

**UNITED STATES DISTRICT COURT  
SOUTHERN DISTRICT OF NEW YORK**

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THOMAS LAUMANN, FERNANDA )  
 GARBER, ROBERT SILVER, DAVID )  
 DILLON, GARRETT TRAUB, and PETER )  
 HERMAN, representing themselves and all )  
 others similarly situated, )  
 )  
 Plaintiffs, )  
 )  
 v. )  
 )  
 NATIONAL HOCKEY LEAGUE, et al., )  
 )  
 Defendants. )  
 )  
 )  
 )  


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Case No. 12-1817 (SAS)

**DECLARATION OF IAN AYRES**

CONFIDENTIAL—SUBJECT TO PROTECTIVE ORDER

**REDACTED**

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## I. INTRODUCTION

1. I have been asked by counsel for Plaintiffs to review and comment upon the proposed Class Action Settlement<sup>1</sup> (“Settlement Agreement”) filed June 11, 2015 in the above captioned matter between Plaintiffs Thomas Laumann, Robert Silver, David Dillon, and Garrett Traub (collectively, “Plaintiffs”), on behalf of themselves and all other Class Members (collectively, “Class Members”), and Defendants National Hockey League (“NHL”), NHL Enterprises L.P., NHL Interactive Cyberenterprises LLC, New York Rangers Hockey Club, New Jersey Devils LLC, New York Islanders Hockey Club L.P., Comcast-Spectacor L.P., Lincoln Hockey LLC, Lemieux Group, L.P., Hockey Western New York LLC, Chicago Blackhawks Hockey Team Inc., San Jose Sharks LLC, DIRECTV, LLC, DIRECTV Sports Networks LLC, DIRECTV Sports Net Pittsburgh, LLC d/b/a Root Sports Pittsburgh, Comcast Corp., Comcast Sportsnet Philadelphia, L.P., Comcast Sportsnet Mid-Atlantic, L.P., Comcast Sportsnet California, LLC, Comcast Sportsnet Chicago, LLC, and The Madison Square Garden Company (collectively, “Defendants”). I have reviewed the Settlement Agreement and the Second Amended Class Action Complaint for this case filed October 26, 2012 in the Southern District of New York.<sup>2</sup> These and other materials that I rely upon in forming my opinions are listed in Appendix 1.<sup>3</sup>

2. Plaintiffs have brought a case on behalf of themselves and all individuals who (1) have purchased programming from DIRECTV and/or Comcast since four years prior to the filing of the Complaint that “included channels carrying video presentations of live NHL hockey

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<sup>1</sup> Class Action Settlement Agreement, Thomas Laumann v. National Hockey League, Case No. 12-cv-1817 (SAS) (filed June 11, 2015) [hereinafter *Settlement Agreement*].

<sup>2</sup> Second Amended Class Action Complaint, Thomas Laumann v. National Hockey League, Case No. 12-cv-1817 (SAS) (filed Oct. 26, 2012) [hereinafter *Complaint*].

<sup>3</sup> Jeffrey West, a consultant working under my supervision, provided substantial assistance in the preparation of this report.

games that were not available through a sponsored telecast,”<sup>4</sup> and (2) all individuals who purchased NHL Game Center Live (“GCL”) since four years prior to the filing of the Complaint. The GCL Package is the consumer product that has been offered to consumers enabling them to view, over the Internet, games designated as “out-of-market” by the NHL and its teams.<sup>5</sup> Plaintiffs allege that Defendants have engaged in anti-competitive behavior that has eliminated competition in the distribution of live men’s hockey games over the Internet and television.<sup>6</sup> Plaintiffs allege that Defendants have created exclusive territories for each NHL team for purposes of live-game video presentation, such that other teams agree not to compete in other teams’ exclusive territories.<sup>7</sup> Plaintiffs allege that the only way for consumers to view live presentations of games for teams outside their exclusive territories is to subscribe to the NHL’s GCL Package (for viewing live games over the Internet) or the NHL Center Ice Package (which is distributed by cable and satellite providers).<sup>8</sup> Each of these packages consists of programming for all out-of-market teams, and a consumer cannot subscribe to a more limited package that would include fewer teams (such as a single favorite team of the consumer that is out-of-market).<sup>9</sup> Therefore, Plaintiffs allege, many consumers are forced to pay for more games than they want. Plaintiffs allege that these practices are anti-competitive.

3. I have been asked to calculate the value of the Settlement Agreement to consumers. Based on the calculations described in this report, I estimate that the Settlement

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<sup>4</sup> *Complaint*, ¶36.

<sup>5</sup> *Settlement Agreement*, at ¶¶21-22.

<sup>6</sup> *Complaint*, ¶2.

<sup>7</sup> *Id.* at ¶6.

<sup>8</sup> *Id.* at ¶7.

<sup>9</sup> *Id.*

Agreement will benefit future GCL, DIRECTV Center Ice, and Comcast Center Ice subscribers by \$20.9 million to \$28.7 million, not including attorneys' fees or costs.

## II. QUALIFICATIONS

4. I am the William K. Townsend Professor at Yale Law School, and a Professor at Yale's School of Management. I was the editor of the Journal of Law, Economics and Organization for seven years. I have previously taught at Harvard, Illinois, Northwestern, Stanford, and Virginia law schools and have been a research fellow of the American Bar Foundation. In 2006, I was elected to the American Academy of Arts and Sciences. I regularly teach courses in Contract Law and Quantitative Corporate Finance. I received my B.A. in Russian Studies and economics and J.D. from Yale University and my Ph.D. in economics from M.I.T.

5. I am the co-author of a widely-adopted contracts casebook, *Studies in Contract Law*, which is now in its 8<sup>th</sup> edition. In the Spring of 2010, together with Barry Nalebuff, I published a book with Basic Books on retirement investments entitled *Lifecycle Investing: A New, Safe, and Audacious Way to Improve the Performance of Your Retirement Portfolio*. My book with Gregory Klass, *Insincere Promises: The Law of Misrepresented Intent*, won the 2006 Scribes book award "for the best work of legal scholarship published during the previous year." I have published 11 books and over 100 articles on a wide range of topics.

6. I am the author of several empirical studies that include econometric analysis and work with large datasets: *Does Affirmative Action Reduce the Number of Black Lawyers?*, 57 Stanford Law Review 1807 (2005) (with Richard Brooks); *To Insure Prejudice: Racial Disparities in Taxicab Tipping*, 114 Yale Law Journal 1613 (2005) (with Fred Vars and Nasser Zakariya); *A Separate Crime of Reckless Sex*, 72 University of Chicago Law Review 599 (2005) (with Katharine Baker); *Shooting Down the More Guns, Less Crime Hypothesis*, 55

Stanford Law Review 1193 (2003) (with John J. Donohue III); *Measuring the Positive Externalities from Unobservable Victim Precaution: An Empirical Analysis of Lojack*, 113 Quarterly Journal of Economics 43 (1998) (with Steven D. Levitt); *Pursuing Deficit Reduction Through Diversity: How Affirmative Action at the FCC Increased Auction Competition*, 48 Stanford Law Review 761 (1996) (with Peter Cramton); *A Market Test for Race Discrimination in Bail Setting*, 46 Stanford Law Review 987 (1994) (with Joel Waldfogel); and *Racial Equity in Renal Transplantation: The Disparate Impact of HLA-Based Allocation*, 270 Journal of American Medical Association 1352 (1993) (with Robert Gaston, Laura Dooley, and Arnold Diethelm).

7. My curriculum vitae is included as Appendix 2. I have previously testified as an expert witness in a variety of antitrust, contract, and civil rights cases. I have attached a list of cases on which I have given sworn testimony (Appendix 3).

8. I file this report in my individual capacity and have no financial stake in the outcome of this case. My hourly rate in this matter is \$850. My compensation is not contingent on any action or event resulting from the analyses, opinions or conclusions in, or the use of, this report.

9. My review of materials and data is continuing, and I reserve the right to modify my opinions as new materials emerge.

### **III. SETTLEMENT AGREEMENT TERMS**

10. The Settlement Agreement includes injunctive relief consisting of new unbundled programming packages and price relief on existing bundle programming packages. In this section, I briefly describe these terms.

**A. GCL Unbundled Programming**

11. Under the terms of the Settlement Agreement, beginning with the 2015-2016 season and continuing for four additional seasons, the NHL Defendants will offer unbundled live game programming that is included in the full, bundled GCL Package.<sup>10</sup> The unbundled live game programming included in this portion of the Settlement Agreement will allow consumers to purchase programming for a single “out-of-market” team rather than the bundled GCL Package that consists of all teams. The consumer price of the unbundled GCL programming for any individual team shall be 80% of the price of the comparable bundled GCL Package. If after the first year the NHL Defendants offer the GCL Package at the “Early Bird”<sup>11</sup> and auto-renewal prices for less than \$130, they may increase the pricing of the Unbundled Packages from 80% to up to 85% of the comparable GCL Package. If after the first year the NHL Defendants offer the GCL Package at the Early Bird and auto-renewal prices for less than \$100, they may increase the pricing of the Unbundled Packages from 80% to up to 90% of the comparable GCL Package.<sup>12</sup>

**B. Center Ice and GCL Price Relief**

12. In addition to the unbundled GCL package, the terms of the Settlement Agreement include provisions for the pricing of the full, bundled GCL and Center Ice Packages.<sup>13</sup> Under those terms, neither the NHL, Comcast, nor DIRECTV shall set the consumer price for a full-season programming package higher in the 2015-2016 season than its price for the 2014-2015 season. The NHL Defendants will provide a 17.25% discount off the 2014-2015

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<sup>10</sup> *Settlement Agreement*, at ¶42. The NHL Defendants will also offer the right to sell unbundled Center Ice programming for each and every NHL team to Comcast and DIRECTV. *Id.* at ¶43. Neither Comcast nor DIRECTV is required to offer this unbundled programming under the terms of the Settlement Agreement, but if they do, it cannot be priced higher than the GCL unbundled package.

<sup>11</sup> The Early Bird price is the price for a full season package that is made available to consumers before the start of the regular season and up to the end of October. *Id.* at ¶10.

<sup>12</sup> *Id.* at ¶42.

<sup>13</sup> *Id.* at ¶44.

consumer prices of all full-season GCL Packages that they offer for the 2015-2016 season. All full-season unbundled packages will be priced relative to this discounted full-season price as described above (i.e., a single team package will be priced 20% below the discounted price for the equivalent league-wide Package).

13. Comcast and DIRECTV will each provide the first three (3) weeks of the 2015-2016 and 2016-2017 Center Ice seasons free to all residential subscribers (for DIRECTV) and to all interactive digital subscribers (for Comcast) to their respective MVPD service, comprising an effective 12.5% discount off of the price of a full-season Center Ice Package (e.g., auto-renewal, Early Bird, or full-season) for that respective season.<sup>14</sup> The price for a full-season Center Ice Package in 2015-2016 and 2016-2017 for any subscriber who purchases the full season will thus be reduced by 12.5% off the retail price for that respective season.

#### **IV. VALUE OF SETTLEMENT AGREEMENT TO CLASS MEMBERS**

14. The Settlement Agreement includes savings for both Class Members who continue to subscribe to the bundled package in the future as well as savings for Class Members who switch from the bundled package to the unbundled GCL package. Therefore, the key inputs to my calculation of the value to Class Members of the terms of the Settlement Agreement are (1) the number of subscribers, (2) the prices, and (3) the share of Class Members who switch from the bundled package to the unbundled package.

15. Based on materials produced by Defendants, the number of full-season subscribers to GCL, DIRECTV Center Ice, and Comcast Center Ice for the 2014-2015 season

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<sup>14</sup> *Id.* at ¶44. Subscribers to Comcast or DIRECTV will not need to take any action to enable the free programming.



was [REDACTED] respectively.<sup>15</sup> The price for the GCL package was \$159.00.<sup>16</sup> The price for the Center Ice packages was \$159.96.<sup>17</sup> The Settlement Agreement does not include any terms related to partial season packages. Therefore, I only consider full-season subscriber and pricing data in my analysis.

16. The NHL has estimated that 45 percent of GCL subscribers have one favorite team,<sup>18</sup> and the NHL's economic expert testified that "more than half of the subscribers have a strong team preference."<sup>19</sup> I consider two scenarios for purposes of valuing the Settlement Agreement to Class Members. Under Scenario 1, I assume that 30% of current GCL and Center Ice subscribers will switch to the less expensive unbundled individual team package offered on the Internet. Under Scenario 2, I assume that 50% of current GCL and Center Ice subscribers will switch to the less expensive unbundled individual team package. I assume that these consumers with a strong team preference who switch value the unbundled team package as much as the bundle package. Because Comcast and DIRECTV are not required to offer the unbundled package to their Center Ice subscribers, I assume that the unbundled package is available only through GCL under the terms of the Settlement Agreement.

17. My assumptions regarding the number and valuations of unbundled GCL subscribers are likely to be conservative because they do not take into account new consumers

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<sup>15</sup> "HIGHLY CONFIDENTIAL – NHL Subscribers.pdf". The GCL subscribers consists only of full-season subscribers; the Comcast Center Ice subscribers includes Early Bird and Regular Season subscribers, and the DIRECTV Center Ice subscribers includes full-season subscribers.

<sup>16</sup> See, e.g., John Emmert, *Be prepared for the new NHL season with NHL GameCenter*, ENGADGET, Oct. 3, 2014, <http://www.engadget.com/2014/10/03/be-prepared-for-the-new-nhl-season-with-nhl-gamecenter/>.

<sup>17</sup> See, e.g., Greg Wyshynski, *How much does NHL Center Ice cost for 2014-2015*, YAHOO SPORTS, Oct. 4, 2014, <http://sports.yahoo.com/blogs/nhl-puck-daddy/how-much-does-nhl-center-ice-cost-for-2014-15-162850281.html>.

<sup>18</sup> NHL2304272.

<sup>19</sup> Declaration of Januz A. Ordover, at 32 n.71. Dr. Ordover classifies a subscriber as having a strong team preference if the subscriber's favorite team accounts for at least half of the subscriber's game views. *Id.*

who will enter (or re-enter) the market. For the purposes of valuing the settlement in monetary terms, what matters is the absolute number of consumers who purchase the single team package instead of the traditional package, not any given percentage of preexisting subscribers. My calculations of the value of the unbundled GCL package to the 30% to 50% share of *current* subscribers does not include the value to the additional consumers who would enter the market once an unbundled package becomes available.

18. For purposes of valuing the settlement terms, I assume that the undiscounted price of the bundled packages will remain \$159.96 through the 2019-2020 season. I also assume that the number of subscribers to GCL, DIRECTV Center Ice, and Comcast Center Ice remains at the 2014-2015 levels. This assumption is conservative, given that subscriptions will likely increase as a result of the lower prices and additional choices coming from the proposed settlement.

19. Table 1 summarizes the data and assumptions upon which I rely in calculating the value of the terms of the Settlement Agreement to Class Members, as described above.

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TABLE 1: MODEL INPUTS

[1]	Subscribers, 2014-2015	██████	██████	██████
[2]	Price of bundled package, 2014-2015	\$159.00	\$159.96	\$159.96
[3]	Discount on Bundled Package Price			
	2015-2016	17.25%	12.50%	12.50%
	2016-2017	0.00%	12.50%	12.50%
	2017-2018	0.00%	0.00%	0.00%
	2018-2019	0.00%	0.00%	0.00%
	2019-2020	0.00%	0.00%	0.00%
[4]	Discount on Unbundled Package, relative to Bundled Package	20%	N/A	N/A
	Assumed % of Bundle Package Subscribers who Switch to Unbundled GCL Package			
[5]	Scenario 1	30%	30%	30%
[6]	Scenario 2	50%	50%	50%
[7]	Assumed annual change in subscribers, 2015-2020	0%	0%	0%
[8]	Assumed annual price change of bundled package, 2015-2020 (before any settlement-related discounts)	0%	0%	0%

*Sources:*

[1] "HIGHLY CONFIDENTIAL – NHL Subscribers.pdf"

[2] John Emmert, *Be prepared for the new NHL season with NHL GameCenter*, ENGADGET, Oct. 3, 2014, <http://www.engadget.com/2014/10/03/be-prepared-for-the-new-nhl-season-with-nhl-gamecenter/>; Greg Wyshynski, *How much does NHL Center Ice cost for 2014-2015*, YAHOO SPORTS, Oct. 4, 2014, <http://sports.yahoo.com/blogs/nhl-puck-daddy/how-much-does-nhl-center-ice-cost-for-2014-15-162850281.html>.[3] *Settlement Agreement*.[4] *Settlement Agreement*. DIRECTV and Comcast are not required to offer unbundled Center Ice packages to their customers. Therefore, I assume that the unbundled package is only offered through GCL.

[5] – [8] Assumptions.

20. To calculate the benefit of the settlement to consumers, I calculate the customer programming costs for all GCL, DIRECTV Center Ice, and Comcast Center Ice subscribers for each of the five seasons beginning with the 2015-2016 season. I calculate these customer costs under the terms of the Settlement Agreement, and I compare these costs to the costs that would

be incurred by subscribers without the settlement. The value of the Settlement Agreement is equal to the difference between these two costs.

21. Table 2 illustrates the programming price per subscriber in my model if the terms of the Settlement Agreement are implemented (“Settlement”) and the programming price per subscriber if the terms of the Settlement Agreement are not implemented (“No Settlement”). Through a comparison of these sets of Settlement and No Settlement prices, Table 2 illustrates the cost savings from the Settlement Agreement to each subscriber who either remains a bundle package subscriber or switches to an unbundled package.

TABLE 2: PRICES OF BUNDLE AND UNBUNDLED PACKAGES

		2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
<b>GCL</b>						
[1]	No Settlement, Bundle Package	\$159.00	\$159.00	\$159.00	\$159.00	\$159.00
[2]	Settlement, Bundle Package	<u>\$131.57</u>	<u>\$159.00</u>	<u>\$159.00</u>	<u>\$159.00</u>	<u>\$159.00</u>
[3]	<b>Bundle Subscriber Benefit</b>	<b>\$27.43</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>
[4]	Settlement, Unbundled Package	<u>\$105.26</u>	<u>\$127.20</u>	<u>\$127.20</u>	<u>\$127.20</u>	<u>\$127.20</u>
[5]	<b>Unbundled Subscriber Benefit</b>	<b>\$53.74</b>	<b>\$31.80</b>	<b>\$31.80</b>	<b>\$31.80</b>	<b>\$31.80</b>
<b>DIRECTV Center Ice</b>						
[6]	No Settlement, Bundle Package	\$159.96	\$159.96	\$159.96	\$159.96	\$159.96
[7]	Settlement, Bundle Package	<u>\$139.97</u>	<u>\$139.97</u>	<u>\$159.96</u>	<u>\$159.96</u>	<u>\$159.96</u>
[8]	<b>Bundle Subscriber Benefit</b>	<b>\$20.00</b>	<b>\$20.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>
<b>Comcast Center Ice</b>						
[9]	No Settlement, Bundle Package	\$159.96	\$159.96	\$159.96	\$159.96	\$159.96
[10]	Settlement, Bundle Package	<u>\$139.97</u>	<u>\$139.97</u>	<u>\$159.96</u>	<u>\$159.96</u>	<u>\$159.96</u>
[11]	<b>Bundle Subscriber Benefit</b>	<b>\$20.00</b>	<b>\$20.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>

Notes:

[1] See Table 1, rows [2] & [8]

[2] = [1] discounted by Table 1, row [3]

[3] = [1] – [2]

[4] = [2] discounted by Table 1, row [4]

[5] = [1] – [4]

[6] See Table 1, rows [2] & [8]

[7] = [6] discounted by Table 1, row [3]

[8] = [6] – [7]

[9] See Table 1, rows [2] & [8]

[10] = [9] discounted by Table 1, row [3]

[11] = [9] – [10]

22. As Table 2 shows, subscribers to the bundled GCL Package would save \$27.43 for the 2015-2016 season under the terms of the Settlement Agreement, resulting from the discounted price of \$131.57 (a 17.25% discount off of the \$159.00 price without the settlement). Subscribers who switch to the unbundled package save an additional 20% from the discounted bundled package. Therefore, the price paid by subscribers switching to the unbundled package in 2015-2016 decreases from \$159.00 to \$105.26—a decrease of \$53.74. For the four seasons beginning with 2016-2017, subscribers who switch to the unbundled GCL Package save \$31.80 relative to what they would pay for a bundled GCL or Center Ice Package.

23. Table 2 also shows that the three free weeks of bundled Center Ice programming lowers the total price of Center Ice programming from \$159.96 to \$139.97 (a 12.5% decrease) for the 2015-2016 and 2016-2017 seasons. This represents a \$20 benefit per Center Ice subscriber who remains with the bundled Center Ice package of either Comcast or DIRECTV.

24. Table 3 illustrates the number of subscribers to the GCL and Center Ice bundle packages who either (1) remain bundle package subscribers under the terms of the Settlement Agreement, or (2) switch to the unbundled GCL package.

TABLE 3: FORECASTED BUNDLE PACKAGE AND UNBUNDLED PACKAGE SUBSCRIBERS FOR EACH SEASON, 2015-2020

		2015	2016	2017	2018	2019	2020
[1]	<i>No Settlement</i>	██████	██████	██████	██████	██████	██████
	<i>Settlement (Scenario 1)</i>						
[2]	Bundled	██████	██████	██████	██████	██████	██████
[3]	Unbundled	██████	██████	██████	██████	██████	██████
[4]	<i>Total</i>	██████	██████	██████	██████	██████	██████
	<i>Settlement (Scenario 2)</i>						
[5]	Bundled	██████	██████	██████	██████	██████	██████
[6]	Unbundled	██████	██████	██████	██████	██████	██████
[7]	<i>Total</i>	██████	██████	██████	██████	██████	██████

Notes:

[1] See Table 1, rows [1] & [7]

[2] = 70% × [1]. See Table 1, row 5.

[3] = 30% of [1] (Total column) for GCL; = 0 for DIRECTV and Comcast Center Ice. See Table 1, rows 4 & 5.

[4] = [2] + [3]

[5] = 50% × [1]. See Table 1, row 6.

[6] = 50% of [1] (Total column) for GCL; = 0 for DIRECTV and Comcast Center Ice. See Table 1, rows 4 & 6.

[7] = [5] + [6]

25. As Table 3 shows, of the ██████ total GCL, DIRECTV Center Ice, and Comcast Center Ice subscribers, ██████ (70% of the total) remain bundle package subscribers when the terms of the Settlement Agreement are implemented under Scenario 1, whereas ██████ (50% of the total) remain bundle package subscribers under Scenario 2. Under Scenario 1, ██████ subscribers (30% of the total) switch to the unbundled GCL package, whereas ██████ subscribers (50% of the total) switch to the unbundled GCL package under Scenario 2.

26. Using the pricing and subscriber calculations illustrated in Tables 2 and 3, I calculate the benefit to GCL and Center Ice subscribers from the Settlement Agreement. Appendix 4 illustrates my calculations under the assumptions of Scenario 1, whereas Appendix 5 illustrates my calculations under the assumptions of Scenario 2. Table 4 summarizes my results

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of the value of the Settlement Agreement to all GCL, DIRECTV Center Ice, and Comcast Center Ice subscribers.

TABLE 4: SUMMARY OF SETTLEMENT AGREEMENT BENEFITS TO BUNDLE PACKAGE AND UNBUNDLED PACKAGE SUBSCRIBERS, 2015-2020

<i>Scenario 1</i>		
[1]	Bundle Subscriber Benefit	██████████
[2]	Unbundled Subscriber Benefit	██████████
[3]	<b>Total Subscriber Benefit</b>	<b>\$20,893,739</b>
<i>Scenario 2</i>		
[4]	Bundle Subscriber Benefit	██████████
[5]	Unbundled Subscriber Benefit	██████████
[6]	<b>Total Subscriber Benefit</b>	<b>\$28,728,888</b>

*Notes:*

[1] See Appendix 4, row [14]

[2] See Appendix 4, row [15]

[3] = [1] + [2]

[4] See Appendix 5, row [14]

[5] See Appendix 5, row [15]

[6] = [4] + [5]

27. Under the assumption of Scenario 1 that 30% of the bundle package subscribers switch to the unbundled package, the total benefit from the Settlement Agreement to subscribers who remain bundle package subscribers is ██████████ from the 2015-2016 to the 2019-2020 seasons. The total benefit to subscribers who switch to the unbundled package is ██████████ under Scenario 1. The total benefit to all GCL, DIRECTV Center Ice, and Comcast Center Ice subscribers is \$20.9 million under Scenario 1.

28. Under the assumption of Scenario 2 that 50% of the bundle package subscribers switch to the unbundled package, the total benefit from the Settlement Agreement to subscribers who remain bundle package subscribers is ██████████ from the 2015-2016 to the 2019-2020 seasons. The total benefit to subscribers who switch to the unbundled package is ██████████

under Scenario 1. The total benefit to all GCL, DIRECTV Center Ice, and Comcast Center Ice subscribers is \$28.7 million under Scenario 1.

29. The valuation range of \$20.9 million to \$28.7 million illustrated in Table 4 is a conservative estimate of the overall benefit of the Settlement Agreement to consumers. First, the valuation is conservative because I assume that the total number of subscribers to the bundled and unbundled packages does not increase over time. It is likely that additional consumers (including Class Members who were not active subscribers in 2014-2015 but had been subscribers in earlier years) would subscribe to these packages due to the decrease in price and increase in programming package choice. Second, I assume in my calculations that prices without the settlement discounts remain constant over time. If the undiscounted price were to increase, then the dollar value of the discounts would increase, thus increasing the value of the settlement to subscribers. Third, my calculations do not include the benefit to *all* Comcast and DIRECTV subscribers who would receive the first three weeks of the 2015-2016 and 2016-2017 seasons of the Center Ice bundle programming for free. Instead, my calculations only include the value of these free weeks to full-season Center Ice subscribers.

## V. CONCLUSION

30. In summary, I find that subscribers to GCL, DIRECTV Center Ice, and Comcast Center Ice will save approximately \$20.9 million to \$28.7 million over the five seasons beginning with the 2015-2016 season and ending with the 2019-2020 season under the terms of the Settlement Agreement. The Settlement Agreement provides further benefits to subscribers by introducing the choice of an unbundled package that has not been offered previously. Therefore, I conclude that the Settlement Agreement benefits Class Members.

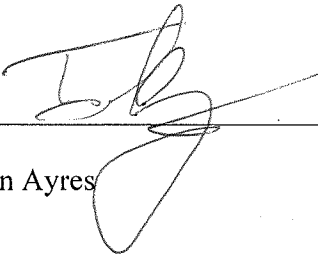


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\* \* \*

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on August 6, 2015.

  
\_\_\_\_\_  
Ian Ayres

## APPENDIX 1: MATERIALS RELIED UPON

### *Legal Filings & Expert Reports:*

- Second Amended Class Action Complaint, Thomas Laumann v. National Hockey League, Case No. 12-cv-1817 (SAS) (filed Oct. 26, 2012).
- Class Action Settlement Agreement, Thomas Laumann v. National Hockey League, Case No. 12-cv-1817 (SAS) (filed June 21, 2015).
- Declaration of Januz A. Ordoover.

### *Court Decisions:*

- Opinion and Order, Thomas Laumann v. National Hockey League, Case No. 12-cv-1817 (SAS) (filed Aug. 8, 2014).

### *Discovery Documents*

- "HIGHLY CONFIDENTIAL – NHL Subscribers.pdf"
- NHL2304272.

### *News Articles:*

- John Emmert, *Be prepared for the new NHL season with NHL GameCenter*, ENGADGET, Oct. 3, 2014, <http://www.engadget.com/2014/10/03/be-prepared-for-the-new-nhl-season-with-nhl-gamecenter/>.
- Greg Wyshynski, *How much does NHL Center Ice cost for 2014-2015*, YAHOO SPORTS, Oct. 4, 2014, <http://sports.yahoo.com/blogs/nhl-puck-daddy/how-much-does-nhl-center-ice-cost-for-2014-15-162850281.html>.

**APPENDIX 2: CURRICULUM VITAE OF IAN AYRES**

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**EDUCATION**

- Ph.D. (Economics) Massachusetts Institute of Technology, 1988.  
Major Fields: Industrial Organization, Econometrics.  
Dissertation: Essays on Vertical Foreclosure, Cartel Stability and the Structural Determinants of Oligopolistic Behavior.
- J.D. Yale Law School, 1986.  
Articles Editor, Yale Law Journal.
- B.A. Yale University, 1981.  
Majors: Russian and East European Studies (Distinction).  
Economics (Distinction).  
Summa Cum Laude, 1981.  
Phi Beta Kappa, 1980.

**PROFESSIONAL APPOINTMENTS**

- William K. Townsend Professor, Yale Law School, 1994 - present.
- Professor, Yale School of Management, 1994 - present.
- Anne Urowsky Professorial Fellow, 2009 – present.
- Research Associate, National Bureau of Economic Research, 2005 - present.
- Editor, JOURNAL OF LAW, ECONOMICS AND ORGANIZATION, 2002 - 2009.
- Adviser, The Center for Cost-Effective Consumerism, 2008 – present.
- Robert B. and Candice J. Haas Visiting Professor, Harvard Law School, Winter Term 2008.
- Visiting Professor, University of Illinois, School of Law, 1997-98.

Lecturer, University of Toronto, Faculty of Law, January 1995.

Professor, Stanford Law School, 1992 - 1994.

Lecturer, University of Illinois, School of Law, Summers 1994 and 1995.

Board of Editors, SUPREME COURT ECONOMIC REVIEW, 1993 - .

Lecturer, University of Iowa, School of Law, January Term 1993.

Lecturer, Moscow State Institute of International Relations (MGIMO) -- Cardozo Law Institute, Summer 1992.

Visiting Professor, Yale Law School, Fall 1991.

Visiting Professor, University of Virginia, School of Law,  
Fall 1990 - Spring 1991.

Guest Scholar, Brookings Institution, Summer 1990 - Spring 1991.

Associate Professor, Northwestern University, School of Law,  
1990 - 1991; (Assistant Professor, 1987-1990).

Research Fellow, American Bar Foundation, 1987 - 1991.

Scholar in Residence, Sonnenschein Nath and Rosenthal - Summer 1990.

Associate Editor, *Law and Social Inquiry*, 1990.

Clerk to the Honorable James K. Logan, Tenth Circuit Court of Appeals, 1986-1987.

Olin Summer Research Fellow, Yale Law School Program in Law, Economics, and Public Policy, May to August 1986.

### **COURSES TAUGHT**

Antitrust, Civil Rights, Commercial Law, Contracts, Corporations, Corporate Finance, Intellectual Property, Law and Economics, Empirical Law and Economics, LGBT Litigation Seminar, Property, Quantitative Methods.

### **PUBLIC INTEREST**

*Rothe Dev. Corp. v. United States*, SA-98-CA-1011-EP, U.S. District Court Western District of Texas, testifying expert concerning narrow tailoring of affirmative action in government procurement, 1999.

Advisor, Justice and Commerce Departments on post-Adarand review of Affirmative Action, 1998.

Member, Board of Directors, Yale Law School Early Learning Center, 1996 - 1997.

Member, Board of Directors, East Palo Alto Community Law Project, 1993 - 1994.

*In re Insurance Antitrust Litigation*, consulting expert; regarding antitrust claims of 17 state Attorneys General against major commercial insurers, 1988 - 1991.

Counsel in Illinois post-conviction petition, *People v. Titone*, 83-C-127, 1988 to 1992 (Death sentence vacated September 7, 1990; argued claims concerning underlying conviction to Illinois Supreme Court, March 14, 1992).

New Haven Battered Women's Temporary Restraining Order Project, September 1985 to April 1986.

Harvard Prison Legal Assistance Project, October 1983 to May 1984.

Legal Services of Western Missouri, June to August 1983.

Jerome Frank Legal Services Organization, January 1983 to October 1984.

## **PUBLICATIONS**

### ***Books***

STUDIES IN CONTRACT LAW (8<sup>th</sup> edition, Foundation Press, 2012) (with Greg Klass).

THE \$500 DIET: WEIGHT LOSS FOR PEOPLE WHO ARE COMMITTED TO CHANGE (Kindle Select, 2011).

CARROTS AND STICKS: UNLOCK THE POWER OF INCENTIVES TO GET THINGS DONE (Bantam Books, 2010).

LIFECYCLE INVESTING: A NEW, SAFE, AND AUDACIOUS WAY TO IMPROVE THE PERFORMANCE OF YOUR RETIREMENT PORTFOLIO (Basic Books, 2010) (with Barry Nalebuff).

STUDIES IN CONTRACT LAW (7<sup>th</sup> edition, Foundation Press, 2008) (with Richard E. Speidel).

SUPER CRUNCHERS: WHY THINKING-BY-NUMBERS IS THE NEW WAY TO BE SMART (BANTAM

BOOKS 2007).

Excerpt: How Computers Routed the Experts, Financial Times (August 31, 2007).

STRAIGHTFORWARD: HOW TO MOBILIZE HETEROSEXUAL SUPPORT FOR GAY RIGHTS (PRINCETON UNIVERSITY PRESS 2005) (with Jennifer Gerarda Brown).

INSINCERE PROMISES: THE LAW OF MISREPRESENTED INTENT (YALE UNIVERSITY PRESS, 2005) (with Gregory Klass).

OPTIONAL LAW: THE STRUCTURE OF LEGAL ENTITLEMENTS (UNIVERSITY OF CHICAGO PRESS, 2005).

WHY NOT?: HOW TO USE EVERYDAY INGENUITY TO SOLVE PROBLEMS BIG AND SMALL (Harvard Business School Press, 2003) (with Barry Nalebuff) *also published in Portugese* as “Você Pode Tudo” (Negocio Editora), *in Spanish* as “¿Y por que NO” (Empresa Activa), *in Korean* (Sejong), *in Japanese* (Hankyu), *in Chinese* (The Commercial Press), *in Bulgarian* (Klasika and Still), *in Chinese* (China Times), *in Estonian* (Tanapaev), *in Italian* (Il Sole), *in Korean* (Sejong Books), *in Russian* (Williams Publishing), and *in Thai* (AR Business Press).

*Book Excerpt: Ideas Waiting to Happen*, FORBES 127 (Oct. 27 2003) (with Barry Nalebuff).

*Book Excerpt: A Role on the Board for the ‘Loyal Opposition,’* DIRECTORS & BOARDS 32 (Fall 2003).

*Book Excerpt: Problem Solving: What Would Croesus Do?,* DARWIN (Nov. 2003).

STUDIES IN CONTRACT LAW (6<sup>th</sup> edition, Foundation Press, 2003) (with Edward J. Murphy & Richard E. Speidel).

VOTING WITH DOLLARS: A NEW PARADIGM FOR CAMPAIGN FINANCE (with Bruce Ackerman) (Yale University Press) (2002).

PERVASIVE PREJUDICE?: UNCONVENTIONAL EVIDENCE OF RACE AND GENDER DISCRIMINATION (University of Chicago Press, 2002).

STUDIES IN CONTRACT LAW (5<sup>th</sup> edition, Foundation Press, 1997) (with Edward J. Murphy & Richard E. Speidel).

RESPONSIVE REGULATION: TRANSCENDING THE DEREGULATION DEBATE (OXFORD UNIVERSITY PRESS 1992) (with John Braithwaite).

***Scholarly Articles and Chapters***

*The Rule of Probabilities*, STANFORD LAW REVIEW (forthcoming 2015) (with Barry Nalebuff).

*Effect of Perineal Self-Acupressure on Constipation: The PSAC Randomized, Controlled Trial*, JOURNAL GENERAL INTERNAL MEDICINE (November 2014) (with Ryan Abbott, Ed Hui and Ka-Kit Hui)

*Innovation Sticks: The Limited Case for Penalizing Failures to Innovate*, U. CHI. L. REV. (forthcoming 2015) (with Amy Kapczynski).

Book Review of *The Behavior of Federal Judges: A Theoretical and Empirical Study of Rational Choice*. By Lee Epstein, William M. Landes, and Richard A. Posner. Harvard University Press, 2013. 52 (LII) JOURNAL OF ECONOMIC LITERATURE 866 (September 2014).

*Beyond Diversification: The Pervasive Problem of Excessive Fees and “Dominated Funds” in 401(k) Plans*, YALE LAW JOURNAL (forthcoming 2014) (with Quinn Curtis).

*Protecting Consumer Investors by Facilitating “Improved Performance” Competition*, UNIVERSITY OF ILLINOIS LAW REVIEW (forthcoming 2014) (with Quinn Curtis).

*Unhappy Meals: Sex Discrimination in Toy Choice at McDonald's*, WILLIAM & MARY JOURNAL OF WOMEN AND THE LAW (forthcoming 2014) (with Antonia Rose Ayres-Brown).

*Evidence and Extrapolation: Mechanisms for Regulating Off-Label Uses of Drugs and Devices*, 64 DUKE LAW JOURNAL 377 (2014) (with Ryan Abbott).

*Anti-Herding Regulation*, HARVARD BUSINESS LAW REVIEW (forthcoming 2014) (with Joshua Mitts).

*Three Proposals for Regulating the Distribution of Home Equity*, YALE JOURNAL ON REGULATION (forthcoming 2013) (with Joshua Mitts).

*A Randomized Experiment Assessing the Accuracy of Microsoft's “Bing It On” Challenge Claims*, 26 LOYOLA LAW REVIEW 1 (2014) (with Emad Atiq, Sheng Li, Michelle Lu, Christine Tsang, & Tom Maher).

*The Chastain Effect: Using Title IX to Measure the Causal Effect of Participating in High School Sports on Adult Women's Social Lives*, 48 JOURNAL OF SOCIO-ECONOMICS 62

(2014) (with Phoebe Clarke).

*Skeletons in the Database: An Early Analysis of the CFPB's Consumer Complaints* 19 FORDHAM JOURNAL OF CORPORATE & FINANCIAL LAW 343 (2014) (with Jeff Lingwall, & Sonia Steinway).

*Measuring Fiduciary and Investor Losses in 401(k) Plans* (working paper 2013) (with Quinn Curtis).

*The No Reading Problem in Consumer Contract Law*, 66 STANFORD LAW REVIEW 545 (2014) (with Alan Schwartz).

*Tops, Bottoms, and Versatiles: What Straight Views of Penetrative Preferences Could Mean for Sexuality Claims Under Price Waterhouse*, 123 YALE LAW JOURNAL 714 (2013) (with Richard Luedeman).

*Diversification Across Time*, 39 JOURNAL OF PORTFOLIO MANAGEMENT 73 (Winter 2013) (with Barry Nalebuff).

*Information Escrows*, 111 MICHIGAN LAW REVIEW 145 (2012) (with Cait Unkovic).

*Anti-Incentives: The Power of Resisted Temptation*, EUROPEAN FINANCIAL REVIEW 40 (February-March 2012).

*Regulating Opt Out: An Economic Theory of Altering Rules*, 121 YALE LAW JOURNAL 2032 (2012).

*Race Effects on eBay*, working paper (2011) (with Mahzarin Banaji and Christine Jolls).

*Randomizing Law*, 159 UNIVERSITY OF PENNSYLVANIA LAW REVIEW 929 (2011) (with Michael Abramowicz & Yair Listokin).

*Testing for Discrimination and the Problem of "Included Variable Bias,"* working paper (2010).

*Meador Lecture: Using Commitment Contracts to Further Ex Ante Freedoms: The Twin Problems of Substitution and Ego Depletion*, 62 ALABAMA LAW REVIEW 811 (2011).

*Commitment Bonds*, 100 GEORGETOWN LAW JOURNAL 605 (2012) (with Michael Abramowicz).

*The Erasure of the Affirmative Action Debate in the Age of Obama*, in THE OBAMAS AND A (POST) RACIAL AMERICA (Gregory Parks & Matthew Hughey, eds. Oxford University Press)



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*Optimal Voting Rules for Two-member Tenure Committees*, 36 SOCIAL CHOICE & WELFARE 323 (2011) (with Colin Rowat and Nasser Zakariya).

*Schwartz Lecture, Never Say No: The Law, Economics and Psychology of Counteroffers*, 25 OHIO STATE JOURNAL ON DISPUTE RESOLUTION 603 (2010).

*Yet Another Refutation of the More Guns, Less Crime Hypothesis – With Some Help From Moody and Marvell*, 6 ECON. J. WATCH 35 (2009) (with John Donohue).

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*Options and Epidemics*, DAEDALUS 118 (Spring 2008).

*Tradable Patent Rights*, 60 STANFORD LAW REVIEW 863 (2007) (with Gideon Parchomovsky).

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*Market Power and Inequality: A Competitive Conduct Standard for Assessing When Disparate Impacts are Justified*, 95 CALIFORNIA LAW REVIEW 669 (2007).

*Comment on Jolls's Behavioral Law and Economics*, in BEHAVIORAL ECONOMICS AND ITS APPLICATIONS (Peter Diamond & Hannu Vartiainen, eds., 2007).

*Seeing Significance: Is the 95% Probability Range Easier to Perceive?*, 20 CHANCE 11 (Winter 2007) (with Antonia Ayres-Brown & Henry Ayres-Brown).

*Written Statement, Disparity Studies as Evidence of Discrimination in Federal Contracting*, U.S. COMMISSION ON CIVIL RIGHTS (May 2006).

*The Secret Refund Booth*, 73 UNIVERSITY OF CHICAGO LAW REVIEW 1107 (2006) (with Bruce Ackerman), published in Spanish in MAS ALLA DEL ACCESO A LA INFORMACION 282 (John M. Ackerman ed. 2008).

*New Rules for Promissory Fraud*, 48 ARIZONA LAW REVIEW 957 (2006) (with Gregory Klass).

*Don't Tell, Don't Ask: Narrow Tailoring After Grutter and Gratz*, 85 TEXAS LAW REVIEW 517 (2006) (with Sydney Foster).

*Ya-HUH: There Are and Should Be Penalty Defaults*, 33 FLORIDA STATE UNIVERSITY LAW REVIEW 589 (2006).

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*First Amendment Bargains*, 18 YALE J. L & HUMANITIES 178 (2006).

*Mark(et)ing Nondiscrimination: Privatizing ENDA with a Certification Mark*, 104 MICHIGAN LAW REVIEW 1639 (2006) (with Jennifer Gerarda Brown).

*Institutional and Evolutionary Failure and Economic Development in the Middle East*, 30 YALE JOURNAL OF INTERNATIONAL LAW 397 (2005) (with Jonathan Macey).

*Does Affirmative Action Reduce the Number of Black Lawyers?*, 57 STANFORD LAW REVIEW 1807 (2005) (with Richard Brooks).

*A Separate Crime of Reckless Sex*, 72 UNIVERSITY OF CHICAGO LAW REVIEW 599 (2005) (with Katharine Baker).

*To Insure Prejudice: Racial Disparities in Taxicab Tipping*, 114 YALE LAW JOURNAL 1613 (2005) (with Fred Vars and Nasser Zakariya).

*Discrimination in Consummated Car Purchases*, in HANDBOOK ON EMPLOYMENT DISCRIMINATION RESEARCH: RIGHTS AND REALITIES 137 (Springer 2005).

*The Inclusive Command: Voluntary Integration of Sexual Minorities into the U.S. Military*, 103 MICHIGAN LAW REVIEW 150 (2004) (with Jennifer Gerarda Brown).

*Should Heterosexuals Boycott Marriage?*, ISSUES IN LEGAL SCHOLARSHIP, Single-Sex Marriage (2004): Article 2, <http://www.bepress.com/ils/iss5/art2> (with Jennifer Gerarda Brown).

*Promissory Fraud Without Breach*, 2004 WISCONSIN LAW REVIEW 507 (2004) (with Gregory Klass).

*Three Tests for Measuring Unjustified Disparate Impacts in Organ Transplantation: The Problem of "Included Variable" Bias*, 48 PERSPECTIVES IN BIOLOGY AND MEDICINE S68 (2005).

*The Brennan Center Jorde Symposium Issue on Bruce Ackerman & Ian Ayres, Voting With Dollars: A New Paradigm for Campaign Finance Reform*, 91 CALIFORNIA LAW REVIEW 641 (2003) and *The New Paradigm Revisited*, 91 CALIFORNIA LAW REVIEW 743 (2003) (with Bruce Ackerman).

*Symposium Issue on Ian Ayres, Pervasive Prejudice?: Unconventional Evidence of Race and Gender Discrimination* (2002), 55 STANFORD LAW REVIEW 2267 (2003) and *Is Discrimination Elusive?*, 55 STANFORD LAW REVIEW 2419 (2003)

*Symposium Issue Commentaries on Bruce Ackerman & Ian Ayres, Voting With Dollars: A New Paradigm for Campaign Finance Reform*, 37 UNIVERSITY OF RICHMOND LAW REVIEW 935 (2003) and *Why a New Paradigm?*, 37 UNIVERSITY OF RICHMOND LAW REVIEW 1147 (2003) (with Bruce Ackerman).

*Shooting Down the More Guns, Less Crime Hypothesis*, 55 STANFORD LAW REVIEW 1193 (2003) (with John J. Donohue III).

*The Latest Misfires in Support of the More Guns, Less Crime Hypothesis*, 55 STANFORD LAW REVIEW 1371 (2003) (with John J. Donohue III).

*Marketing Privacy*, 20 YALE JOURNAL ON REGULATION 77 (2003) (with Matthew Funk).

*Correlated Values in the Theory of Property and Liability Rules*, 32 JOURNAL OF LEGAL STUDIES 121 (2003) (with Paul Goldbart).

*Valuing Modern Contract Scholarship*, 112 YALE LAW JOURNAL 881 (2003).

*Outcome Tests of Racial Disparities in Police Practices*, 4 JOURNAL OF THE JUSTICE

RESEARCH & STATICS ASSOCIATION 131 (2002).

*Internalizing Outsider Trading*, 101 MICHIGAN LAW REVIEW 313 (2002) (with Stephen Choi).

*Optimal Delegation and Decoupling in the Design of Liability Rules*, 100 MICHIGAN LAW REVIEW 1 (2001) (with Paul Goldbart).

*Using Public Affirmative Action to Remedy Private Discrimination* (with Frederick E. Vars) Chapter 2 in NYU WORKING PAPERS ON LABOR AND EMPLOYMENT LAW: 1998-1999 35 (2001).

*A Dilution Mechanism for Valuing Corporations in Bankruptcy*, 111 YALE LAW JOURNAL 83 (2001) (with Barry E. Adler).

*Substitutes for Insider Trading*, 54 STANFORD LAW REVIEW 235 (2001) (with Joe Bankman).

2000 MONSANTO LECTURE IN TORT REFORM AND JURISPRUDENCE: *Using Tort Settlement To Cartelize*, 34 VALPARAISO UNIVERSITY LAW REVIEW 595 (2000).

*Disclosure versus Anonymity In Campaign Finance*, in DESIGNING DEMOCRATIC INSTITUTIONS, XLII NOMOS 19 (Ian Shapiro & Stephen Macedo, eds.2000).

*Economics of Affirmative Action*, in 2 ENCYCLOPEDIA OF THE AMERICAN CONSTITUTION 848 (Leonard W. Levy & Kenneth L. Karst, eds., 2d ed. 2000)

*Empire or Residue: Competing Visions of the Contractual Canon*, in LEGAL CANONS 47 (J.M. Balkin and S. Levinson, eds.) (2000).

*Threatening Inefficient Performance*, 44 EUROPEAN ECONOMIC REVIEW 818 (2000) (with Kristin Madison).

*Determinants of Citations to Articles in Elite Law Review*, 29 JOURNAL OF LEGAL STUDIES 427 (2000) (with Fredrick E. Vars).

*Taking Issue With Issue Advocacy*, 85 VIRGINIA LAW REVIEW 1793 (1999).

*Nondiscretionary Concealed Weapons Laws: A Case Study of Statistics, Standards of Proof and Public Policy*, 1 AMERICAN LAW AND ECONOMICS REVIEW 436 (1999) (with John J. Donohue III).

*Threatening Inefficient Performance of Injunctions and Contracts*, 148 UNIVERSITY OF PENNSYLVANIA LAW REVIEW 45 (1999) (with Kristin Madison).

*The Employment Contract*, 8 KANSAS JOURNAL OF LAW AND PUBLIC POLICY 71 (1999) (with Stewart Schwab).

*Comment [on "The Tobacco Deal" by Jeremy Bulow & Paul Klemperer]*, in BROOKINGS PAPERS ON ECONOMIC ACTIVITY: MICROECONOMICS 395 (1998).

*Eroding Entitlements as Litigation Commitment*, 66 UNIVERSITY OF CHICAGO LAW REVIEW 836 (1999).

*Majoritarian v. Minoritarian Defaults*, 51 STANFORD LAW REVIEW 1591 (1999) (with Robert Gertner).

1998 LADD LECTURE: *Empire or Residue: Competing Visions of the Contractual Canon*, 26 FLORIDA STATE LAW REVIEW 897 (1999).

*Discrediting the Free Market*, 66 UNIVERSITY OF CHICAGO LAW REVIEW 273 (1999).

*Limiting Patentees' Market Power Without Reducing Innovation Incentives: The Perverse Benefits of Uncertainty and Non-Injunctive Remedies*, 97 MICHIGAN LAW REVIEW 985 (1999) (with Paul Klemperer).

*When Does Private Discrimination Justify Public Affirmative Action?* 1998 COLUMBIA LAW REVIEW 1577 (1998) (with Fredrick E. Vars).

1998 MONSANTO LECTURE IN TORT REFORM AND JURISPRUDENCE: *Protecting Property With Puts*, 32 VALPARAISO UNIVERSITY LAW REVIEW 793 (1998).

*"Pro-competitive Executive Compensation" as a Condition for Approval of Mergers that Simultaneously Exploit Consumers and Enhance Efficiency*, 19 CANADIAN COMPETITION RECORD 18 (Spring 1998) (with Stephen F. Ross).

*The Donation Booth: Mandating Donor Anonymity to Disrupt the Market for Political Influence*, 50 STANFORD LAW REVIEW 837 (1998) (with Jeremy Bulow) republished as *La Donacion Secreta: Evitar que los candidatos sepan quienes son sus donantes permite desaticular el trafico de influencias*, 83 ESTUDIOS PUBLICOS 67 (2001).

*Measuring the Positive Externalities from Unobservable Victim Precaution: An Empirical Analysis of Lojack*, 113 QUARTERLY JOURNAL OF ECONOMICS 43 (1998) (with Steven D. Levitt).

*Default Rules for Incomplete Contracts*, THE NEW PALGRAVE DICTIONARY OF ECONOMICS AND THE LAW, Vol. A-D 585 (Peter Newman, ed., 1998).

*Three Proposals To Harness Private Information in Contract*, 21 HARVARD JOURNAL OF LAW AND PUBLIC POLICY 135 (1997).

*The Twin Faces of Judicial Corruption: Extortion and Bribery*, 74 DENVER UNIVERSITY LAW REVIEW 1231 (1997).

*Never Confuse Efficiency With A Liver Complaint*, 1997 WISCONSIN LAW REVIEW 503 (1997).

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*Legal Entitlements as Auctions: Property Rules, Liability Rules, and Beyond*, 106 YALE LAW JOURNAL 703 (1997) (with Jack Balkin).

*Narrow Tailoring*, 43 UCLA LAW REVIEW 1781 (1996).

*Pushing the Envelope: Antitrust Implications of the Envelope Theorem*, 17 MISSISSIPPI COLLEGE LAW REVIEW 21 (1996). *See also* ELECTRONIC DISCUSSION, 17 MISSISSIPPI COLLEGE LAW REVIEW 91, 93, 102 (1996).

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*The Q-Word As Red Herring: Why Disparate Impact Liability Does Not Induce Hiring Quotas*, 74 TEXAS LAW REVIEW 1485 (1996) (with Peter Siegelman).

Review, *Overcoming Law*, by Richard A. Posner, 40 AMERICAN JOURNAL OF LEGAL HISTORY 371 (1996).

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*Distinguishing Between Consensual and Nonconsensual Advantages of Liability Rules*, 105 YALE LAW JOURNAL 235 (1995) (with Eric Talley).

*Further Evidence of Discrimination in New Car Negotiations and Estimates of Its Cause*, 94 MICHIGAN LAW REVIEW 109 (1995).

Review, *The Limits of Freedom of Contract*, by Michael J. Trebilcock, 33 JOURNAL OF ECONOMIC LITERATURE. 865 (1995).

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*Supply-Side Inefficiencies in Corporate Charter Competition: Lessons from Patents, Yachting and Bluebooks*, 43 KANSAS LAW REVIEW 541 (1995).

*Race and Gender Discrimination in Negotiation For the Purchase of a New Car*, 84 AMERICAN ECONOMIC REVIEW 304 (1995) (with Peter Siegelman).

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*Unequal Racial Access to Kidney Transplantation*, 46 VANDERBILT LAW REVIEW 805 (1993) (with Laura Dooley and Robert Gaston).

*Making a Difference: The Contractual Contributions of Easterbrook and Fischel*, 59

UNIVERSITY OF CHICAGO LAW REVIEW 1391 (1992), reprinted in 35 *Corporate Practice Commentator* 65 (1993).

*Designing Responsive Regulatory Institutions*, 2 THE RESPONSIVE COMMUNITY 41 (1992) (with John Braithwaite).

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*Back to Basics: Regulating How Corporations Speak to the Market*, 77 VIRGINIA LAW REVIEW 945 (1991).

*Fair Driving: Gender and Race Discrimination in Retail Car Negotiations*, 104 HARVARD LAW REVIEW 817 (1991).

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*Analyzing Stock Lockups: Do Target Treasury Sales Foreclose or Facilitate Takeover Auctions?*, 90 COLUMBIA LAW REVIEW 682 (1990).

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*Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 YALE LAW JOURNAL 87 (1989) (with Robert Gertner), *reprinted* 7 PEKING UNIVERSITY LAW REVIEW 17 (2005).

*A Private Revolution: Markovits and Markets*, 64 CHICAGO-KENT LAW REVIEW 861 (1989).

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*The Ticket to Savings*, FORBES 176 (May 22, 2006) (Barry Nalebuff).

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*Privatizing Gay Rights with Non-discrimination Promises Instead of Policies*, THE ECONOMIST'S VOICE, Vol. 2: No. 2, <http://www.bepress.com/ev/vol2/iss2/art11> (2005) (with Jennifer Gerarda Brown).

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*Warning: We Discriminate*, ALTERNET [www.alternet.org/rights/22030/](http://www.alternet.org/rights/22030/) (May 17, 2005) (with Jennifer Gerarda Brown).

*Peer Pressure*, FORBES 135 (April 11, 2005) (with Barry Nalebuff).

*Looking Out For No. 2: A Modest Proposal for Single-Use Toilets*, SLATE [www.slate.com/id/2114441](http://www.slate.com/id/2114441) (March 7, 2005).

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*Stop Thief*, FORBES 88 (Jan. 10, 2005) (with Barry Nalebuff).

*Going Soft on Microsoft? The EU's Antitrust Case and Remedy*, THE ECONOMISTS' VOICE, Vol. 2: No. 2, Article 4, [www.bepress/ev/vol2/iss2/art4/](http://www.bepress/ev/vol2/iss2/art4/) (2005) (with Barry Nalebuff).

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*Anonymously Yours*, WORTH 32 (November 2004).

*Cable Bundling* (Nov. 19, 2004) (public radio commentary with Barry Nalebuff).

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*Microsoft I: A Remedy Worthy of Solomon*, INTERNATIONAL HERALD TRIBUNE (Oct. 11, 2004) (with Barry Nalebuff).

*Going, Going, Google*, THE WALL STREET JOURNAL A12 (August 20, 2004) (with Barry Nalebuff).

*Cellphone Sleuth* (Aug. 20, 2004) (public radio commentary with Barry Nalebuff).

*Throwaway Tickets*, FORBES 52 (August 18, 2004) (with Barry Nalebuff).

*A Donation Booth?* (June 23, 2004) (public radio commentary with Barry Nalebuff).

*Say Goodbye to TIVO* (June 9, 2004) (public radio commentary with Barry Nalebuff).

*Dialing for Thieves*, FORBES 76 (April 19, 2004) (with Barry Nalebuff).

*Getting Iraq to Undermine OPEC* (April 6, 2004) (public radio commentary with Barry Nalebuff).

*The Wrong Ticket to Ride*, NEW YORK TIMES A29 (March 24, 2004) (with Barry Nalebuff).

*Benefits of Non-Transparency* (Feb. 23, 2004) (public radio commentary with Barry Nalebuff).

*Don't Sell Us Short*, FORBES 57 (Feb. 2, 2004) (with Barry Nalebuff).

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*Why Legislating Low Tuitions for State Colleges Is a Mistake: They Just Subsidize the Rich*, WRIT FINDLAW'S LEGAL COMMENTARY (October 30, 2003) (with Aaron Edlin) [http://writ.news.findlaw.com/commentary/20031030\\_ayres.html](http://writ.news.findlaw.com/commentary/20031030_ayres.html).

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*Making Ideas Take Flight*, BUSINESS 2.0 133 (Oct. 2003) (with Barry Nalebuff).

*Dialing for Dollars*, NEW YORK TIMES A29 (Sept. 30, 2003).

*Blackboxes For Cars* (Sept. 16, 2003) (public radio commentary with Barry Nalebuff).

*Exactly Who's in the Right in this Labor Dispute?* YALE DAILY NEWS 2 (Sept. 4, 2003) (with Barry Nalebuff).

*Sarbanes/Oxley's First Birthday* (July 30, 2003) (public radio commentary with Barry Nalebuff).

*Blackbox for Cars*, FORBES 83 (August 11, 2003) (with Barry Nalebuff).

*Patriot Dollars Put Money Where the Voters Are*, L.A. TIMES at 15 (July 17, 2003) (with Bruce Ackerman).

*An Educated Consumer*. FORBES 95 (June 09, 2003) (with Barry Nalebuff).

*Charity Begins At Schedule A*, NEW YORK TIMES, p. A21, col. 1 (April 15, 2003) (with Barry Nalebuff).

*Make Car Insurance Fairer*, FORBES 154 (March 17, 2003) (with Barry Nalebuff).

*Pay Per Mile Auto Insurance* (Feb. 25, 2003) (public radio commentary with Barry Nalebuff).

*Spoiling Spam* (Dec.24, 2002) (public radio commentary with Barry Nalebuff).

*The Virtues of a Virtual Strike*, FORBES 128 (Oct. 25, 2002) (with Barry Nalebuff).

*Virtual Strikes* (Oct. 4, 2002) (public radio commentary with Barry Nalebuff).

*Price-Protect Your Home*, FORBES 101 (Sept 16, 2002) (with Barry Nalebuff).

*Disclosing Hidden Fees to Consumers* (Aug. 28, 2002) (public radio commentary with Barry Nalebuff).

*An Alternative to Expensing Stock Options* (July 24, 2002) (public radio commentary with Barry Nalebuff).

*Campaign Reform's Worst Enemy*, NEW YORK TIMES, p. A19, col. 2 (July 6, 2002) (with Bruce Ackerman).

*Opt-Out Advertising*, FORBES 164 (June 20, 2002) (with Barry Nalebuff).

*A Community of Ideas*, FORBES 173 (May 9, 2002) (with Barry Nalebuff).

*If Telemarketers Paid For Your Time*, FORBES 225 (April 15, 2002) (with Barry Nalebuff).

*A Viable Alternative to Breaking up Microsoft: Compulsory Licensing That Would Make Microsoft Compete With Its Past Self*, WRIT FINDLAW'S LEGAL COMMENTARY (April 10, 2002) (with Aaron Edlin) [http://writ.news.findlaw.com/commentary/20020410\\_edlin.html](http://writ.news.findlaw.com/commentary/20020410_edlin.html)

*Connecticut's Speeder-Friendly Crackdown*, NEW YORK TIMES, p. A19, col. 2 (August 31, 2001) (with Barry Nalebuff).

*Should Campaign Donors Be Identified?*, 24 REGULATION 12 (Summer 2001), *excerpted as A Real Solution: Make Donors Anonymous*, NATIONAL REVIEW ONLINE (July 12, 2001) <http://www.nationalreview.com/comment/comment-ayres071201.shtml>.

*Why Telemarketers Should Pay Us*, HARTFORD COURANT, p. A15, col. 3 (May 10, 2001) (with Matthew Funk).

*Lectures vs. Laptops*, NEW YORK TIMES, p. A25, col. 2 (March 20, 2001).

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<http://bostonreview.mit.edu/BR26.1/ayres.html>), *reprinted in* Archon Fung, Dara O'Rourke, & Charles Sabel, *CAN WE PUT AN END TO SWEATSHOPS* 80 (Beacon Press 2001)

*Why Prosecute Linda Tripp?*, NEW YORK TIMES P. A17, col. 1 (August 10, 1999).

*Remedying Private Discrimination: Following the 'Anderson' Model*, LOS ANGELES TIMES M2, col. 3 (April 26, 1998).

*The Donation Booth*, 22 BOSTON REVIEW 26 (December-January 1997-98) (with Jeremy Bulow) (available at <http://bostonreview.mit.edu/BR22.6/ayres.html>), *reprinted in* 47 YALE LAW REPORT 62 (2000) and THE NEWS-GAZETTE, B1 (Sept. 27, 1998).

*Breaking Windows: Why the Justice Department Should Go After the Microsoft Monopoly*, THE NEW REPUBLIC 18 (Nov. 17, 1997).

*Car Buying, Made Simpler*, NEW YORK TIMES F12 (April 13, 1997) (with Peter Schuck).

*Aid Diversity, and the Treasury*, NEW YORK TIMES F13 (May 21, 1995) (with Peter Cramton).

*Price and Prejudice*, THE NEW REPUBLIC 30 (July 6, 1992).

*Colleges in Collusion*, THE NEW REPUBLIC 19 (October 16, 1989).

### **NAMED LECTURES**

The W. D. Carpenter Lecture, "Diversifying Time: Why Buying Stock With Borrowed Money Can Reduce Risk?," Middlebury College, Department of Economics, April 26, 2010.

The Meador Lecture, "Freedom and Commitment," University of Alabama, School of Law, April 19, 2010.

The 46<sup>th</sup> Henry J. Miller Lecture, "Barriers to Diversification," Georgia State University, School of Law, March 18, 2010.

The Schwartz Lecture on Dispute Resolution, "Never Say No: The Law, Economics and Psychology of Counteroffers," Ohio State University, Moritz College of Law, April 2, 2009.

The Biddle Lecture, "A New Test for Race Discrimination," Harvard Law School, November 12, 2008.

The Hart Lecture, "The Secret Refund Booth," Georgetown University Law Center, March 22, 2006.

The Henry Schneider Lecture, "Mark(et)ing Nondiscrimination," Columbia Law School, March 8, 2005.

The Hazard Lecture, "Can Creativity be Taught?: Why Not!," Pembroke Hill High School, September 17, 2004.

The John M. Olin Lecture in Law and Economics, "Why Not?: Can Legal Creativity Be Taught?," Michigan Law School, September 11, 2003.

The Monsanto Lecture in Tort Reform and Jurisprudence, "Using Tort Settlement To Cartelize," Valparaiso University, School of Law, March 26, 2000.

The John M. Olin Public Lecture in Law and Economics, "Coveting Thy Neighbor's Stock: Substitute Trading as Evasion and as Policy Tool," University of Toronto, September 24, 1999.

The Ladd Lecture, "Empire or Residue: Competing Visions of the Contractual Canon," Florida State College of Law, October 22, 1998.

The Monsanto Lecture in Tort Reform and Jurisprudence, "Protecting Property with Puts," Valparaiso University, School of Law, March 26, 1998.

Inaugural Lecture for William K. Townsend Chair, "Solomonic Bargaining," Yale Law School, November 15, 1994.

The Mirikitani Lecture in Law and Economics, "Back to Basics," University of Hawaii, March 9, 1990.

#### **PROFESSIONAL MEMBERSHIP**

James W. Cooper Fellow, Connecticut Bar Foundation, 2009 – present.

Fellow, American Academy of Arts & Sciences, 2006 - present.

Member, American Law Institute, 1997 - present.

Board of Directors, American Law and Economic Association, 1995-1999.

Admitted, Illinois Bar, 1987.

**AWARDS**

Bernstein Fabozzi/Jacobs Levy Outstanding Article Award for *Diversification Across Time* (with Barry Nalebuff), 2013.

Scribes Book Award (INSINCERE PROMISES) – "for the best work of legal scholarship published during the previous year," 2006

Research in the Public Interest, The Center for Public Representation, 1991.

**ACTIVITIES**

1st Place, Law and Society Association -- 5 kilometer fun run, 1989, 2002 and 2003.

Completed 1984 Boston marathon in 3 hours, 12 minutes.

Whiffenpoofs, 1980-81.

Yale Russian Chorus, 1977-80.

Semester in Soviet Union, Moscow's Pushkin Institute, Spring 1979.

CURRENT AS OF JANUARY 7, 2015

**APPENDIX 3: CASES IN WHICH IAN AYRES HAS TESTIFIED OR WRITTEN A DISCLOSED REPORT**

1. City of Los Angeles v. Wells Fargo & Co. (2015), Case No. 2:13-cv-09007-ODW (RZX) (C.D. Cal.) (testifying expert; re: disparate impact of mortgage lending practices).
2. City of Los Angeles v. Bank of America Corp. (2015), Case No. 2:13-cv-09046-PA (AGRx) (C.D. Cal.) (testifying expert; re: disparate impact of mortgage lending practices).
3. Cave v. Saxon Mortgage Services, Inc. (2014) No. 2:11-cv-04586-JP & No. 2:12-cv-05366-JP (E.D. Pa) (testifying expert; re: mortgage modification policies).
4. Adkins v. Morgan Stanley (2014) No. 1:12-cv-7667-VEC (S.D. N.Y.) (testifying expert; re: disparate impact of mortgage lending practices).
5. Saint-Jean v. Emigrant Mortgage Co. (2013) No. 1:11-cv-02122-SJ (E.D. N.Y.) (testifying expert; re: disparate impact and disparate treatment of mortgage lending practices).
6. In Re: Bank of America Home Affordable Modification Program (HAMP) Contract Litigation (2013), No. 1:10-md-02193-RWZ (D. Mass.) (testifying expert; re: mortgage modification policies).
7. In Re: CitiMortgage, Inc. Home Mortgage Affordable Modification Program (“HAMP”) Litigation (2013), No. 11-md-2274-DSF (PLAx) (C.D. Cal.) (testifying expert; re: mortgage modification policies).
8. In re JPMorgan Chase Mortgage Modification Litigation (2012), No. 11-md-02290-RGS (D. Mass.) (testifying expert; re: mortgage modification policies).
9. Reso v. Artisan Partners Limited Partnership (2012) No. 2:11-cv-00873-JPS (E.D. Wis.) (testifying expert; re: competition in the mutual fund industry).
10. Guerra v. GMAC LLC (2011) No. 2:08-cv-01297-LDD (E.D. Pa.) (testifying expert; re: disparate impact of discretionary pricing policies).
11. In re Wells Fargo Mortgage Lending Practices Litigation (2010) No. 08-CV-01930-MMC (JL) (N.D. Cal.) (submitted declaration responding to a motion to exclude the testimony of another expert re: disparate impact of discretionary pricing policies).
12. In re Countrywide Financial Mortgage Lending Practices Litigation (2010) MDL No. 1974 (W.D. Ky.) (testifying expert; re: disparate impact of discretionary pricing policies).
13. Barrett v. Option One Mortgage Corp. (2010) No. 08-10157 (D. Mass.) (testifying expert; re: disparate impact of discretionary pricing policies).
14. In re First Franklin Financial Corp. Litigation (2010) No. C08-01515JW (HRL) (N.D. Ca.) (testifying expert; re: disparate impact of discretionary pricing policies).

15. In re Federated Mutual Funds Excessive Fee Litigation (2009) Consolidated No. 2:04-cv-352-DSC (W.D. Pa.) (testifying expert; re: competition in the mutual fund industry).
16. Connecticut Podiatric Medical Association v. Health Net of Connecticut (2008) No. X01-CV-05-005900-S (CT SUP. CT.) (analyzed business justifications for discriminatory pricing in reimbursement rates paid to podiatrists and medical doctors).
17. INEOS Fluor Americas LLC, v. Honeywell International Inc. (2006) Civil Action No.: 06-189-SLR (DC. Del.) (expert concerning competition in the market for hydrofluoric acid).
18. Techold Participações S.A. v. Telecom Italia International N.V. (2006) International Chamber of Commerce Arbitration Nos.: 13960/CCO, 14048/CCO, 14376/CCO and 14393/CCO (expert concerning breach of corporate fiduciary duties).
19. Regarding Cayuga Nation's Land in Trust Application (2006) (expert concerning economic impact of placing certain lands in trust).
20. Blanchard & Co. v. Barrick Gold Corp. (2005) NO.: 02-3721 c/w 04-2610 (E.D. Louisiana) (expert concerning derivative trading strategies).
21. Claybrooks v. Primus Automotive Financial Services, Inc. (2005) No. 3-02-0382(M.D. Tenn.) (Testifying expert concerning disparate impact of finance markups).
22. Owens v. Nationwide Mutual Insurance Co. (2005) No. 3-03CV1184-H (N.D. Texas) (expert concerning disparate impact of credit scoring mechanism).
23. Russell v. Bank One (2004), No. 3-02-0365 (M.D. Tenn.) (testifying expert concerning disparate impact of finance markups).
24. Fishback and Willis vs. AHFC (2004), No. 3-02-0490 (M.D.Tenn.) (Testifying expert concerning disparate impact of finance markups).
25. Smith v. CFC (2004) No. 00-6003 (D.N.J.) (expert concerning disparate impact of finance markups).
26. Jones v. FMCC (2004) No. 00 CIV 8330 (S.D.N.Y.) (testifying expert concerning disparate impact of finance markups).
27. Coleman v. GMAC (2003) No. 3-98-0211 (M.D. Tenn) (testifying expert concerning disparate impact of finance markups).
28. Monsanto v. Scruggs (2002) Civil Action No. 3:00CV-161-P-A (N.D. Miss) (testifying expert concerning GM seed antitrust and patent abuse claims).
29. Rodriguez v. FMCC (2002) No. 01 C 8526 (N.D. Ill.) (submitted report concerning disparate impact of finance markups).

30. Cisco System, Inc (2001) (transfer pricing report prepared for IRS).
31. Cason v. Nissan Motor Acceptance Corp (2001) 3-98-0223 (M.D. Tenn.) (testifying expert concerning disparate impact of finance markups).
32. Star Scientific v. Steve Carter (2001) IP01-0838 C T/G (S. D. Indiana) (testifying expert concerning MSA qualifying statute).
33. Johnson v. City of Tulsa (2001) 94-C-39-H (N.D. Okla.) (submitted report concerning racial profiling by Tulsa Police Department).
34. Wisconsin v. Rent-a-Center (2000) (testifying expert concerning rent-to-own transaction).
35. Dynalantic Corp. v. United States Department of Defense (1999) (submitted report concerning narrow tailoring of affirmative action in government procurement).
36. Colon v. Rent-a-Center (1999) (wrote report concerning rent-to-own transaction).
37. Rothe Dev. Corp. v. United States, (1999) (testifying expert concerning narrow tailoring of affirmative action in government procurement).
38. Chiron Corp. v. Hoffman-La Roche (1999) (submitted report concerning interpretation of contract releasing certain claims concerning Hepatitis C patent).
39. Teledyne v. Boeing (1998) (testifying expert re: contractual and antitrust issues of Apache attack Helicopter fuselage procurement).
40. Connecticut Municipal Electric Energy Cooperative v. Connecticut Light & Power Co. (February 1998) (submitted report concerning interpretation of Life-of-Unit nuclear power output contract).
41. F. Buddie Contracting Ltd. v. Cuyahoga Community College District (March 1998) (submitted expert report re: narrow tailoring of procurement affirmative action plan).
42. Lufkin v. IDES and CMS (January 1998) (consulting expert; re: disparate impact and Equal Pay Act challenge to Illinois compensation plan).
43. DOJ's PCS Auction Investigation (June 1997) (non-testifying expert on competitive effects of auction bidding strategies).
44. Cassandra Burney et al. v. Rent-a-Center (1996-97) (testifying expert; re: excess interest charged in rent-to-own agreements).
45. Mother Bertha Music, Ltd. v. Bourne Music Ltd. (May 1996) (consulting expert; re: interpretation of copyright assignment contract).
46. U.S. v. Christopher Barnes (March 1996) (testifying expert, re: statistical representation of minorities in federal criminal venires).

47. U.S. v. John M. Purdy, Jr. (February 1996) (testifying expert; re: statistical representation of minorities in federal criminal venires).
48. Johnson v. Apple (July 1994) (testifying expert; re: disparate treatment and damages).
49. Williams v. Du Pont (July 1993) (affidavit expert; re: appropriate prejudgement interest rate).
50. AT&T (September 1993) (consulting expert; re: appropriate preconditions for lifting interexchange restriction).
51. James E. Gilleran, et al. v. Deno Evangelista, et al. (October 1992) (testifying expert; re: fiduciary duties of officers and directors).
52. Neiman Marcus Group v. Federated Department Stores (January 1992) (consulting expert; re: covenant not to compete).
53. In re Fare Box Litigation (1989) (testifying expert; re: relevant market and merger to monopoly).
54. In re Insurance Antitrust Litigation (1988 - 1991) consulting expert; re: antitrust claims of 17 state Attorneys General against major commercial insurers.





*Appendix 4 Notes:*

[1] See Table 3, row [2]

[2] See Table 2, row [3]

[3] = [1] × [2]

[4] See Table 3, row [3]

[5] See Table 2, row [5]

[6] = [4] × [5]

[7] = [5] + [6]

[8] See Table 3, row [2]

[9] See Table 2, row [8]

[10] = [8] × [9]

[11] See Table 3, row [2]

[12] See Table 2, row [11]

[13] = [11] × [12]

[14] = [3] + [10] + [13]

[15] = [6]

[16] = [14] + [15]



*Appendix 5 Notes:*

[1] See Table 3, row [5]

[2] See Table 2, row [3]

[3] = [1] × [2]

[4] See Table 3, row [6]

[5] See Table 2, row [5]

[6] = [4] × [5]

[7] = [5] + [6]

[8] See Table 3, row [5]

[9] See Table 2, row [8]

[10] = [8] × [9]

[11] See Table 3, row [6]

[12] See Table 2, row [11]

[13] = [11] × [12]

[14] = [3] + [10] + [13]

[15] = [6]

[16] = [14] + [15]