UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

NATCHITOCHES PARISH HOSPITAL SERVICE DISTRICT and J.M. SMITH CORP. d/b/a SMITH DRUG COMPANY, on behalf of themselves and all others similarly situated, Plaintiff, vs. TYCO INTERNATIONAL, ltd.; and TYCO INTERNATIONAL (U.S.), INC.; TYCO HEALTHCARE GROUP, L.P. THE KENDALL HEALTHCARE PRODUCTS COMPANY, Defendants.	)	Civil Action No. 05-12024 EXPERT REPLY DECLARATION OF DR. HAL SINGER

INTRODUCTION

1. I have been asked by counsel for the proposed class to respond to the portions of the expert report written by Margaret E. Guerin-Calvert that concern issues relating to damages.[1] In my expert report,[2] I estimated damages associated with the foreclosure caused by both Tyco's commitment contracts and Tyco's sole-source contracts with group purchasing organizations (GPOs). I estimated damages associated with the foreclosure caused by Tyco's commitment contracts with hospitals at approximately $183 million. I estimated damages associated with the foreclosure caused by Tyco's sole-source contracts with GPOs at approximately $123 million. In

1. Expert Report of Margaret E. Guerin-Calvert, Jan. 31, 2008 [hereinafter *Guerin-Calvert Report*]. Ms. Guerin-Calvert asserts that her principle assignment was to "assess damages claims alleged as a result of certain business practices by Tyco and to provide an independent expert assessment of the damages projections prepared by Plaintiffs' expert, Dr. Hal Singer."

2. Expert Report of Dr. Hal Singer, December 18, 2007 [hereinafter *Singer Damages Report*].

my aggregate damages estimate, which encompasses both of these two possible forms of foreclosure, I estimated that, but for Tyco's conduct, sharps container prices would have been between 17 percent and 31 percent less than extant prices during the Class Period, depending on the year in question. These pricing estimates yield an aggregate damages estimate of approximately $191 million for the Class Period.[3] Implicit in these damage estimates are several conservative assumptions, which have the effect of decreasing my damages estimates from what they would be otherwise.[4]

2. To arrive at these estimates of but-for prices and the resulting damages, I used the new empirical industrial organization (NEIO) model, which produces but-for average market prices under a theory that the foreclosure reduced rivals' market shares.[5] The NEIO model yields a relationship between producer price-cost margins, industry concentration, and industry demand. In his initial merits expert declaration, Professor Elhauge describes why simply depriving firms of market share will have anticompetitive effects. [6] Thus, the NEIO model is

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3. *Singer Damages Report* ¶¶ 67-73. Since my damages report was filed, Professor Elhauge has provided revised estimates of foreclosure shares and his simultaneous comparisons, which are inputs into my damages model. I understand that the new inputs incorporate data from Stericycle and Bemis, which were not incorporated previously because they were produced near or after the deadline for the initial report. In addition, I understand that the revised inputs now reflect some minor additions and corrections discussed in Professor Elhauge's reply report. Most notably for my purposes, they incorporate matching of Tyco and BD buyers for 2001-2002. Previously, I inferred the inputs in these years based on data from other time periods. *See Singer Damages Report* ¶ 58. I have therefore computed revised damages estimates, which are reported in Appendix 1. The revised estimates are somewhat smaller than those appearing in my initial expert report, although the difference is not large. For example, my aggregate damage estimate decreased from approximately $191 million to approximately $187 million, which constitutes a decline of just 2.5 percent.

4. In Appendix 2 of my expert report, I analyzed the sensitivity of my damage estimates by examining the degree to which estimated damages increase by relaxing various conservative assumptions. *Singer Damages Report* ¶¶ 76-83.

5. The NEIO literature dates back to the work of former Department of Justice chief economist Dr. Timothy Bresnahan, who used the NEIO approach to study the effect of industry concentration on the aluminum industry. It has been applied by numerous economists to study numerous industries, as described by Dr. Bresnahan in the widely used *Handbook of Industrial Organization*. *See* Timothy F. Bresnahan, *Empirical Methods for Industries with Market Power*, in 2 HANDBOOK OF INDUSTRIAL ORGANIZATION (Richard Schmalensee & Robert Willig eds., North Holland 1989).

6. Expert Report of Professor Einer Elhauge, December 18, 2007, ¶31 [hereinafter *Elhauge Initial Declaration*].

well-suited for damage estimation here, because the theory of liability posits that Tyco's rivals were foreclosed from large segments of the sharps containers industry, thereby reducing their market share. In addition, the NEIO approach allows the researcher to remain agnostic with respect to the precise form of competitive interaction among firms in the industry, and allows the data to answer this question.

3. To implement my damage model, I applied a homogeneous-product version of the NEIO model. As I explain below, the homogeneous-product version of the NEIO framework has been frequently applied by economists not only to homogeneous products industries, but also to industries with some degree of product differentiation: The very premise of an economic model is to simplify the analysis while retaining the essence of the problem. In any case, as I explained in my expert report,[7] and as I explain further below, sharps containers are homogeneous, commodity-like products. Thus, the application of a homogeneous-products NEIO framework is entirely appropriate.

4. As I explained in my expert report, when the NEIO model is applied to data from the sharps container industry, the results indicate that the NEIO framework captures key aspects of competitive interaction in the sharps container industry rather well. In particular, my estimates indicate that pricing in the sharps container market is close to what would be expected if the industry were monopolized. This finding comports well with the notion that Tyco possesses significant pricing power, which is consistent with the concentrated nature of the sharps container industry.[8]

5. As the opposing damages expert, Ms. Guerin-Calvert's role, as I understand it, is to critique the manner in which damages were estimated *under the assumption that Plaintiff's*

7. *Singer Damages Report* ¶ 19.
8. *Id.* ¶ 63.

theory of harm is correct. Given this assumption, the critical role for a damages expert is to project the magnitude of any damages attributable to Tyco's anticompetitive conduct. But a significant portion of Ms. Guerin-Calvert's report concerns issues relating to the plaintiffs' theory of harm. For example, Ms. Guerin-Calvert devotes significant energies to the argument that group purchasing organizations (GPOs) provide efficiencies for hospitals generally and, in the instant case, GPOs ensured "competitive discipline on prices charged by Tyco and price/service benefits for consumers."[9] Similar assertions by Ms. Guerin-Calvert relating to liability include, but are not limited to, (1) that market shares are not indicative of market power in a bidding market,[10] (2) sole-source contracts are no less competitive than multi-source contracts,[11] (3) that the contracting practices used by Defendant did not prevent rivals from competing effectively,[12] and (4) that the actual world achievements of two rival manufacturers of sharps containers (Becton Dickinson and Stericycle) are proof that Defendant's contracting practices had no adverse effect on competition.[13]

6. Although I am not persuaded by Ms. Guerin-Calvert's evidence in support of those claims, as Plaintiffs' damages expert, I have not been asked to render an opinion on issues relating to liability. That task has been assigned to Plaintiffs' liability expert, Professor Einer Elhauge. As damages expert, I understand my role as *accepting* Plaintiffs' theory of harm and projecting how that harm manifested itself in terms of higher prices. Ms. Guerin-Calvert appears unwilling to accept that role, and instead largely criticizes the Plaintiffs' theory of harm. Indeed, Ms. Guerin-Calvert criticizes me for "accept[ing] without independent evaluation Professor

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9. *Guerin-Calvert Report* ¶¶ 13, 51-61.
10. *Id.* ¶ 14.
11. *Id.* ¶ 17.
12. *Id.* ¶ 20.
13. *Id.* ¶ 21.

Elhauge's conclusion that all of the alleged anticompetitive GPO contracting practices foreclosed other sharps container suppliers."[14] Clearly, Ms. Guerin-Calvert and I have a fundamentally different understanding of the role of a damages expert in an antitrust case. Ms. Guerin-Calvert does not get around to critiquing my damages model until the last section of the last heading of her report (Part VI.C.), and even there, she is not willing to concede that Defendant's conduct could be the cause of the discrepancy in rival penetration between the foreclosed and unforeclosed segments of the market.

7. Thus, the bulk of Ms. Guerin-Calvert's report amounts to an "all-or-nothing" critique of my damage estimates. If her critique is accurate, then Plaintiff's theory of liability is incorrect, and damages are zero. But if it is inaccurate, then the damage estimate reverts to the figures that I have provided, because Ms. Guerin-Calvert provides no alternative damage estimates.

8. When boiled down, Ms. Guerin-Calvert has four major critiques of my damages model: (1) that the new empirical industrial organization (NEIO) model is unsuitable here because it presupposes a positive relationship between concentration levels and price-cost margins;[15] (2) that I overstate the shift in share that rivals could have captured in a but-for world given their capacities in the actual world;[16] (3) that the NEIO model assumes that the products in the relevant market are homogenous;[17] and (4) that I failed to account for information that is

14. *Id*. ¶ 22. Ms. Guerin-Calvert also asserts that I assume "any and all GPO contract terms are 'imposed' on customers and provide no benefit to them. . . ." *Id*. Not only does my damage model not assume any such thing, a search of the word "imposed" in my two prior reports generates no hits.
15. *Id*. ¶ 23.
16. *Id*. ¶ 24.
17. *Id*. ¶ 25.

individual to each class member.[18] In addition, Ms. Guerin-Calvert claims to identify various additional "flaws" in my damage analysis.[19]

9. My report is organized as follows. In Part I, I respond to each of the four major criticisms offered by Ms. Guerin-Calvert. In Part II, I highlight several areas where Ms. Guerin-Calvert asserted facts about the industry that are not correct.

I. MS. GUERIN-CALVERT'S MAJOR CRITICISMS OF MY DAMAGES MODEL

10. In this section, I address each of Ms. Guerin-Calvert's four principal critiques of my damages model, in addition to the miscellaneous "flaws" she claims to identify. I conclude that none of her critiques are valid.

A. Claim 1: The NEIO Model Is Unsuitable Here Because It Presupposes a Positive Relationship between Concentration Levels and Price-Cost Margins

11. One of Ms. Guerin-Calvert's principal critiques of the NEIO model is that the NEIO model predicts that a decrease in concentration levels, all else equal, leads to a decrease in price-cost margins. Ms. Guerin-Calvert instead asserts that "[o]wing to the nature of the competition through bidding for GPO or other group contracts in the sharps container industry, prices are not necessarily positively correlated with concentration."[20] As I demonstrate below, this claim is flatly contradicted by the data here. On a more basic level, however, Ms. Guerin-Calvert's critique speaks to liability issues, and as such is irrelevant as a critique of my damage model, which accepts Plaintiffs' theory of harm.

12. If Plaintiffs' theory of harm is correct, then foreclosure in the sharps container market has harmed competition. As a direct result of Tyco's exclusionary contracts, rivals'

18. *Id.* ¶ 26.
19. *Id.* ¶ 144.
20. *Id.* ¶ 82.

market shares are lower, and Tyco's pricing power is greater.[21] Thus, if one accepts Plaintiffs' theory of harm, one must also accept that prices and concentration would have been lower in the but-for world, as indicated by the NEIO model. On the other hand, Ms. Guerin-Calvert posits that Tyco's contracts have not harmed competition, although they may have increased Tyco's market share. She argues that due to *ex ante* competition for GPO contracts, "observing that a manufacturer has a high market share after that competition has occurred tells one nothing about whether the price is elevated."[22]

13. In other words, Ms. Guerin-Calvert's assertion that pricing and concentration are unrelated to each other speaks directly to liability. In particular, if Ms. Guerin-Calvert's claim is correct, and if Tyco's contracts have not in fact harmed competition, then Plaintiffs' theory of harm must be incorrect. But if Plaintiffs' theory of harm is invalid, then *there is no need for a damages model*, as damages are zero by definition. Alternatively, if one accepts Plaintiffs' theory of harm, as I do in my damage analysis, then Ms. Guerin-Calvert's claim must be incorrect. As such, her critique is irrelevant to my damage analysis.

14. Despite the irrelevance of Claim 1 as a damage critique, it bears emphasis that the data are unsupportive of her claim. Ms. Guerin-Calvert claims that "[d]espite Dr. Singer's assertions, there is no economic basis to believe that lower concentration means lower prices in an industry where GPOs act as intermediaries to hold bids, review bids, and award contracts—*indeed, the facts are to the contrary*."[23] Yet she provides no empirical evidence that lower concentration should not be correlated with lower price-cost margins in the sharps container

21. *Elhauge Initial Declaration* ¶ 1.
22. *Guerin-Calvert Report* ¶ 80.
23. *Id.* ¶ 82 (emphasis added).

industry, and as I demonstrate below, the data here confirm a positive correlation.[24] A brief inspection of my expert report reveals that the data most relevant to this issue are easily accessible in the tables I have already provided. Below I present the Herfindahl-Hirschman Index (HHI) of industry concentration and industry-wide price-cost margins for sharps containers. Both of these data series were discussed in detail in my expert report,[25] and are reproduced in Table 1.

15. Inspection of the data indicates that the correlation between concentration and price-cost margins is indeed positive, as the NEIO model predicts, and not negative or zero, as Ms. Guerin-Calvert claims.[26] Stated differently, an increase in the HHI is associated with an increase in price-cost margins. In particular, the value of the correlation coefficient, which always lies between negative one (in the case of a perfect negative relationship) and positive one (in the case of a perfect positive relationship) is 0.69. Intuitively, this result indicates that price-cost margins tend to be high (that is, above average) when the HHI is relatively high, and low (below average) when the HHI is relatively low.[27]

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24. The only data that Ms. Guerin-Calvert offers in support of her claim involves a comparison of the pricing of sole-source contracts and dual source contracts: "[A] sole-source award at a GPO, despite potentially leading to a relatively higher degree of concentration, can solicit fierce price competition *ex ante* as firms compete for the substantial sales that contract placement may bring. This notion is supported by the evidence, referenced earlier, showing that manufacturers offer lower prices on products for sole-source contracts than dual-source contracts." *Id.* ¶ 83. Once again, Ms. Guerin-Calvert is simply contradicting and trying to explain away Plaintiffs' liability theory.

25. *Singer Damages Report* ¶¶ 56-63, Table 10, and Table 13.

26. Note that Ms. Guerin-Calvert is technically incorrect to focus on the relationship between concentration and *prices*. In reality, the NEIO model shows the relationship between concentration and *price-cost margins*. *See Singer Damages Report* ¶¶ 26-28. Of course, given that costs are often relatively constant, prices and price-cost margins tend to be highly correlated in practice.

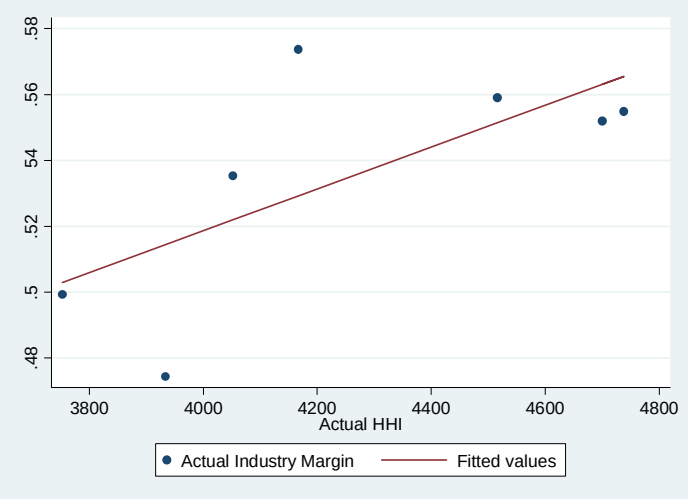
27. *See, e.g.,* JEFFREY M. WOOLDRIDGE, INTRODUCTORY ECONOMETRICS: A MODERN APPROACH 713-14 (Thomson South-Western 2003).

TABLE 1: CONCENTRATION AND PRICE-COST MARGINS
IN THE SHARPS CONTAINER INDUSTRY

Year	Industry HHI	Industry Price-Cost Margin $(P - C) / P$
2001	4,700	0.55
2002	4,738	0.55
2003	4,516	0.56
2004	4,167	0.57
2005	4,052	0.54
2006	3,934	0.47
2007	3,753	0.50
Correlation coefficient = 0.69		

16. It is also informative to present the data as a scatterplot, as shown below in Figure 1. In addition, Figure 1 contains a simple univariate regression line fitted to the data. Like the correlation coefficient, the regression results indicate a positive relationship between concentration and price-cost margins. Furthermore, the R-squared of the regression is 0.47, indicating that HHI alone explains about 47 percent of the variation in price-cost margins from 2001-2007.

FIGURE 1: SCATTERPLOT OF CONCENTRATION AND PRICE-COST MARGINS



17. In short, Ms. Guerin-Calvert's claim that "in the sharps container industry, prices are *not necessarily positively correlated* with concentration"[28] is wrong. Even a cursory review of the relevant data shows clearly that price-cost margins are positively correlated with concentration. As noted previously, these data are not new to this proceeding, and have been available for review by Ms. Guerin-Calvert.

B. Claim 2: I Overstate the Shift in Share That Rivals Could Have Captured in A But-For World Given Their Capacities in the Actual World

18. Ms. Guerin-Calvert is critical of my estimation[29] and allocation[30] of but-for market shares for Tyco's rivals. First, she argues that the but-for shares for Tyco's rivals implied by my model are not "economically plausible."[31] Second, she argues that Tyco's rivals lacked the capacity *in the actual world* to have grown their sales in the volumes I predicted.[32] She concludes that my estimate of but-for shares "deviates from the realities of this industry."[33]

1. Ms. Guerin-Calvert Claims That The But-For Shares Implied by My Model Are Not Economically Plausible

19. To support the claim that my estimation of but-for market shares for Tyco's rivals was not plausible, Ms. Guerin-Calvert cites (1) the fact that Becton Dickinson (BD) has gained access to certain GPO contracts during the class period;[34] (2) [redacted], [redacted],[35] and (3) the fact that BD has gained market share

28. *Guerin-Calvert Report* ¶ 82 (emphasis added).
29. I estimated but-for market shares of rival by projecting rival penetration in the non-foreclosed segments of the market onto the foreclosed segments of the market.
30. I allocated the increase in market share for rivals according to their pro-rata shares in the actual world.
31. *Id.* ¶ 87.
32. *Id.*
33. *Id.* ¶ 89.
34. *Id.* ¶ 90.
35. *Id.* (citing deposition of James Shaw). *See also id.* ¶92 (citing deposition of Richard Kogler).

during the class period.[36] Ms. Guerin-Calvert concludes that this evidence "contradicts the *Plaintiffs' experts'* hypothesis that Becton Dickinson was foreclosed and as a result should have expanded its share of sales by as much as 56% in a given year."[37] Again, it is not clear to which expert Ms. Guerin-Calvert is referring. As Plaintiffs' damages expert, it is not my role to demonstrate that BD was foreclosed (that is the role of the Plaintiffs' liability expert). Instead, I am accepting Plaintiffs' theory of harm and projecting how that harm manifested itself in the actual world.

20. Regarding the fact that BD has gained market share during the class period, Ms. Guerin-Calvert confuses the appropriate benchmark for a damage analysis. (This confusion occurs repeatedly throughout her report.) Under the Plaintiffs' theory of harm, BD's actual market share *at any point in time during the class period* was less than its but-for market share. The fact that BD's actual market share at some time, *t*, during the class period exceeded its actual market share in *t* - 1 is irrelevant. Stated differently, even if BD's *actual* market share increased during the class period, under the Plaintiffs' theory of harm, BD's *but-for* market share would have been higher than BD's actual market share at any point in time.

21. The fact that BD gained access to certain GPOs during the class period was accounted for in Professor Elhauge's foreclosure analysis. Setting aside the market-share rebates, any hospital that purchased a device from Tyco under a dual-source contract with Tyco and BD was considered non-foreclosed. Because the increase in rivals' share came exclusively from the foreclosed segment, the fact that BD gained access to certain GPOs served to decrease my

36. *Id.*
37. *Id.* (emphasis added).

estimate of damages. Thus, it is odd that Ms. Guerin-Calvert would seize on this fact to criticize my analysis.[38]

22. Referring to the statements of company officials, Ms. Guerin-Calvert implies that, relative to Plaintiffs' economic experts, business executives employed by BD and Stericycle are in a better "position to know how Covidien's contracting practices have affected their opportunities."[39] Once again, the evidence cited by Ms. Guerin-Calvert speaks to the *existence* of foreclosure, which is not a topic on which a damage expert should opine. In his reply declaration, I understand that Professor Elhauge will discuss the reliability (or lack thereof) of testimony by such company officials as it pertains to issues of liability.

23. Ms. Guerin-Calvert also rejects the possibility that BD's but-for market share would exceed Tyco's but-for market share by 2005.[40] As a preliminary matter, this result is not "particularly implausible"[41] when one decomposes Tyco's but-for market share.[42] More fundamentally, here Ms. Guerin-Calvert focuses on an intermediate step in my calculations, while ignoring the final result. In particular, beginning in 2005, the damage model actually predicts lower percentage decreases in price in the but-for world. The model therefore predicts that damages will comprise a smaller percentage of revenue than in previous years.[43] Hence, the but-for allocations of market share to BD from 2005 forward that Ms. Guerin-Calvert seems to

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38. It is similarly odd that Ms. Guerin-Calvert would point to the achievements made by other Tyco rivals.
39. *Id.* ¶ 93.
40. *Id.* ¶¶ 79, 91.
41. *Id.* ¶ 91.
42. In particular, the decline in Tyco's market share is the product of A, B, and C, where A is Tyco's actual market share, B is the share of Tyco's buyers who are foreclosed, and C is the change in rival penetration. Professor Elhauge's estimates of B and C are high in 2005 relative to earlier years in the class period. In particular, his estimates of B and C are approximately 80 percent and 70 percent, respectively, in 2005. Given Tyco's extant market share of 57 percent, Tyco's share in the but-for world declines by over 30 percentage points (equal to 0.57 x 0.8 x 0.7) in 2005. In my benchmark model, I allocate approximately two-thirds of this 30-percentage-point decline to BD, which had an actual market share of around 25 percent. Thus, BD captures approximately 45 percent market share in the but-for world (equal to 25 percent plus two-thirds of 30 percent). *See Singer Damages Report* at Table 17.
43. I allocated the increase in market share for rivals according to their pro-rata shares in the actual world.

view as somehow excessive are actually associated with smaller price effects and damages than were obtained in previous years.

24. In addition, as I explained in my damages report, my decision to allocate but-for shares proportionately to rivals' actual shares—thereby awarding BD the *largest* share of the total change in rivals' market share—is extremely conservative. I could have assumed, less conservatively, that BD captures only about five percentage points of Tyco's 30-percentage-point decline under the rationale that BD, by having access to some but not all GPO contracts, was less vulnerable to Tyco's alleged anticompetitive conduct than other rivals. As demonstrated in Appendix 2 of my damages report, under that scenario, damages *increase* from $191 to $232 million. Again, it is odd that Ms. Guerin-Calvert would seize on this point to criticize my analysis.

25. Finally, Ms. Guerin-Calvert argues that my treatment of BD's and Tyco's market shares in the but-for world is inconsistent because BD engaged in many of the same alleged anticompetitive practices of Tyco.[44] It appears that Ms. Guerin-Calvert misunderstands (or perhaps refuses to accept) the Plaintiffs' theory of harm. Tyco, and not BD, is the defendant in this case, but Ms. Guerin-Calvert seems intent on treating both as defendants. Once again, she attempts to critique the Plaintiffs' theory of harm instead of my damage analysis. I understand that these liability issues will be addressed by Professor Elhauge.

2. Ms. Guerin-Calvert Claims That Tyco's Rivals Lacked the Capacity in the Actual World to Have Grown Their Sales in the Volumes I Predicted

26. Next, Ms. Guerin-Calvert argues that Tyco's other rivals—Stericycle and Daniels—were not in a position to absorb the increase in market shares implied by my damage model due to the nature of the reusable business. To support these "unmet demand" theories, Ms.

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44. *Guerin-Calvert Report* ¶ 94.

Guerin-Calvert argues that I failed to consider the "time, effort and expense of setting up and operating a network of wash centers, logistical services and geographic presence" for reusable suppliers.[45] To support this argument, Ms. Guerin-Calvert cites evidence that (1) [redacted] [46] (2) [redacted] [47] and (3) that "the reusable company must have personnel or contractors in place who are able to provide reliable service."[48] With the exception of the third piece of evidence, which appears to be nothing more than a random factoid,[49] the purpose of this exercise is to undermine my implicit assumption that Tyco's rivals would have been positioned to absorb new business in the but-for world.

27. This argument is unpersuasive and uneconomic. Stericycle[50] and Daniels[51] likely made investments in capacity in the actual world based on the assumption that their sales would be constrained by Tyco's alleged anticompetitive contracting practices. To compare the *but-for* world sales for these rivals against their *actual* capacities, as Ms. Guerin-Calvert has done,[52] is to presume incorrectly that the investment decisions by Stericycle and Daniels could not be recalibrated in a but-for world. Stated differently, in a but-for world without Tyco's alleged exclusionary contracting practices, Stericycle and Daniels likely would have increased their

45. *Id.* ¶ 88.
46. *Id.* ¶ 97 (citing Kogler deposition).
47. *Id.* ¶ 98 (citing deposition of David Skinner).
48. *Id.* ¶ 99.
49. In the same spirit, Ms. Guerin-Calvert later cites evidence that Daniel "was encountering dirty and smelly containers out in the field." *Id.* ¶ 106. The connection between this factoid and Ms. Guerin-Calvert's theory of unmet demand is tenuous at best.
50. Ms. Guerin-Calvert admits that by the beginning of 2005, Stericycle was "able to reach 100% of the market." *Id.* ¶ 97.
51. [redacted] *Id.* ¶ 105 [redacted]
52. For example, Ms. Guerin-Calvert cites evidence that Daniels had five or six sales persons in 2004. *Id.* ¶ 107. The implication that Daniels would not have increased its sales force in but-for world to accommodate sales in previously foreclosed segments of the sharps container market is unreasonable.

capacity so as to absorb the but-for (higher) demand for reusable containers. The fact that Daniels and Stericycle may have suffered delays waiting for permits or may have encountered quality problems with contractors in the actual world does not have any bearing on the optimal capacity decision of reusable makers in the but-for world. Although Stericycle and Daniels, like any firm in the economy, would incur some dislocation costs as they scale up their operations, it is incorrect to presume, as Ms. Guerin-Calvert has, that Stericycle and Daniels would forgo sales because they lacked the *actual* capacity to meet *but-for* demand, which violates basic economic theory.

28. Another "unmet demand" theory offered by Ms. Guerin-Calvert is that I overestimated Stericycle's sales prior to 2003 because Stericycle did not acquire its predecessor, BioSystems, until 2003.[53] There is no reason why 100 percent of Bio System's incremental sales in the but-for world would have to come from health care entities outside of Bio System's regional footprint; according to Professor Elhauge, Tyco's foreclosure was not limited to particular localities in the United States. My model allows for incremental sales from both in-region health care entities and out-of-region entities (assuming Stericycle or its predecessor increased its capacity to meet demand that was otherwise foreclosed). Ms. Guerin-Calvert insists that such an increase in capacity would not have occurred in the but-for world, citing testimony from Stericycle's Richard Kogler. But the lines from his deposition that she cites come no where close to proving her point:

> **Q. Do you know whether Bio Systems prior to 2003 engaged in any efforts to expand their geographical market penetration beyond the northeast?**
> A. You know, I don't know. I think they were considering it is what I understand when we were

53. *Id.* ¶ 119 (citing Kogler Deposition at l49:4-18).

> doing the acquisition.
> Some of their constraints were they were
> -- they were a public company.
> They were 60 percent owned by one elderly
> gentleman, and his interest was really in, you
> know, generating capital or cash for himself, you
> know, or dividending out, so I think there was no
> reason they couldn't expand other than that it
> wasn't really their shareholders' desire to do so.

Ms. Guerin-Calvert's views this testimony as supporting her claim that there were "reasons other than the alleged anticompetitive contracting practices [why] Bio Systems chose not to expand outside of the Northeast." However, this claim misses the point entirely. My damages analysis does not presuppose that each individual reusables manufacturer would have necessarily expanded its operations by a given amount in the but-for world. Assuming arguendo that Bio Systems could not have satisfied their but-for demand given their actual capacity, and were somehow unwilling or unable to finance such an expansion,[54] nothing would have prevented other reusables from "picking up the slack" in the but-for world. To make her claim at all meaningful, Ms. Guerin-Calvert would have to demonstrate that reusables manufacturers *as a group* would have systematically declined profitable opportunities for expansion in the but-for world.

C. Claim 3: The NEIO Model Requires That The Products In The Relevant Market Are Homogenous

29. Ms. Guerin-Calvert argues that the NEIO model that I used is inappropriate given what she claims is the high degree of product differentiation in the sharps container industry.[55] Ms. Guerin-Calvert is wrong on two dimensions. First, contrary to her characterization, the

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54. The logic offered by Mr. Kogler is unpersuasive, as it presumes incorrectly that the only way for a firm to finance expansion is through cash, when in fact capacity can be financed with debt or dilution of equity. Thus, Bio System's expansion would not necessarily prevent the senior partner from continuing to take cash from the business.

55. *Guerin-Calvert Report* ¶ 124.

sharps container industry is properly modeled as being homogenous. Second, even with some degree of product differentiation, the NEIO that I used is appropriate. Ms. Guerin-Calvert's confusion stems from a basic misunderstanding of the implications of the NEIO model: "Given the type and size differences across products, the [NEIO] model cannot tenably assume that price differences would disappear in the but-for world."[56] But the NEIO model does *not* assume that the prices for all containers are the same in the but-for world. As I explained in my class certification report, the NEIO model produces an average but-for price across all types of sharps containers, and therefore accommodates price variation across types of containers and even across customers for the same type of container.[57] Ms. Guerin-Calvert fails to acknowledge that the existence of an average does not imply the absence of a standard deviation.[58]

1. Sharps Containers Are Properly Modeled as a Homogenous Product

30. [redacted]

56. *Id.* ¶ 127.

57. Singer Reply to Ordover at ¶ 19.

58. The concepts of the average (mean) and the standard deviation are fundamental to econometric and statistical analysis. The mean measures the central tendency of a random variable (such as empirical pricing data), and the standard deviation measures the variation of the random variable around the mean. *See, e.g.*, Wooldridge, *supra*, at 704-712. The fact that my damage model predicts the mean price in the but-for world does not imply that the variation around the but-for mean will be zero.

59. [redacted]

60. *Id*. at 24658.

[redacted][61][redacted]

[redacted][62][redacted]

31. After carefully reviewing Ms. Guerin-Calvert's analysis, I am not convinced that sharps containers should be characterized as highly differentiated. I provide a detailed critique of her analysis of sharps containers in Part II below.[63] Ms. Guerin-Calvert repeatedly seizes on differences in color as a basis for claiming that sharps containers are highly differentiated.[64] She notes that sharps containers come in yellow, red, grey, almond, and clear colors.[65] In an effort to inflate the types of sharps containers offered by Tyco, she lists a *red*, in-room five-quart container with a hinged lid and average selling price of $2.72 separately from a *clear*, in-room five-quart container with a hinged lid and average selling price of $2.72.[66] She offers no

61. *Id*.

62. [redacted]

63. As I demonstrate in Part II, Ms. Guerin-Calvert repeatedly attempts to make Tyco's product line appear excessively broad and differentiated relative to its competitors. For example, when presenting a comparison of product offerings across suppliers she ignores altogether the product offerings of competitors such as Bemis, Sure-Way, and Medical Action.

64. *Guerin-Calvert Report* ¶ 31, Appendix 9: Table 6, Table 7.

65. *Id*. Appendix 9: Table 6.

66. *Id*. As illustrated in Part II, Ms. Guerin-Calvert also attempts to inflate the breadth of Tyco's product offerings by employing a highly dubious product classification methodology. In particular, she proposes a twelve-part classification scheme for Tyco's sharps containers, evidently obtained by accepting Tyco's marketing materials at face value. Ms. Guerin-Calvert proceeds to argue that none of Tyco's competitors offers a fully comparable line of products. However, she neglects to mention explicitly that the product classifications she relies on to reach this conclusion collectively account for only about 3 percent of Tyco's sales.

explanation why differences in color, however, imply that these products are highly differentiated. Presumably, there is none.[67]

32. Ms. Guerin-Calvert also focuses on differences in sizes as a basis for claiming that sharps container products are highly differentiated.[68] For the same reason that color differences do not constitute significant product differentiation, size differences do not constitute significant differentiation. As I demonstrated in my damages report, although sharps containers vary by size, for the most part, Tyco's rivals provide the same range of sizes to health care entities.[69] Thus, Tyco cannot differentiate its sharps containers from its rivals on the basis of size. The mere fact that a patient-room container comes in three gallons and four gallons does not imply that buyers perceive those two containers to be highly differentiated products. [redacted][70] Moreover, my econometric analysis revealed that users are willing to substitute among sharps containers of varying capacity. The best "fit" obtained in my demand estimation occurred when quantity was measured in quarts, instead of the number of containers, and price was measured in dollars per quart.[71] These capacity-based regressions also yielded the highest estimate of the elasticity of demand for

67. Ms. Guerin-Calvert leaves the reader with the misleading impression that Tyco is the sole provider in the industry of sharps containers for use with dialysis, as I note in Part II. However, BD alone records sales to *over 275* dialysis facilities.

68. *Id.* ¶ 46 ("I demonstrate that sharps containers are in fact differentiated on size, features and other product and service characteristics, and that the NEIO model, as specified, does not provide an economically sound way to model Covidien's product prices in a hypothesized but-for world.").

69. *Singer Damages Report* ¶ 18, Table 1.

70. [redacted]

71. *Singer Damages Report* ¶¶ 51-54.

sharps containers.[72] These results provide strong evidence that volume is not a differentiating characteristic, because customers are willing to substitute between containers of different sizes.[73]

2. Even if Sharps Containers Were Not Properly Characterized as a Homogeneous Product, the Model I Used Would Still Be Appropriate

33. To prove that my damages model leads to an "incorrect conclusion" in the presence of product differentiation, Ms. Guerin-Calvert reproduces a passage from the *Handbook of Industrial Organization*, by former Department of Justice chief economist Dr. Timothy Bresnahan.[74] In fact, the passage that she quotes, and the article by Dr. Bresnahan from which it is derived, are actually quite supportive of the homogeneous-product NEIO approach embodied in my damages model. In addition, Dr. Bresnahan's observations are also completely unsupportive of Ms. Guerin-Calvert's contention that the damage model results in an invalid conclusion. Below I reproduce the passage in question:

> Far and away the most common technique for apparently product-differentiated industries is to assume that the products in the industry are basically fairly close substitutes, use an index of several products' prices as the observable price, and proceed. This procedure is not inherently wrong. It may, however, result in the attribution of market power to noncompetitive conduct when in fact the source of the market power is differentiated products.[75]

As a preliminary matter, the passage illustrates the fact that, in choosing to model the sharps container industry using a homogeneous-product NEIO model, I have adopted a common procedure that many economists have employed in the past to study a variety of industries with some degree of product differentiation. Indeed, Dr. Bresnahan points out that this procedure has

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72. *Id*.

73. The fact that the capacity-based regressions yield a higher elasticity estimate than the non-capacity based regressions indicates that customers reduce the capacity (quarts) demanded in response to a one percent increase in price by a greater percentage than they reduce the quantity of containers demanded. This implies that the mix of containers of various capacities that customers demand tends to vary in response to changes in price, which implies substitutability across containers of different sizes.

74. *Guerin-Calvert Report* ¶ 139, citing Bresnahan, *supra*, at 1046.

75. Bresnahan, *supra*.

been applied to several industries with differentiated products, including roast coffee, tobacco, textiles, and cigarettes.[76]

34. No sensible observer would claim that *all* brands of coffee, tobacco, textile products, cigarettes, or sharps containers are literally *perfect* substitutes for one another. Indeed, there are relatively few empirical examples of industries in which competing firms offer products completely devoid of any differences. Nevertheless, a homogeneous-product NEIO model remains an effective means of modeling such industries, despite the potential for some of the products involved to be less than perfect substitutes for one another. Evidently the editorial boards of professional economics journals would agree.[77] As Dr. Bresnahan observes, adopting the widely used approach of approximating a modestly differentiated products industry with a model that assumes product homogeneity does not invalidate the analysis.[78]

35. However, Dr. Bresnahan does point out an important limitation that economists should bear in mind when applying a homogeneous-product NEIO to an industry with some potential for product differentiation: market power may sometimes be attributed to anticompetitive behavior, when, in reality, "the source of the market power is differentiated products."[79] Ms. Guerin-Calvert appears to seize on this point in an attempt to imply that my damages model leads to an "incorrect conclusion."[80] But this claim is baseless. In the context of the damages model, the potential for market power arising from product differentiation to be mistakenly attributed to noncompetitive conduct would manifest itself as a tendency to

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76. *Id.* at note 39 (citing several published NEIO studies that adopt product homogeneity as a simplifying assumption).

77. *Id.* at note 39 (citing several econometric studies published in several professional journals, including the *Journal of Econometrics*, the *Journal of Political Economy*, and the *Journal of Industrial Economics*).

78. *Id.*

79. *Id.*

80. *Guerin-Calvert Report* ¶ 139 ("Indeed, not recognizing the effect of product differentiation on the competitive interaction among suppliers can lead to an incorrect conclusion being drawn from the model").

overestimate the conduct parameter.[81,82] But, as I stressed repeatedly in my expert report, in my damages model the conduct parameter is held fixed in the actual and but-for worlds.[83] Stated differently, a biased estimate of the conduct parameter in the actual world would carry over as a biased estimate in the but-for world—but the difference between the actual and but-for worlds would be unaffected. Therefore, even if one assumes incorrectly that product differentiation among sharps containers is significant, any resulting bias in the estimated conduct parameter would not result in biased damage estimates. Thus, although I certainly agree with Dr. Bresnahan's observation regarding this important limitation of homogeneous-product NEIO models, this limitation is irrelevant to the damage estimates that flow from my model.

36. Ms. Guerin-Calvert again reveals her misunderstanding of the NEIO model when describing the but-for price of Tyco's products implied by the model: "Plaintiffs' expert is assuming that . . . the price of *every one of Covidien's products* would have similarly changed by the same percentage as industry average price changed."[84] This proposition is simply not true. The mere fact that the model produces an average price for Tyco's sharps containers in the absence of the alleged foreclosure does not imply that the price of *every one of Tyco's products* falls by the same amount. Instead, the model allows for the prices of different Tyco products to

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81. As I noted in my expert report, the conduct parameter captures the degree of pricing competition in an industry, and therefore captures a firm's ability to raise prices above cost. In particular, "large" values of the conduct parameter are consistent with monopoly pricing. As the conduct parameter declines, industry pricing becomes less consistent with monopoly pricing and more consistent with perfect competition. *Singer Damages Report* ¶ 28-32.

82. If products in a given industry are homogeneous, a "high" value of the conduct parameter measures firms' collective ability to restrict output and thus to raise price above costs. However, if products are differentiated, a "high" value of the conduct parameter may reflect, at least in part, a firm's ability to raise prices above costs simply because the product that it produces is not perfectly substitutable for the output produced by other firms. Thus, product differentiation itself may confer a degree of pricing power. If a homogeneous-product model is employed in a differentiated-products industry, pricing power due to product differentiation may be incorrectly attributed to anticompetitive conduct. Note that this does not imply that pricing power itself has been overstated or measured incorrectly. Instead, it is the *source* of the pricing power that is in dispute.

83. *Singer Damages Report* ¶ 32.

84. *Guerin-Calvert Report* ¶ 142 (emphasis added) (citation omitted).

decrease by different amounts—it merely imposes an average but-for price across all of Tyco's products.

37. In fact, Ms. Guerin-Calvert's inaccurate assertion is flatly contradicted by another inaccurate claim that she makes elsewhere in her report. For convenience, I refer to Ms. Guerin-Calvert's assertion that each of Tyco's products must decline in value by the same percentage as "Proposition 1". Ms. Guerin-Calvert asserts elsewhere, incorrectly, that the NEIO model implies identical prices for every Tyco product in the but-for world.[85] For convenience, I will refer to this claim as "Proposition 2". Except in the special case where all products are priced identically to begin with in the actual world—a claim that I would not make, and that I doubt Ms. Guerin-Calvert would endorse—it is a mathematical impossibility for both of Ms. Guerin-Calvert's propositions to be true.

38. For example, suppose that Tyco sells two containers for $2 and $3, respectively, in the actual world. For Proposition 1 to hold, both prices must decline by the same percentage in the but-for world. Suppose both containers decline in price by 20 percent. In this case, but-for prices for the two containers will clearly be unequal: The first container will sell for $1.60 and the second for $2.40. Thus, Proposition 2 is violated. In fact, Propositions 1 and 2 are always incompatible (unless all products are somehow priced identically in the actual world).

39. For these reasons, Ms. Guerin-Calvert's critique of the NEIO model rings hollow. After failing to establish significant product differentiation, Ms. Guerin-Calvert concludes that, to estimate damages here, "a significantly more sophisticated model would be needed that could take into account the degree of substitutability between rivals' products and Covidien's product,

85. *Id.* ¶ 127.

and the impact this has on the demand for Covidien's products."[86] One cannot be sure of what Ms. Guerin-Calvert has in mind. In light of her critique of the NEIO model, I suspect that she would attack *any* model as being not sufficiently "sophisticated" to capture every idiosyncrasy of the sharps container industry. Indeed, no economic model can be held to such a standard—the very premise of a model is to simplify the analysis. As I explained in my damages report, although I considered more elaborate versions of the NEIO model,[87,88] the version that I employed was more than adequate to accommodate the minimal differentiation in product lines within and across suppliers of sharps containers.

D. Claim 4: I Failed To Account For Information That Is Individual To Each Class Member

40. Ms. Guerin-Calvert asserts without any proof that my damages model failed to account for several factors that are allegedly individual to each class member, including "GPO membership, geographic location, the time period during which the member made its purchases,

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86. *Id.* ¶ 143.

87. To implement a differentiated products version of the model, one would model the industry using a system of differentiated demand equations. There are two basic approaches that one may adopt when modeling the demand for differentiated products. First, the researcher may elect to use aggregated linear methods, and model demand using a system of equations relating the quantity demanded of a good to various factors, including the prices of the other goods in the system. *See, e.g.,* Ronald W. Cotterill, William P. Putsis, Jr., & Ravi Dhar, *Assessing the Competitive Interaction between Private Labels and National Brands* 73 THE JOURNAL OF BUSINESS 109, 114 (2000). Alternatively, one may employ aggregated discrete choice models, in which each product's market share is a function of its product characteristics and its price, as well as the product characteristics and prices of other products in the market. *See, e.g.,* Steven Berry, James Levinsohnn and Ariel Pakes, *Automobile Prices in Market Equilibrium*, 63 ECONOMETRICA 841 (1995) (containing a detailed and sophisticated example of these techniques as applied to the automobile market). The authors also provide a review of the literature in this area, and cite less intricate implementations of the same basic principle. Once the "front end" component of the model has been estimated, the researcher would have a model that relates market shares (and, thus, concentration) and equilibrium prices to the model parameters and other relevant data (for example, product characteristics). But-for prices and margins could then be estimated by examining the response of the system to changes in parameters or concentration or both.

88. There are no formal "decision rules" that allow one to determine precisely when a differentiated-products demand model should be used in favor of a homogeneous-products model. The degree of differentiation employed by the researcher will typically vary with the research question. Even automobiles, which are far more differentiated than sharps containers, may be aggregated substantially in some contexts, depending on the research application. *See, e.g.,* Berry, Levinsohn, and Pakes, *supra,* at 842 ("For example, an applied researcher investigating tariffs might be tempted to aggregate all foreign and all domestic cars. However the resulting model is unlikely to prove useful when investigating domestic competition or pollution taxes."). Likewise, because my damage model is designed for calculating *classwide* damages—as opposed to, say, investigating the effect of a pollution tax levied only on non-reusable containers—the fact that I aggregate sharps containers is wholly appropriate.

or the product mix it bought."[89] She later explains the implications of my alleged failure to account for these factors:

> Accounting for these factors would require, at a minimum, an analysis of the bargaining power and process of each GPO, and an analysis of to which GPOs (if any) each purported class member belongs. Without such an analysis, Dr. Singer cannot determine whether one or multiple GPOs (and their members) actually paid highly competitive prices and *were therefore not injured or damaged*.[90]

Once again, Ms. Guerin-Calvert cannot concede the possibility that class members were actually injured. Her criticism therefore does not speak to whether my damage analysis is properly specified, but instead addresses whether damage calculations are even necessary. Indeed, Ms. Guerin-Calvert never connects this argument to a critique of my damages model.

41. Setting aside this mistaken emphasis, her basic claim that my damages model does not account for these factors is generally not true. Regarding the time period during which the member made its purchases, I provide separate damages estimates for each year in the Class Period, which accounts for changes in competitive factors over time. Regarding GPO membership, my calculation of but-for shares depends critically on the difference in rival penetration in the allegedly foreclosed and non-foreclosed segments of the market, which in turn depends critically on whether the buyer belonged to a GPO, and if so, under which GPO tier the buyer purchased a sharps container.

42. Ms. Guerin-Calvert observes that I do not account for product mix or geographic location of a particular buyer. But this observation does not affect my ability to estimate classwide damages or to allocate those damages to class members. Presumably Ms. Guerin-Calvert cites the geographic location of a buyer because she mistakenly believes that I have allocated in the but-for world particular Tyco customers to particular rival suppliers, some of

89. *Guerin-Calvert Report* ¶ 26.
90. *Id.* ¶ 85 (emphasis added).

which allegedly did not serve certain areas of the country during the early portion of the Class Period. Because my damages model does not perform such an allocation, her critique has no force. Similarly, any failure to account for the specific SKU number of a sharps container purchased by a class member does not affect my ability to estimate classwide damages or to allocate those damages to class members. Presumably, Ms. Guerin-Calvert cites the "product mix" of a buyer because she mistakenly believes that sharps containers are highly differentiated.[91] Because the sharps container industry is properly modeled as a homogenous product, estimating the but-for average market price for all sharps container is clearly sufficient to compute classwide damages.

E. Additional "Flaws" Identified by Ms. Guerin-Calvert

43. In this section, I analyze some additional "flaws" in my analysis identified by Ms. Guerin-Calvert, and conclude that none of her observations is valid as a critique of my damages analysis.

1. Ms. Guerin-Calvert Claims That The NEIO Model Relies Entirely on the Estimated Industry Price and Professor Elhauge's Estimate of Changes in Rivals' Shares

44. Ms. Guerin-Calvert claims that the damage estimates "are derived using a New Empirical Industrial Organization (NEIO) model, using *only* an estimated industry price and Professor Elhauge's estimate of changes in rival's shares."[92] This claim is simply inaccurate. As I attempted to make this clear in my expert report, my damage model does *not* rely exclusively on the estimated industry price and changes in rivals' shares. (Indeed, elsewhere in her report,

91. *Id.* ¶ 135 ("Thus, to be reliable, Dr. Singer's NEIO model would have to measure and account for the varying product mixes purchased by each putative class member to evaluate whether that class member was damaged.").

92. *Id.* ¶ 69 (emphasis added).

Ms. Guerin-Calvert acknowledges as much.[93]) For example, another crucial input to the damage model is given by firm and product-specific cost data. These data are used to compute price-cost margins;[94] in addition, the cost data are a critical instrumental variable used to estimate the industry demand function.[95] More broadly, transactional data from both Tyco and BD are used extensively in my damage analysis.[96]

2. Ms. Guerin-Calvert Claims That The Estimated Industry Elasticity and Conduct Parameter are Irrelevant to the Damage Model

45. In addition, Ms. Guerin-Calvert asserts that "neither the elasticity of demand nor the nature of competition that Dr. Singer claims is embodied in the conduct parameter bears at all on his findings."[97] Ms. Guerin-Calvert's implication that my efforts to estimate the elasticity of demand and the conduct parameter are somehow superfluous is invalid. In reality, estimation of the industry demand function (and the conduct parameter) is directly relevant to damage estimation for several reasons, which I discuss in detail below.

46. As a preliminary matter, the conduct parameter estimates provide a useful validation of the degree to which of the NEIO framework captures the critical aspects of competitive interaction in the sharps container industry. As I noted in my expert report, the conduct parameter estimates—which cannot be obtained without first obtaining an estimate of the industry elasticity of demand (E)—imply that competitive conduct in the industry is similar, although not identical, to what would prevail under a pure monopoly. This finding comports well with the notion that Tyco possesses significant pricing power.[98]

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93. *Id.* ¶ 148.
94. *Singer Damages Report* ¶ 62.
95. *Id.* ¶ 47.
96. *Id.* ¶ 40, and at Tables 15-17.
97. *Guerin-Calvert Report* ¶ 147.
98. *Singer Damages Report* ¶ 63 ("Thus, according to my estimates of the conduct parameter, competitive interaction in the sharps container market is similar, although not identical, to what would be expected if the

47. Likewise, my estimate of the industry demand function is directly relevant to the manner in which damages are calculated. Ms. Guerin-Calvert asserts that I "assume that the industry elasticity remains constant between the actual and but-for worlds"; therefore, "the changes in industry prices, and hence the damage estimates, do not depend on the industry elasticity."[99] In claiming that the exercise of estimating the industry elasticity of demand is superfluous to my damage analysis, Ms. Guerin-Calvert overlooks the crucial distinction between the industry demand *function* and the industry demand *elasticity*. In particular, as I noted in my expert report, the estimated industry demand function indicates that a constant elasticity specification fits the data best.[100] Based on this conclusion, which flows directly from analysis of the data, the elasticity of demand is held constant between the actual and but-for worlds. In other words, I do not simply "assume that the industry elasticity remains constant between the actual and but-for worlds,"[101] as Ms. Guerin-Calvert asserts. Rather, based on the properties of the data, I conclude that the degree of curvature of the industry demand function is such that the price elasticity remains constant as one moves along the demand curve. Thus, the shape of the estimated demand function is directly relevant to the way in which damage estimates are computed.

48. Finally, my estimates of the conduct parameter and the elasticity of demand are also critical inputs into the sensitivity analysis performed in Appendix 2 of my expert report. Throughout the main body of my expert report, I assume conservatively that the degree of pricing competition among firms in the industry, as captured by the conduct parameter, is no

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industry were monopolized. Given the concentrated nature of the sharps container industry, this result suggests that the NEIO model captures key aspects of competitive interaction in the industry rather well.")

99. *Guerin-Calvert Report* ¶ 151.

100. *Singer Damages Report* ¶ 87 ("Based on these results, I conclude that linear specifications fit the data poorly, and are dominated by constant-elasticity models.")

101. *Guerin-Calvert Report* ¶ 151.

different in the but-for world in than in the actual world.[102] In Appendix 2, I demonstrate the degree to which damages would increase if this conservative assumption is relaxed by varying degrees. For example, if pricing competition in the but-for world were to increase such that but-for margins fell to a level halfway between their current (conservative) level and the level implied by Cournot competition, aggregate damages would increase from $191 million to $271 million.[103] Had I not estimated the industry demand function and the conduct parameter, it would not have been possible to perform this analysis.

3. Ms. Guerin-Calvert Claims To Identify Purported "Biases" in the Data

49. Ms. Guerin-Calvert opines that the industry price and cost data employed in the damage analysis "are likely biased in a way that leads to inflated damages."[104] In particular, she asserts that the estimated industry prices are likely biased upward, while the estimated industry-wide costs are likely biased downward.[105] However, even assuming hypothetically that these sources of bias exist and are significant, my damage estimates would not be biased as result. The reason for this conclusion is straightforward: the damage estimates are derived not from the absolute *level* of prices or costs, but rather from the *change* in price-cost margins between the actual and but-for worlds. These purported biases would not affect this change.

50. The only components of my damage estimates that depend on levels rather than changes are Tyco's actual revenues, which are multiplied by the percentage change in prices to arrive at annual damage estimates. If my estimate of Tyco's actual price were somehow inflated, then the revenue figures and damage estimates would be inflated as well. However, Tyco's revenues cannot, by definition, suffer from the type of bias alleged by Ms. Guerin-Calvert, who

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102. *Singer Damages Report* ¶ 32.
103. *Id.* ¶ 83, Table A2.
104. *Guerin-Calvert Report* ¶ 148.
105. *Id*. ¶¶ 149-150.

claims that *industry-wide* prices were inflated as a result of "omitting lower priced suppliers".[106] This alleged bias would obviously have no effect on the computation of Tyco's revenues, which depend on quantity and pricing data specific to Tyco.

II. OTHER ERRORS IN MS. GUERIN-CALVERT'S REPORT

51. Ms. Guerin-Calvert makes numerous errors of fact and mischaracterizes several aspects of the sharps container industry, particularly with respect to the classification of sharps container types and her characterization of the breadth of product lines offered. Ms. Guerin-Calvert ignores completely the product offerings of several competitors, mischaracterizes the breadth of Tyco's product line, and underreports the product lines offered by BD, Stericycle, and Daniels.

52. As a preliminary matter, Ms. Guerin-Calvert's comparison of product offerings across suppliers does not even acknowledge the existence of several competitors, and hence ignores their product offerings altogether. In Appendix 9 of her report (entitled "Analysis of Differentiation Across Sharps Containers"), Ms. Guerin-Calvert displays various product categories offered (in her judgment) by Tyco, BD, Stericycle, and Daniels.[107] However, no mention whatsoever is made of other competitors, such as Medical Action, Bemis, or Sure-Way. As I noted in my expert report, each of these three competitors offers several container types comparable to Tyco's offerings.[108] Curiously, none of these companies is mentioned anywhere in Appendix 9 of Ms. Guerin-Calvert's report, although both Bemis and Sure-Way receive mention elsewhere.[109]

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106. *Id*. ¶ 149.
107. *Id.* at Appendix 9, Table 3.
108. *Singer Damages Report* at Table 1.
109. *Guerin-Calvert Report* ¶¶ 52-53, Appendix 1, and Appendix 4.

53. Ms. Guerin-Calvert characterizes the market for sharps containers as consisting of twelve types of containers. To arrive at this classification, she appears to accept Tyco's marketing materials at face value—although she does not clarify exactly which marketing materials she relies on, and does not offer any explanation as to why these materials should be deemed more reliable than other documentation indicating a smaller number of product categories.[110] In any event, on the basis of this classification system, Ms. Guerin-Calvert argues that *none* of Tyco's competitors offers a fully comparable line of sharps containers, because, in her judgement, no competitor appears to offer products in each of the twelve categories spanning Tyco's offerings.[111]

54. After examining the array of sharps container types suggested in Ms. Guerin-Calvert's report, I conclude the twelve-product classification scheme she endorses is unnecessarily complicated, and includes several purported "categories" accounting for a trivial fraction of Tyco's sales. A more sensible classification scheme would include fewer categories, such as the relatively simple, six-part framework that I proposed in my expert report.[112] In particular, according to the figures that Ms. Guerin-Calvert reports, the six categories included in my classification scheme account for approximately 97 percent of Tyco's sales.[113] Therefore, the six purported categories that she proposes to add account for a grand total of approximately 3

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110. *Id.* at Appendix 9 ¶ 2 ("Covidien's [Tyco's] marketing materials show that it categorizes containers into as many as 12 different types to reflect the range of needs healthcare providers have."). However, Ms. Guerin-Calvert does not provide a citation to any specific documents or materials in support of this claim. As I observed in my expert report, my review of promotional materials of several manufacturers led me to conclude that there are no more than six categories. *Singer Damages Report* at ¶ 17.

111. *Guerin-Calvert Report*. at Appendix 9, ¶ 5 ("[I]n contrast to Covidien's [Tyco's] product line its competitors offer more limited scopes of products.")

112. *Singer Damages Report* at Table 1.

113. *Guerin-Calvert Report* at Appendix 9, Table 2. In Table 2, Ms. Guerin-Calvert reports Covidien's annual sales for each of her twelve product categories. The six product categories included in my proposed classification scheme are listed in Table 2 as "Chemotherapy", "In-Room", "Large Volume", "Multi-Use", "Pharmaceutical Waste", and "Phlebotomy". The cumulative total sales of these six categories for 2001-2007 (the years appearing in Table 2) represent 96.7 percent of total cumulative sales for this time period.

percent of Tyco's sales, or less than one percent per product.[114] Thus, even if one assumes hypothetically that Ms. Guerin-Calvert's six additional categories are representative of highly differentiated products, and are not viewed as substitutes for any of the other categories—although she has not demonstrated this point—these purported categories comprise a trivial fraction of the sharps container industry.

55. Ms. Guerin-Calvert's apparently unconditional acceptance of a classification scheme purportedly based on Tyco's marketing materials results in significant mischaracterizations. For example, she opines that BD's product line is significantly more limited than Tyco's. This assertion is based on her claim that BD does not offer comparable containers in five of her twelve purported product categories. It is quite likely that BD and other suppliers do in fact offer containers in at least two of these five categories ("Biohazardous Waste" and "Dialysis Disposal"), as I demonstrate below. However, even if Ms. Guerin-Calvert's claim were true, it remains the case that the five purported product categories collectively account for approximately 3 percent of Tyco's cumulative sales for 2001-2007.[115] In contrast, my six-part classification scheme avoids this misleading implication, and shows that BD offers a full product line comparable to Tyco's.[116]

56. Some of the purported "categories" included in Ms. Guerin-Calvert's twelve-part classification scheme do not seem to represent distinct product types at all. For example, she indicates that Tyco is the only supplier to manufacture so-called "Biohazardous Waste"

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114. $(1 - 0.967)/6 \approx 0.0055$.

115. *Id.* at Appendix 9, ¶ 5. Ms. Guerin-Calvert's assertion is based on her claim that BD does not offer comparable containers in five of her twelve product categories: "Biohazardous Waste", "Dialysis Disposal", "Non-Biohazardous Waste", "RCRA Hazardous Waste", and "Transportable". For sales figures, *see Guerin-Calvert Report* at Appendix 9, Table 2.

116. *Singer Damages Report* at Table 1.

containers.[117] However, she provides no definition or description of this category, nor any justification regarding how or why a "Biohazardous Waste" container would be meaningfully distinct from any other typical sharps container, described in my expert report as a container "designed to manage *biohazardous waste* and prevent accidental needlestick or other sharps injuries."[118] An examination of the BD, Stericycle and Daniels websites shows that *every* sharps container provided by BD, Stericycle and Daniels bears a label or sticker indicating that it is for use with "Biohazardous Waste."[119] Thus, the available evidence leads me to conclude that Ms. Guerin-Calvert's attempt to declare Tyco the sole provider of such containers is grossly misleading.

57. Finally, Ms. Guerin-Calvert's classification system leaves the reader with the misleading impression that Tyco is the sole provider in the industry of sharps containers for use with dialysis. In particular, she notes that "Tyco uses its Dailysafety [sic] brand to market its container for use with dialysis related sharps," and she claims in Appendix 9 that Tyco alone produces "Dialysis Disposal" containers.[120] However, Stericycle's website indicates that it also services dialysis centers.[121] Similarly, Daniels' website lists two studies evaluating the Daniel's Sharpsmart container for dialysis use.[122] [redacted][123]

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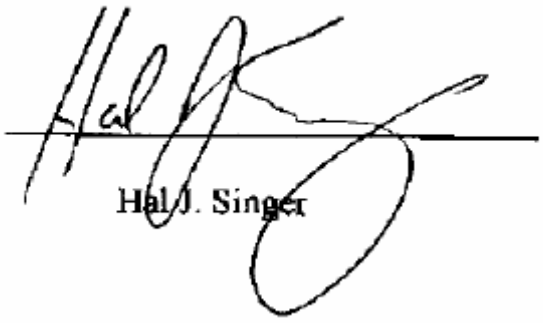
117. *Guerin-Calvert Report* at Appendix 9, Table 3.
118. *Singer Damages Report* ¶ 7 (emphasis added).
119. *See* http://www.bd.com/sharps/pdfs/full_line.pdf; http://www.stericycle.com/sharpsdisposal html ; *see also* http://www.danielsinternational.com/us/index.cfm?section=2&category=9 .
120. *Guerin-Calvert Report* at Appendix 9, Table 3, and ¶ 8.
121. See Stericycle Website: Dialysis Center Services, available at http://www.stericycle.com/dialysiscenter html ("Stericycle provides medical waste services for many leading dialysis centers.").
122. *See* Daniels International Website: "Mo Atkinson (Infection Control – NZ)" available at http://www.danielsinternational.com/us/index.cfm?section=27&category=27&viewmode=content&contentid=23 ("The mobile Access Plus containers are a great innovation proving to be invaluable in places like the Haemodialysis units.") and Daniels International Website: "Sheila Morgan (Infection Control – UK)" available at http://www.danielsinternational.com/us/index.cfm?section=27&category=27&viewmode=content&contentid=27

CONCLUSION

58. My report and Ms. Guerin-Calvert's report are like two ships passing in the night. Until she is willing to accept the Plaintiffs' theory of harm and project what the absence of that harm might look like in the but-for world, it is impossible for an observer to compare our findings. Ms. Guerin-Calvert offers few critiques of my damage model per se. The arguments she does offer are often uneconomic, lacking in empirical support, and fail to take into account both the mechanics of the modeling framework and its intellectual foundations. Finally, her mischaracterization of the breadth of Tyco's product line relative to its competitors is significant, suggesting a basic misunderstanding of the industry at best.

* * *

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



("Re: SharpSmart Reusable Sharps Container System 'The above product was introduced to seven clinical areas on the Freeman Hospital site for a trial period of four weeks. Clinical areas involved in the trial were: *Renal Dialysis (Inpatient and Outpatient departments)*, General Medicine, Renal Transplant Unit, Cardiothoracic Theatres and Intensive Care (Cardiothoracic and Heart/Lung Transplantation).'") (emphasis added).

123. BD transactional sales data.

Executed on February 15, 2008.

APPENDIX 1

TABLE A1:

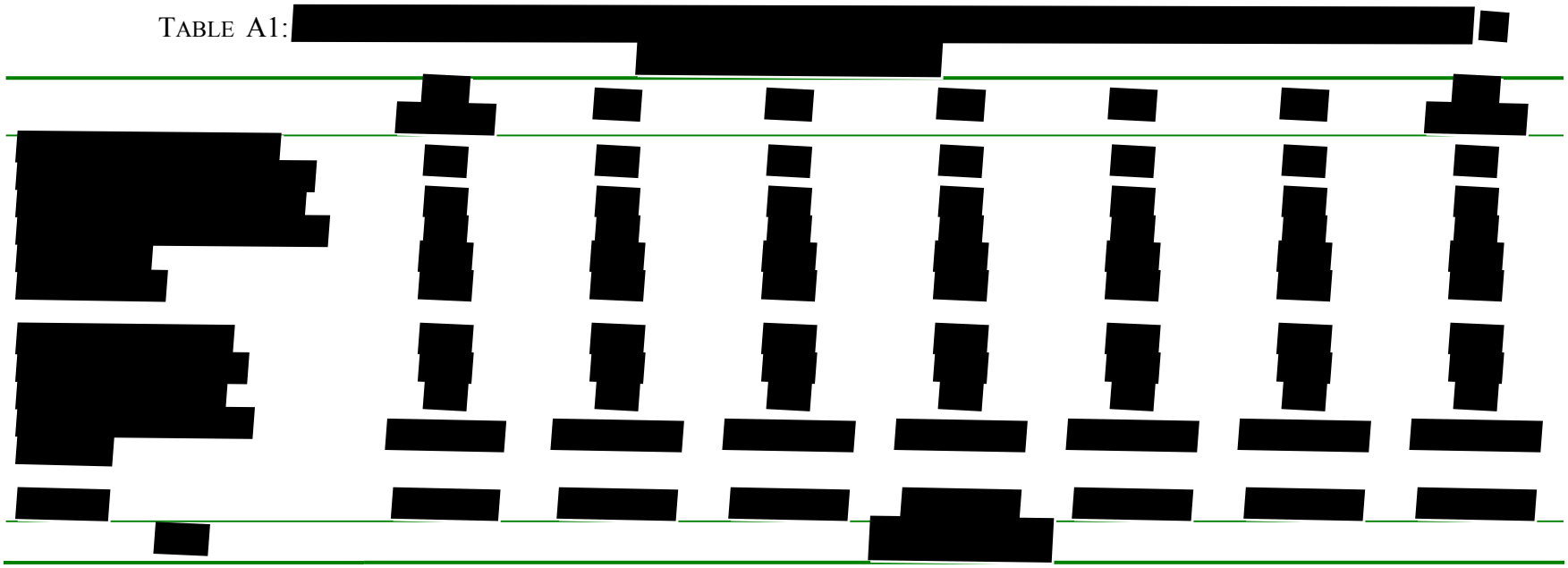


TABLE A2: [redacted]

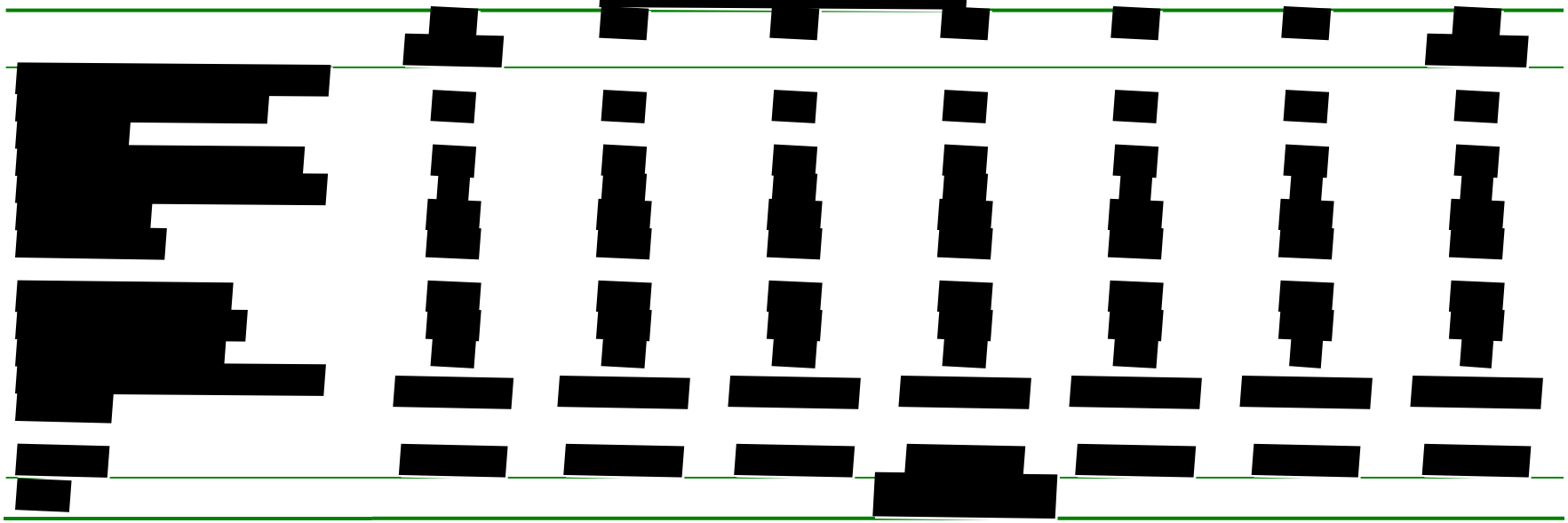


TABLE A3: [redacted]