in-market teams usually are zero or almost zero,¹⁵ so that the distribution of viewing times for each team includes low values for in-market teams due to blackouts. Thus, the procedure for creating a large sample of consumer preferences from which to estimate demand is based on viewing times of near zero for teams that are blacked out for each consumer.

This mistaken characterization of my analysis leads defendants' economic experts to make three erroneous criticisms.

First, the *McFadden Report* (p. 11) claims that my demand analysis suffers from sample selection bias because in-market fans are likely to have more intense preferences for the home team. This claim is incorrect because the model does not use the viewing behavior of out-of-market fans to predict demand for a bundle that includes in-market games or for single-team in-market telecasts. Because the model estimates demand and simulates prices and market shares for single-team and league bundles of out-of-market live game telecasts, there is no selection bias. As the *Noll Declaration* states (pp. 102-103), my preliminary analysis did not explicitly take into account how local blackouts restrict viewer choice and demand; however, incorporating blackouts explicitly in the model is easy and, as explained elsewhere, this refinement has now been accomplished.

¹⁵ Subscriber viewing times for in-market teams are not always zero, most likely because subscribers who have multiple residences or who access games while travelling experience blackouts based on the location from which they access games, not their primary residence.

Second, Professor Ordover (pp. 5-6, 16-23, 36-38) offers a lengthy defense of “content exclusivity,” undertakes an analysis how the loss of in-market content exclusivity would lead to major changes in the production and distribution of live game telecasts, and asserts that my analysis is flawed because it conflates the effects of territorial rights and content exclusivity.¹⁶ Because my models assume that blackouts of live game telecasts within a team’s home broadcast territory continue, none of these arguments are a relevant criticism of my analysis.

Third, Professor Pakes (pp. 27-33) argues that RSNs would not allow their live telecasts to be included in the league bundles for free because they would lose “content exclusivity” in their home broadcast territories, thereby forcing them to compete with a product that carries the same live game telecasts without compensation.¹⁷ This criticism of my analysis is unwarranted for two reasons. First, it erroneously assumes that in the counter-factual world league bundles would not black out a team’s live game telecasts in the team’s home territory. Second, it erroneously assumes that RSNs, and not teams, own the rights to live game telecasts and so have the power to withhold telecasts from the league.

My analysis assumes that RSNs would enjoy the same “content exclusivity” in the counter-factual world that they currently enjoy, which is to be the only source of in-market live

¹⁶ While Professor Ordover claims that I ignore the distinction between territorial rights and content exclusivity, the *Noll Declaration* describes the system of home territorial rights in MLB and the NHL (pp. 12-15) and explains the difference between *team exclusivity* (exclusive rights to telecast games involving a particular team) and *sport exclusivity* (exclusive in-market rights to telecast games in an entire sport) (pp. 109-113). The system in place in both leagues grants *sport exclusivity* to an RSN for live game telecasts within its team’s home territory. In the counter-factual world an RSN would acquire *team exclusivity* in a team’s home territory but also would be able to acquire the right to distribute a team’s live game telecasts out of market, thereby symmetrically eliminating the *sport exclusivity* that currently is enjoyed by other RSNs in their home territories. Professor Ordover does not make the distinction between team exclusivity and sport exclusivity, instead conflating the two by assuming that the elimination of the latter involves elimination of the former.

¹⁷ “It is one thing to have a restriction that forces the RSN to provide its telecasts to the BFW League Package in return for the exclusive right to telecast its games in its home territory. It is quite another to assume that the RSN would be willing to give its telecasts to the BFW League Package free of charge when the package is competing with the RSN in its home market.” *Pakes Report*, pp. 32-33.

telecasts of games involving the team for which they have acquired exclusive television rights within the team's home territory. The change in the counter-factual world is that a team would be able to sell the right to distribute out-of-market live game telecasts that already are telecast in market. As a practical matter, because RSNs already are distributed to out-of-market MVPDs with blackouts of live games that they telecast in market, the only change in MVPD distribution in the counter-factual world is that out-of-market blackouts would not be required. In addition, a team could add Internet streaming to its website or license the right to add live games to the website of its RSN.

Professor Pakes' analysis of the "incentive" for RSNs to withdraw their participation in the league bundles is incorrect for another reason, which is that an RSN has no rights to out-of-market telecasts to sell to anyone. Professor Pakes characterizes the current system as one in which an RSN "gives" live game telecasts to the league for inclusion in the league bundle. This characterization is inaccurate. [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]¹⁸ The right that teams actually sell to RSNs is limited to distributing the telecast of a game within the home broadcast

¹⁸ [REDACTED]

(Bates Nos. NHL0001032-46 at 35). The agreement confers [REDACTED], but states that "[REDACTED]

[REDACTED]" (at 36-36). The agreement between MLB and DirecTV states: "[REDACTED]

[REDACTED]" (Bates Nos. DTV-SP0094027-90 at 41).

territory of a team through MVPDs and does not include an ownership interest in the telecast. Thus, the incentive to withdraw from the league bundle that Professor Pakes has analyzed pertains to a right that an RSN does not possess and cannot withdraw.

The analysis in the *Noll Supplement* shows that RSNs would profit from being permitted to distribute live game telecasts out of market even if their live game telecasts were included in the league bundle without payment to the RSN, as is now the case. Thus, each RSN would prefer expanding the rights that it acquires from a team to allow it to offer out-of-market telecasts on a stand-alone basis in addition to retaining exclusive rights to these telecasts in market and having its live game telecasts included in the league bundle. Likewise, a team could retain the right to out-of-market telecasts and, without consulting its RSN, deal directly with out-of-market MVPDs for carrying its live game telecasts and/or offer these live game telecasts through its website. The analysis shows that these arrangements would be profitable for each team.

BARGAINING

Defendants' economic experts argue that an economic analysis of the sale of out-of-market live game telecasts, whether through league bundles or stand-alone RSNs, ought to model bargaining between each RSN and both an MVPD (for unbundled carriage of the RSN without blackouts) and the league (for including the RSN in the league bundle).¹⁹ Professor Ordover (p. 39) adds the criticism that a valid model also would take into account the fees that teams charge RSNs for the rights to televise games. These criticisms are based on the fact that the article by Professors Crawford and Yurukoglu models bargaining over a per subscriber carriage fee between suppliers of channels and MVPDs, and finds that unbundling would cause most carriage

¹⁹ The *Pakes Report*, pp. 7-9 and 13-18, examines per-subscriber fees that RSNs would charge MVPDs. The *Ordover Report*, pp. 16-23, 49-53, examines per-subscriber fees that RSNs would charge the leagues for being included in league bundles. The assumption that the leagues would pay RSNs for inclusion in the out-of-market bundle makes no economic sense because the RSN has rights to live game telecasts only to the extent that that right is granted by teams and consistent with league rules.

fees to rise. Defendants' economic experts conclude that the same phenomenon would occur if consumers could buy access to every out-of-market RSN that carries live MLB or NHL games. The conclusion that a model of unbundling the league bundles should produce results that parallel the general results in the published article is puzzling for two reasons.

First, the article by Professors Crawford and Yurukoglu reports that negotiated carriage fees for sports networks would decline with unbundling. The declarations by defendants' economic experts do not mention this result, let alone explain why it does not apply to unbundled single-team telecasts.²⁰ I did not cite this result (notwithstanding that it is favorable to the plaintiffs) and did not attempt to determine the reason for it because I concluded that a bargaining model is not appropriate for determining the prices for out-of-market live game telecasts; however, if one believes that the bargaining model is appropriate, one needs to understand why the model in the published article produces different results for sports networks than for other types of channels and why the bargaining model of the effects of unbundling the league bundles that is adopted by defendants' economic experts produces a different result than the results reported by Professors Crawford and Yurukoglu. Rather than acknowledge and address these issues, defendants' economic experts simply ignore them.

Second, Professors Crawford and Yurukoglu assume that bundled cable offerings are replaced (not supplemented) by a la carte channel offerings. Professors Crawford and Yurukoglu do not analyze whether the option to buy channels a la carte would cause an increase in either

²⁰ Professors Crawford and Yurukoglu conjecture that unbundled prices for sports networks fall because the difference between the average and marginal values of viewing time on sports networks is greater than on networks. Professor Pakes stated that this result is a "problem" with the article and cited this conjecture as an explanation (*Deposition of Ariel Pakes*, December 8, 2014, pp. 96-97), but he did not analyze whether this conjecture is true. In fact, if the marginal value of viewing time is a better indicator of the average value for sports networks than for other types of networks, the "problem" in the model by Professors Crawford and Yurukoglu is that it overestimates the increase in a la carte prices for other types of channels rather than underestimates the effect on a la carte prices for sports channels. In the absence of systematic analysis of this issue, neither conjecture is more valid than the other, and whether these results constitute a "problem" is unknown.

wholesale carriage fees or the retail price of the bundle if both the bundle and a la carte channels were offered. The analogous problem here is to examine the implication of *replacing* the league bundles with 30 a la carte options, each of which offers the live game telecasts of one team in the league.²¹

The results in the *Noll Declaration* and *Noll Supplement* are consistent with the result in the published article, which is that the sum of the prices of the unbundled offerings substantially exceeds the original bundle price. But the relevant issue here is whether the bundle price would increase or decline if unbundled and bundled channels were both available. Professors Crawford and Yurukoglu do not address this issue in their article. Defendants' economic experts do not mention this feature of their article, let alone explain why their conclusions about carriage fees and consumer welfare would apply to a counter-factual world in which both bundles and a la carte channel selection are available.

Notwithstanding the assertions by defendants' economic experts, it is not a mistake to exclude negotiations over a per subscriber fee for carrying an RSN on an MVPD or for an RSN to obtain the rights to distribute live game telecasts of a team.

For Internet services, RSNs/teams and leagues deal directly with consumers so there is no intermediate negotiation over a wholesale price to model. Thus, this criticism does not apply to two of the three models in the *Noll Declaration* and the *Noll Supplement*. For the league season in which data were produced (2012 for MLB and 2011-12 for the NHL), MLB's league bundle had [REDACTED] subscribers on Comcast, an estimated [REDACTED] subscribers on DirecTV, and [REDACTED] Internet subscribers, while the NHL league bundle had [REDACTED] subscribers on Comcast, an estimated [REDACTED] subscribers on DirecTV, and [REDACTED] subscribers over the Internet.²² Thus, this criticism did not apply to [REDACTED] percent of the members of the MLB class and [REDACTED] percent of the

²¹ This point is made in the *Noll Declaration*, p. 101.

²² Exhibits 1A, 1B, 2A, 2b, 3A and 3B of the *Noll Supplement* contain estimates of subscriber data. As explained elsewhere, in the re-estimation of the models reported here, Internet viewing of the playoffs has been removed, which causes the number of Internet subscribers to decline.

members of the NHL class in 2012, and would not apply to larger fractions of both classes of consumers today.

For MVPD services, defendants' economic experts derive their conclusions from incorrect assumptions about the form of carriage agreements between MVPDs and content suppliers when both entities have substantial market power. To reach the conclusion that unbundling out-of-market live game telecasts on MVPDs causes the price of the bundle to rise, defendants' economic experts assume that an RSN/team and an MVPD negotiate a per subscriber carriage fee that is above the competitive price (because content suppliers have market power) and that the MVPD (which also has substantial market power) then sets the retail price of each RSN above the competitive level. This assumption is not valid, and hence modeling the negotiation process is unnecessary and potentially misleading, in either of two circumstances: (1) the content supplier or the MVPD lacks market power, which would be the case if Internet distribution is a close competitive substitute for MVPD distribution and/or RSNs/teams are close competitive substitutes for each other, or (2) the parties negotiate a different form of licensing agreement than the one that is assumed by defendants' economic experts. The *Noll Declaration*, pp. 101-102, justifies ignoring these negotiations for the first reason: Internet distribution of live out-of-market games is a close competitive substitute for delivery of the same product by MVPDs, and RSNs collectively offer more similar products than the broader category of all program channels that are distributed by MVPDs and/or over the Internet. Here I explain why the modeling assumption that is adopted by defendants' economic experts is not valid for the second reason: real-world licensing agreements do not take the form that defendants' economic experts assume.

A textbook conclusion in the economic theory of prices is that if an input and a final product that uses it are both monopolized and wholesale and retail prices are independently set as per-unit prices, the retail price will be higher than the retail price that maximizes the combined profits of the monopolists.

“It is well known in economics that the vertical integration of a downstream monopolist and an upstream monopolist is profitable, in the sense that the profit of the integrated entity will exceed the combined pre-integration profits. The reason for this is that the presence of double marginalization results in the consumer being charged a price that exceeds the monopoly price that would be charged by the integrated firm.”²³

This result does not always hold if both the upstream market and the downstream market are oligopolies, but the models in the *Noll Supplement* and defendants’ economic expert reports include the simplifying assumption that competition occurs only between the league bundle and each RSN because a fan is assumed to be interested in gaining access to out-of-market live game telecasts of only the fan’s favorite team. Thus, the models assume a series of duopolies of an RSN/team and a league, and “with successive duopolists it is always profitable for a pair of downstream and upstream firms to vertically integrate unilaterally, no matter what the other pair of firms does.”²⁴

If double marginalization occurs, both buyer and seller benefit from finding a way to avoid it. In addition to vertical integration, the other solutions are to construct carriage fees that are not “linear pricing” (a fixed charge per unit of output, which here is a per subscriber fee) and/or to negotiate both wholesale and retail prices as part of the agreement.²⁵ Defendants’ economic experts do not mention, let alone analyze, alternative ways to price rights, and defendants’ economic experts did not investigate whether per subscriber fees without an agreement on retail prices are actually used by MVPDs and suppliers of sports content.²⁶

²³ Gerard Gaudet and Ngo Van Long, “Vertical Integration, Foreclosure, and Profits in the Presence of Double Marginalization,” *Journal of Economics and Management Strategy* Vol. 5, No. 3 (Fall 1996), pp. 409-32 at p. 410.

²⁴ *Ibid.*, p. 411.

²⁵ Patrick Rey and Jean Tirole, “The Logic of Vertical Restraints,” *American Economic Review* Vol. 76, No. 5 (December 1986), pp. 921-39, state: “Upstream and downstream firms often do not trade intermediate goods through a simple linear pricing mechanism” (p. 921). These authors examine two-part tariffs (a fixed fee and a price equal to marginal cost) and resale price maintenance (wholesalers and retailers agree on the retail price as well as the wholesale price) as remedies for double marginalization.

²⁶ In his deposition testimony, Professor Pakes could not describe the problem of double marginalization (pp. 44-50, 70-73, 134-137), did not identify any pricing strategies that avoid

Relevant agreements for sports content show that, indeed, the solutions to the double marginalization problem that economists identified long ago are used in practice. Agreements between broadcasters and teams for the right to televise games normally do not depend on the number of consumers who view the broadcast or pay a subscription fee to gain access to televised games, and often include provisions about retail pricing.

(1) [REDACTED]
[REDACTED]
[REDACTED]²⁷

(2) The 2007 agreement between MLB and DirecTV²⁸ specifies how DirecTV can package out-of-market games (ruling out sales of individual games or teams) (p. 13). The agreement also stipulates:

[REDACTED]

While this agreement does not explicitly determine retail prices, it gives MLB a role in pricing and establishes that prices of similar services, including MLB.tv, will be benchmarks for setting retail prices.

(3) The MLB agreement with DirecTV is not expressed as a per subscriber fee. Instead, the rights fee is expressed as a formula: [REDACTED]

double marginalization, such as a two-part tariff (pp. 78-81), and acknowledged that he had not studied contracts between MVPDs and content suppliers (pp. 66, 113).

²⁷ Bates Nos. NHL0001027-30.

²⁸ Bates Nos. DTV-SP0094027-90.

prices and output if the league bundle is unbundled are for MLB Extra Innings on DirecTV. The MLB contract with DirecTV shows that modeling the process for setting the price for this product by assuming that the content provider charges a per subscriber fee and then plays no role in setting retail prices is wildly inaccurate and leads to incorrect results that favor the defendants by creating retail prices that reflect the effects of double marginalization when, in reality, the contracts do not lead to double marginalization. Thus, defendants' economic experts have developed a model that is inconsistent with the facts and that produces unreliable results that are favorable to the defendants.

Neither I nor defendants' economic experts have analyzed demand, prices and market shares for out-of-market live NHL games through MVPDs because neither Comcast nor DirecTV have produced data for NHL Center Ice that can support such an analysis. When such data are available, the models that are constructed to analyze them must depend on the properties of the data. Regardless of the modeling accommodations that are necessary to make the best use of these data, an economically valid model for NHL Center Ice would not be based on the assumption that the NHL charges [REDACTED] and [REDACTED] because that is not the kind of contracts that the NHL has signed with DirecTV and iN Demand. These contracts give the NHL [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]³² Thus,

³² To illustrate, consider a simple linear demand model in which the quantity sold, $Q = A - P$, where P is the retail price. Assume for ease of exposition that the only component of marginal cost is the rights fee, which can be expressed as either a fixed fee, a , per unit of output as defendants' economic experts assume, or as a fraction, f , of the retail price (the actual NHL case). In the first case profits are equal to $P(A-P) - a(A-P)$ and the profit-maximizing price is $(A+a)/2$, which implies that a higher rights fee leads to a higher retail price. If a higher rights fee arises from greater market power on behalf of the input supplier, the increase in retail prices reflects double marginalization. In the second case, profits equal $P(A-P) - aP(A-P)$ and the

the appropriate model for the NHL's relationship with MVPDs is not the model that has been used by defendants' economic experts.

Defendants' economic experts are simply wrong as matters of economic theory and the practical reality of contracting for relevant content to claim that a model of the relationship between content suppliers and MVPDs must incorporate bargaining over input prices to produce reliable estimates of retail prices. Their criticism that my analysis is somehow unscientific and unreliable because I did not model the upstream components of the vertical chain of transactions has no validity.

MARGINAL COSTS

Marginal cost is potentially an important input to an antitrust economic analysis of whether conduct by a defendant caused anticompetitive injury. Consequently, the procedure for estimating marginal cost can play an important role in analyzing several issues, including determination of whether defendants possess and exercise monopoly power as well as calculation of prices and outputs in the counter-factual world. As explained in the *Noll Declaration* (pp. 75, 80-84), a commonly used indicator of market power is the Lerner Index, which is the percentage of price that is a mark-up over marginal cost. Economic theory predicts that an increase in market power will lead to an increase in the Lerner Index, that higher marginal costs affecting all firms in an industry will cause higher retail prices, and that in a product differentiated industry higher marginal costs for one firm will cause an increase in its retail price relative to the prices

formula for profit-maximizing price is $A - 2P - aA + 2aP = 0$, or $2P(1-a) = A(1-a)$. Here the terms $(1-a)$ on each side of the equation cancel (as long as the royalty rate is less than 100 percent), so profit maximization implies that $P = A/2$. Thus price does not depend on the royalty rate and so an increase in the market power of the input supplier does not cause a higher retail price through double marginalization. If the MVPD has other sources of marginal cost, the pricing result is intermediate between these extremes. The take-home lessons from these examples are that the extent to which double marginalization is a problem depends on contract details that must be taken into account in a model and that if double marginalization creates a significant problem, the parties to a contract have means available to mitigate or even avoid it.

charged by its competitors.

Estimates of the marginal costs of the league bundles and stand-alone channels that show out-of-market games of a single team are a necessary component of my analysis of liability and damages. Marginal costs are used to prove monopoly power (the Lerner Index) and to quantify anticompetitive injury and damages (the effect on prices for the league bundles if restrictions on out-of-market telecasts are lifted). Here the relevant measure is the marginal cost of a subscriber. Examples of costs that include a marginal subscriber cost are marketing, set-up, billing, customer service, and data streaming.

The *McFadden Report* (p. 17) asserts that “a scientific approach requires careful measurement of team and league marginal costs because but-for world prices and damages are highly sensitive to the inputs.” This counsel of perfection sets up an impossible burden for the plaintiffs to offer a reasonable method for calculating damages because the defendants, not the plaintiffs, possess all of the information about their costs and their cost records may not reflect “careful measurement” of marginal costs.

The leagues produced some cost data for their Internet bundles, but these data are too aggregated and imperfectly documented to allow precise estimates of the marginal costs of the bundles or the dependence of these costs on whether the service is a bundle or channel that offers only the live game telecasts of a single team. To implement the models of price formulation (combining the demand and supply models) in my prior declarations, I assumed that the costs that were produced were all marginal costs for the bundle, even though this assumption is certain to overstate the magnitude of marginal costs. I did this because this assumption biases the results of my analysis in a way that is favorable to the defendants. First, it understates the true Lerner Index and hence is stacked against finding the presence of monopoly power. Second, it causes the counter-factual prices of the league bundles that are calculated from the supply and demand simulation to be higher, and hence damages to be lower, because higher marginal costs imply higher retail prices.

In implementing the simulation model to calculate prices and market shares in the counter-factual world, I assumed that the marginal cost of each stand-alone channel was 1/30 of the marginal cost of the bundle. Defendants' economic experts criticize this assumption on the grounds that it is arbitrary. The *Ordover Report*, pp. 47-48, asserts that assuming that no costs are fixed is obviously wrong and that my analysis assumes implausibly low marginal costs for RSNs, although Professor Ordover does not explain why my estimates of the marginal cost of a subscriber to stand-alone live game telecasts of a team are implausible. The *McFadden Report* (pp. 15-16) states that my declarations contain "no analysis to show that the teams would have lower marginal costs than the leagues" and that I have no information about "the costs that a team would face in offering its own programming in the but-for world." Professor McFadden then calculates the effects on the calculation of prices in the counterfactual world if the marginal cost of the league bundle were the same as I have assumed and the marginal cost of a stand-alone channel varied from 1/30 to double the marginal cost of the league. Of course, it is not true, as Professor McFadden puts it, that I had "no information" about the marginal cost of a subscriber to stand-alone out-of-market telecasts of a team. MLB and the NHL produced some cost data that, while insufficiently documented and excessively aggregated, are not devoid of information. My error was not that I did not consider this information, but that I did not anticipate that the assumption that all costs were marginal would be controversial.

The best way to produce a more accurate estimate of marginal cost is for the defendants to provide more detailed, better documented cost data. The declarations by defendants' economic experts provide no such information. The next best way to produce better estimates of the marginal cost of a subscriber is to analyze the data that have been produced to identify components of costs that include marginal costs. Defendants' economic experts did not undertake this analysis either. Had they done so, potentially they could have generated some empirical evidence about whether my cost assumptions cause a significant error in predicting prices in the counter-factual world. Instead, defendants' experts have stated the obvious: a

single-team service will not be an effective competitor if its marginal cost is sufficiently high relative to the marginal cost of the league bundle.³³

The *McFadden Report* (p. 15 footnote 12) states that “it is evident that the component of marginal cost that is associated with servicing a subscriber, including billing, providing content, determining digital rights, and collecting and processing payments, would be similar for the league bundle and an a la carte channel.”³⁴ This sweeping statement is not correct, as is apparent from examining the nature of the costs that MLB and the NHL have reported.

The first step in producing the best feasible estimates of marginal costs is to identify cost elements that plausibly could depend on the number of subscribers. To ascertain the validity of the criticisms by defendants’ economic experts of my assumptions about marginal costs, I have undertaken further analysis of the cost data that were provided by MLB and the NHL to identify costs that are at least in part marginal. In each case, as in my prior analysis, I assume that if a

³³ Professor McFadden asserts that the appropriate way to analyze the effect of marginal costs on damages is to run the model under widely various assumptions about marginal costs to determine the sensitivity of results to cost assumptions (*McFadden Deposition*, p. 192-93). Professor McFadden’s statement is incorrect for two reasons. First, extreme assumptions about marginal costs are certain to produce unreliable predictions about prices and market shares. Without plausible bounds for marginal cost, one cannot evaluate the results of these simulations. Second, if the marginal cost of a single-team service is sufficiently high, any model will predict counter-factual prices that produce no damages. Professor McFadden’s recommended solution, because it places no boundary on the marginal cost of a single-team service, is a circular justification for the conclusion that anticompetitive injury cannot be proved and damages cannot be calculated. To place a reasonable lower bound on the price elevation that arose from anticompetitive conduct, a reasonable upper bound must be placed on the marginal cost of a single-team service so that some counter-factual simulations can be ruled out as implausible.

³⁴ Professor McFadden does not define these terms, and two – providing content and determining digital rights – are unclear. The term “providing content” could refer to the content of a channel, but this is a marginal cost per subscriber only if rights fees are a per-subscriber fee. If this is the meaning that Professor McFadden intended, his assertion that content fees are a marginal cost per subscriber is incorrect for all three of the bundled services that are analyzed in this report. The other meaning for “providing content” is Internet streaming fees, which I assume to be the case. The term “determining digital rights” usually refers to identifying copyright holders to negotiate royalties, which cannot be Professor McFadden’s intended meaning. Here I assume that this phrase refers to identifying locations of subscriber for enforcing blackouts in the league bundle.

cost element plausibly contains any marginal costs, then all of these costs are treated as marginal. The reason for this assumption is that damages are lower if marginal costs are higher.³⁵ For each category I use other information from discovery to analyze the relationship between marginal costs for the bundle and for a single-team service, if possible. Exhibits 1A (MLB) and 1B (NHL) list the cost categories in the leagues' data and summarize the results of this analysis.³⁶

One important cost is associated with the customer billing system. At his deposition, Professor McFadden elaborated on one of these costs: the fee charged by a credit card company if a consumer pays for a subscription by using a credit card.³⁷ But this example does not support the claim that marginal costs would be "similar" for the bundle and a single-team service. Credit card fees usually are a percentage of the amount charged. In the counter-factual simulations the estimated prices of the league bundles are substantially greater than the price of all single-team services, so that credit card fees are substantially greater for the league bundle than for a stand-alone team.

MLB does not pay credit card fees directly, although they affect its bank deposits. MLB's billing system is managed by Paymentech/Amex and Cybersource. These companies process credit card payments, send charges to and receive payments from credit card companies, deposit payments in MLB's bank account, and charge a variety of fees for managing MLB's customer accounts.³⁸ No information has been produced on the fraction of these costs that are

³⁵ If the marginal cost of a bundle is lower, current prices include more monopoly overcharges that can be competed away by single-team live game telecasts. If the marginal cost of a stand-alone team is lower relative to the marginal cost of the bundle, the price of the stand-alone product is lower and so has a greater competitive impact on the price of the bundle. These effects are apparent in Professor McFadden's simulations, which show that if the marginal cost of stand-alone telecasts is at the high end of his range, damages are zero.

³⁶ In recalculating these numbers, I also have made a small correction to the revenues from MLB.tv by removing the revenues associated with post-season games that also were available on national television channels.

³⁷ *McFadden Deposition*, pp. 191-92.

³⁸ See https://www.chasepaymentech.com/faq_payment_processing_information.html, <https://support.cybersource.com/cybskb/index?page=content&id=C228&actp=LIST>, and Bates Nos. MLB0500544 and MLB0255273.

calculated as a percentage of a customer's bill, a fee per transaction, a fee per subscriber, or a fixed fee for managing the billing system.³⁹ Thus, to be conservative I assume that the cost per subscriber associated with these items is not lower for a single team product, even though this assumption is certain to lead to an overestimate of marginal costs for a single-team service because some of these costs (like credit card fees) are not a fixed cost per subscriber but are lower for a single-team service.

TV Geolocation refers to MLB's patented computer system that identifies the customer's location based upon IP address.⁴⁰ As such, it may be the "program content" costs that were mentioned by Professor McFadden as imposing "similar" marginal costs on both the bundle and a single-team service. In this case, the costs of creating, improving and maintaining computer software to determine the location of a subscriber is a fixed cost and so should not be included in marginal costs. Technically, the marginal costs of "determining digital content" are "similar" for the bundle and the single-team service in that they are both zero.

The most important change in estimated marginal costs for MLB is that the 2012 data did not contain Internet streaming costs, which I assume is "providing content" in the *McFadden Report*. These costs probably should have been included in the 2012 MLB data but were not. To correct for this likely omission in the 2012 MLB data, MLB's streaming costs for 2011 were added to the 2012 costs, after subtracting MLB's streaming costs for other products, such as minor league baseball and Glenn Beck.⁴¹

Average streaming cost per subscriber is a reasonable estimate of the marginal cost of a

³⁹ The procedure that I have used finds the value of P that maximizes $PQ - FQ$, where F is average costs, P is the price, Q is the number of subscribers, and $Q = Q(P)$. If the structure of costs were known, the model could be changed so that P maximizes $(1-f_r)PQ - f_sQ - f_f$, where f_r is the part of the current cost that proportional to revenue, $f_s < F$ is the part of the current cost that is a per-subscriber charge, and f_f is the part of the current cost that is unrelated to either revenue or the number of subscribers.

⁴⁰ See Dan Frommer, "MLB.com Gets Geolocation Patent," *Business Insider*, May 14, 2009, at <http://www.businessinsider.com/mlbcom-gets-geolocation-patent-2009-5>.

⁴¹ See Bates No. MLB0108889.

subscriber because streaming cost is determined by the amount of time that a subscriber spends watching games and typically is a fixed price per gigabyte.⁴² The DirecTV MLB data show viewing times, but the MLB.tv data do not, so I use viewing times on DirecTV to estimate the average viewing time of subscribers who watch a single team (for whom the stand-alone product for their favorite team is attractive) and subscribers who watch multiple teams (for whom the bundle is attractive). Because single-team consumers spend much less time watching baseball games, the marginal cost per subscriber of single-team viewers is much less. Consequently, contrary to Professor McFadden's assertion, this component of cost is not likely to be similar for the bundle and a single-team service.

Finally, customer service is the cost of responding to customer complaints via e-mail, telephone, on-line forum or web chat. This cost item includes complaints for other products, and I have removed these costs because they are unrelated to streaming game telecasts.⁴³ I have adjusted customer service costs for a single-team service by removing the cost of complaints to MLB.tv that are generated by blackouts, based on the assumption that an out-of-market single-team service would have no blackouts. Although the evidence indicates that blackouts give rise to most customer complaints,⁴⁴ I assume that a far lower fraction (20 percent) of customer service costs is for dealing with complaints about blackouts. I assume that the remaining costs would be the same for a single-team service since collectively single-team services provide the same feeds over the same infrastructure as the league bundle. Plausibly these costs also depend on the total time that a subscriber spends viewing a service because a customer will not complain if not attempting to watch, in which case the marginal cost of customer service would be lower for single-team service because it would be watched less intensively. Hence, my estimates are conservative in that they are likely to overestimate the marginal cost of a single-team service.

⁴² See Bates No. MLB0012825, Seventh Addendum at 1.

⁴³ See Bates Nos. MLB0039222, MLB0039758.

⁴⁴ An internal email from MLBAM CEO Robert Bowman in 2010 stated that "[REDACTED]" (Bates No. MLB0351016).

For the NHL, programming, equipment, and front-office costs have been assigned to fixed costs. Programming is not provided on a customer-by-customer basis and, in any case, is a minor cost. Depreciation, maintenance and equipment refer to the costs of maintaining the web site, including storage of archived games, technical support and services from NeuLion,⁴⁵ which do not depend on the number of subscribers. Because customer acquisition and support costs are part of other costs, operating costs apparently refers to administrative costs, which do not depend on the number of subscribers.

The items listed under marketing costs can be considered in part a marginal cost of subscribers under the assumption that an increase in expenditures on advertising to hockey fans increases the number of subscribers. One problem is that marketing costs are likely to include expenditures to promote other products, such as access to classic games or merchandise that is offered on a website. I assume that these costs are all marginal for subscribers to the league bundle, although this assumption leads to an overestimate of marginal costs. I also assume that these costs are the same for single-team channels, although this, too, overstates these marginal costs because marketing for a single-team service has a much narrower and more focused fan base (single-team fans) that can be targeted to likely subscribers through ads on a team's web site and broadcasts of games.

Subscription costs are regarded as marginal and equal for both services because of the absence of detailed information about these costs. Streaming costs are assumed to be marginal and the costs for the league bundle have been adjusted to reflect the fact that single-team consumers of the NHL bundle spend less time watching games than consumers who watch several teams. Other direct expenses appear to include customer support costs, but may include other items.⁴⁶ In the absence of further information these are assumed to be marginal and equal for both the bundle and single-team services, although marginal customer support costs are likely

⁴⁵ Bates No. NHL0001192, from the NeuLion contract.

⁴⁶ Bates No. NHL1445676, Column D.

to be lower for single-team services because the latter have less viewing time per subscriber and do not have blackouts.

The results of this analysis are shown on the last line of Exhibits 1A and 1B. The upper bounds on marginal costs for league bundles are \$ [REDACTED] for MLB (slightly higher than in the *Noll Supplement*) and \$ [REDACTED] for the NHL (substantially lower than in the *Noll Supplement*). The upper bound on marginal costs for single-team service is \$ [REDACTED] for MLB and \$ [REDACTED] for the NHL, both much higher than the estimates in the *Noll Supplement*. Important caveats are that these costs are likely to be overestimated for both the bundle and stand-alone services, and that the difference between the bundle and single-team marginal costs is likely to be underestimated because some costs that are lower for a single-team service are assumed to be the same.

MODEL REFINEMENTS

This section describes the refinements to the three models (for the two Internet bundles plus MLB Extra Innings on DirecTV) that have been implemented in response to the criticisms by defendants' economic experts, and implements these refinements to re-estimate damages and to examine the consequences of hypothetical circumstances that are analyzed in the declarations of defendants' economic experts. The refinements include changes in the data that are used in the models and changes in the specifications and assumptions in the models.

Data Changes

The only data that defendants have produced to date that can support an econometric analysis of demand are the Internet versions of the league bundles (MLB.tv and NHL GameCenter Live) and DirecTV's version of MLB Extra Innings (*Noll Supplement*, p. 25).⁴⁷

⁴⁷ The Comcast data cover too short a period and too few geographic areas to produce a reliable estimate of demand for an entire season for out-of-market games throughout the nation. The

The data that are used in the refined model differ from the data that were used in the *Noll Supplement* as follows.

The most important change in the data is to measure viewing times for each RSN, rather than for each team. This change responds to the criticism by Professors McFadden and Ordober that team viewing times involve double counting as well as to produce results that can be compared directly to some of Professor Ordober's calculations.

As explained elsewhere, whether this change is an improvement is unclear. Demand studies in team sports find that attendance and television audiences depend on the identities of both teams. Nevertheless, there are two reasons to adopt this change. First, RSNs are the elements in the choice set of customers for out-of-market telecasts. Viewers decide to watch a specific RSN that is the television outlet for a particular team. Second, consumers subscribe to the bundle (and, hypothetically, to a single-team out-of-market RSN/team) for a period that is considerably longer than a single game or single series (most subscribers buy the entire season). Hence, the service that is purchased is a package of games that involve more and less attractive opponents.⁴⁸

The decision to switch to RSN viewing required three adjustments to the data.

First, the data that were produced do not always record the identity of the channel on which a viewer watched a game. When the broadcaster of a game that a subscriber watches is not known, for each viewer the game is assigned to the RSN that televises the games of the team

DirecTV data for NHL Center Ice have been aggregated by assigning all viewing simply to NHL out-of-market games so that viewing times cannot be calculated for each team or RSN.

⁴⁸ The fact that consumers do not purchase access to pairs of teams but to a large number of games is a reason not to adopt Professor McFadden's idea of measuring the viewing times of each pair of teams. This proposal cannot be implemented on data from a single season (some pairs of teams play no games so preferences for that combination cannot be studied). And even with multi-season data, the proposal is unworkable computationally because of its complexity. Implementing this proposal would require 435 ($30 \times 29 / 2$) separate viewing options and an enormous sample size of constructed consumer preferences in order to include sufficient variance in preferences for every pair to yield a reliable demand model.

that the viewer watches most.⁴⁹ Thus, in a match-up between the Yankees and the Red Sox, consumers who spend more time watching the Yankees are assigned to the Yankees' RSN, while consumers who spend more time watching the Red Sox are assigned to the Red Sox RSN.

Second, not all games are televised by an RSN. Although every team has an RSN that telecasts most of its games, some games are telecast by an over-the-air television stations, not the RSN, but are nevertheless included in the league bundle. Of course, because teams (not broadcasters) own the rights to games, combining the two sources of game telecasts into a single option in either a league bundle or a single-team service presents no problem. Here the viewing times on the Internet services for each source of games for a particular team are combined and assigned the name of the team's RSN simply to create a unique identifier for each team's game telecasts. For MLB Extra Innings, DirecTV does not carry live game telecasts that are televised by a few over-the-air stations, so that a customer watches one of these games must be watching the RSN of the other team. In these cases, a subscriber's viewing time is assigned to the RSN of the team that the subscriber spends the greater time watching.

Third, some RSNs carry the live game telecasts of multiple teams. Here we treat the viewing data for each team as if it were a separate RSN. Again, because teams, not RSNs, hold the rights to their telecasts, this assumption corresponds to the reality that teams control the distribution of their game telecasts, but not the distribution of game telecasts of other teams that share the same RSN. Thus, the counter-factual world that we seek to model is one in which access is sold to service that offers live game telecasts of a single team. While this service is labeled as the team's RSN, it just as easily could be labeled as the team itself.

Another data change is to eliminate viewing times for post-season games.⁵⁰ Many of these games were available over national networks. The recorded viewing of games on the

⁴⁹ This procedure is essentially the same method that Professor Ordover used to allocate viewing times to a single team, rather than two (*Ordover Report*, p. 25, footnote 59).

⁵⁰ The NHL data include all regular season games in the bundle and the MLB data include games from the regular season and spring training.

league bundles that were available simultaneously on other channels is not a reliable indicator of team preferences. This procedure reduces by a small amount the amount of viewing time.

The final data change is to use the revised estimates of marginal costs of the bundle and single-team services, as discussed in the section of this declaration on costs. Simulations also have been run under the assumption that marginal cost is the same for both the bundle and each single-team service.

Refined Specification

The details of my modeling approach are set forth in the *Noll Supplement* (pp. 28-37). This section describes the changes that have been made to respond to the criticisms of this approach.

The change in the data to RSN viewing requires a change in the interpretation of the variables in the theoretical model. Because viewing time now corresponds to an RSN, the utility weights in the theoretical model no longer refer to a team but instead refer to an RSN that carries the live games of a particular team. These utility weights incorporate all sources of demand associated with viewing that RSN, including the value of the team that is associated with the RSN, the opponents of that team, and the other elements of live Game telecasts, such as the announcers and production values.

The model of consumer preferences has been extended to include two new parameters that separate consumers into three types. The first type consists of consumers who are interested in only one RSN/team (Professor McFadden's "superfan"). These consumers are constrained to derive no value from watching any RSN other than their favorite. The second type consists of customers who are fans of two RSNs, for which viewing time generates positive value, but for all other RSNs viewing time produces no value. The third type consists of customers who are interested in at least three teams, and perhaps more. This group includes Professor McFadden's hypothetical "fans of the game" who could derive value from watching all thirty teams/RSNs.

In the theoretical model of consumer choice, the amount of time that a consumer allocates to a particular RSN depends on the marginal utility of viewing each team and the marginal utility of doing something else. Customer types are used to separate consumers into groups according to how many RSNs they consider viewing, but whether they actually view an RSN also depends on the utility of doing other things. Consumers view one RSN if only one RSN produces greater utility from viewing time than the incremental utility of doing something else. This group includes superfans who derive no utility from viewing any RSN other than their favorite, but it also includes fans of more than one RSN (that is, consumers who could derive utility from more than one RSN/team), but for whom the marginal utility of watching a game exceeds the marginal utility doing something else for only one team. The distinction here is that superfans are constrained to derive no value from an RSN other than the RSN of their favorite team, whereas other fans are not so constrained, but nonetheless may decide to watch only one RSN because the option to do other things is so appealing. A consumer watches many RSNs only if for many RSNs marginal utility of viewing exceeds the marginal utility of doing something else.

The distribution of consumers among the single RSN type, the two RSN type, and the multiple RSN type is estimated from the viewing data. This change requires estimating two additional parameters: the proportion of subscribers who belong to the one-RSN type and the proportion of subscribers who belong to the two-RSN type. The viewing data show that most customers for both league bundles devote most of their viewing time to one or two channels, but that a significant fraction spread their viewing time over twenty or more channels. The viewer type parameters are estimated from the distribution among consumers of the ratio of time spent viewing each consumer's favorite channel to the total time that consumer spends viewing all channels. If a customer is a single RSN type, this ratio is one. For a two-RSN customer, this ratio is nearer one-half. If a customer is, to use Professor McFadden's term, a "fan of the game," this ratio is approximately 1/30.

Including two additional parameters (one-RSN type and two-RSN type) to the model increases the number of parameters in the model to $2N+6$, where N is the number of RSNs.⁵¹ These types add new data features that are used as moment conditions: the mean, standard deviation, skewness, and kurtosis of the distribution of the ratio of time spent viewing the most-watched channel to the total amount of time spent viewing all channels in the bundle.⁵²

The refined econometric model provides estimates of consumer type parameters that are similar to the subscriber preferences that are reported in defendants' internal documents. For MLB Extra Innings on DirecTV, the estimated model finds that █ percent of subscribers prefer a single RSN, █ percent of subscribers prefer two RSNs, and █ prefer three or more RSNs. Survey data in a DirecTV presentation report that █ percent of current MLB Extra Innings subscribers are fans of a single team, █ percent are fans of two teams, and █ percent are fans of three or more teams.⁵³ The estimated model for the NHL shows that █ percent of subscribers prefer a single RSN, █ percent of subscribers prefer 2 RSNs, and █ percent prefer three or more RSNs. An NHL presentation estimates that █ percent of U.S. GameCenter Live subscribers have one favorite team, █ percent have two favorite teams, and █ percent of three or more favorite teams.⁵⁴

The *Noll Declaration* and *Noll Supplement* adopted the Bertrand model of competition with a simplification of the competitive interactions among the participants in the counter-factual world, assuming that the only competition would be between the bundle and each single-team service. Defendants' economic experts created alternative models that convert this series of

⁵¹ The other parameters of the model are the mean and standard deviation of viewing time for each of the 30 RSNs and of two parameters in the utility function.

⁵² By adding four moments, the number of moments equals the number of parameters ($2N + 6$), which makes the system appear exactly identified. But because the moments of the viewing time ratio are unrelated to consumer purchase decisions, they cannot be used to identify the mean and standard deviation of the marginal utility of the bundle.

⁵³ Bates No. DTV-SP0001208, slide 37.

⁵⁴ Bates No. NHL2304272.

duopolies (an RSN and the bundle) into a “joint venture” (or collusive cartel) in which the bundle and the single-team services collaborate to maximize joint profits. For example, Professor Ordover creates a model in which double marginalization is used collusively to eliminate competition.⁵⁵ Because these alternative specifications eliminate the only source of competition in the model, they produce a procedure for proving anticompetitive injury and calculating damages that compares monopoly with a series of two-firm collaborations, thereby not surprisingly finding little or no effects from eliminating territorial restrictions on out-of-market telecasts.

The model has now been extended to introduce some competition among RSNs as well as competition between each RSN and the league bundle. These changes are based on the consumer type parameters, which determine the fraction of one-RSN, two-RSN, and multi-RSN customers. The model still assumes that consumers can purchase either the league bundle or one single-team RSN. A consumer who is one-RSN type would consider buying only the most preferred single-team service, the league bundle, or nothing, which parallels the situation that was assumed for all consumers in my previous declarations. A two-RSN consumer would consider buying either of the two most preferred RSNs, the league bundle, or nothing. A multi-RSN consumer would choose among all out-of-market RSNs, the league bundle, or no out-of-market games. Hence, the latter two customer types generate competition among RSNs as well as competition between an RSN and the league bundle.

For all consumer types, the model further separates consumers among broadcast

⁵⁵ Professor Ordover has all RSNs increase prices in steps of one cent until the combined profits of the RSNs and the league bundle are maximized (*Ordover Report*, pp. 16-23). This example proves that if a cartel can impose a tax on output, a tax can be set that maximizes the joint profits of cartel members. The textbook example of this behavior is anticompetitive patent pools in which royalties per unit of output are set to maximize joint profits. See Carl Shapiro, "Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting," in Adam B. Jaffe, Joshua Lerner, and Scott Stern (editors), *Innovation Policy and the Economy, Volume 1*, pp. 119-150. MIT Press, 2001.

territories (72 for MLB and 46 for the NHL) in order explicitly to incorporate the restrictions on consumer choice that are created by blackout rules. Once a customer's local broadcast territory is identified, all in-market RSNs are removed from the consumer's choice set according to the blackout rules for that territory. For example, consumers in the MLB broadcast territory that is shared by the New York Yankees and New York Mets are not allowed to choose the RSNs of these teams.

Revised Damages Calculations

The revised calculations of monthly prices and market shares for the league bundles and each single-team service are shown in Exhibit 2.⁵⁶ Exhibit 2A shows the results for MLB.tv (MLB's Internet service), Exhibit 2B shows the results for NHL GameCenter Live (the NHL's Internet service), and DirecTV's version of MLB Extra Innings. The effect of the modeling changes is actually to increase the magnitude of the fall in prices that would arise if the prohibition of out-of-market distribution of single-team services was eliminated. The monthly price for MLB.tv now falls by \$5.55 (instead of \$4.63 as calculated in the *Noll Supplement*), a reduction of 27.7 percent (instead of 23.1 percent). For NHL GameCenter Live, the drop in price is \$8.20 (31.2 percent) instead of \$6.20 (23.6 percent). For MLB Extra Innings on DirecTV, the price falls by \$9.17 (27.3 percent) instead of \$8.34 (24.8 percent).

Exhibit 3 shows the amount of damage for each of these services. Total damages are \$9,715,870 (Exhibit 3A) for subscribers to MLB.tv, \$2,004,346 for subscribers to GameCenter Live (Exhibit 3B), and \$17,142,465 for subscribers to DirecTV Extra Innings (Exhibit 3C).

For the Internet services, the monthly prices among single-team services are in the range of \$6 to \$10 (for MLB.tv) and \$5 to \$10 (for NHL). The monthly DirecTV MLB Extra Innings prices for each RSN are in the range of \$10 to \$16. All models produce higher prices for the

⁵⁶ Standard errors for parameter estimates, predicted prices, and predicted market shares are included in the backup material for this declaration.

most popular teams.⁵⁷

The refined models produce lower estimates of market shares for the league bundles than the models in the *Noll Supplement*. The revised market shares for the bundles are 2.20 percent (instead of 3.50 percent) for MLB.tv, 1.08 percent (instead of 1.54 percent) for NHL GameCenter LIVE, and 1.54 percent (instead of 2.49 percent) for MLB Extra Innings on DirecTV. The sums of the market shares of each RSN are between 10 and 20 times larger than the loss to the bundle: 23.13 percent for MLB.tv, 11.15 percent for GameCenter Live, and 14.87 percent for MLB Extra Innings on DirecTV.

The refined model also shows that if restrictions on out-of-market distribution of live game telecasts are removed, the league bundles would continue to exist. Exhibit 4 shows the profits of the league with and without the presence of the bundle under the assumption that all RSNs are distributed out of market. For all three services, league profits are higher if the bundle is offered.

MODEL RELIABILITY CRITICISMS

Defendants' economic experts have questioned the reliability of the models in the *Noll Supplement*, and have proposed several "tests" that purport to show that the models are not reliable. This section evaluates these criticisms and finds that they are unwarranted. This section also reports the results of testing the refined econometric model under some of the hypothetical assumptions that were made by defendants' economic experts to challenge the reliability of the models in the *Noll Supplement*.

Coding Error

⁵⁷ For example, for MLB.tv the price of the Yankees is nearly \$4 higher than the price of the Astros, and for NHL GameCenter Live the price of the Penguins is over \$4 higher than the price of the Blue Jackets. In general the rank order of prices conforms to Professor McFadden's claim that the most popular teams should have the highest prices.

During his deposition, Professor McFadden stated that there was a discrepancy between the description of the econometric model in the *Noll Supplement* and the computer code in the backup material.⁵⁸ Professor McFadden speculated that the computer code normalized a scale parameter (a coefficient in front of the viewing time utility denoted by γ_i in the *Noll Supplement*) to 1 while the *Noll Supplement* stated that it was estimated.⁵⁹

Although Professor McFadden's criticism is not clear, it seems to reflect a misreading of the *Noll Supplement*, which states (p. 33) that " γ_i is assumed to have a mean of one and a variance of zero," meaning that it is normalized to 1. The *Noll Supplement* explains on the same page that "normalizing the value of γ_i to one is a common procedure in econometrics." This normalization is also done by Professors Crawford and Yurukoglu. Footnote 22 of their article states that they normalize the scale of utility by setting the scale parameter to 1. Thus, there is no basis for this criticism.

Joint Venture Pricing

Professor Pakes asserts that the counterfactual world would involve "joint venture" pricing in which the bundle and the single-team services would set prices collaboratively to maximize their joint profits. Professor Pakes concludes that the price of the bundle would be higher under this assumption than in the scenario in which prices are set independently to maximize the profits of the associated product, rather than the joint profits of all products. Professor Pakes concludes that under this assumption, the price of the bundle in this counterfactual world would exceed its current price.⁶⁰

The assumption that the league sets bundle prices above the competitive level to preserve the profits of single-team RSNs is not supported by any evidence. In fact, the CEO of MLB

⁵⁸ *McFadden Deposition*, p. 234.

⁵⁹ *McFadden Deposition*, pp. 234–5.

⁶⁰ *Pakes Report*, pp. 24-27 and Exhibits 3-4.

Advanced Media, Robert Bowman, stated that MLB prices are less than the market could support “to serve our broader mission of getting the greatest number of baseball games to the greatest number of fans.”⁶¹

Professor Pakes’ joint venture examples assume that the league and single-team services would engage in collusion in setting their prices in a simplified model in which the only potential source of competition is between the bundle and the single-team service. The fact that a league is a joint venture of teams does not imply that member teams can use the joint venture as a mechanism to engage in price collusion, as discussed in the analysis of the “single entity” issue in the *Noll Declaration* (pp. 113-14).

Professor Pakes’ profitability analysis does not actually model the maximization of joint profits. Professor Pakes does not include in his model the profits of each RSN/team inside its home territory. While the league earns no revenue from in-market broadcasts, if the league set the bundle price to maximize the joint profits of the league and the RSNs/teams, it would have to take into account the local revenues of its partners in price collusion because these sources of revenues are more important than the revenues from the league bundle or the potential revenues of RSNs/teams from out-of-market distribution of live games. Team financial data show that local television rights are far greater than the estimated counter-factual revenue from out-of-market distribution of live game telecasts on single-team services. In fiscal 2012, average revenues per NHL team from local television were [REDACTED],⁶² and in 2012 average revenues per MLB team from local television were [REDACTED].⁶³ These revenues are much greater than the [REDACTED] percent of total bundle profits that is distributed to each team. Thus, modeling the effects of this [REDACTED] percent profit share from the league bundle, while ignoring much greater sources of profits, produces results that are economically meaningless.

⁶¹ See *Declaration of Robert Bowman*, November 12, 2014, p. 12.

⁶² Bates No. NHL3655230.xlsx.

⁶³ Bates No. MLB1002651.

Notwithstanding these criticisms, the revised models produce estimates of joint-venture prices that are very close to current prices. The predictions for joint-venture pricing of the league bundles in the counter-factual world from the revised models are: \$20.29 for MLB.tv (the current price is \$20.05), \$25.73 for NHL GameCenter Live (the current price is \$26.28), and \$33.34 for MLB Extra Innings on DirecTV (the current price is \$33.59).⁶⁴ The appropriate conclusion to draw from these results is that the revised models predict that collusive prices in the counter-factual world would be essentially the same as the current monopoly prices.

Professor Pakes also makes an inconsistent assumption in his comparison of counter-factual prices with current prices. While Professor Pakes assumes that the leagues maximize joint profits in the counter-factual world, he also assumes that current prices for the league bundle are set to maximize profits from the bundle alone.⁶⁵ To produce a valid comparison, Professor Pakes would have to assume that the current prices for MLB Extra Innings are calculated to maximize joint profits of the league bundle plus the in-market revenues of all RSNs (including the Root Sports Networks that are owned by DirecTV). The implication of this assumption is that current prices for league bundles are above profit-maximizing prices in order to prevent some of the cannibalization of local television audiences that arises among subscribers to the league bundle. Thus, the elevation in prices in the counter-factual world that Professor Pakes estimates is due to three factors: the abandonment of the assumption that the leagues maximize the profits of the bundle (which elevates prices even if there were no out-of-market single-team services), the introduction of competition from out-of-market single-team services (which reduces prices for the league bundles), and the elimination of this competition from price collusion among the league and the RSNs/teams in setting prices for out-of-market live game telecasts. But if current prices already reflect the first effect, and the model is recalibrated to

⁶⁴ The results are contained in the backup materials for this declaration.

⁶⁵ As a practical matter, this assumption applies only to MLB on DirecTV because this is the only MVPD service that has been modeled.

reflect this fact, then Professor Pakes' calculations overestimate the counter-factual prices of the bundle.

Professor Pakes also examines the effects of the withdrawal of the Yankees from the league bundle under the counter-factual assumption that restrictions on distributing live game telecasts out of market are eliminated, and finds that the sum of the profits of the Yankees plus the league bundle are higher if the Yankees withdraw.⁶⁶ While pricing as a joint venture is not necessary to obtain this result, his results arise in part because competition between the Yankees and the bundle is eliminated. Because the simplified model includes no other source of competition, withdrawal from the bundle enables the Yankees vastly to increase the price of their single-team service.

In analyzing the incentives facing the Yankees, Professor Pakes does not analyze whether under current rules the Yankees have a financial incentive to withdraw from the league bundle. The refined model can be used to simulate the effect of having the Yankees withdraw from the league bundle and distribute their live game telecasts out-of-market. The results of this simulation, which are shown in Exhibit 5, are that the Yankees already would deviate from the league agreement if they could and that, if they did so, total league profits would increase. The results of Professor Pakes' analysis of Yankee withdrawal has two components: the value of withdrawing from the existing agreement, and the additional effect if all other teams distribute their live game telecasts out-of-market. Professor Pakes analyzes only the combined effects of both defections, not the separate effect of each.

Of course, the league does not permit the Yankees to withdraw now. Professor Pakes does not examine why the league prevents this deviation, notwithstanding its profit potential. The answer, of course, is that selective withdrawal from the league broadcasting agreement may not be possible because it would cause the league bundle to unravel and, in any case, would require complex adjustments to league revenue sharing rules. Revenue sharing is valuable to the

⁶⁶ *Ibid.*, pp. 29-32.

league because it suppresses player salaries,⁶⁷ but valuable to society because it makes more teams financially viable, thereby increasing jobs for players and creating economic welfare for fans.⁶⁸ But not all teams benefit from revenue sharing or other league rules, such as baseball's luxury tax. Moreover, because revenue sharing keeps some teams in business that otherwise would fail financially and has adverse effects on competitive balance and average team quality,⁶⁹ eliminating revenue sharing would be likely to increase total league profits.⁷⁰ Thus, showing that a highly successful team like the Yankees would prefer not to be subject to these league rules, whether mandatory participation in the league bundle, revenue sharing, or the luxury tax on large expenditures on player salaries, and even that total league profits might rise if they were not, are not surprising results and certainly do not qualify as reasons to regard a model of the effects of one of these rules to be regarded as unreliable.

Alternative Marginal Cost Assumptions

Professor McFadden calculates the implications of the models in the *Noll Supplement* under a wide range of assumptions about the ratio of marginal costs between a single-team service and the league bundle. Professor McFadden concludes that if the marginal cost of a single-team service is sufficiently high, my models predict that some consumers would pay more for a single-team service than for the bundle that contains that service.⁷¹ For example, if the

⁶⁷ See James Quirk and Mohammed El Hodiri, "The Economic Theory of a Professional Sports League," in Roger G. Noll, *Government and the Sports Business*, Brookings Institution (1974), pp. 33-80, and Rodney Fort and James Quirk, "Cross-Subsidization, Incentives and Outcomes in Professional Team Sports Leagues," *Journal of Economic Literature* Vol. 33, No. 3 (September 1996), pp. 1265-99.

⁶⁸ See Roger G. Noll, "The Economics of Baseball Contraction," *Journal of Sports Economics* Vol. 4, No. 4 (November 2003), pp. 332-55.

⁶⁹ See Stefan Szymanski and Stefan Kesenne, "Competitive Balance and Gate Revenue Sharing in Team Sports," *Journal of Industrial Economics* Vol. 52, No. 1 (March 2004), pp. 165-77.

⁷⁰ Stefan Kesenne, "Revenue Sharing and Owner Profits in Professional Team Sports," *Journal of Sports Economics* Vol. 8, No. 5 (October 2007), pp. 519-29.

⁷¹ *McFadden Report*, pp. 22-24 and Figure 2

marginal cost of the bundle equals the marginal cost of a single-team service, Professor McFadden's calculations estimate that 20 percent of consumers would buy a single-team service at a price that exceeds the price of the bundle. Professor McFadden concludes that a model cannot be reliable if it predicts prices for a single-team service that exceed the price of a bundle that includes that service.

Professor McFadden's calculations are designed to exploit a feature of the random coefficient logit model, which is that the probability of purchasing a product varies between zero and one but does not ever exactly equal either boundary. This assumption normally is innocuous because the products for which a demand relationship is being estimated are known to exist and to generate interest among consumers. But under extreme assumptions, the model is essentially being asked to perform a logically incoherent task – to calculate the demand for a product that would not exist under the assumption that its price exceeded the price of another product that dominated it (that is, delivers all of the same features plus more).

In constructing his test of model reliability, Professor McFadden places no upper limit on the ratio of the marginal cost of the single-team service to the marginal cost of the bundle. If the marginal cost of a single-team service has no upper limit, there always is a hypothetical ratio of marginal costs that is sufficiently high that the single-team service will set its price above the monopoly price of the bundle and lure a small number of customers who have atypically large marginal utility for that service. But demonstrating that a random coefficient logit model produces inaccurate results outside the realm of plausible values for a key data input is not a reasonable criticism of a model. If under realistic assumptions a model made such predictions, a simple re-specification – to constrain all single-team prices to be less than the bundle, thereby eliminating the assumption of that the relationship between price and sales quantity is continuous for all prices – would solve the problem. But this re-specification is unnecessary if the assumptions that give rise to the problem are unrealistic.

As discussed elsewhere, the assumption that the marginal cost of a single-team service is

greater than or equal to the marginal cost of a bundle is implausible and inconsistent with the data. My analysis of marginal costs concludes that the upper bounds of single-team marginal costs as a fraction of bundle marginal costs are 70 percent for MLB and 58 percent for the NHL. Professor McFadden's calculations of prices for single-team services do not fail his test for these ratios of marginal costs.

Even with the implausible assumption that marginal costs are the same for a single-team service and the bundle, the refined econometric model does not produce results for the counter-factual world that fail Professor McFadden's test. Under the assumption of equal marginal costs, the counter-factual prices of the bundles exceed the highest price of any team in the bundle.⁷² These new results differ from the calculations by Professor McFadden due to the effects of the refinements to the model that create three types of consumers and that includes some competition among the single-team services.

Dependence of Results on the Random Seed

The *McFadden Report* concludes that the results of the model are determined primarily by the random seed that is used to initialize counter-factual simulations, not the distribution of viewing times among teams. Professor McFadden reaches this conclusion on the basis of the observation that different random seeds produce different rank orderings of the team in terms of the prices of single-team services.

This observation does not constitute a valid criticism of the reliability of the model. The model does predict that the prices of single-team services will be similar and that the main effect of team popularity on price will be on differences in market shares. There is no reason in

⁷² Using the revised models to calculate counter-factual prices, the price of the MLB.tv bundle is \$14.05 (greater than the \$11.98 price for Yankees games), the price of the NHL Internet bundle is \$16.79 (greater than \$11.68 for Penguins games), and the price of DirecTV MLB Extra Innings is \$23.48 (greater than \$19.03 for Yankees games). The details of these calculations are in the back-up material in support of this declaration.

economic theory to believe that this result is unusual or counter-intuitive.⁷³ If single-team services have similar marginal costs and a similar price-elasticity of demand at the same price, the principal difference among them in market equilibrium will be in sales volumes, not prices.

Because predicted prices for the single-team services are similar, there also is nothing surprising about the result that small sample sizes produce different results in terms of the rank-order of prices in a circumstance in which predicted prices are similar. This variation in predictions is called “simulation error,” and results from using a random process to generate the sample of consumer preferences that are then used in the counter-factual simulation. The magnitude of the simulation error associated with predictions about a particular product depends on the number of hypothetical consumer preferences that affect the demand for each specific product. While a sample of 100,000 hypothetical consumers superficially seems quite large, the number who will subscribe to a particular single-team service is much less than one percent (a few hundred subscribers) for most teams.

If the goal of the simulation were to predict the prices of specific single-team services, one solution to the problem is to calculate the mean or median of Professor McFadden’s simulations. Another similar solution is to run a simulation with a much larger sample size than 100,000. But the purpose of the simulations in the *Noll Supplement* is not to predict prices of single-team services, but to calculate the price of the bundle under the assumption that it faces competition from 30 single-team RSNs. Random variations among preferences for single-team services that arise in creating a sample of consumers for purposes of simulating market outcomes are, as a statistical matter, not likely in the aggregate to have a substantial effect on the price of the league bundle when the prices of single-team services are similar. Professor McFadden does not find that the random seed has a substantial effect on the bundle price.

⁷³ At his deposition, Dr. McFadden acknowledged that it was not a “logical necessity” for the most popular teams to have the highest prices. *McFadden Deposition*, p. 170. Dr. McFadden also testified that the market shares in the *Noll Supplement* were consistent with the relative popularity of teams and were “a consequence of the real data.” *Ibid.*, p. 180.

Each of the three refined econometric models has been used to calculate prices and market shares using 50 simulations. The sample size for each MLB model is 720,000, and the sample size for the NHL Internet model is 460,000 (in each case 10,000 for each home television territory). The results of these simulations show much less variation in the rankings of teams by price and consistently show that the median rankings of team prices reflect the relative popularity of teams.⁷⁴ The average difference in the highest and lowest ranking by price among all 30 teams is 2.43 for MLB.tv, 6.87 for NHL GameCenter Live, and 4.53 for MLB Extra Innings on DirecTV. Thus, even if the sensitivity of the rank-order of the prices of single-team services were a valid test of the reliability of the model, the refined models run on larger, stratified samples show much less sensitivity to sampling error.

The Sensitivity of Prices to Difference in Preferences

Professor McFadden concludes that the models in the *Noll Supplement* are unreliable because the results are insufficiently sensitive to different assumptions about the preferences of consumers among teams.⁷⁵ According to Professor McFadden, a valid scientific model would produce both reliable and dramatically different results under extreme assumptions about the distribution of preferences.

Dr. McFadden includes three hypothetical calculations that are designed to show that the results in the *Noll Supplement* are not sensitive to viewership data and that the model is unreliable because it makes predictions in these circumstances that are unrealistic. In the “Superfan” scenario, every consumer is a fan of one team and watches only games involving that team, an assumption that he describes as “extreme caricatures of sports fans”⁷⁶ that are “at the extreme edges ... of what might occur in reality.” In the “Fan of the Game” scenario, all

⁷⁴ The simulation results are contained in the backup materials for this declaration.

⁷⁵ *McFadden Report*, pp. 12-15 and Tables 6-7.

⁷⁶ *Ibid.*, p. 6.

consumers are equally interested in all 30 teams and spread their viewing time equally among them. In the “Least Favorite Team” scenario, each consumer is given the choice of the bundle, the consumer’s least favorite team, or nothing.

I disagree with Professor McFadden that these tests of the reliability of the model are appropriate, let alone common in economics research.⁷⁷ But even if these were valid tests, Professor McFadden’s speculations about the results that one should expect from these cases are baseless. Moreover, the refined models do not produce results that are inconsistent with the results that are expected from economic theory.

Superfan. In the “Superfan” scenario, Dr. McFadden constructs a hypothetical data set for MLB and the NHL in which every consumer watches only one team – the Oakland Athletics in baseball or the San Jose Sharks in hockey.⁷⁸ Dr. McFadden hypothesizes that “the but-for world market equilibrium will tend to be close to monopoly pricing for each team channel, with a league bundle price that is sufficiently high so that it does not undercut the pricing of each team’s telecast, leading to a negligible league bundle share.”⁷⁹ Instead, Professor McFadden finds that if the models in the *Noll Supplement* are re-estimated using these hypothetical data, the prices for the bundle and the single-team service are not very different than in the models that were estimated using the true viewership data.

Assessing whether the results from models that are based on these hypothetical data are plausible is not a reasonable test of the reliability of the models. Indeed, no purpose is served by analyzing a circumstance that is completely divorced from reality by using a model that was constructed to analyze real-world data that are wildly at variance with the hypothesized data.

The specification of an econometric model is derived from an economic analysis of the

⁷⁷ Professor McFadden also does not regard his tests as normal practice for testing the reliability of models. *McFadden Deposition*, p. 127-29.

⁷⁸ *McFadden Report*, pp. 8-9.

⁷⁹ *Ibid.*, p. 7.

market that the model is intended to analyze.⁸⁰ If all consumers of out-of-market broadcasts were fans of the same specific team, neither the leagues nor MVPDs would go to the trouble and expense of offering a league bundle. Instead, a league would offer only the games of the one team that is of interest to customers. Territorial restrictions on out-of-market telecasts of other teams and nation-wide “game of the week” telecasts on national networks that feature teams other than America’s consensus favorite would make no sense because, if offered, they would attract no audience and have no sales.

To analyze this alternative universe, an economist would not use a random coefficient logit model that allows choices among all 30 teams. Professor McFadden’s results are driven by an assumption in the models in the *Noll Supplement* that is standard in random coefficient logit models and that was made in the article by Professors Crawford and Yurukoglu. This assumption is that the option of having access to view the games of every team in the league has some value, even if as a practical matter a consumer elects never to view games. Thus, Professor McFadden seeks to use a model that assumes that all teams have some value while simultaneously assuming that only one team actually has value. This incoherency between the modeling assumption and the assumption in the generation of the hypothetical data renders Professor McFadden re-estimated model and the simulations from it meaningless. Instead of adopting a model that has an assumption that conflicts with reality, an economist would construct a model of demand for the “Superfan” scenario that did not assume that the opportunity to view other teams had value, but would focus only on the trade-off between spending time viewing the unanimously agreed favorite team and doing something else (the outside option).

Professor McFadden’s theoretical speculations about the predictions from an appropriate model of the “Superfan” scenario are incorrect. If for some reason the league offered a bundle including America’s only favorite team and all other teams, and America’s unanimously preferred team also offered an out-of-market single-team service, the appropriate supply side

⁸⁰ Professor Pakes says much the same thing. See *Pakes Report*, pp. 4-5.

model would be a duopoly in which the firms sell identical products. In this case, the Bertrand model is unrealistic because it predicts that competition will force price to marginal cost. A more plausible duopoly model is Nash-Cournot, which predicts that in a duopoly the fall in price causes the Lerner Index to fall in half.

Notwithstanding my conclusion that such an exercise is pointless, the “Superfan” scenario has been simulated using the refined model. For the Superfan scenario, the refined econometric model generates reasonable results for but-for prices and market shares. For all three models, the simulation predicts that the price of the stand-alone service from the favorite team is close to the price of the bundle, and the “Superfan” favorite team is the only single-team service with a positive market share.⁸¹

Fan of the Game. In the “Fan of the Game” scenario, Dr. McFadden constructs another hypothetical data set in which every consumer spends an equal amount of time watching every team, with differences among consumers only in the total time spent viewing the sport.⁸² Dr. McFadden hypothesizes that “there would be little competition driving the price of the league bundle lower and I would expect the but-for world predicted price and market share of the bundle to remain close to actual observed levels.”⁸³ Instead, Professor McFadden finds that the results are similar to the results of the simulations using actual viewing data.⁸⁴

The structure of the refined models is appropriate for analyzing the implications of the hypothetical “Fan of the Game” data. In this scenario consumers value all teams (here, by assumption, equally). My disagreement with Professor McFadden concerns his expectations about the results that the model should predict with these preferences. In this scenario, fans

⁸¹ These simulations are submitted with the backup materials for this report.

⁸² *McFadden Report*, pp. 7-8.

⁸³ *Ibid.*, p. 8.

⁸⁴ *Ibid.*

prefer variety,⁸⁵ but unlike the consumers in the real world who watch only one or two RSNs, all consumers find each team to be a close competitive substitute for all other teams. Hence, nothing in economic theory predicts that a consumer with a lower intensity of demand would be unwilling to sacrifice variety to take advantage of the lower price of a subscription to a single-team service, while a consumer with a very high intensity of demand for the sport would be willing to pay more to obtain more product variety. In addition, because all single-team services are close competitive substitutes, economic theory predicts that they would have similar prices.

Economic theory also predicts that lower prices for single-team services arising from competition among them would cause the price of the league bundle to be lower. The competition that would exist under this scenario between the league bundle and single-team services would be for consumers with middling intensities of demand that puts them at the margin with respect to whether greater variety is worth the higher price. Economic theory provides no basis for concluding that the price of the bundle and the average price for single-team services would differ a great deal between the real-world data and the hypothetical data, but it does predict that the price of the bundle would exceed the price of a single-team service.

Based on expectations from economic theory described above, the refined econometric model generates reasonable results under the ‘Fan of the Game’ scenario.⁸⁶ In each of the three models, the counter-factual simulated price of the bundle exceeds the prices of all single-team services and is lower than the actual bundle price and the predicted price from the simulations using actual viewing data.⁸⁷ For MLB.tv, the ‘Fan of the Game’ bundle price is \$8.92, versus \$14.50 in the counter-factual simulation using actual data and the actual price of \$20.05. For

⁸⁵ The taste from variety comes from the assumption that the value of watching a single RSN is given by $w_i \log(1+t_i)$. If all teams have equal value, the w_i will be equal, and consumers will have a diminishing marginal value of time spent watching each team. Consequently, a consumer derives greater value from spreading viewing among teams equally than devoting all time to viewing one team.

⁸⁶ As indicated by the nature of the ‘Fan of the Game’ scenario, the refined econometric model considers all consumers as multi-RSN types.

⁸⁷ The simulation results are included in the backup material for this declaration.

NHL GameCenter Live, the simulated bundle price for “Fan of the Game” is \$9.85, versus \$18.08 for the counter-factual simulation based on real viewing data and the actual price of \$26.28. For MLB Extra Innings on DirecTV, the “Fan of the Game” bundle price is \$14.31, compared to \$24.42 for the counter-factual simulation using actual data and the actual price of \$33.59.

Least Favorite Team. Professor McFadden’s third test of the reliability of the models that I have adopted is a scenario in which consumers are permitted to purchase either the league bundle or their least favorite team, rather than their most favorite team.⁸⁸ For the “Least Favorite Team” scenario Professor McFadden asserts that the bundle should maintain its actual price because a consumer’s least favorite team would not be a competitive substitute for the bundle.⁸⁹ Professor McFadden finds that, contrary to his expectation, prices and market shares are similar under this scenario to the scenario in which consumers choose between the league bundle and their most favorite team.

Like the “Superfan” scenario, the “Least Favorite Team” scenario is based on an assumption that is not only not true, but could not possibly be true. To implement this scenario, the league and each RSN would have to know the identity of the least favorite team of every consumer in the nation, and then conspire to eliminate the other 29 single-team RSNs from each fan’s choice set. The rationale for examining the implications of this bizarre assumption is Professor McFadden’s characterization of how this would affect consumer choice. Implicit in his analysis is the assumption that for all consumers the value of watching the least favorite team is far less than the value of watching the most favorite team, so that if choices are restricted in the manner that the scenario assumes, price competition between single-team services and the bundle will all but disappear, leaving the bundle price largely unchanged.

As a matter of economic theory, Professor McFadden’s expectations are not correct

⁸⁸ *McFadden Report*, pp. 21-22 and Tables 8-9.

⁸⁹ *Ibid.*, p. 21.

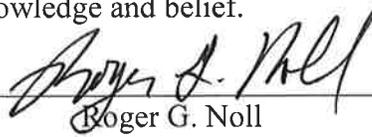
because, in analyzing this scenario, he failed to take into account the presence of customers who, in his terminology, are “Fans of the Game.” If the value of the least favorite team is not substantially less than the value of the most favorite team, the restricted choice that Professor McFadden allows will not necessarily lead to dramatically different results than the actual choice that is assumed in the counter-factual world, where consumers are permitted to buy their most preferred single-team service. For example, if the “Least Favorite Team” scenario were combined with the “Fans of the Game” scenario, the results from the “Most Favorite Team” and “Least Favorite Team” would be identical because customers would place the same value on each team.

In the context of the refined model, which explicitly takes into account blackouts and separates consumers according to the number of RSNs that they are interested in watching, the “Least Favorite Team” cannot be implemented in a simple way. First, the refined model removes blacked-out RSNs from the consumer’s choice set. To implement the “Least Favorite Team” scenario for the refined model, the identity of a consumer’s least favorite team is limited to RSNs that are not blacked out. Second, the proper treatment of customers who are “one RSN” and “two RSN” types in this scenario is unclear. These customers are known to derive zero value from all other teams, so restricting their choice in the manner that Professor McFadden assumes is tantamount to assuming that they will buy the bundle or nothing. Hence, I make this assumption in implementing this scenario for the revised model. Third, the revised model allows multi-RSN types to choose among the bundle, all RSNs that are not blacked out, or nothing, which is a device for introducing more competition into the model. Professor McFadden permits consumers to consider only one single-team service. Because one purpose of the refined model is to introduce more competition, the version of this scenario that applies to the refined model is to allow multi-RSN consumers to choose among the bundle, their three least-favorite RSNs that are not blacked out (because multi-RSN consumers have three or more favorite teams), or nothing.

Under these assumptions, the refined model predicts that in the “Least Favorite Team” scenario the price of the bundle would be below the actual price, but not by as much as in the models that do not artificially restrict the choice of RSNs.⁹⁰ The counter-factual prices are \$18.04 for MLB.tv (\$2.01 less than the actual price of the bundle), \$23.79 for NHL GameCenter Live (\$2.49 less than the actual price of the bundle), and \$30.28 for MLB Extra Innings on DirecTV (\$3.31 less than the actual price of the bundle). The reasons for this result are that, in the actual data, the number of consumers with “Fan of the Game” preferences is insufficient to generate as much competition between the bundle and single-team services when consumers are required to consider only their least-favorite teams. This result is driven by the actual data concerning viewer preferences, not by economic theory, and so is inconsistent with Professor McFadden’s criticism that the results of the model are not driven by the data.

⁹⁰ The results of these simulations are submitted with the backup material for this declaration.

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



A handwritten signature in black ink, appearing to read "Roger G. Noll", is written over a horizontal line. The signature is cursive and somewhat stylized.

Roger G. Noll

Executed in Palo Alto, California, December 29, 2014.

Exhibit 1A. MLB.tv Cost and Margin Analysis

Data Item	Bundle Cost (Noll Supplement)	Bundle Cost (Refined Model)	Single-RSN Cost (Refined Model)	Comments
TV Geolocation (\$)				Fixed cost
Streaming and HTTP Downloads (\$)				Marginal cost ¹
Paymentech/Amex (\$)				Marginal cost
Cybersource (\$)				Marginal cost
Customer Service (\$)				Marginal cost ²
Total Marginal Costs (\$)				
Total Revenue (\$)				
Profit Margin (%)				
Monthly Price (\$)				
Monthly Marginal Cost (\$)				

Source: MLB0108889 and calculations from MLB.tv price and revenue data (see text).

¹ Single channel cost equals ■% of bundle cost (see text).

² Single channel cost equals ■% of bundle cost (see text).

Exhibit 1B. NHL Cost and Margin Analysis

NHL (2012)	Bundle Cost (Noll Supplement)	Bundle Cost (Refined Model)	Single-RSN Cost (Refined Model)	Comments
Cost of Revenues				
Subscriptions Cost (\$)				Marginal cost
Marketing Costs				
Advertising (\$)				Marginal cost
Direct Marketing (\$)				Marginal cost
Promotions and Publicity (\$)				Marginal cost
Tickets and Hospitality (\$)				Marginal cost
Direct Costs				
Programming Costs (\$)				Fixed cost
Streaming & Security & Network Dist. (\$)				Marginal cost ³
Dep. & Main. & Equip. Costs (\$)				Fixed cost
Other Direct Expenses (\$)				Marginal cost
Operating Costs				
Salaries & Benefits (\$)				Fixed cost
Travel (\$)				Fixed cost
Office and Other Operating Costs (\$)				Fixed cost
Total Marginal Costs (\$)				
Total Revenue (\$)				
Profit Margin (%)				
Monthly Price (\$)				
Monthly Marginal Cost (\$)				

Source: NHL2356612 page 71, NHL1779549 and calculations from NHL GameCenter Live price and revenue data.

³ Single channel cost equals [redacted] % of bundle cost (see text).

Exhibit 2A. MLB Counterfactual Internet Streaming Prices and Market Shares

Team	Price (\$ Per Month)	Market Share (%)
Angels	7.63	0.77
Astros	6.55	0.68
Athletics	7.13	0.75
Blue Jays	6.84	0.79
Braves	8.46	0.77
Brewers	6.81	0.75
Cardinals	8.24	0.78
Cubs	7.49	0.75
Diamondbacks	6.84	0.74
Dodgers	8.60	0.84
Giants	8.14	0.80
Indians	6.88	0.75
Mariners	6.92	0.75
Marlins	6.68	0.74
Mets	7.70	0.73
Nationals	7.48	0.74
Orioles	7.57	0.73
Padres	6.81	0.76
Phillies	8.41	0.84
Pirates	7.29	0.75
Rangers	7.40	0.71
Rays	7.16	0.76
Red Sox	9.10	0.88
Reds	7.20	0.73
Rockies	6.64	0.75
Royals	6.67	0.72
Tigers	8.35	0.82
Twins	6.98	0.76
White Sox	7.12	0.74
Yankees	10.21	1.03
Bundle	14.50	2.20
Total share		25.33
Original bundle	20.05	3.60
1 RSN type (%)	21.16	
2 RSN type (%)	39.42	

Exhibit 2B. NHL Counterfactual Internet Streaming Prices and Market Shares

Team	Price (\$ Per Month)	Market Share (%)
Ducks	5.87	0.36
Bruins	6.98	0.36
Sabres	6.61	0.37
Hurricanes	5.57	0.38
Flames	5.81	0.39
Blackhawks	7.34	0.35
Blue Jackets	5.19	0.38
Avalanche	5.55	0.38
Stars	5.75	0.35
Red Wings	8.72	0.35
Oilers	5.66	0.40
Panthers	5.68	0.38
Kings	6.81	0.34
Wild	5.41	0.38
Canadians	5.60	0.40
Devils	6.31	0.35
Predators	5.48	0.38
Islanders	5.70	0.37
Rangers	6.82	0.34
Senators	5.36	0.41
Flyers	8.04	0.35
Coyotes	5.53	0.38
Penguins	9.54	0.33
Sharks	6.34	0.36
Blues	6.11	0.36
Lightning	5.17	0.39
Maple Leafs	6.20	0.39
Canucks	6.87	0.38
Jets	5.35	0.41
Capitals	7.00	0.35
Bundle	18.08	1.08
Total share		12.23
Original bundle	26.28	1.64
1 RSN types (%)	51.15	
2 RSN types (%)	21.20	

Exhibit 2C. DirecTV Counterfactual Prices and Market Shares for Baseball

Team	Price (\$ Per Month)	Market Share (%)
Angels	11.42	0.50
Astros	10.84	0.45
Athletics	11.51	0.49
Blue Jays	10.81	0.52
Braves	12.89	0.49
Brewers	10.54	0.50
Cardinals	11.81	0.48
Cubs	11.42	0.48
Diamondbacks	10.55	0.49
Dodgers	12.75	0.53
Giants	11.40	0.49
Indians	11.15	0.49
Mariners	10.67	0.49
Marlins	10.69	0.50
Mets	11.88	0.47
Nationals	12.83	0.49
Orioles	11.74	0.48
Padres	11.18	0.51
Phillies	12.69	0.53
Pirates	10.66	0.49
Rangers	11.49	0.46
Rays	11.69	0.50
Red Sox	12.91	0.51
Reds	11.26	0.48
Rockies	10.50	0.50
Royals	10.53	0.48
Tigers	12.08	0.50
Twins	10.89	0.50
White Sox	10.95	0.48
Yankees	15.94	0.61
Bundle	24.42	1.54
Total share		16.41
Original bundle	33.59	2.59
1 RSN types (%)	42.68	
2 RSN types (%)	21.76	

Exhibit 3A. MLB.tv Damages Estimates (2012)

Package	Overcharge Per Subscriber (\$)	Number of Subscribers	Total Overcharge (\$)
Full Season (Premium)	33.21		
Full Season (Basic)	30.45		
Renewal (Premium)	5.53		
Renewal (Basic)	17.99		
Half-season - May (Premium)	11.07		
Half-season - May (Basic)	27.68		
Half-season - July (Premium)	13.84		
Half-season - July (Basic)	27.68		
Race to Pennant - August (Premium)	22.14		
Race to Pennant - August (Basic)	31.83		
Race to Pennant - two-day sale late August (Premium)	1.10		
Race to Pennant - mid September (Premium)	2.77		
Race to Pennant - late September (Premium)	2.77		
Monthly installments (Premium)	6.92		
Monthly installments (Basic)	34.60		
Other	-		
Total	-		

Exhibit 3B. NHL Damages Estimates (2011-2012)

Package	Overcharge Per Subscriber (\$)	Number of Subscribers	Total Overcharge (\$)
Early Bird	49.71		
Full Season	52.64		
Half Season	36.96		
Race to Cup	24.74		
Other ⁴	-		
Total	-		

Exhibit 3C. DirecTV Damages Estimates (2012)

Package	Overcharge Per Subscriber (\$)	Number of Subscribers	Total Overcharge (\$)
Renewal	209.94		
Early Bird	215.94		
Full Season	223.96		
Telemarketing Full Season	209.97		
Half Season	139.96		
Race to Pennant	69.99		
Other	-		
Total	-		

⁴ Subscribers to the "Vault" package have been removed from the damages calculations.

Exhibit 4. Industry Profits with and without Bundle (\$)

Service	With Bundle	Without Bundle
MLB.tv	18,247,638	16,399,737
NHL GameCenter Live	2,019,535	1,683,160
DIRECTV	18,013,933	15,623,970

Exhibit 5. Yankees Deviation in Current World, DirecTV data

Team	Current Profit (\$)	Profit following Yankees deviation (\$)
Yankees	██████████	3,601,436
League excluding Yankees	██████████	8,413,103
Total	██████████	12,014,539

Appendix A

Bates No.	File name or Description
Materials considered in the <i>Noll Declaration</i> and <i>Noll Supplement</i> included by reference	
The record materials listed in Dr. Ordoover's declaration	
The record materials listed in Dr. Pakes' declaration	
The record materials listed in Dr. McFadden's declaration	
Declaration of Robert Bowman	
N/A	Pakes report
N/A	Ordoover report
N/A	McFadden report
N/A	Pakes deposition transcript
N/A	Ordoover deposition transcript
N/A	McFadden deposition transcript
N/A	Berry, Levinsohn & Pakes (1995)
N/A	Berry, Levinsohn & Pakes (2004)
N/A	Crawford & Yurukoglu (2012)
N/A	Fort & Quirk (1996)
N/A	Gaudet & Van Long (1996)
N/A	Jaffe, Lerner & Stern (2001)
N/A	Kesenne (2007)
N/A	Noll (1974)
N/A	Noll (2003)
N/A	Rey & Tirole (1986)
N/A	Szymanski & Kesenne (2004)
N/A	Handbook of Industrial Organization (1989)
COMCAST-00000693-747	
DTV-SP0001208	
DTV-SP0094027-90	
DTV-SP0222857-913	
DTV-SP0310945	
LRP (2006-2012)	
MLB0002396-439	
MLB0012825	
MLB0039222	
MLB0039758	

MLB0108889	
MLB0255273	
MLB0351016	
MLB0500544	
NHL0001027-30	
NHL0001032-46	
NHL0001192	
NHL1445676	
NHL1779549	
NHL2304272	
NHL2356612	
NHL3655230	
Dan Frommer, "MLB.com Gets Geolocation Patent," <i>Business Insider</i> , May 14, 2009	
Zip Code Database from www.unitedstateszipcodes.org	
Household Data from U.S. Census Bureau, Profile of General Population and Housing Characteristics: 2010	
Zip Code to Zip Code Tabulation Area Translation Table: http://udsmapper.org/docs/Zip_to_ZCTA_crosswalk_2010_JSI.xls	
MLB Blackout Locator: http://www.mlb.com/mlb/subscriptions/blackout.jsp	
NHL Blackout Locator: http://www.nhl.com/ice/ziplookup.htm	
Chase Paymentech FAQ: Payment Processing Information: https://www.chasepaymentech.com/faq_payment_processing_information.html	
CyberSource Support Center FAQ: https://support.cybersource.com/cyberskb/index?page=content&id=C228&actp=LIST	