

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

NATCHITOCHEs PARISH)	
HOSPITAL SERVICE DISTRICT and)	
J.M. SMITH CORP. d/b/a SMITH)	
DRUG CO., on behalf of themselves)	
and all others similarly situated,)	
)	Civil Action No. 05-12024
Plaintiffs,)	
vs.)	<u>EXPERT REPORT OF</u>
)	<u>PROFESSOR EINER</u>
)	<u>ELHAUGE</u>
TYCO INTERNATIONAL, Ltd.;)	
TYCO INTERNATIONAL (U.S.),)	
INC.; TYCO HEALTHCARE)	
GROUP, L.P.; and THE KENDALL)	
HEALTHCARE PRODUCTS)	
COMPANY)	
)	
Defendant)	



December 18, 2007

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INTRODUCTION

1. I have been retained by counsel for plaintiffs and the class to analyze the allegations and facts in this case, and opine on whether, as a matter of economics, they constitute anticompetitive conduct and had an anticompetitive impact on purchasers of sharps containers. I conclude that Tyco's loyalty and bundled contracts with buyers substantially foreclosed the sharps container market, and that Tyco's sole-source contracts with GPOs substantially foreclosed the GPO brokerage services market.¹ These substantial foreclosures have each harmed competition and buyers by impairing the competitiveness of rivals and lessening constraints on Tyco's market power. In particular, the foreclosures (1) made rivals less efficient by depriving them of economies of scale, (2) raised rivals' costs in ways separate from economies of scale, and (3) reduced rival market share in a way that lessened their ability to constrain Tyco's pricing power. The anticompetitive effects of Tyco's contracts are not redeemed by any plausible procompetitive benefits. Thus, I conclude that prices are higher and output lower than they would have been in the but-for world without Tyco's exclusionary contracts.

QUALIFICATIONS

2. I am the Petrie Professor of Law at Harvard University, where I have taught antitrust, contracts, corporations, and health care policy, and I write and teach mainly about economic analysis of those areas. I am also the faculty director of the Petrie-Flom Center in Health Law Policy, Biotechnology, and Bioethics.

3. I am the co-author of a recently published textbook from Foundation Press on antitrust law and economics entitled *Global Antitrust Law & Economics*, and its foreign counterpart with Hart Publishing, *Global Competition Law & Economics*. My other recent published work includes two lengthy pieces on antitrust economics: "Why Above-Cost Price Cuts to Drive out Entrants Do Not Signal Predation or Even Market Power—and the Implications for Defining Costs," 112 *Yale Law Journal* 681-827 (2003); and "Defining Better Monopolization Standards," 56 *Stanford Law Review* 253-344 (2003). I was also a co-author on Volume X of the Areeda Antitrust

¹ I use the term Tyco to refer to Tyco and its subsidiaries, including Kendall, and its predecessors in interest, such as Sage and Graphics Control. Recently, Tyco Healthcare changed its name to Covidien, but for clarity I refer to the firm as Tyco because that was its name for most of the class period.

Treatise on tying. My CV is attached as Exhibit A.

4. I am President of Legal Economics LLC, and a Member of Advisory Boards for the Journal of Competition Law & Economics, the Social Sciences Research Network on Antitrust Law & Policy, and the Social Sciences Research Network on Telecommunications & Regulated Industries. I have taken courses in economics, antitrust, and economic analysis of law, and regularly read and use economic literature on antitrust economics, including books on industrial organization. I also regularly attend workshops on those and other topics regarding the economic analysis of law. I routinely use and teach economic analysis in my classes, including those that I regularly offer on antitrust law and economics.

5. I have specific expertise on the antitrust economics of medical device suppliers' exclusionary agreements with group purchasing organizations (GPOs), hospitals, and other buyers. In 2002, I wrote a report to the U.S. Senate on the antitrust economics of such agreements.² I also wrote a report for the Department of Justice-Federal Trade Commission (DOJ-FTC) hearing on the proper antitrust analysis of exclusionary agreements with GPOs and hospitals, which covered the relevant economic issues.³

6. I have also filed expert economic reports evaluating the impact of exclusionary agreements in several medical product cases. I have filed two prior declarations in this case at the class certification stage explaining why the economic issues raised by these types of exclusionary agreements are classwide issues.⁴ I also filed expert economic declarations assessing a purchaser class action against similar exclusionary agreements on hospital bed markets in Spartanburg Regional Healthcare System v. Hillenbrand Industries, and testified by deposition in that case before it settled.⁵ I filed expert economic reports assessing the economic effects of such exclusionary agreements on oximetry markets in Masimo Corp. v. Tyco Health Care

² See Einer R. Elhauge, *The Exclusion of Competition for Hospital Sales Through Group Purchasing Organizations, Report to the U.S. Senate*, June 25, 2002, at 2, available at http://www.law.harvard.edu/faculty/elhauge/pdf/gpo_report_june_02.pdf [hereinafter Elhauge Senate Report].

³ Einer R. Elhauge, *Antitrust Analysis of GPO Exclusionary Agreements*, Comments Regarding Hearings on Health Care and Competition Law and Policy: Statement for DOJ-FTC Hearing on GPOs (Sept. 26, 2003), available at http://www.law.harvard.edu/faculty/elhauge/pdf/statement_ftcdoj.pdf [hereinafter Elhauge Statement to the DOJ/FTC].

⁴ I attach these declarations as Exhibit B and C and incorporate them by reference. I may rely on the economic analysis contained in these declarations if I am called to testify in this case.

⁵ *Spartanburg Regional Healthcare System v. Hillenbrand Industries*, Civil Action No. 7: 03-cv-2141 (D.S.C. filed June 2003).

Group, and testified as an economic expert both by deposition and at trial in that case.⁶ I filed expert economic reports assessing the effects of such exclusionary agreements on the market for trocars in *Applied Medical Resources Corp. v. Ethicon, Inc.*, and testified as an economic expert by deposition and twice at trial in that case.⁷ I filed expert economic reports assessing the effects of exclusionary agreements and entry on the market for erythropoietin stimulating agents (ESAs) in *Amgen v. F. Hoffman La-Roche*, and testified both by deposition and at trial in that case.⁸ I assessed the effects of similar exclusionary agreements on the needle and syringe markets in *Retractable Technologies v. Becton Dickinson*, and testified by deposition in that case before it was settled.⁹ I also filed an expert report and two expert declarations in *Rochester Medical Corporation v. C.R. Bard* that assess the effects of such exclusionary agreements on the markets for Foley and intermittent catheters, and have testified by deposition in that case.¹⁰

7. I have also served as expert on antitrust economics in many cases involving other markets. Moreover, I have served as a special consultant to the Federal Trade Commission on antitrust issues, with a particular focus on antitrust issues in the health care industry. Additionally, I submitted economics reports to Congress and the FCC on the antitrust economics of Internet Access bills and Interactive Television regulation.

8. In the instant case, I have been retained by counsel for the class and its representatives, Natchitoches Parish Hospital Service District and Smith Drug Co., to analyze the allegations and facts in this case and opine on whether and why as matter of economic theory they do or do not constitute anticompetitive conduct and resulted in anticompetitive injury.¹¹ I understand that the class period is from October 4, 2001

⁶ *Masimo Corp. v. Tyco Healthcare Group & Mallinckrodt, Inc.*, No. CV-02-4770 (C.D. Cal. filed Aug. 2001); *Masimo Corp. v. Tyco Health Care Group*, No. CV 02-4770 MRP, Memorandum of Decision Re: Motions in Limine (May 28, 2004).

⁷ *Applied Medical Resources v. Johnson & Johnson, Ethicon, Inc., Ethicon Endo_Surgey, Inc., & Johnson & Johnson Health Care Systems, Inc.*, No. SAVC 03-1329-JVS (C.D. Cal.); *Applied Medical Resources v. Ethicon, Inc.*, No. SAVC 03-1329-JVS, Tentative Minute Order Re: Motions in Limine, at 23-25.

⁸ *Amgen v. F. Hoffman-La Roche*, Civil Action No.: 05-12237 WGY (D. Mass.).

⁹ *Retractable Technologies, Inc. v. Becton Dickinson & Co.*, Civil Action No. 5:01-CV-036, (E.D. Tex. filed Jan. 2001).

¹⁰ *Rochester Medical Corporation, Inc. v. C.R. Bard, Inc., et al.*, Civil Action No. 5:04-CV-060 (E.D. TEx.)

¹¹ I file this declaration in my capacity as an expert to Natchitoches and Smith Drug and not on behalf of Harvard University, which does not take institutional positions with respect to specific legislation, litigation, or regulatory proceedings.

through the present, and I focus my analysis on that period.¹² In preparing this report, I, my research assistants, or my staff at Legal Economics have reviewed the discovery in this case, including the depositions, produced documents, electronic data, and substantive pleadings, and I have relied on the documents cited below and on my general knowledge of the literature on the economic analysis of antitrust and health care issues in analyzing the facts and forming my economic conclusions.

9. My factual inquiry is continuing, and I reserve the right to modify or supplement this report as further information warrants.

I. BACKGROUND AND SUMMARY

10. I understand this case is brought by a plaintiff class that consists of all direct purchasers of Tyco's sharps container products between October 4, 2001 and the present against defendant Tyco (and its subsidiaries).¹³ The basic allegation made by the plaintiff class is that Tyco has anticompetitively enhanced and/or maintained its monopoly power in the sharps container market through the use of exclusionary agreements. As I show below, the evidence validates these claims and shows that Tyco has anticompetitively enhanced and/or maintained its monopoly power to the detriment of sharps container buyers. Here, I summarize the conclusions from my investigation into this matter, and provide background information on the types of contracts and economic theories that are relevant to this matter.

A. Market Definitions

11. The relevant product market in this case is sharps containers, which are specialized containers used for the disposal of bio-hazard medical products, including needles, syringes, blood collection devices, and IVs.¹⁴ This market includes both disposable and reusable sharps containers, which are the two basic varieties of sharps

¹² Class Action Complaint ¶16.

¹³ Class Action Complaint ¶¶12-15, 16. Some of the class members are distributors, while others are hospitals or other healthcare providers that purchase the sharps containers they use directly from Tyco. This distinction does not affect the analysis I perform below as to whether Tyco's contracts have caused substantial marketwide foreclosure in a relevant product or service market, and thus this distinction does not affect the substance of my analysis.

¹⁴ See Part II.A.1 (establishing that this is the relevant product market).

containers. Disposable sharps containers are thrown out after each use, while reusable containers are emptied, washed, and reused. Tyco and Becton Dickinson (BD) are the two largest manufacturers of disposable sharps containers.¹⁵ Other disposable manufacturers include Medical Action, Winfield, Medline, Bemis, Post Medical, Smiths Medical, and a number of other small manufacturers, who collectively have less than 9% of the market.¹⁶ Stericycle and Daniels are the two largest manufacturers of reusable sharps containers.¹⁷ Other smaller manufacturers of reusable sharps containers include Sure-Way and SteriLogic.¹⁸

12. The market for Group Purchasing Organization (GPO) brokerage services is also relevant to this case.¹⁹ This is a relevant market because it is a vital service used to broker sales of sharps containers, and because Tyco has used exclusionary agreements to foreclose its rivals from obtaining access to these GPO brokerage services. GPOs negotiate standardized contracts with manufacturers of medical devices, such as Tyco, and then offer those standardized contracts to buyers.²⁰ GPOs are the most efficient way of brokering contracts for the sale of sharps containers, because they reduce the need for costly marketing, sales pitches, and negotiations with individual buyers, and predictably increase the amount of sales.²¹ Thus, all else equal, sellers that have access to GPO brokerage services will have lower sales and contracting costs than those who do not, and so will the buyers who deal with them. The foreclosure of the GPO brokerage services market is accordingly relevant to this case because it increases the costs of rival sharps container makers and of buyers transacting with those rivals.

13. The relevant geographic market for the sale of sharps containers and GPO brokerage services is the United States.²²

¹⁵ See Table 1; *infra* ¶47.

¹⁶ See Table 1.

¹⁷ See *infra* ¶47. Stericycle's reusable product was made by its Biosystems division.

¹⁸ See <http://www.sure-way.net>; <http://www.sterilogic.com>.

¹⁹ See Part II.A.2 (establishing that GPO brokerage services are a relevant market).

²⁰ For numerous reasons, GPOs may not always serve as faithful agents for their members or the interests of GPOs and purchasers may diverge in some instances. See Elhauge Senate Report, at 27-42.

²¹ See Part II.A.2 (discussing the efficiencies of GPOs).

²² See Part II.A.3 (establishing that the relevant geographic market is the U.S. for sharps containers and GPO brokerage services).

B. Market Shares and Power

14. Tyco has had revenue market shares ranging from ██████████ in the sharps container market.²³ These high market shares, high entry barriers, and Tyco's ability to exclude rivals and control prices demonstrate that Tyco has had monopoly power in the sharps container market during the relevant period.²⁴

15. In the market for GPO brokerage services, the average market shares for the seven major GPOs were Novation 32.96%, Premier 28.93%, Healthtrust 11.06%, Broadlane 8.02%, Amerinet 7.28%, Consorta 6.02%, and MedAssets 5.72%.²⁵

C. The Exclusionary Agreements and Economic Theory on Their Effects

16. Tyco has foreclosed its rivals with two basic types of contracts. First, Tyco has entered into sole-source contracts with GPOs on sharps containers. GPO sole-source contracts prohibit GPOs from brokering sharps container sales for Tyco's rivals.²⁶ Tyco had sole source contracts with four of the seven major GPOs during portions of the relevant period, and until September 2006 always had sole-source contracts with at least three major GPOs. These contracts foreclosed Tyco's sharps container rivals from accessing GPO brokerage services offered by these GPOs. By excluding rivals from these contracts, Tyco deprived them of the most efficient means of brokering sales of sharps containers.

17. This is *not* a claim that GPOs themselves are anticompetitive. To the contrary, GPOs are a highly efficient means of brokering medical device sales. The anticompetitive effects arise when GPOs take part in exclusionary agreements, like Tyco's, that have the aggregate effect of impairing rival competition. Thus, it is Tyco's exclusionary contracts *with* GPOs, and not the GPOs themselves, that are anticompetitive. These agreements harm competition for reasons I explain in detail below. Moreover, it is important to recognize that the efficiencies produced by GPOs do not justify the exclusionary agreements at issue. To the contrary, the greater

²³ See Part II.B.1 (calculating these market shares).

²⁴ See Part II.C (analyzing Tyco's market power in the sharps container market).

²⁵ See Part II.B.2 (calculating these shares for GPOs).

²⁶ See Part III.A.1 (discussing Tyco's general policy of entering into exclusionary agreements with GPOs); Part III.B (analyzing and summarizing the terms of these exclusionary agreements with GPOs).

efficiency of GPOs means that agreements that foreclose them to rivals are foreclosing the most efficient means of brokering sales, which impairs rival efficiency.²⁷

18. Second, Tyco has entered into share-based and bundled contracts with buyers or networks of buyers that impose price penalties on buyers who refuse to purchase a high percentage (typically 80-95%) of their sharps containers from Tyco.²⁸ Many (but not all) of these exclusionary contracts were brokered by GPOs. The GPO-brokered exclusionary contracts often provided several tiers and commitment levels that buyers could choose between, but buyers who did not select the highest commitment tier were hit with pricing penalties, and buyers who did not choose to commit at all were hit with the most severe pricing penalties. In addition to share-based contracts, Tyco also used tailored volume-based restrictive contracts that required buyers to continue making the same amount of purchases from year-to-year from Tyco to avoid pricing penalties. These contracts accomplish the same result as share-based contracts because a requirement to buy 100% of the prior year's purchases from Tyco is effectively the same as a requirement to buy 100% of one's purchases from Tyco, given that the amounts of these medical products that buyers need will not vary much from period to period.

19. Further, in both its GPO contracts and in its individual buyer contracts, Tyco sometimes bundled its sharps container products with numerous unrelated products. Tyco did this through some standardized GPO programs, such as Novation's Opportunity program or the MedAsset Select program. These programs typically required buyers to commit to make a high percentage (90-95%) of their purchases in a number of product categories – including products other than sharps containers – from the manufacturers participating in the special program. Buyers that did not meet their commitments across all product categories suffered pricing penalties in all those product categories. Tyco also typically used bundling in its individual buyer contracts, which imposed share-based and/or tailored-volume-based requirements on a wide range of Tyco products. Buyers that did not meet these requirements across a range of products suffered pricing penalties. These bundled requirements reinforced the exclusionary effect of Tyco's share-based requirements by tying the purchases the buyer made of sharps container products to the prices on other products.

²⁷ See Elhauge Statement to the DOJ/FTC, at 2.

²⁸ See Part III.A.2 (discussing Tyco's general policy of entering into exclusionary agreements with buyers); Part III.C (analyzing and summarizing the terms of these exclusionary agreements with buyers); Appendix A (summarizing in detail the standardized contracts that were brokered between Tyco and buyers by GPOs).

20. It is important not to be misled by the self-serving language used by Tyco in discussing these agreements. These contracts often use terms like “loyalty discount” or “bundled discount” or “rebate” – but those terms misleadingly imply that purchasers paid lower prices than they would have in the but-for world. In fact, the contracts, standing alone, can show only that in the actual world unrestricted purchasers paid higher prices than restricted purchasers. Because Tyco could artificially inflate the unrestricted price in order to induce buyers to purchase a substantial share from Tyco, restricted prices that are lower than unrestricted prices would remain higher than the more competitive prices in the but-for world. Further, because marketwide foreclosure inflated prices, that further increases unrestricted and restricted prices above but-for prices. Moreover, if Tyco truly wanted to give discounts and rebates to buyers, it could have offered discounts or rebates that were not conditioned on exclusionary requirements. Thus, in this case, it is more accurate to view the relevant price differences as imposing a price penalty on purchasers that refused to meet Tyco’s requirements, rather than as providing some sort of benefit.

21. In addition, it is important not to conflate the two primary ways in which GPOs and their contracts matter for this case. Specifically, GPOs both (1) entered into sole-source agreements with Tyco that foreclosed its rivals from accessing GPO brokerage services, and (2) developed standardized contracts for Tyco to use with buyers, which included share-based requirements or bundled requirements that foreclosed those buyers from buying from Tyco’s rivals. Tyco also entered into the latter type of contract with buyers outside of the standard GPO contracts. Each type of contract separately and independently causes anticompetitive harm in the sharps container market by foreclosing rivals from a relevant market and allowing Tyco to charge supra-competitive prices. These anticompetitive effects arise for reasons I explain in detail below. Further, the anticompetitive effects from both types of contracts exacerbate each other.

D. The Substantial Market Foreclosure

22. Here, the evidence shows that these exclusionary agreements have been used widely enough to produce substantial market foreclosure. Indeed, the evidence shows that Tyco had a general policy of entering into exclusionary contracts with both GPOs and buyers and recognized that these contracts excluded rivals. The result is that Tyco’s contracts have substantially foreclosed the relevant markets, which – in accordance with the economic theory that I discuss below – has raised rivals’ costs and deprived rivals of valuable efficiencies and market share that would have made

them more effective competitors in the but-for world. The end result is to harm buyers by forcing them to pay higher prices for sharps containers than they would have had to pay in the but-for world absent Tyco's exclusionary contracts.

23. 1. The Substantial Foreclosure of the GPO Brokerage Services Market. Tyco's exclusionary sole-source agreements with GPOs have substantially foreclosed the market for GPO brokerage services, which is by far the most efficient means of brokering contracts to sell medical devices like sharps containers.²⁹ Overall, the foreclosure from Tyco's sole source contracts was 50.04% from Oct. 2001-May 2005, 78.97% in June 2005-July 2005, 46.01% from August 2005-Sept. 2006, and 39.99% from Oct. 2006-June 2007. All of these levels of foreclosure are substantial. This substantial foreclosure of the GPO brokerage services market has relegated rivals to using less efficient means of obtaining contracts to sell their sharps containers, and has thus anticompetitively increased Tyco's monopoly power and prices in the sharps container market relative to the but-for world.

24. 2. The Substantial Foreclosure of the Sharps Container Market. The loyalty and bundled exclusionary agreements Tyco entered into with buyers have also substantially foreclosed the markets for selling sharps containers.³⁰ A conservative lower-bound calculation reveals that Tyco's bundled and share-based with purchasers of sharps containers foreclosed at least 32.47-39.40% of the sharps container market from 2001 through 2007.

25. 3. Combined Foreclosure of Free Competition by these Exclusionary Contracts. Both Tyco's exclusionary GPO contracts and exclusionary share-based and bundled contracts impaired the ability of rivals to sell to sharps container buyers and impaired free competition. Some buyers were affected by both types of contracts, both GPO and share-based or bundled, while others were affected by only one type of contract or the other. In total, these contracts together directly foreclosed free competition for 42.97-46.68% of sharps container sales. Note that even those buyers who did not have either type of contract were affected by the higher marketwide prices that Tyco's exclusionary contracts caused.

26. 4. The Economics of Foreclosure. Because the anticompetitive effects flow from marketwide foreclosure that elevates market prices and/or reduces market

²⁹ See Part III.B (analyzing GPO contracts and calculating foreclosure in that market).

³⁰ See Part III.C (analyzing Tyco's contracts with buyers and calculating foreclosure).

quality for all purchasers, they do not depend on the particulars of the specific sorts of agreements used with different purchasers, nor on whether entering into those agreements may have been beneficial to the purchasers acting individually.³¹ In particular, because the anticompetitive effects from Tyco's conduct flow from total marketwide foreclosure:

(a) It does not matter whether the agreements were literally 100% exclusive for participating buyers.³² To achieve the relevant anticompetitive foreclosure, agreements need not completely prohibit buyers from dealing with the firm's rivals.

(b) It does not matter whether the agreements imposed an absolute obligation to meet the exclusionary requirements or instead made meeting the requirements necessary to avoid unfavorable prices or get special payments.³³ The anticompetitive effects flow from the foreclosure, not from the means used to gain that foreclosure. Further, even a pure exclusive dealing agreement will have some implicit penalty for failing to abide by the restrictions of the agreement, and it makes no economic sense to treat more leniently agreements that make that penalty explicit by providing different prices for buyers that abide by different levels of restrictions imposed by Tyco.

(c) It does not matter whether some purchasers or their GPOs initiated or individually perceived a benefit from entering into the exclusionary agreements. The main reason buyers agree to exclusionary agreements that create anticompetitive marketwide effects is that the costs of their individual decisions to agree are largely externalized onto the rest of the market, while the benefits of avoiding price penalties by agreeing to the exclusionary condition go entirely to the individual buyer that agrees. This gives buyers incentives to agree to exclusionary agreements that harm other buyers, and other buyers have similar incentives, meaning they can all have individual incentives to enter into

³¹ See Elhauge Statement to the DOJ/FTC, at 2, 11-15, 21-25.

³² Accord Louis Kaplow & Carl Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 121 n.198 (Jan. 2007), forthcoming in *HANDBOOK OF LAW AND ECONOMICS* (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (stating that “the economic principles and analysis are similar” for “exclusive dealing” and “discounts to buyers that purchase a large fraction of their needs from the incumbent supplier”).

³³ Accord Louis Kaplow & Carl Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 124 n.207 (Jan. 2007), forthcoming in *HANDBOOK OF LAW AND ECONOMICS* (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (stating that “formal exclusivity contracts are not necessary for this result [that rivals can be excluded by a dominant firm’s contracts]. Similar effects may arise from pricing strategies (such as quantity or loyalty discounts)”; XI HOVENKAMP, *ANTITRUST LAW* ¶1807b, at 116 (1998) (“[A]ntitrust policy should not differentiate between the manufacturer of widgets who explicitly imposes exclusive dealing on its dealers and the manufacturer who gives such dealers a discount or rebate for dealing exclusively in the manufacturer’s widgets.”).

exclusionary agreements even though the ultimate result of all of them doing so is that all buyers are harmed.³⁴

This externality can create a collective action or prisoner's dilemma problem. Suppose each buyer is offered a small short-term discount from a monopoly price if it will agree to buy under an exclusionary policy that will, if a substantial share of buyers agree to it, hamper the ability of rivals to compete and thus enhance the seller's market power against all buyers. If they think about the anticompetitive consequences at all, each buyer will individually reason that, if enough other buyers agree to the exclusionary policy, then the seller will successfully create or protect anticompetitive seller market power regardless of what the individual buyer does, since the individual buyer alone does not have a large enough buyer share to prevent that marketwide result from occurring. And, if enough other buyers do not agree to the exclusionary policy, then the seller will fail to gain or protect anticompetitive market power regardless of what the individual buyer does. Thus, no matter what it expects other buyers to do, each individual buyer has incentives to agree to the exclusionary policy in exchange for the discount, because its individual decision has little influence on whether the adverse marketwide effects occur, but does definitely determine whether or not that buyer gets a discount.

(d) This same externality problem will also give buyers incentives to stay in such harmful exclusionary agreements, even if those agreements are terminable, because terminating would cause buyers to incur price penalties individually, and any benefits produced by marginally reducing marketwide

³⁴ See Elhauge, *Defining Better Monopolization Standards*, *supra*, at 284-88, 339-41; Ilya R. Segal & Michael D. Whinston, *Naked Exclusion: Comment*, 90 AM. ECON. REV. 296, 296-97, 304, 307 (2000); MICHAEL D. WHINSTON, LECTURES ON ANTITRUST ECONOMICS 144 (MIT Press, Cambridge 2006) (if "there is more than one buyer and [the rival] has scale economies . . . the contract signed by any one buyer can have a negative externality on all other buyers"); Louis Kaplow & Carl Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 124 (Jan. 2007), forthcoming in HANDBOOK OF LAW AND ECONOMICS (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) ("Many individual retailers choose to purchase from [the dominant firm] on an exclusive basis, but collectively the retailers, and final consumers, are harmed in the long run by [the dominant firm's] exclusive dealing."); *id.* at 122 ("[T]he presence of multiple . . . buyers . . . leads to a free-rider problem in attempts to foil [the dominant firm]'s anticompetitive design," and such a multiple-buyer situation "supports an equilibrium in which all buyers agree to exclusivity, in exchange for an arbitrarily small transfer, and [the entrant] is excluded from the market . . . even if [the entrant] is more efficient than [the dominant firm]"); Joseph Farrell, *Deconstructing Chicago on Exclusive Dealing*, 50 ANTITRUST BULLETIN 465, 476-77 (2005) (finding that if there are many buyers, as there are here, that "competition from [the rival] can be a public good among multiple buyers. Especially if it could 'discriminate' out of equilibrium, S [the incumbent seller] may be able quite cheaply to induce enough buyers to sign 'nakedly' exclusionary contracts. Buyers are harmed here, by one another's deals (not by their own, if they are rational): the alternative facing each buyer is worse than the benchmark because others' deals make entry less likely.").

foreclosure would be shared with all the other buyers.³⁵ Even though the total benefits in the form of lower prices to all buyers from termination exceed the total penalties, the share of benefits an individual buyer receives likely will not exceed those penalties, causing each buyer to decline to terminate individually even if all buyers would be better off if all of them terminated collectively. In other words, even if such exclusionary agreements are terminable, that does not alter the incentives of buyers to comply with them despite the net harm they create for buyers as a class. Thus, terminability does not alter the foreclosure and barriers to rival entry or expandability that these agreements create.

(e) It does not matter whether different purchasers entered into different sorts of exclusionary agreements, because the relevant anticompetitive effects do not turn on whether marketwide foreclosure was accomplished by one type of agreement.³⁶ Consider the fact that Tyco has both bundled and unbundled share-based contracts covering sharps containers. The unbundled exclusionary agreements penalize unrestricted buyers with price penalties on sharps containers. The bundled exclusionary agreements penalize unrestricted buyers on sharps containers with price penalties on both sharps containers and on a range of other bundled products. Further, some of the agreements required buyers to purchase 80% of their sharps containers from Tyco and others 90%. The relevant foreclosure in sharps containers is thus the aggregate foreclosure in sharps containers produced by both the bundled and unbundled requirements to purchase 80% and 90% of sharps containers from Tyco. The fact that some of the share-based restrictive contracts are bundled just increases the penalties

³⁵ See Einer Elhauge, *Defining Better Monopolization Standards*, *supra*, at 340-42; Kaplow and Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 129 n.221 (Jan. 2007), forthcoming in *HANDBOOK OF LAW AND ECONOMICS* (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (terminability does not eliminate anticompetitive effects because “exclusive dealing policies can have anticompetitive effects even without the use of formal exclusive-dealing contracts, much less long-term exclusive-dealing contracts”); Willard K. Tom, David A. Balto & Neil W. Averitt, *Anticompetitive Aspects of Market-Share Discounts and Other Incentives to Exclusive Dealing*, 67 *ANTITRUST L.J.* 615,623-24 (2000) (“Even if the contracts are of short duration or are terminable at will, switching to the entrant could be an irrational strategy for a distributor for a variety of reasons, including the new entrant's need for a broad network of distributors in order to satisfy customer needs or to achieve economies of scale, and the difficulty the entrant may have in developing brand recognition without widespread distribution. Thus, there might be a collective action problem: it would be rational for a large number of distributors to switch, if only they could coordinate with each other, but it might be irrational for any one distributor to switch independently”); MICHAEL D. WHINSTON, *LECTURES ON ANTITRUST ECONOMICS* 166 (MIT Press, Cambridge 2006) (if there are a number of firms trying to secure exclusive deals or downstream consumers (like the patients here), “exclusionary contracts need not have long durations to have an anticompetitive effect Indeed, we even could imagine these contracts being renewed each morning. Since the economic motives are the same each day, the equilibrium outcome will be as well.”).

³⁶ See IX AREEDA, *ANTITRUST LAW* 94, 104 (1991) (should aggregate the foreclosure produced by different sorts of exclusionary agreements).

for noncompliance, and the fact that some require a higher share means those buyers' purchases are foreclosed to a greater degree. But the anticompetitive effects do *not* flow from the extent to which these agreements foreclose individual buyers. Rather, they flow from the extent to which, in the *aggregate*, all these agreements produce a *marketwide* foreclosure that impairs rival competitiveness as described above, because it is that impairment of rival competitiveness that causes the harm to competition.

27. All of this means that buyers can be harmed by these contracts even if buyers or their GPOs have voluntarily agreed to these contracts. Buyers are willing to agree to these share-based and bundled contracts that threaten them with price penalties, even though doing so makes them worse off than they would be in the but-for world without these agreements. The reason is that buyers do not have the luxury of comparing the restricted prices to but-for prices, but rather must compare restricted prices to the penalty prices Tyco charges to buyers who refuse to abide by the restrictions of its exclusionary conditions. Because Tyco can choose an unrestricted price that is far above the but-for price, and thus is a price penalty for refusing to abide by the condition, buyers do not benefit from what are nominally styled "discounts." Indeed, economic literature has shown that, even if there were only one buyer in the downstream market, a dominant firm in the upstream market could use restricted contracts to foreclose that buyer by setting the unrestricted price well above the but-for price and offering a "discount" for abiding by the restriction.³⁷ Nor can we assume that current market prices generally charged without exclusionary conditions equal the but-for price that would be charged without the exclusionary agreements. Such an assumption amounts to simply assuming away the relevant theories about how anticompetitive injury can occur. Where share-based and bundled contracts produce marketwide foreclosure that gives the dominant firm more market power than it would have otherwise had, then current market prices will be higher than but-for prices would have been without that foreclosure. Thus, economic harm does not turn on whether buyers are better off accepting a share-based or bundled agreement than they would have been accepting the unrestricted prices outside of the exclusionary contracts that prevailed in the actual world, for the unrestricted prices in the actual world have been artificially inflated by Tyco's exclusionary conduct.

³⁷ See Joseph Farrell, *Deconstructing Chicago on Exclusive Dealing*, 50 ANTITRUST BULLETIN 465, 476 (2005) (stating that because of this dynamic, "one cannot assume that B's [the buyer's] alternative to a proposed exclusive deal is as good as the benchmark that he would be offered if exclusive dealing were prohibited. Exclusive dealing can hurt a rational buyer—not of course relative to the alternative that he rejects, but relative to the benchmark that would arise if exclusive dealing were banned").

28. Likewise, economic theory shows that it is invalid to infer whether buyers are better off by looking at whether they voluntarily agreed to the exclusionary requirements. They may agree to these requirements only to avoid price penalties or because the conditions are part of a scheme to make it economically unattractive not to comply. Further, as discussed above, externality problems can give individual purchasers incentives to accept exclusionary agreements in order to avoid price penalties, even though the collective result of all of them agreeing is to create a marketwide foreclosure that makes all of them worse off than they would have been without the exclusionary agreements.³⁸ In a market such as the sharps container market where many thousands of buyers make purchases, the collective action problems are likely to be particularly powerful. It is thus incorrect to claim that purchasers must benefit if they voluntarily enter into exclusionary agreements.³⁹ Rather, individual purchasers may have incentives to participate in the exclusionary program once it has been introduced, even though the existence of the exclusionary program collectively harms all of the purchasers in the aggregate.

29. A simple hypothetical may help to illustrate this dynamic. Assume, just for purposes of illustration, that the but-for price for a sharps container would be \$10 absent Tyco's exclusionary conduct, but that, because that conduct forecloses a substantial share of the market, the actual market price is \$20. To induce purchasers to agree to its exclusionary program, Tyco has charged restricted buyers 10% less than unrestricted buyers and set the unrestricted price at \$20. In this hypothetical, each buyer would have individual incentives to abide by Tyco's restrictions, because then it would pay \$18 rather than \$20. But the collective effect of many buyers agreeing is a substantial foreclosure that makes all buyers worse off because, rather than paying the but-for price of \$10, the restricted buyers pay \$18 and the unrestricted buyers pay \$20. This disjunction between individual incentives and marketwide harm will tend to cause each purchaser to abide by the restrictions and remain restricted, creating and

³⁸ See Kaplow and Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 122 (Jan. 2007), forthcoming in *HANDBOOK OF LAW AND ECONOMICS*, (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (stating that "the presence of multiple ... buyers ... leads to a free-rider problem in attempts to foil [the dominant firm's] anticompetitive design" and stating that such a multiple-buyer situation "supports an equilibrium in which all buyers agree to exclusivity, in exchange for an arbitrarily small transfer, and [the entrant] is excluded from the market ... even if [the entrant] is more efficient than [the dominant firm]"); MICHAEL D. WHINSTON, *LECTURES ON ANTITRUST ECONOMICS* 144-147 (MIT Press, Cambridge 2006) (stating that "the incumbent may not need to pay compensation to any of the buyers if they each expect that enough other buyers will sign anyway" and concluding that because of externality/free-rider problems that, "as the number of symmetric buyers grows large, so that each buyer becomes a very small part of aggregate demand, the incumbent is certain to be able to exclude for free").

³⁹ See Elhaage, *Defining Better Monopolization Standards*, *supra*, at 339-40; Louis Kaplow, *Extension of Monopoly Power Through Leverage*, 85 *COLUM. L. REV.* 515, 532-33 (1985); XI HOVENKAMP, *ANTITRUST LAW* 94-95 (1998).

sustaining a substantial marketwide foreclosure that harms all purchasers. (I am not opining on what the but-for price would actually be in this case, as I understand that Dr. Hal Singer has been retained to file a damages report on this issue. I am merely using these numbers as an illustration of how Tyco's conduct can induce buyer agreement.)

30. Accordingly, it is a mistaken position to argue that purchasers were not injured because some voluntarily accepted the exclusionary conditions and may have been satisfied with doing so. The fact that individual buyers may agree in their self-interest does not at all disprove the anticompetitive harm, because the gravamen of the complaint is that the anticompetitive conduct made the alternatives to agreeing worse than they would have been in a world without that conduct. The correct inquiry is whether purchasers are worse off than they would have been in the but-for world without the exclusionary conduct, not whether they are worse off in the actual world than they would have been had they responded to the conduct differently.

E. The Effect on Rival Sales of Tyco's Contracts

31. The impact of Tyco's exclusionary contracts on rivals is amply demonstrated by the experience of rivals attempting to sell to buyers in the face of the foreclosure produced by these exclusionary contracts.⁴⁰ It is confirmed by how sales by Tyco's rivals to Novation members rose sharply after Tyco's sole source contract with Novation ended. It is also confirmed by numerous simultaneous comparisons I have performed of the relative market shares of rivals versus Tyco at buyers with and without exclusionary contracts at each point in time. It is further confirmed by regressions I have performed to compare the difference in rivals' market shares in portions of the market that were or were not restricted by Tyco's exclusionary contracts.

F. The Anticompetitive Impact of Tyco's Contracts

32. The economic literature shows that anticompetitive effects can be caused both by exclusive dealing contracts, like those Tyco has entered into with GPOs, and by share-based and bundled restrictive contracts, like those Tyco has entered into with

⁴⁰ See Part IV.A.

buyers. This literature concludes that exclusive dealing contracts and share-based and bundled restrictive contracts have similar economic effects, and should be analyzed using the same economic principles.⁴¹ These types of contracts can cause anticompetitive effects when, to avoid unfavorable terms, a dominant firm like Tyco requires purchasers or their GPOs to abide by restrictions that foreclose enough of a market to deprive rivals of economies of scale, that raise rivals' costs, or that simply deprive rivals of market share. Indeed, the economic literature shows that a dominant firm like Tyco can exclude rivals in this way without sacrificing any profits.⁴²

33. Substantial foreclosure can impose barriers to rival entry and expansion that make rivals smaller, which can also make rivals less efficient when the market exhibits various economies of share, such as economies of scale, scope, research, learning, and/or network effects.⁴³ Barriers to rival entry and expandability are

⁴¹ See Louis Kaplow & Carl Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 121 n.198 (Jan. 2007), forthcoming in HANDBOOK OF LAW AND ECONOMICS (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (stating that “the economic principles and analysis are similar” for “exclusive dealing” and “discounts to buyers that purchase a large fraction of their needs from the incumbent supplier”); *id.* at 124 n.207 (stating that “formal exclusivity contracts are not necessary for this result [that rivals can be excluded by a dominant firm’s contracts]. Similar effects may arise from pricing strategies (such as quantity or loyalty discounts)”); Willard K. Tom, David A. Balto & Neil W. Averitt, *Anticompetitive Aspects of Market-Share Discounts and Other Incentives to Exclusive Dealing*, 67 ANTITRUST L.J. 615, 615, 623-24, 627 (2000) (stating that “market-share discounts structured to produce total or partial exclusivity should be judged according to the same economic principles that govern exclusive dealing” and should be condemned “if they produce anticompetitive effects without counterbalancing procompetitive effects”).

⁴² See Kaplow & Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 130 (Jan. 2007), forthcoming in HANDBOOK OF LAW AND ECONOMICS (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (“[I]t is also possible that a highly anticompetitive exclusive arrangement would involve no short-term profit sacrifice by the monopolist.”); MICHAEL D. WHINSTON, LECTURES ON ANTITRUST ECONOMICS 144-147 (MIT Press, Cambridge 2006) (stating that the dominant firm “may not need to pay compensation to any of the buyers if they each expect that enough other buyers will sign anyway” and that because of externality/free-rider problems, “as the number of symmetric buyers grows large, so that each buyer becomes a very small part of aggregate demand, the incumbent is certain to be able to exclude for free”).

⁴³ See Einer R. Elhauge *Defining Better Monopolization Standards*, *supra*, at 320-23; Elhauge Statement to the DOJ/FTC, *supra*, at 3-9; CARLTON & PERLOFF, *supra*, at 35-40, 44-47 (3rd ed. 2000) (discussing economies of scale and scope); XI HERBERT HOVENKAMP, ANTITRUST LAW 94-95 (1998); Louis Kaplow & Carl Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 124 (Jan. 2007), forthcoming in HANDBOOK OF LAW AND ECONOMICS (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (stating that because of foreclosure, rivals to a dominant firm “may indeed conclude that making the necessary investments to expand its product line, manufacturing capacity, sales and distribution network, or advertising would not yield a sufficient return.”); Thomas G. Krattenmaker & Stephen C. Salop, *Anticompetitive Exclusion: Raising Rivals’ Costs to Achieve Power Over Price*, 96 YALE L.J. 209, 234-45 (1986); Stephen C. Salop & David T. Scheffman, *Raising Rivals’ Costs*, 73 AM. ECON. REV. 267 (1983) (Special Issue); James E. Hodder & Yael A. Ilan, *Declining Prices and Optimality When Costs Follow an Experience Curve*, 7 MANAGERIAL & DECISION ECON. 229 (1986); A. Michael Spence, *The Learning Curve and Competition*, 12 BELL J. ECON. 49 (1981); David S. Evans & Richard Schmalensee, *A Guide to the Antitrust Economics of Networks*, ANTITRUST, Spring 1996, at 36; Michael L. Katz & Carl Shapiro, *Systems Competition and Network Effects*, 8 J. ECON. PERSP. 93 (1994); S.J. Liebowitz & Steve Margolis, *Network Effects and Externalities*, in THE NEW PALGRAVE’S DICTIONARY OF ECONOMICS AND THE LAW 671 (1998).

created by Tyco's contracts because the exclusionary restrictions mean that rivals cannot simply compete on equal terms with the dominant firm in trying to sell to buyers.⁴⁴ Instead, buyers that switch some portion of sales to the rivals will have to (1) incur higher contracting costs when rivals cannot access those buyers' GPOs, and/or (2) incur price penalties on other purchases the buyers make from Tyco on sharps containers or on other products that are bundled with sharps containers. Buyers will be less willing to make such a switch than they would be in an unrestrained market, for any level of product quality and price the rivals offer. Thus, rivals have a smaller share than they would have achieved in an unrestrained market with the same product and terms.

34. In the extreme case, this impairment of rival efficiency has the anticompetitive effect of eliminating existing rivals or deterring new entrants. But impairing rival efficiencies also has an anticompetitive effect when rivals remain in the market at reduced efficiency, because this worsens the market options available to buyers and lessens the constraints on Tyco's market power, enabling Tyco to raise prices above but-for levels.⁴⁵ This anticompetitive effect can exist even if Tyco's rivals are equally (or more) efficient in the sense that they have the same (or better) cost curve, because the foreclosure can prevent rivals from growing to the point at which they would have achieved their natural efficiencies.⁴⁶

35. Similarly, foreclosing rivals from the GPO brokerage services market can make rivals less efficient by depriving them of the most efficient means of brokering

⁴⁴ Rivals also may not be able to offset the penalties imposed by the dominant firm. *See, e.g.*, Willard K. Tom, David A. Balto & Neil W. Averitt, *Anticompetitive Aspects of Market-Share Discounts and Other Incentives to Exclusive Dealing*, 67 ANTITRUST L.J. 615, 627 (2000) ("A smaller competitor would find it hard to match [the] incentives and penalties [of a dominant firm's share-based discounts] because it would have to match the absolute dollar value of the discount on its own smaller sales volume, thereby necessitating a larger percentage discount.").

⁴⁵ *See, e.g.*, MICHAEL D. WHINSTON, LECTURES ON ANTITRUST ECONOMICS 147 (MIT Press, Cambridge 2006) ("[S]cale economies need not be in the form of entry costs to get exclusionary effects"); Louis Kaplow & Carl Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 124 (Jan. 2007), forthcoming in HANDBOOK OF LAW AND ECONOMICS (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (finding that even if foreclosed rivals are already on the market that anticompetitive effects can arise because an existing rival "may indeed conclude that making the necessary investments to expand its product line, manufacturing capacity, sales and distribution network, or advertising would not yield a sufficient return. [The dominant firm]'s exclusivity may render unprofitable a strategy under which [the existing rival] gradually increases its share at the retail locations where [the dominant firm] has traditionally been dominant.").

⁴⁶ *Accord* Louis Kaplow & Carl Shapiro, *Antitrust*, Harvard John M. Olin Center for Law, Economics, and Business Discussion Paper No. 575, at 123 (Jan. 2007), forthcoming in HANDBOOK OF LAW AND ECONOMICS (A. Mitchell Polinsky & Steven Shavell, eds., Elsevier, 2007) (finding that a multiple-buyer situation "supports an equilibrium in which all buyers agree to exclusivity, in exchange for an arbitrarily small transfer, and [the entrant] is excluded from the market . . . even if [the entrant] is more efficient than [the dominant firm]").

contracts for sharps containers.⁴⁷ This can deprive rivals of market share, with the adverse effects described above. But substantial foreclosure from the most efficient means of brokering contracts can also raise rivals' costs, even if it does not cause rivals to lose any sales, simply by forcing rivals to use less efficient alternatives than GPOs. This will have an anticompetitive effect because if rivals' costs are increased, then rival efficiency will be reduced, making them less able to constrain Tyco's market power. This then enables Tyco to raise its prices above the levels that it could charge in the but-for world, thus harming buyers.

36. Foreclosure also enhances Tyco's market power under standard measures of market power that consider the ability of rivals to expand to supply the market by offering a more favorable price. Standard economic models of market power assume that market power is directly proportional to a firm's market share and inversely proportional to the elasticity of supply of the firm's rivals, with elasticity measured as the percentage increase in rival supply that is made in response to a certain percentage increase in the original firm's price. Rather than assuming instantaneous and infinite expandability of rival production levels, these standard models more reasonably assume that rivals' ability to expand depends in part on how large they already are. Thus, because Tyco has through foreclosure obtained a higher share of the market and relegated its rivals to a smaller share than in the but-for world, it can lessen the ability of rivals to constrain its prices given a constant elasticity of supply. This allows Tyco to increase its prices even if rival efficiency is unimpaired. In other words, how big Tyco's rivals already are affects how far and how quickly they can expand, and thus affects how well those rivals can constrain Tyco's behavior.

37. To put the point mathematically, under standard economic measures of market power, if ϵ_{def} is the firm-specific demand elasticity of the defendant,⁴⁸ then the degree of its market power (as measured by the extent to which that defendant can maximize profits with a price above marginal cost) is determined by the equation $(P - MC)/P = -1/\epsilon_{\text{def}}$.⁴⁹ Further, under these standard measures, if ϵ_{mkt} is the marketwide

⁴⁷ HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY 421 (2d ed. 1999) (noting that "foreclosure theories of exclusive dealing become more robust if" a the substantial foreclosure is "raising rivals' costs by relegating them to inferior distribution channels"); Thomas G. Krattenmaker & Stephen C. Salop, *Anticompetitive Exclusion: Raising Rivals' Costs to Achieve Power Over Price*, 96 YALE L.J. 209, 234-45 (1986).

⁴⁸ Firm-specific demand elasticity is the extent to which an increase in a firm's own prices would reduce its own output.

⁴⁹ See Gregory J. Werden, *Demand Elasticities in Antitrust Analysis*, 66 ANTITRUST L.J. 363, 368-72 (1998).

demand elasticity,⁵⁰ $\epsilon_{\text{rivsupp}}$ is the supply elasticity of rivals, and S is the share of the defendant (which means $1-S$ is the share of all the other firms), then it can be shown that $\epsilon_{\text{def}} = \epsilon_{\text{mkt}}/S + \epsilon_{\text{rivsupp}}(1-S)/S$.⁵¹ The result is that enhancing a defendant's market share in ways unrelated to product merits (such as by using exclusionary restrictions) can be anticompetitive even if it does not lower rival efficiency, because it lowers the defendant's firm-specific demand elasticity ϵ_{def} , and thus increases its market power, given a constant rival supply elasticity and market demand elasticity.

38. This adverse effect of foreclosure on rival expandability is exacerbated if the foreclosure also reduces the efficiency of rivals, because such a reduction would both (1) reduce rival elasticity of supply at every price level, and (2) lower rival market share, thereby lowering their ability to expand at any given level of elasticity of supply. Even if rival efficiency is not reduced, the effect is exacerbated to the extent that Tyco's exclusionary agreements are an impediment that slows down rival expandability and reduces their supply elasticity.

39. The evidence here shows that all three types of harm are present and caused by Tyco's exclusionary contracts. First, the evidence shows that Stericycle has not yet achieved its economies of scale, while Tyco and BD appear to have exhausted their economies of scale. This implies that any foreclosure that reduced the growth of firms that were around or below Stericycle's size deprived them of economies of scale. Second, the greater ease with which Daniels sold to buyers after several previously sole-source Tyco GPO contracts added Daniels, suggests that its costs of obtaining contracts were lower when it had GPO contracts. The pursuit of GPO contracts by Daniels and Stericycle also shows that they believed GPO contracts would lower their costs of obtaining contracts. Third, rivals cannot instantly expand to provide all of the market need for sharps containers, which supports the application of the standard antitrust economic formulas above that show how increasing Tyco's market share leads to higher prices. Each of these reasons would be an independent source of anticompetitive harm, but the evidence suggests that all three exist here.

40. Even without the above direct evidence of anticompetitive harm, likely anticompetitive harm can be inferred from the existence of substantial marketwide foreclosure and the absence of redeeming procompetitive efficiencies.

⁵⁰ Marketwide demand elasticity is the extent to which an increase in market prices would reduce output on the market as a whole.

⁵¹ See William M. Landes & Richard A. Posner, *Market Power in Antitrust Cases*, 94 HARV. L. REV. 937, 944-45, 985-86 (1981).

41. Finally, note that in some of his academic work, Tyco's own expert Prof. Ordover *agrees* with me, and with all of the other literature that I discuss and cite above, that contracts like the ones Tyco has used here can impair rival efficiency and harm buyers. Specifically, Prof. Ordover's academic writing states:

(1) that share-based discounts "implemented by a dominant manufacturer ... can exclude equally efficient rivals, misallocate resources, and lower consumers welfare";⁵²

(2) that a dominant firm that is larger than its rivals "would be willing to expend greater resources to raise its rival's costs than the rival would be willing to expend in an attempt to keep them down";⁵³

(3) that "[l]oyalty rebates can induce demand-enhancing services and facilitate better extraction of the monopoly rent that is potentially available to the seller" and "can also be used to protect this rent from dissipation or to enhance the size of the rent by lessening or removing the competitive constraint";⁵⁴

(4) that "bundling by a multi-product firm can lead to the exclusion of an equally efficient rival";⁵⁵ and

(5) that the economic literature shows that exclusive dealing can anticompetitively exclude rivals "when there are economies of scale in production and multiple retail markets where the buyers' do not coordinate their decisions and no one retailer is large enough to ensure the survival of the potential entrant";⁵⁶

(6) that "The Chicago school presumption that as a matter of theory unilateral business arrangements between consensual buyers and sellers are

⁵² Ordover & Shaffer, *Exclusionary Discounts* 1 (August 25, 2006) (noting that this can be so when the dominant manufacturer "may have easier access to financing than its rival or rivals"). Ordover and his co-author stress that this conclusion holds even if "despite there being no downstream externalities (and thus no coordination difficulties among buyers), complete information about cost and demand parameters, and no economies of scale in production. Moreover, we showed that this result holds even though both firms have the same marginal cost of production and thus are equally efficient. The result holds whether the products sold to consumers are horizontally or vertically differentiated, and it holds whether or not the entrant can compete on the full range of offerings to the buyer (i.e., whether or not the entrant can compete on both units). We found that the key assumptions are (a) the entrant is more financially constrained than the incumbent, and (b) the buyer incurs switching costs after its initial round of purchases, which are features of many real-world market settings." *Id.* at 26-27.

⁵³ Ordover, J. & G. Saloner, *Predation, monopolization, and antitrust*, in: R. Schmalensee & R. Willig, eds, VOL I, HANDBOOK OF INDUSTRIAL ORGANIZATION 537, 565 (North-Holland, Amsterdam 1989).

⁵⁴ Ordover & Shaffer, *Economics of Loyalty Rebates: Where Are We Now?*, at 29 (FTC/DOJ Hearings Nov. 29, 2006).

⁵⁵ Ordover & Shaffer, *Exclusionary Discounts* 4 (August 25, 2006).

⁵⁶ Ordover & Shaffer, *Exclusionary Discounts* 3 (August 25, 2006).

likely to be efficiency-enhancing does not hold up”.⁵⁷ There thus seems to be no economic dispute about the fact that the types of contracts that Tyco has entered into have potentially exclusionary effects on rivals and buyers. Not only does the economic literature show that these contracts can be exclusionary, but Tyco’s own expert admits that they can have the effects I have described. The only potential dispute thus is the factual one about whether Tyco’s contracts cause these anticompetitive effects in this instance, which (as shown below) they do.

G. The Lack of Procompetitive Efficiencies

42. I have seen no evidence that there are any offsetting efficiencies resulting from the exclusionary agreements in this case. The two efficiencies that the defense put forward at the class certification stage – that these contracts promote volume-based efficiencies and that GPOs are efficient – are complete red herrings.⁵⁸ If additional efficiencies are later offered, I will evaluate them at that time.

II. MARKET DEFINITION, SHARES, AND POWER

A. Market Definition

1. The Relevant Product Market Is All Sharps Containers

43. The relevant product market in this case consists of all sharps containers. The relevant market includes both disposable and reusable sharps containers, because the products are functionally interchangeable substitutes for one another, and the evidence shows that buyers switch between them based on price. Nor do other types of containers substitute for sharps containers, because they do not protect against needlesticks in the same way, and because government regulations preclude using other containers for the purposes for which sharps containers are used. Nor is the market limited to sharps containers designed for a specific purpose, because the evidence again suggests that the products are functionally interchangeable.

⁵⁷ Ordoover & Shaffer, *Economics of Loyalty Rebates: Where Are We Now?*, at 29 (FTC/DOJ Hearings Nov. 29, 2006).

⁵⁸ See Part IV.C (discussing why these justifications are not valid).

44. **a. Other Containers Are Not Reasonable Substitutes for Sharps Containers.** Sharps containers are containers that are specially designed for the safe disposal of needles and other sharp devices used in a medical setting (collectively, the items that are disposed of in sharps containers are known as “sharps”).⁵⁹ Safe disposal of these sharp items is especially important because of the potential that healthcare employees will be stuck by a needle, and thereby exposed to a patient’s blood, other fluids, and diseases.

45. Other types of containers – such as trash cans or waste baskets – do not substitute for sharps containers and thus are not in the relevant market. These products do not substitute for sharps containers because they are not designed to prevent needlestick injuries or exposure to blood, other fluids, or harmful chemicals in the way that sharps containers are. Sharps containers are made out of special, puncture-resistant material that prevents needles from sticking through the container and injuring someone handling the container.⁶⁰ Sharps containers often have special features – such as weighted lids – that prevent the containers from being overfilled and prevent individuals from sticking their hands into the sharps container.⁶¹ Indeed, the sales literature from sharps container manufacturers touts the technological sophistication of their products and their products’ ability to prevent needlestick injuries versus rival products.⁶² Likewise, the FDA approves sharps containers, while it does not approve other waste containers.⁶³

⁵⁹ See, e.g., Tyco Class Opposition, 2-3 (“A sharps container is a device used by healthcare providers to dispose of needles and other ‘sharp’ forms of medical waste ... Sharps containers are used by a variety of healthcare providers, both in acute care facilities ... and in other types of facilities.”); CDC/NIOSH: Selecting, Evaluating, and Using Sharps Disposal Containers, DHHS (NIOSH) Publication No. 97-111, available at <http://www.cdc.gov/Niosh/sharps1.html>; see also TYN0080225-TYN0080250, at 230 (“Sharps containers are used in every healthcare setting.”).

⁶⁰ See Tyco Class Opposition, 2-3 (“A sharps container is typically made out of puncture resistant material.”); Deposition of David Skinner, 200-01 (“[T]he Daniels system, the plastic that it is made of is very strong. It’s very tough, and that’s a highly unlikely event that you would ever get a needle coming through the Daniels system” and stating that “independent tests have shown that the Daniels system has the highest level of puncture resistance of any sharps container in the market”); TYN028017-TYN0028054 at 029 (stating that Stericycle’s sharps contain is “puncture-resistant”).

⁶¹ See TYN0059350-TYN0060055 at 625 (ECRI report describing features of various sharps containers); Deposition of David Skinner, 199-204 (discussing various safety features of the Daniels product versus Tyco’s product).

⁶² [REDACTED]

⁶³ See Letter to Manufacturers and Initial Distributors of Sharps Containers and Destroys Used by Health Care Professionals, Feb. 3, 1994, available at <http://www.fda.gov/cdrh/comp/doc933.pdf> (“The purpose of this letter is to

46. The revealed preferences of buyers confirm that sharps containers and other containers are in separate markets. Buyers mandate the use of sharps containers to protect their employees from injury, which they would not do unless sharps containers provided a special benefit that other containers did not.⁶⁴ Moreover, sharps containers are significantly more expensive than other containers such as trash cans. If those other containers were substitutes for sharps containers, then one would expect buyers to use or purchase those containers instead of sharps containers. That they do not do this strongly suggests that sharps containers are in their own market.

47. Even if buyers wanted to purchase other containers in lieu of sharps containers, they could not because the use of sharps containers is mandated by various government regulations.⁶⁵ These regulations create a distinctive demand for sharps containers that can not be satisfied by substitutes.

48. **b. Reusable and Disposable Sharps Containers are in the Same Market.** Sharps containers come in two broad, primary types. Some sharps containers are disposable, meaning that the container is discarded along with the needles and other sharps that it contains.⁶⁶ Tyco and BD manufacture these types of sharps containers.⁶⁷ Others are reusable, meaning that they are emptied of the sharps

clarify the regulatory status of devices which serve as Sharps Containers and/or Sharps Destroyers (sharps devices). These products are devices as that term is defined by Section 201(h) of the Federal Food, Drug, and Cosmetic Act (the Act)... Because of increasing concern about transmission of disease associated with needle sticks, e.g., HIV, Hepatitis B, and other blood born agents, we are exercising our discretion to now require manufacturers and initial distributors of sharps devices to comply with all applicable requirements of the Act, including registration and listing, obtaining appropriate marketing clearance, assuring conformance with the Good Manufacturing Practices for medical devices regulation (GMP), and to appropriately label the devices to assure they provide adequate directions for safe use.”); *see also* TYN0056667-TYN0056898 at 689 (stating that sharps containers are a Class Two medical device regulated by the FDA, and that regulations require (1) overfill protection; (2) fill status indicator; (3) tamper resistance; and (4) the ability to monitor the fill level); TYN0056667-TYN0056898 at 713 (Stericycle webpage stating that the FDA approved Stericycle’s container in 1999).

⁶⁴ *See, e.g.*, NPH000130 (memorandum from Natchitoches Environmental Services, showing that sharps container disposal is required for any sharp device with “acute rigid corners, edges or protuberances capable of cutting or piercing” including any needles, blades, or blood vials).

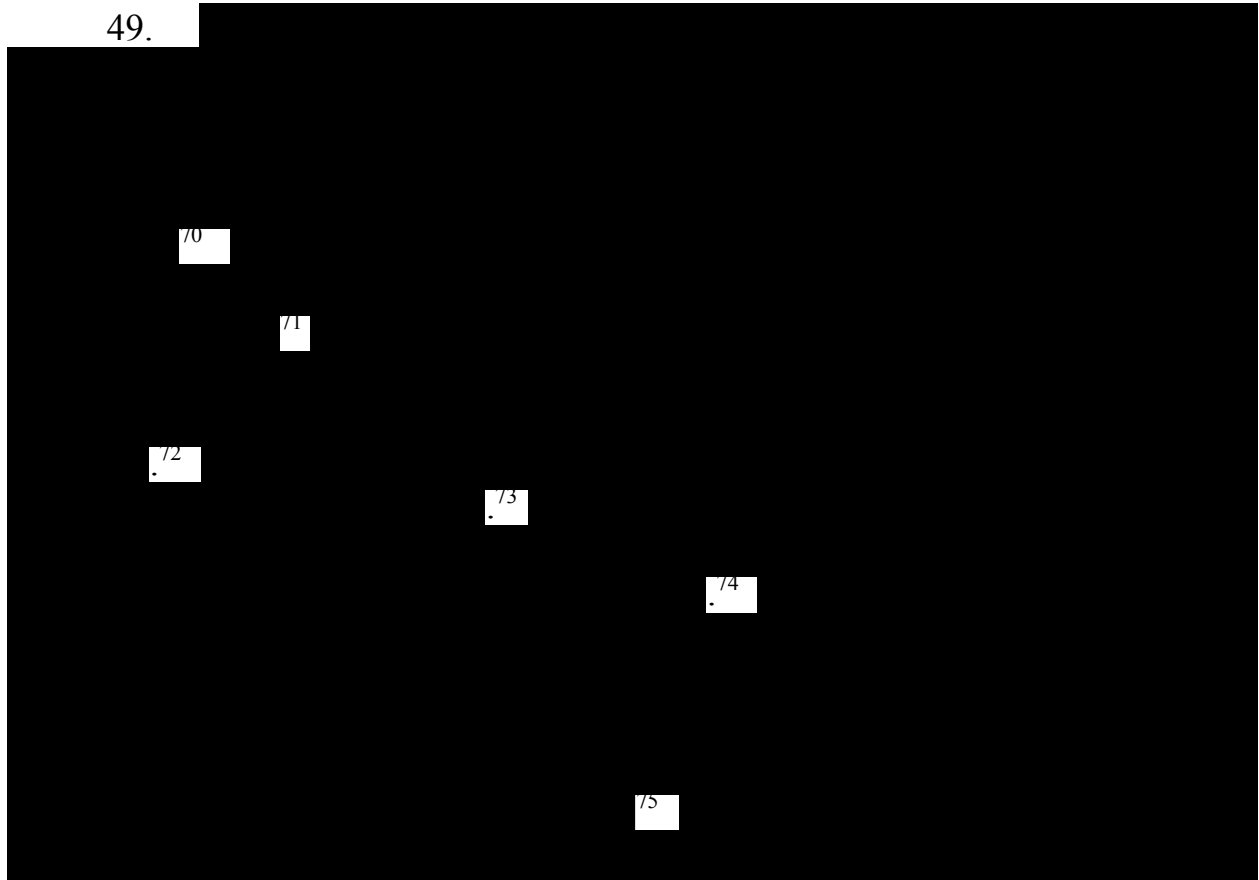
⁶⁵ *See* 29 C.F.R. §1910.1030(c)(4)(iii)(A) (OSHA regulation requiring that “contaminated sharps [be] discarded immediately or as soon as feasible” in sharps containers that are puncture resistant, leakproof, closable, and appropriately labeled). In a prior case, Tyco admitted there are various laws relating to sharps use such as those I discuss here. *See* DI_00034764-DI_00034801 at 768-769 (expert report from Tyco’s expert in a patent case against Daniels stating that “the October 2000 Needlestick Prevention Act mandated that healthcare facilities start using safer sharps devices. Various agencies, such as OSHA, CDC and NIOSH, have guidelines and directives related to sharp safety”).

⁶⁶ *See* Deposition of David Skinner, 159 (“[T]here is a disposable type of sharps container which gets filled up and then the whole container and waste gets thrown away.”).

⁶⁷ TYN0023279-TYN0023318 at 281.

inside them, cleaned and sterilized, and then used again.⁶⁸ Stericycle and Daniels are two companies that manufacture reusable sharps containers.⁶⁹ Both types of containers perform an identical function – safely disposing of needles and other sharps – in essentially an identical way.

49.



⁶⁸ See Deposition of David Skinner, 159 (“There is a reusable sharps container system that gets filled up, emptied, washed, and then brought back to the facility”).

⁶⁹ TYN0023279-TYN0023318 at 281.

⁷⁰ TYN0011074-TYN0011079 at 074.

⁷¹ CON-NAT 0002137-CON-NAT 0002139 at 137.

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⁷³ TYN0184397.

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⁷⁵ TYN0064208-TYN0064211 at 210-211.

[REDACTED]

50. [REDACTED]

51. [REDACTED]

[REDACTED]

⁷⁶ TYN0184396-TYN0184399 at 397.

⁷⁸ TYN0137253.

⁷⁹ *See infra* ¶116.

⁸⁰ TYN0137253.

⁸¹ TYN0057183-TYN0057545 at 232 (a 2006 planning document predicting Tyco's future market shares).

⁸² TYN0031837-TYN0031860 at 839.

⁸³ I have not yet had an opportunity to fully analyze this data. When I do so, I will update my analysis as appropriate.

[REDACTED]

52. [REDACTED]

53. **c. The Relevant Market for Assessing Market Shares and Foreclosure Includes All Sharps Containers.** Different models of sharps containers are not in separate markets that are narrower than the market for all sharps containers. Tyco advances this mistaken claim in its class briefing, stating that the “prices of products for which there were few competitive offerings plainly were subject to less price pressure than the products that every competitor offered.”⁹² But the mere fact that different models of containers might have some physical differences does not

⁸⁴ TYN0010661-TYN0010869 at 661-62.

⁸⁵ TYN0036397-TYN0036406 at 399.

⁸⁶ [REDACTED]

⁸⁷ TYN0045757.

⁸⁸ *See, e.g.*, TYN0045511-TYN0045514.

⁸⁹ TYN0057183-TYN0057545, at 240.

⁹⁰ DI_00034764-DI_00034801 at 764.

⁹¹ DI_00034764-DI_00034801 at 769.

⁹² Tyco Class Opposition, 33.

mean that they are in separate markets. Instead, one must determine whether the models are reasonably interchangeable so that the availability of one model constrains the ability to raise prices on another.

54. For example, a 10 gallon sharps container would be in the same market as an 8 gallon sharps container because both perform an identical function and buyers would substitute from one to the other if prices on one changed. I have seen no evidence to suggest that customers typically view one model of sharps containers as a separate market from other models of sharps containers that perform the same function, albeit while being a different size. Further, even if some sizes of sharps containers were not substitutable for other sizes of sharps containers, there is a chain of substitutability linking the largest sharps containers with the smallest ones that means the price changes on any one size of container will affect pricing on other sizes.⁹³ Thus, even if a buyer were not willing to substitute between a 10 gallon sharps container and a 1 gallon sharps container simply because of the size difference, buyers nevertheless would be willing to substitute between the 10 gallon sharps container with an 8 gallon sharps container, and would be willing to substitute between the 8 gallon sharps container and an even smaller size, and so on until the buyer was willing to substitute to a 1 gallon sharps container. This chain of substitution means that sharps containers of all sizes are in the same market.

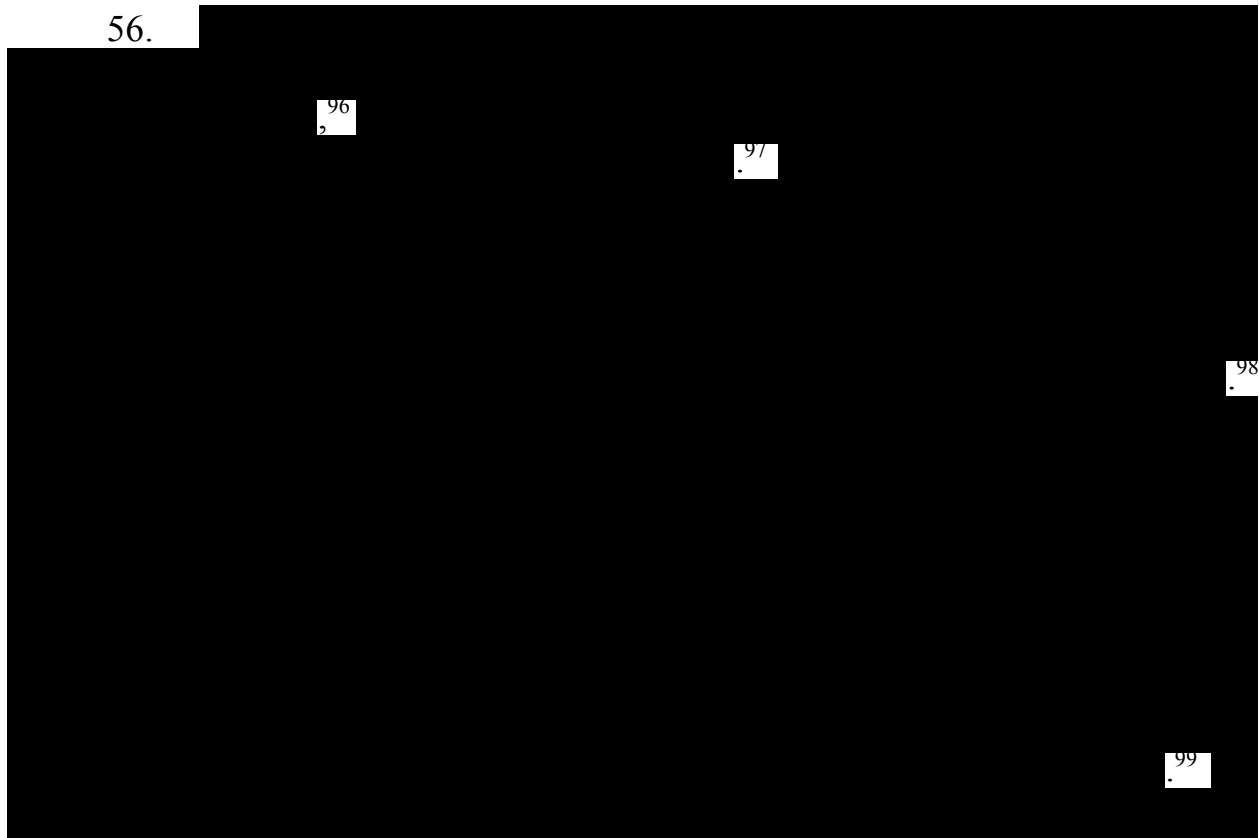
55. The same is generally true if one considers the different categories of sharps containers. For example, many of Tyco's contracts divided its products into five categories under the "Five-Star" program. These categories were (1) in-room sharps containers, (2) ancillary sharps containers, (3) large volume sharps containers, (4) phlebotomy containers, and (5) chemotherapy sharps containers.⁹⁴ There appear to be no meaningful differences in the function of the sharps containers in the first four of these groups, as all simply accept the same type of sharps containers but are merely configured in slightly different ways and in different sizes. For example, Tyco's website states that phlebotomy containers are configured to "fit into present

⁹³ See, e.g., Commission Notice on the Definition of the Relevant Market for the Purposes of Community Competition Law, 1997 O.J. C 372 ("In certain cases, the existence of chains of substitution might lead to the definition of a relevant market where products or areas at the extreme of the market are not directly substitutable.... [This] reasoning may apply if product B is a demand substitute for products A and C. Even if products A and C are not direct demand substitutes they might be found to be in the same relevant product market since their respective pricing might be constrained by substitution to B"); see also ELHAUGE & GERADIN, GLOBAL ANTITRUST LAW & ECONOMICS 306 (Foundation Press 2007) (excerpting this portion of the Commission Notice).

⁹⁴

blood drawing trays for the efficient disposal of blood, hypodermic and IV needles,” but lists no other differentiating characteristics between these containers and the other varieties of sharps containers.⁹⁵ There is no indication from Tyco’s product descriptions or the other materials that I have reviewed that buyers view the first four categories of sharps containers as non-substitutable, or that the types of sharps that can be disposed in one of these categories differs from those that can be disposed in the others.

56.



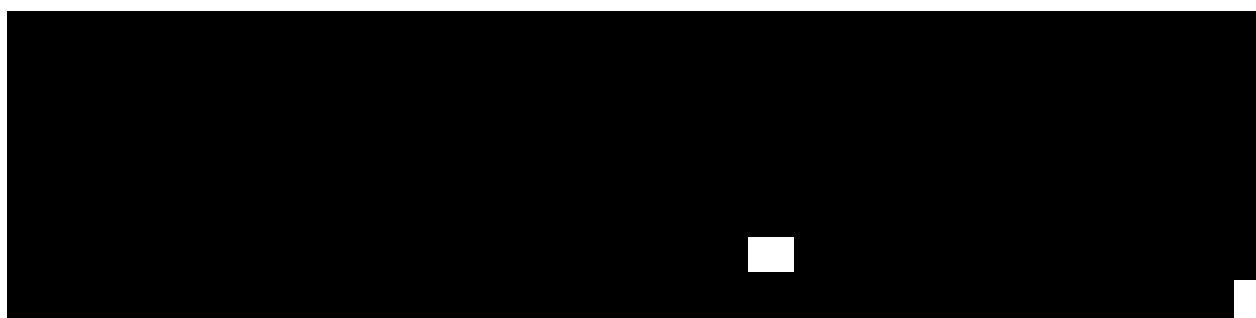
⁹⁵ <http://www.kendallhealthcare.com/kendallhealthcare/pageBuilder.aspx?contentID=76348&webPageID=0&topicID=76335&breadcrumbs=%20:121623,81045:0,76334:0#Features%20and%20Benefits>.

⁹⁶ See <http://www.kendallhealthcare.com/kendallhealthcare/pageBuilder.aspx?topicID=70677&breadcrumbs=%20:121623,81045:0> (listing Tyco’s chemotherapy containers and showing distinctive color).

⁹⁷ See <http://www.kendallhealthcare.com/kendallhealthcare/pageBuilder.aspx?contentID=70689&webPageID=0&topicID=70678&breadcrumbs=%20:121623,81045:0,70677:0#Features%20and%20Benefits> (listing the characteristics of Tyco’s Chemosafety sharps container).

⁹⁸ See, e.g., <http://www.kendallsharpsafety.com/SharpSafety/pageBuilder.aspx?contentID=125622&webPageID=0&topicID=121897&breadcrumbs=0:108273,81045:0,80885:0#Features%20and%20Benefits> (showing a large volume container with gaskets); <http://www.kendallsharpsafety.com/SharpSafety/pageBuilder.aspx?contentID=76312&webPageID=0&topicID=76300&breadcrumbs=0:108273,81045:0,76299:0#Features%20and%20Benefits>.

⁹⁹ See TYN0001089-TYN0001209 at 095.



57. In any case, even if one believed that different models of sharps containers were in different markets from a demand perspective, there would nevertheless be *supply* substitution because manufacturers could easily switch from manufacturing different models of sharps containers.¹⁰⁰ As a result, regardless of whether one defines the relevant market as including all or only some sharps containers from a demand perspective, for purposes of calculating market shares, all sharps containers are in the relevant market because of supply substitution. There is no indication in the evidence I have reviewed that suppliers cannot substitute between making different types of containers. Even with chemotherapy containers – the one type of container for which one could most plausibly claim a separate demand market – the primary differences between it and other sharps containers are the (1) color of the container; and (2) inclusion of gaskets and an absorbent pad, although as noted some other containers have these features as well. Clearly, manufacturers would be able to easily alter the color of their containers or include or remove absorbent pads in response to price changes. Thus, supply substitution between chemotherapy containers and other containers clearly seems feasible, and all of them should thus be included when measuring market shares in the sharps container market.

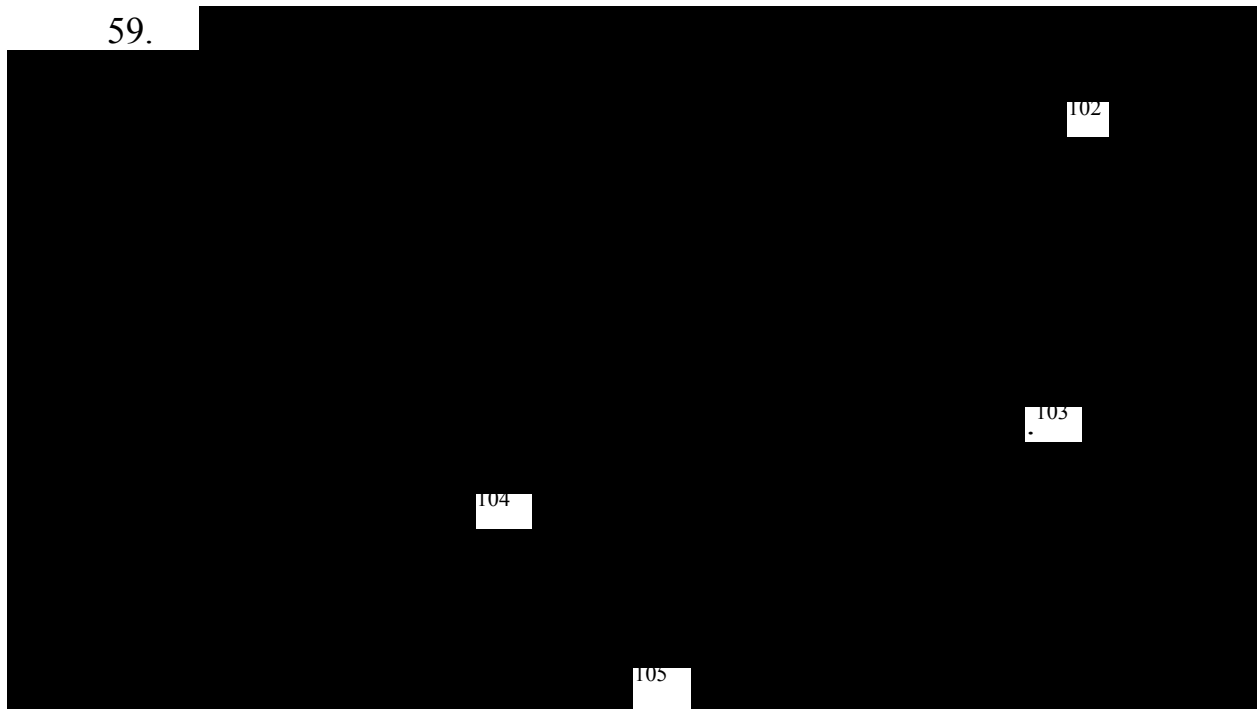
58. Moreover, for purposes of assessing the theory that foreclosure deprived rivals of economies of scale, the issue is whether rivals could achieve the same economies of scale by switching to making other types of containers.¹⁰¹ Because rivals can easily substitute between different types of sharps containers, it is clear that

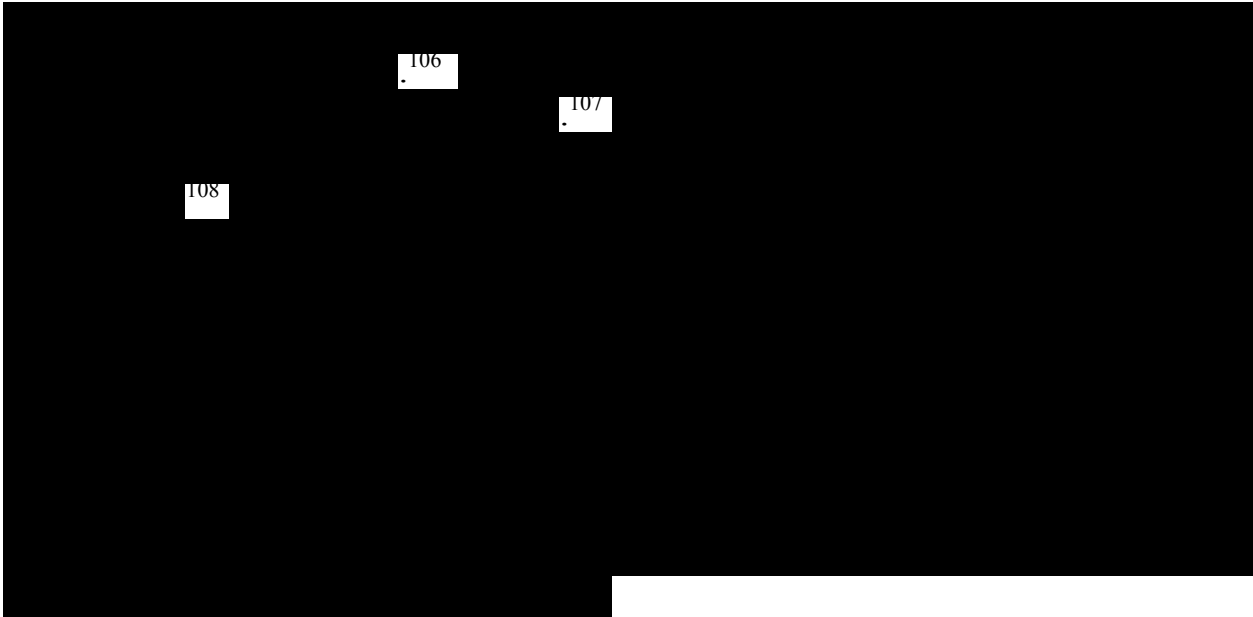
¹⁰⁰ See U.S. Dept. Of Justice & Federal Trade Commission, Horizontal Merger Guidelines §1.32 (1992, revised 1997) (“In addition, the Agency will identify other firms not currently producing or selling the relevant product in the relevant area as participating in the relevant market if their inclusion would more accurately reflect probable supply responses.”); §1.41 (“The Agency normally will calculate market shares ... based on the total sales or capacity currently devoted to the relevant market together with that which likely would be devoted to the relevant market in response to a ‘small but significant and nontransitory’ price increase.”).

¹⁰¹ See IIB AREEDA & HOVENKAMP, ANTITRUST LAW 418, ¶¶570a, 570b (3d ed, 2007) (“the standard universe in which to examine foreclosure is that in which the defendant’s rivals sell The relevant market for this purpose includes the full range of selling opportunities reasonably open to rivals, namely all the product and geographic sales they may readily compete for . . .”).

they gain their manufacturing economies of scale across all of the sharps containers that they produce. Similarly, because all sharps containers are covered by the same contracts, sold by the same salespeople, and marketed by the same materials, any economies of scale in marketing sharps containers are likewise common across all containers. With reusables in particular, any economies of scale they achieve in servicing a customer are also achieved across all the containers that a customer has and are not specific to any one type of container. This means that for purposes of assessing whether Tyco's challenged conduct deprived rivals of economies of scale, one must look at the foreclosure of all sharps containers, regardless of one's views on the demand substitutability between containers.

59.





60. Other evidence also indicates that different sizes or types of sharps containers do not fall into separate markets. Tyco set its price policies across all containers, rather than adopting different pricing policies for different models.¹⁰⁹ Tyco, BD, and the reusable firms entered into contracts that covered all of their sharps containers at once, which suggests that they viewed them as falling into the same market. Tyco documents also discuss sharps containers as a group, suggesting that Tyco does not view different models as being in their own individual markets.

61. The evidence as a whole thus indicates that all sharps containers, including chemotherapy containers, are in one market for purposes of assessing market and foreclosure shares.

¹⁰⁶ [Redacted]

¹⁰⁷ [Redacted]

¹⁰⁸ Skinner Deposition, 237.

¹⁰⁹ [Redacted]

2. GPO Brokerage Services Are a Relevant Market

62. Group purchasing organizations (GPOs) provide brokerage services by negotiating standardized contracts that facilitate the sale of medical devices to hospitals and other healthcare buyers. GPOs are the most efficient means of brokering sales of medical devices like sharps containers, because GPOs offer economies of scale in contracting that lower transaction costs and facilitate sales to enormous numbers of purchasers.¹¹⁰ Indeed, Tyco's expert admitted in his class certification report that GPOs are highly efficient, stating that GPOs "provide manufacturers with the ability to achieve reductions in transaction costs" and acknowledges that GPOs provide efficiencies as "intermediaries in the industry in which hundreds of sellers reach out to hundreds of buyers."¹¹¹ The role of GPOs is analogous to the way real estate brokers facilitate the sale of homes by assisting in the contracting process, although GPOs operate on a larger scale and deliver contracting efficiencies to hundreds or thousands of buyers at once, unlike a real estate broker who typically delivers brokerage services on a more individual basis. Thus, GPOs will likely be even more important in facilitating the sale of medical products than real estate brokers are in selling homes. Because of these tremendous efficiencies, GPO brokerage services are a distinct service market. The availability of this service market is directly related to rival costs in the relevant sharps containers product market, because sellers who do not have access to GPO brokerage services incur higher per unit sales and contracting costs.

63. Aside from contracting economies of scale, GPOs provide their users with additional benefits that cause buyers to value the use of GPO brokerage services. Novation, for example, offers its GPO clients a range of electronic order management and data connectivity services geared toward improving ordering efficiencies.¹¹² Novation also adds value to the purchase process, such as by reviewing and evaluating new products and services, helping its clients to resolve issues with suppliers, and lobbying for standardization on e-commerce and bar coding.¹¹³ Similarly, Premier offers its clients benchmarking to improve supply chain ratios and comprehensive

¹¹⁰ See LAWTON R. BURNS, *THE HEALTH CARE VALUE CHAIN* (2002); EUGENE SCHNELLER, *THE VALUE OF GROUP PURCHASING IN THE HEALTH CARE SUPPLY CHAIN*, available at <http://www.novationco.com/pressroom/attachments/GroupPurchasing.pdf>.

¹¹¹ Ordover Declaration ¶55 (Jan. 19, 2007).

¹¹² http://www.novationco.com/programs/order_mgmt.asp.

¹¹³ http://www.novationco.com/programs/contract_mgmt.asp.

spending analytics tools, among other value-added services.¹¹⁴

64. The revealed preferences of hospitals show that hospitals regard GPO brokerage services as essential. Between 96-98% of hospitals utilize GPO brokerage services, and the top seven GPOs broker contracts that cover 85% of the sales in U.S. hospital market.¹¹⁵ Specific to the sharps container market, the data shows that 75% of Tyco's sales in the acute segment are brokered by GPOs.¹¹⁶ Given that hospitals would join GPOs and use their services only if they receive some sort of benefit as a consequence, the fact that the overwhelming majority of hospitals do so indicates that GPOs offer valuable advantages to hospitals in purchasing that the hospitals cannot achieve through other methods without the use of GPO services.

65. The greater efficiency of GPOs at brokering sales of medical devices is further confirmed by the evidence that medical supplies sell for substantially less through GPOs than without them, indicating that this price difference must be offset by lower brokerage costs.¹¹⁷ Hospitals buying through GPOs receive prices that on average are 12.1% less than the prices paid by hospitals that are not buying through GPOs.¹¹⁸ This clearly meets the standard definition under antitrust economics for defining a market, which is whether a monopolist in a putative market could sustain a 5% difference in prices.¹¹⁹ Here, a 5% difference in the price of sharps containers in fact already exists. Moreover, in determining whether a GPO brokerage service market exists, the relevant issue is not whether a putative monopolist in GPO brokerage services could sustain a price increase in sharps container prices, but rather

¹¹⁴ <http://www.premierinc.com/costs/tools-services/basics/general-benefits.jsp>.

¹¹⁵ See BURNS, *supra*, at 63-64; SCHNELLER, *supra*, at 3.

¹¹⁶ These figures are calculated using Tyco's sales data. First, the share of sales each month going through one of the major GPOs with which Tyco has a contract is calculated, and then the average of that figure from Oct. 2001 to May 2007 (the last date for which Tyco produced data) is calculated. Indicators in Tyco's sales data were used to identify the transactions going through each of the major GPOs.

¹¹⁷ SCHNELLER, *supra*, at 2, 6-7; HIGPA President Robert Betz, Hospital Group Purchasing Organizations 2 (Presented to FTC Sept. 10, 2002) (available at <http://www.ftc.gov/ogc/healthcare/betzrobert.pdf>).

¹¹⁸ This figure is calculated by taking the mean value of prices of sharps containers to buyers inside and outside of GPOs, weighting by the sales made to GPO buyers. Then, the percentage difference between these two means is calculated. This is done on an annual basis, and then averaged from 2000-2007, the years of available data for Tyco. Note that if instead weighting is done by sales made to non-GPO buyers, the price difference is even larger, specifically 15%. I limit this analysis to hospitals to abstract from other factors that might lead to a difference in sharps container prices other than the use of GPO brokerage services, such as the fact that alternative site buyers typically pay higher prices than acute care buyers.

¹¹⁹ U.S. DEPARTMENT OF JUSTICE & FEDERAL TRADE COMMISSION, HORIZONTAL MERGER GUIDELINES §1.11 (1992, revised 1996) (stating that defining a market turns on whether a "hypothetical profit-maximizing firm that was the only present and future seller of those products ('monopolist') likely would impose at least a 'small but significant and nontransitory' increase in price", which is typically understood as a 5% increase in prices).

whether that putative monopolist could sustain a 5% increase in the price of GPO services. The price of GPO services is the 2-3% fee that they charge. Thus, a 5% increase in the price of GPO brokerage services would be a 0.1% or 0.15% increase in fees to levels of 2.1-3.15%. This means that so long as the per unit costs of selling sharps containers through GPOs are 2.1% to 3.15% lower than the costs of selling them outside of GPOs, sellers of sharps containers would not stop using GPOs if a hypothetical monopolist in GPO services raised prices by 5%. Given that sellers of sharps containers are in fact willing to sell through GPOs at prices that are 12.1% lower than the prices they charge outside of GPOs, as well as pay an additional administrative fee of 2-3%, sellers of sharps containers clearly would not switch away from GPOs in response to a 5% increase in GPO fees. Indeed, the fact that GPOs typically raise their fees from 2% to 3% if they agree to a sole source agreement, and have been able to sustain such 50% price increases, shows that a 0.1% or 0.15% increase in fees in fact has not caused sellers or buyers of sharps containers to stop using GPO brokerage services.

66. [REDACTED]

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¹²¹ The importance of GPO contracts to smaller manufacturers was further illustrated by testimony from David Skinner of Daniels, who testified that getting access to GPO contracts had a tremendous effect on Daniels's sales.¹²² Thus, separate from the cost savings GPOs offer, the sheer effectiveness of GPOs at brokering sales for a large volume of products that hospitals and other buyers purchase makes it unlikely that manufacturers or buyers would stop using GPO brokerage services if GPOs increased their fees by 5%.

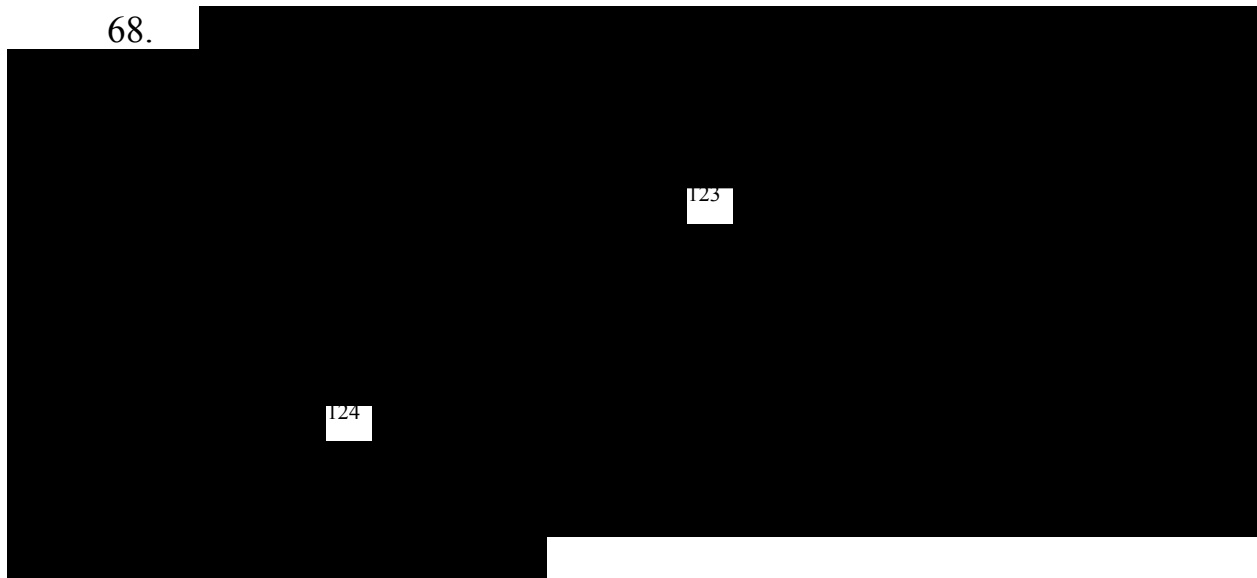
¹²⁰ These figures are calculated as described above in note 118.

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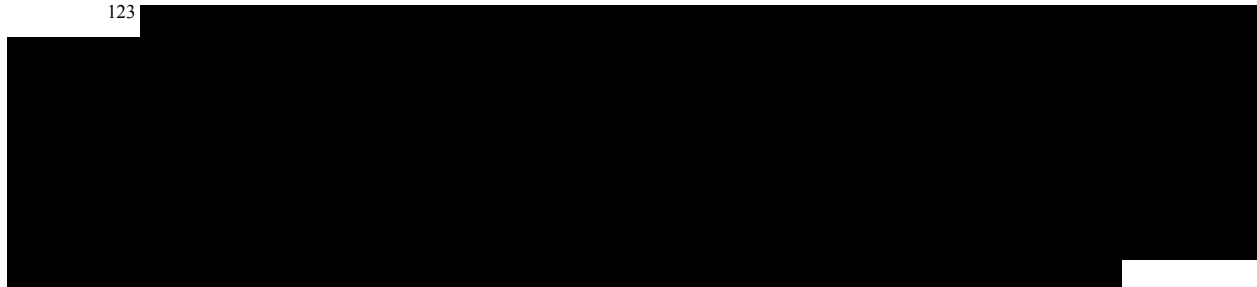
¹²² See *infra* ¶¶172-174.

67. Given the tremendous advantages of GPOs over direct marketing, the two are not reasonably interchangeable, and GPOs thus constitute a separate service market. Foreclosing rival sellers of sharps containers from a substantial share of this market for GPO brokerage services is thus likely to significantly raise the sales costs of those rivals and hamper their ability to expand their sales of sharps containers. It is analogous to, say, foreclosing rivals in a product market from access to the market for trucking services in a case where trucking is the most efficient means of delivering products in that specific product market. This type of foreclosure would raise the shipping costs of the rivals and hamper their ability to compete in the product market, even though the rivals could use the less efficient alternatives of shipping their product with, say, ships or trains. Because GPOs are so important, if Tyco was able to foreclose its rivals in the sharps container market from GPO brokerage services, that foreclosure by itself would be enough to substantially injure competition in the sharps container market as a matter of antitrust economics.

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¹²⁴ These figures are calculated on a monthly basis, and then averaged across all months from the start of the class period until the end of the data.

69. The GPO brokerage services market is a distinct market from the sharps container product market. The GPO brokerage services market could be foreclosed without the sharps container product market being foreclosed, or vice-versa. But if Tyco has foreclosed either market, then that will have an anticompetitive effect on its rivals in the sharps container market by impairing their competitiveness in the sharps container market, and will have an anticompetitive effect on competition and on buyers by limiting the ability of competition from rivals to restrain Tyco's pricing for buyers in that market. As a result, either type of foreclosure will independently lead to higher prices for sharps container or reduced output/quality than would exist in the but-for world absent Tyco's exclusionary conduct. The combined effect of foreclosure in both markets is greater than the effect of foreclosure in only one market or the other. Even though the GPO brokerage service market is a separate market from the sharps container market, the adverse effects of foreclosure in either market will be greater Tyco market power and higher prices in the sharps containers market.

3. The Relevant Geographic Market is the United States

70. **a. The Relevant Market Is the United States Only, And Does Not Include Foreign Countries.** Both parties in this case appear to agree that the relevant geographic market does not include foreign countries, but rather is limited to the United States. Plaintiffs have said so explicitly.¹²⁵ Tyco's class briefing claims that "competition will vary by geographical region" within the United States, implying that it believes that the relevant geographic market is narrower than the U.S.¹²⁶ Tyco's claim that the market is narrower than the U.S. is wrong for reasons I explain below, but it necessarily means that the market is not broader than the U.S.

71. Three other pieces of evidence confirm a conclusion that the geographic market for sharps containers is limited to the U.S. First, sharps containers sold in the United States are governed by a different regulatory regime than in other nations. To sell sharps containers in the United States, a company must get approval from the FDA, which also regulates the claims a seller may make about a product.¹²⁷ There are also other U.S.-specific regulations, such as OSHA, which are discussed in more detail below.¹²⁸

¹²⁵ See Class Action Complaint 23.

¹²⁶ Tyco Class Opposition, 36.

¹²⁷ See *infra* ¶93.

¹²⁸ See *infra* ¶93.

72.

[REDACTED]

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[REDACTED]

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74. The relevant geographic market for GPO brokerage services is likewise the United States for the simple reason that GPOs typically do not broker sales abroad.¹³⁴ Although there are pushes to develop centralized brokerage services to save costs on medical purchases abroad, these centralized services typically have not been provided by the seven major United States-based GPOs.¹³⁵

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[REDACTED]

¹³⁰ TYN0062351.

¹³¹ TYN0062352-TYN0062358.

¹³² TYN0062352-TYNTYN0062358, at 352 (product code 8931).

¹³³ TYN0062352-TYNTYN0062358, at 352 (product code 85121).

¹³⁴ See, e.g., Curt Werner, *Under Fire Once More, Group Purchasing Fires Back*, HEALTHPURCHASINGNEWS, Dec. 2001, available at http://www.findarticles.com/p/articles/mi_m0BPC/is_12_25/ai_81413172 (noting that Canada and Europe are non-GPO markets).

¹³⁵ See, e.g., Rachael Lewington, *European Hospital Purchasing Practices—Rationalization and Reform*, HBS Consulting Strategy Report, summarized at http://www.hbs-consulting.com/HBSStrategyReviews/report_tender.asp (noting that European countries are developing purchasing groups and providing examples from Norway and England,

75. **b. The Relevant Market Is the United States as a Whole, And Is Not Divided into Regional Submarkets.** The geographic market is not narrower than the entire United States. As noted above, Tyco has implied otherwise in its class briefing, but has provided no evidence to support this claim.¹³⁶ Instead, Tyco simply asserts that, because reusable manufacturers may be less able to operate in remote locales, those remote locales are necessarily a different geographic market. But simply because some buyers are geographically more isolated than others does not mean that those more remote buyers fall into separate, individual geographic markets.

76. First, Tyco's claim that markets are regional is belied by Tyco's own pricing and contracting strategies. Tyco enters into standardized contracts with buyers that are brokered by GPOs that operate on a national level. Thus, the contract terms and pricing that Tyco offers to any GPO member are the same nationwide, regardless of whether that member is located in a remote rural area of the country or in the heart of a metropolis. If the market were regional rather than national, one would expect Tyco to offer different contracts and pricing based on the different geographic locations and market conditions. That Tyco does not do this is strong evidence that the relevant market is national. Further, since Tyco is the dominant seller in every region, the fact that its standard price terms are the same in all regions means that market prices will be similar in all regions since rivals in each region must compete with Tyco.

77. Second, Tyco and BD's data confirms the absence of regional markets. Buyers in this data were classified as falling into one of four regions based on the classification scheme used by the U.S. Census.¹³⁷ The average price difference between each region was then calculated.¹³⁸ This gave a total of six comparisons for each year for each manufacturer. For Tyco, only five observations out of a total of 48 (six comparisons for eight years) showed a 5% price difference, and none showed higher than a 6.5% price difference.¹³⁹ Only in 2007, a year for which I have only partial data, did any one region have prices that were more than 5% different than

which are developing these systems through their nationalized health systems).

¹³⁶ Tyco Class Opposition, 36.

¹³⁷ http://www.census.gov/geo/www/us_regdiv.pdf (dividing U.S. into Northeast, South, Midwest, and West regions).

¹³⁸ I calculate the average price for each region by weighting the sales in each region by the sales Tyco or BD made overall. Then, the difference in average prices between each region is calculated.

¹³⁹ I found a greater than 5% difference in 2004 and 2007 between the West and Midwest region, in 2007 between the South and Midwest region, and in 2006 and 2007 between the Midwest and Northeast.

every other region. For BD too only five observations out of a total of 36 observations (six comparisons for seven years from 2000-2006) showed a price difference of greater than 5%, and none of these differences was more than 6.6%.¹⁴⁰ In no year BD data did any one region have prices that were more than 5% different than every other region. Given that antitrust economics typically requires a 5-10% price difference to define a separate market, this evidence does not support separate regional markets.

78. Third, given Tyco's standardized national contracting practices, Tyco's premise that reusable sharps containers cannot compete in some regions is irrelevant to whether reusable competition constrains Tyco's pricing discretion. Because Tyco prices on a nationwide basis, competition from reusables in one area of the country will reduce Tyco's pricing discretion in that area, and thus will cause Tyco to lower prices on a nationwide basis. That is, even if Tyco is correct that reusables can only be sold in certain areas, the competition provided by the reusables in those areas nevertheless has a beneficial nationwide effect on nationwide pricing, because Tyco and other disposable firms price on a nationwide basis.

79. Fourth, Tyco's premise seems to be that only competition from reusables exists, and that this causes the market to be regional. But this premise is false: there are a number of competing sharps container manufacturers who make disposable sharps containers. Chief among these is Tyco's largest competitor, Becton Dickinson, but there are also a number of other, smaller disposable competitors. Nor is there evidence that the ability of these other manufacturers to compete with Tyco is limited by geographic region, or that their regional market shares or prices differ. BD's data in fact shows that it competes in every single state. Given this, other disposable manufacturers also could compete in every single state if they were able to obtain a large enough share of the market in a world without Tyco's conduct. This again suggests that the relevant market in which Tyco competes is national.

80. Fifth, Tyco's premise that reusable manufacturers cannot compete on a national basis is factually incorrect. In fact, the largest reusable supplier, Stericycle has been working to roll out reusable services in every state where it offers waste hauling services, which include 48 states, the District of Columbia, and Puerto Rico.¹⁴¹

¹⁴⁰ I found a greater than 5% difference between pricing in the Midwest and Northeast for 2003, 2004, 2005, and 2006 and between the West and the Midwest for 2000.

¹⁴¹ Stericycle 2003 10-K, at 1-2, 5; <http://216.24.134.29/medicalwaste/national.html> (Stericycle's website providing a map identifying Stericycle's operating locations); TYN0053538-TYN0053584 at 543.

Stericycle's operation is thus clearly national. In addition, Stericycle's experience also provides reason to believe that a national reusable sharps program may in fact be superior to a regional reusable system, because a national system (1) allows Stericycle to service national account customers requiring waste disposal at dispersed locations, and (2) may improve safety by providing additional back-up collection and treatment facilities in the event of a local disaster.¹⁴² There are thus valuable efficiencies reusables can gain by expanding to operate nationally.

81. Other reusable sharps container vendors are also developing a national presence. Since Daniels entered the US market in California, it has expanded its network to cover the North East, down the east coast through Florida, through the Midwest, and across into California and the rest of the West Coast.¹⁴³ More specifically, Daniels's sales data shows that, as of July 2007, it had customers in California, D.C., Delaware, Florida, Iowa, Illinois, Indiana, Michigan, Minnesota, North Carolina, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, and West Virginia.¹⁴⁴ Further, the areas Daniels does not currently service could be serviced by another reusable company, as demonstrated by Sure-Way Systems, which is a leading provider of medical waste services, including reusable sharps containers, in Montana, Western Wyoming, and North and South Dakota, and, as of June 2003, was expanding its capacity to cover parts of Alabama, Georgia, Mississippi, Florida, and Tennessee.¹⁴⁵ Sure-Way also sells sharps containers to medical waste hauling companies outside of its service area, such as to Hawaii Bio-Waste in Hawaii and MedClean Management Solutions in Texas.¹⁴⁶ Similarly, SteriLogic Waste Systems has sought to expand its sharps container business geographically through a partnership program whereby firms in other regions license its containers and systems.¹⁴⁷ All of this shows that reusable

¹⁴² Stericycle 2006 10-K, at 7; TYN0053143-TYN0053207, at 196.

¹⁴³ <http://www.danielsinternational.com/us/index.cfm?section=3&category=3> (Daniels website stating it entered the market in 2003); TYN0109753-TYN0109755 (Tyco worrying about Daniels competitive threat in 2002).

¹⁴⁴ See *DI_Billing_Summary July 07.xls*, Column C, Column H.

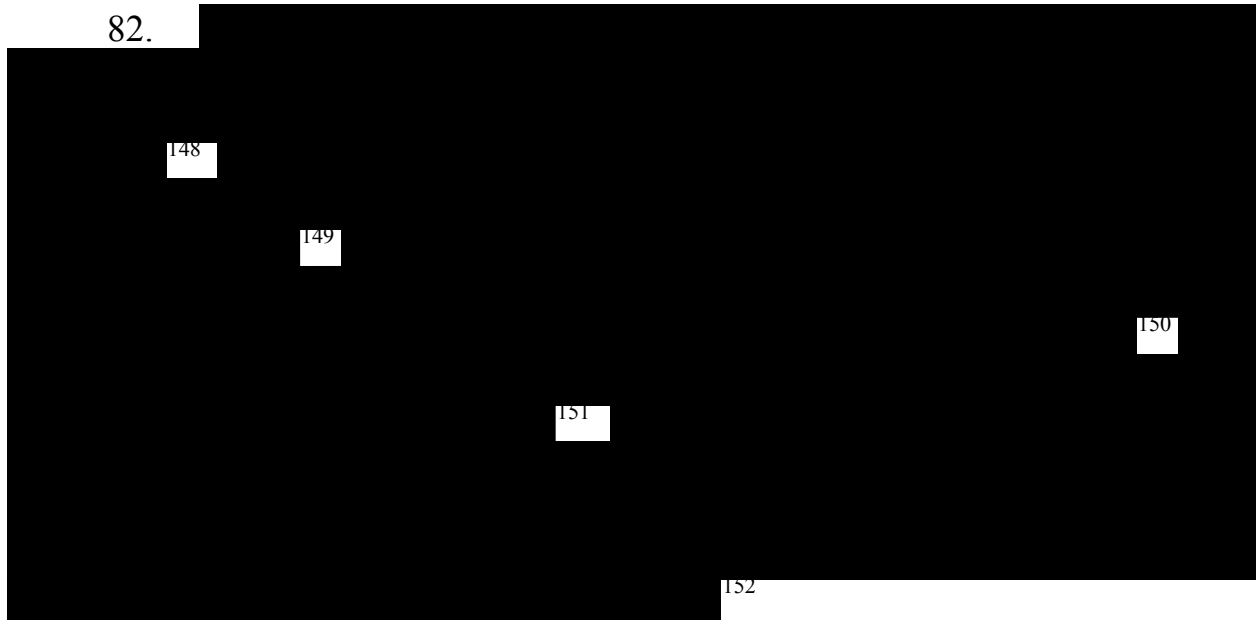
¹⁴⁵ *Sharps Elimination Technologies Inc. Enters into Letter of Intent with Sure-Way Systems*, BUSINESS WIRE, May 16, 2003, AVAILABLE AT http://findarticles.com/p/articles/mi_m0EIN/is_2003_May_16/ai_101876567 (stating that Sure-Way is the "preferred provider of medical waste services" in Montana, North Dakota, and Western Wyoming); *Sharps Elimination Technologies, Inc.: Sure-Way Systems, Inc. Acquires Medical Waste Processing Facility*, BUSINESS WIRE, July 14, 2003, available at http://findarticles.com/p/articles/mi_m0EIN/is_2003_July_14/ai_105403272 (stating that Sure-Way is "positioned to roll out its reusable sharps program throughout the key Southeast US market").

¹⁴⁶ <http://www.hawaiihiowaste.com>; <http://medcleanmgt.com>.

¹⁴⁷ <http://www.sterilogic.com/corp.html> ("Due the geographical constraints of transporting waste, the regulatory compliance issues of multi-state operations and the varying market conditions throughout the U.S., SteriLogic is growing strategically through partnership and alliance programs. These partnerships contract with the SteriLogic Systems division which designs and supplies the proprietary reusable sharps containers and associated equipment.").

sharps containers can be used in remote regions and that firms can enter into licensing agreements with local waste haulers to expand on a national scale.

82.



83. Sixth, the regulatory requirements relating to sharps containers are similar nationwide, and buyer demand for sharps containers is also similar across the nation, suggesting that the relevant markets are national, not regional. These regulations come from several government entities. First, sharps containers must get FDA approval, which is common on a nationwide basis.¹⁵³ Second, OSHA (the Occupational Safety and Health Administration) regulates sharps containers to prevent injury from bloodborne pathogens.¹⁵⁴ Third, the CDC (Centers for Disease Control) and NIOSH (the National Institute for Occupational Safety and Health) have recommendations relating to the quality of sharps containers.¹⁵⁵ All of these

¹⁴⁸ TYN0137253 (emphasis added).

¹⁴⁹ TYN0034827-TYN0034870 at 830 (emphasis added).

¹⁵⁰ TYN0034827-TYN0034870 at 830 (emphasis in original).

¹⁵¹ TYN0064212-TYN0064224 at 215 (emphasis added).

¹⁵² TYN0053316-TYN0053319 at 316-317 (emphasis added).

¹⁵³ See Letter to Manufacturers and Initial Distributors of Sharps Containers and Destroyers Used by Health Care Professionals, Feb. 3, 1994, available at <http://www.fda.gov/cdrh/comp/doc933.pdf>; TYN0056667-TYN0056898 at 745 (stating that since 1994, sharps containers have been a class II medical device).

¹⁵⁴ See 29 C.F.R. §1910.1030 (regulations covering sharps containers, including reusable sharps containers); TYN0056667-TYN0056898 at 747 (listing certain OSHA regulations); TYN0056667-TYN0056898 at 741-742 (Tyco document listing OSHA regulations that apply to reusable containers).

¹⁵⁵ See CDC/NIOSH: Selecting, Evaluating, and Using Sharps Disposal Containers, DHHS (NIOSH) Publication No. 97-111, available at <http://www.cdc.gov/Niosh/sharps1.html>; TYN0056667-TYN0056898 at 742-744

regulations and recommendations are common nationwide. While there is some variation in regulations governing the sanitizing of reusable sharps containers on a state-by-state basis, the national government also has rules relating to the sanitization of sharps containers, and on the whole, national regulations seem to predominate over state-based ones.¹⁵⁶ In short, the regulatory barriers to entry in the market are predominately national, suggesting that the market will be national. Further, in addition to these common national regulations, because medical treatment standards are fairly uniform on a national basis and because health care professionals practicing in one place have often trained in another, buyers across the U.S. can be expected to have comparable demands for sharps containers, again suggesting that the geographic market for sharps containers is a national one.

84. Even if the relevant markets were regional rather than national, one would have to take into account the effects of supply substitution, for reasons already noted above. Because it is relatively easy for suppliers to shift their output from some areas to others, this would make the market shares and inferred market power similar in each regional market. Supply substitution also means that rivals could turn to making sales in other regions if they were foreclosed from a particular region, thus making the relevant foreclosure market national even if the market for purchasers was regional. In fact, the evidence shows that all of Tyco's production of sharps containers occurs in one plant in Illinois, which are then shipped from there throughout the nation, showing that the relevant market is national.¹⁵⁷

(listing CDC/NIOSH requirements that apply to reusable containers);

¹⁵⁶ See, e.g., <http://www.sterilogic.com/regulatory.html> (noting that the U.S. FDA allows containers to be reused if good manufacturing practices and quality assurances are in place, including the development and maintenance of the FDA's required Master Device Record and Master History Record and noting that SteriLogic designed its own proprietary unloading and sanitizing equipment to comply with OSHA regulations); <http://www.danielsinternational.com/us/index.cfm?viewmode=faq§ion=24&category=8> (stating that as a requirement of the FDA, manufacturers are required to prove that reusable sharps containers are as safe on their two-hundredth use as on their first use). Various states have somewhat different requirements on the handling of waste and on the handling and treatment processes that can be used by FDA-approved reusable sharps containers. See, e.g., Memos from the California Department of Health Services Medical Waste Management Program (HDS-MWMP) available at http://www.cdph.ca.gov/certlic/medicalwaste/Documents/MedicalWaste/AFL_ReusableSharpsLetter.pdf and <http://www.cdph.ca.gov/certlic/medicalwaste/Documents/MedicalWaste/Reusablelist.pdf> (stating that the CA DHS-MWMP must approve the handling and treatment process of FDA-approved reusable sharps containers companies in California, and that only Stericycle and Daniels had this approval as of August 18, 2005); <http://www.sterilogic.com/regulatory.html> (noting that SteriLogic must comply with regulations and/or receive licenses from the New York State Department of Health, the New York State Department of Conservation, the Pennsylvania DEP, and the New York DEC relating to the transportation of regulated waste and the sanitization of sharps containers).

¹⁵⁷ See, e.g., TYN0479362 (stating that the "Sharps Disposal System manufacturing facility" is located in "Crystal Lake, Illinois").

85. Nor is there evidence that the market for GPO brokerage services is regional rather than national. GPO contracts are standardized on a national basis and do not vary based on specific regions, which means that GPO brokerage services are provided from one common national location rather than on a regional basis. Further, GPOs have members across the country.

B. Market Shares

1. Market Shares in the U.S. Sharps Container Product Market

86. Tables 1 presents the market shares of Tyco, BD, and other competitors in the U.S. sharps container market. This table relies on data from IMS and HPIS, two market research firms that provide market intelligence in healthcare industries.¹⁵⁸ Tyco's documents show that Tyco's data from IMS covers the acute care segment of the market and that Tyco's data from HPIS covers the alternative care segment of the market, and thus they are added together to calculate the market shares.¹⁵⁹ Tyco's production of HPIS data has been somewhat spotty, and thus I have had to rely on several different sources for HPIS data, and have had to make estimates of what the data would have been in several quarters where I lacked actual data.¹⁶⁰

¹⁵⁸ The IMS data was provided in electronic form by Tyco. *See* Sharps Disposal Systems IMS 2Q07.xls. The HPIS data was produced in several different forms depending on the time period, as I explain below in note 160.

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¹⁶⁰ After the fourth quarter of 2004, I rely on electronic HPIS data produced by Tyco. *See* Copy of Sharps GHX 3Q07 Alternate Site.xls. From the third quarter of 2003 through the third quarter of 2004, I rely on hard copy documents Tyco produced that show the figures from a HPIS spreadsheet. *See* TYN0181328-TYN0181331. Prior to then, I rely on assorted hard copy documents. For the fourth quarter of 2001 and the first quarter of 2002, I rely on TYN0383769, which reports HPIS data from the second quarter of 2001. *See* TYN0383768-TYN0383771 at 769. For the second quarter of 2002 through the first quarter of 2003, I rely on TYN0031168. *See* TYN0031141-TYN0031174 at 168. This document reports HPIS data for the first quarter of 2003 and reports the moving annual total sales from the second quarter of 2002 through the first quarter of 2003. The sales in the second quarter of 2002 through the fourth quarter of 2002 are estimated by subtracting the actual sales in the first quarter of 2003 from the moving average total and then dividing by three. For the second quarter of 2003, I rely on TYN0031391. *See* TYN0031365-TYN0031396 at 391.

87. Neither source of sales data has information on reusable shares. Thus, I have used Tyco's documents that provide estimates of the share of reusable sales to estimate what share of the market is made up by reusable competitors in each year.¹⁶¹ I report market shares in dollars both because Tyco's documents generally report market shares in dollars and because that is the most economically relevant measure, given that each disposable container is used only once but competes against reusables that use the same unit multiple times, so that measuring market share in units would not offer a functionally relevant comparison.

161



[REDACTED] ¹⁶⁶

^{89.} [REDACTED] ¹⁶⁷ [REDACTED] ¹⁶⁸ [REDACTED] ¹⁶⁹ [REDACTED]

2. Market Shares in the GPO Brokerage Services Market

90. Table 2 presents the market shares of the seven major GPOs in the GPO brokerage services market. These shares were calculated using the sales data produced by Tyco and BD, which identify the GPOs through which sales go.¹⁷⁰

[REDACTED] ¹⁶⁶ [REDACTED]

¹⁶⁷ See TYN0046097-TYN0046102 at 102.

¹⁶⁸ See TYN0046097-TYN0046102 at 102.

¹⁶⁹ [REDACTED] I have only partial data for Daniels in 2004 and no data for BD in 2007, and thus I do not calculate Daniels's relative share in those two years. Stericycle has refused to produce sales data that would allow me to further confirm the accuracy of these estimations, although pursuant to a court order Stericycle on December 14 produced some limited sales data information relating to sales to customers that appear in both Tyco and Stericycle's sales database. Given that this data is only partial, it may be of limited usefulness, but I will supplement my report as appropriate when I have had an opportunity to analyze this data.

¹⁷⁰ I calculate these shares as the overall share of sharps containers dollars from 2001 through 2006 sold by Tyco and GPO to buyers belonging to each GPO, using the GPO indicators provided in the Tyco and BD sales data. I omit 2000 because it is before the class period and omit 2007 because I have no data from BD for that year. I include all sales made to buyers indicated to belong to a GPO, even if Tyco or BD did not have a GPO contract in a specific year or month with that GPO. For example, if the BD data prior to 2005 indicates that a buyer is a Novation member, I use that indicator in my calculations, even though BD did not have a GPO contract with Novation before 2005. Sales to constituent GPOs (e.g., VHA) or to hospital networks affiliated with a GPO (e.g., Kaiser) are included for all years in the market share calculation of the major GPO. These numbers are roughly similar to those available in other sources for the overall share of hospital expenditures that these seven major GPOs have, see, e.g., *By The Numbers*, MODERN HEALTHCARE at 22 (Dec. 22, 2003), but give a more accurate picture of the foreclosure of GPO brokerage services relevant to the sharps container market at issue here.

TABLE 2: GPO BROKERAGE SERVICE MARKET SHARES	
Novation	32.96%
Premier	28.93%
Healthtrust (HPG)	11.06%
Broadlane	8.02%
Amerinet	7.29%
Consorta	6.02%
MedAssets	5.72%

C. Market Power

91. Throughout the relevant period, Tyco has had monopoly and market power in the sharps containers market. Three sources of evidence indicate that Tyco had such power throughout the relevant period: (1) high market shares coupled with high barriers to entry and expansion; (2) direct evidence that Tyco has the power to exclude rivals; and (3) Tyco's power to control prices.

1. High Market Shares Coupled with High Barriers to Entry and Expansion

92. Tyco's share of the sharps containers market has ranged from [REDACTED] during the relevant period. Tyco's market share was always more than double that of its nearest rival, and four to six times as large as all the reusable manufacturers put together. The sharps container market also has high barriers to entry and expansion that make it hard for new rivals to enter, or existing rivals to expand, in a way that could restrain Tyco's market power.

93. Government regulations erect one important barrier to entry. As discussed above, sharps containers must get FDA approval.¹⁷¹ They must also comply with OSHA regulations that require sharps containers be closable, puncture resistant, leakproof on sides and bottom, and labeled and color coded appropriately, along with

¹⁷¹ See Letter to Manufacturers and Initial Distributors of Sharps Containers and Destroyers Used by Health Care Professionals, Feb. 3, 1994, available at <http://www.fda.gov/cdrh/comp/doc933.pdf>; TYN0056667-TYN0056898 at 745 (stating that since 1994, sharps containers have been a class II medical device).

other regulations on the use of sharps containers.¹⁷² Further, the CDC (Centers for Disease Control) and NIOSH (the National Institute for Occupational Safety and Health) have recommendations relating to the quality of sharps containers, which are not regulations but are likely important for manufacturers to comply with.¹⁷³ The fact that Tyco discussed these regulations in its sales literature shows that it not only believed these issues were important for manufacturers, but also that these regulatory issues matter to buyers.¹⁷⁴ In addition, Tyco's documents indicate that other regulations from the Department of Transportation (DOT), the Environmental Protection Agency (EPA), and state-level bodies create important barriers to entry and expansion.¹⁷⁵ Reusable sharps container manufacturers also face additional barriers to entry and expansion because they need to obtain permits to haul and dump the waste from local governments, which can be a costly and time-consuming process, especially if a new rival is attempting to expand to service new areas.¹⁷⁶

94. The regulations relating to sharps containers underscore the fact that sharps containers need to be designed to reduce needlestick injuries. The average facility suffers at least three of these annually, at a cost of over \$1,000 per incidence.¹⁷⁷ Because there are approximately 5,000 hospitals in the United States, this would translate into a cost of approximately \$15 million annually or approximately 7-11% of the total value of sharps containers.¹⁷⁸ These figure would

¹⁷² See 29 C.F.R. §1910.1030(c)(4)(iii)(A) (listing this requirements); 29 C.F.R. §1910.1030 (regulations covering sharps containers, including reusable sharps containers); see also TYN0056667-TYN0056898 at 747 (listing certain OSHA regulations); *id.* at 741-742 (Tyco document listing OSHA regulations that apply to reusable containers).

¹⁷³ See CDC/NIOSH: Selecting, Evaluating, and Using Sharps Disposal Containers, DHHS (NIOSH) Publication No. 97-111, available at <http://www.cdc.gov/Niosh/sharps1.html>; TYN0056667-TYN0056898 at 743-744 (listing CDC/NIOSH requirements that apply to reusable containers);

[REDACTED]

¹⁷⁴

[REDACTED]

¹⁷⁵

[REDACTED]

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[REDACTED]

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[REDACTED]

¹⁷⁸

[REDACTED]

be higher if one included the much larger number of alternative site buyers who purchase sharps containers. Given these risks, beyond the strict regulatory requirements, potential entrants into the sharps container markets must design high-quality products that meet buyer demands for puncture and leak resistant containers that effectively protect medical workers from exposure to sharps (such as by having specially designed lids). Both disposable and reusable manufacturers emphasize the quality and safety of their products. Further, companies' sharps container designs are protected by intellectual property laws, and there is proprietary knowledge relating to the manufacture of sharps containers, meaning that rivals cannot simply adopt existing technology wholesale, but rather must design their own sharps containers.¹⁷⁹ All of this means that entrants must overcome barriers to designing a safe, high-quality sharps container.

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[REDACTED]

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[REDACTED]

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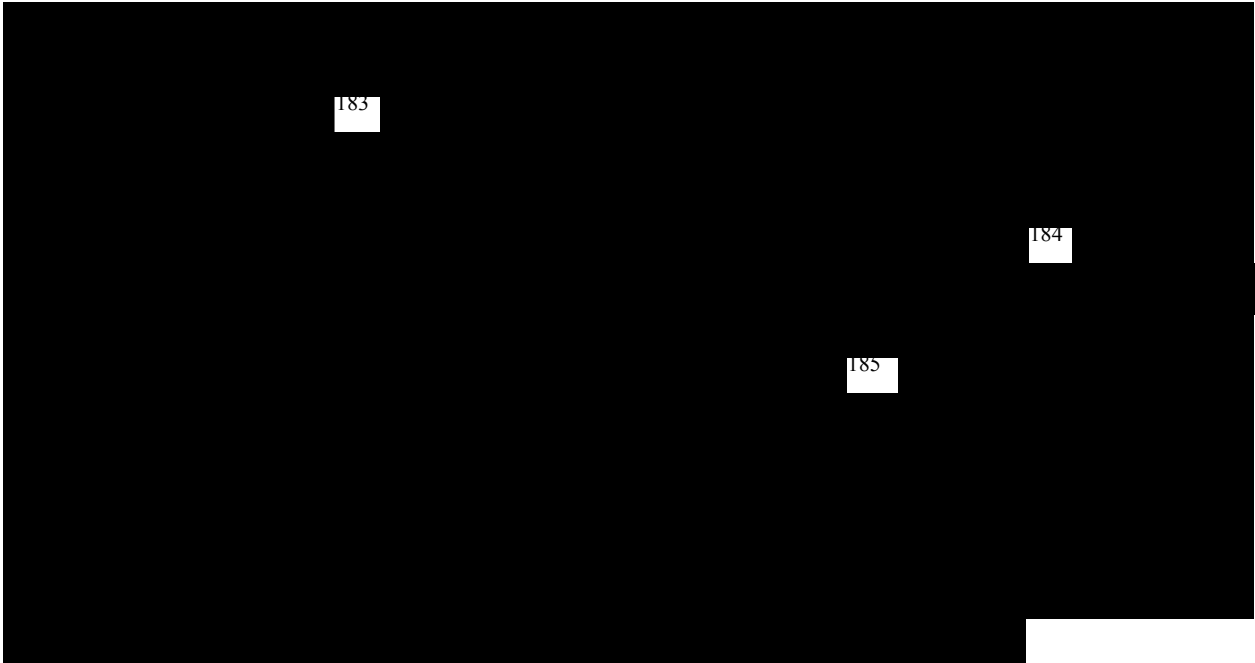
[REDACTED]

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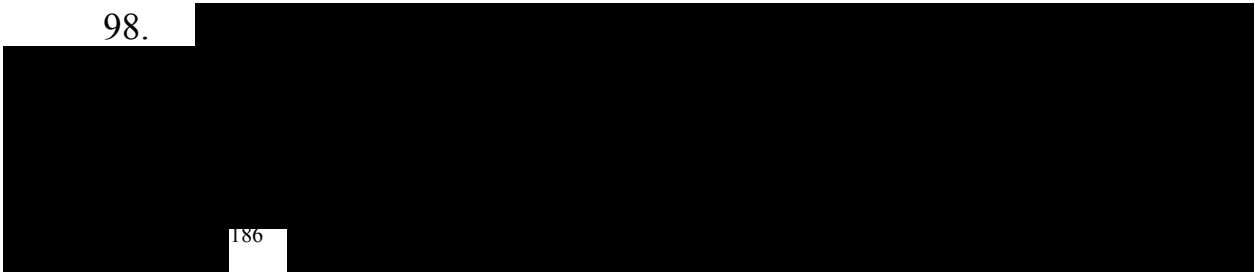
¹⁸⁰ Herbert Deposition 73.

¹⁸¹ Herbert Deposition 74.

¹⁸² BD produced only one cost variable that was labeled "total." Tyco broke down its costs into four component parts, namely material, labor, VOH (presumably standing for variable overhead), and FOH (presumably standing for fixed overhead). Tyco's costs thus appear to be the total costs incurred in producing its product. The total cost of all these components is used in my regressions.



97. This evidence shows two things. First, it shows that there clearly are economies of scale in the production of greater numbers of sharps containers, as the regressions focusing on the individual SKUs produced by both Tyco and BD show. Second, it suggests that in the aggregate, Tyco and BD have both achieved their economies of scale in producing sharps containers, as there is little change in either firm's aggregate average costs from additional production.



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99. Data from Stericycle also helps to confirm the presence of economies of scale in the production of sharps containers, that these economies of scale exist with reusable sharps containers as well as disposable containers, and that firms at their size level have (unlike Tyco and BD) not yet achieved full economies of scale. Stericycle's profit and loss statements from 2005 and 2006 are used for this analysis.

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100. Testimonial and documentary evidence confirm these data.

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¹⁸⁷ This figure is calculated by calculating the total units sold in Tyco and BD's data for each year.

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¹⁸⁹ Kogler Deposition 84.

101. Stericycle's 2006 10-K confirms the existence of economies of scale, with Stericycle stating: "We believe that our acquisitions will enable us to improve our operating efficiencies through increased utilization of our service infrastructure."¹⁹² This is further confirmed in Stericycle's second quarter 2006 earnings call, where Stericycle stated that in the reusable sharps container business "We are achieving density in those markets. And we are seeing it because the margins of the business are moving up. As we said early on when you start out in any given area, obviously, you don't have the margins you want because you don't have the density. Then as you sell and do the fill-in you start to get to where you want to be."¹⁹³ Stericycle also stated that the margins in its reusable business were currently in the high 20s, but that they could rise to the mid-30s to low-40s, implying that Stericycle's reusable business still had additional economies of scale it could gain.¹⁹⁴ Further, in a presentation at the Thomas Weisel Partners Healthcare Conference, Stericycle explained that its operations became more profitable as it gained economies of scale as its sales expanded: "The Bio Systems service offering - once it reaches full density - should have margins that are north of the average margins that we're getting on the medwaste side. It's kind of in the high - mid to high 20s. Obviously when you are rolling out a new program into new geographies, you can imagine the margin when you [write] up the first hospital associated with one [class] facility. You are writing up all that depreciation. You maybe have hired one service tech who isn't spread out over multiple facilities, and your costs are high."¹⁹⁵

102. Some of Daniels's document also show that it recognized the presence of economies of scale in the sharps container market.

¹⁹⁰ Kogler Deposition 84-85.

¹⁹¹ Kogler Deposition 85.

¹⁹² Stericycle 2006 10-K, at 41. Note that although this statement is not specific to Stericycle's reusable sharps container business, the logic here applies directly and other evidence is specific to its reusable business.

¹⁹³ Q2 2006 Stericycle Earnings Conference Call.

¹⁹⁴ Q2 2006 Stericycle Earnings Conference Call.

¹⁹⁵ Fair Disclosure Wire, Stericycle at Thomas Weisel Partners Healthcare Conference, Sept. 6, 2006.

¹⁹⁶ DI_00771635-DI_00771642 at 636.

[REDACTED]

103.

[REDACTED]

¹⁹⁷ DI_00267495-DI_00267527 at 507.

¹⁹⁸ DI_00276114-DI_00276154 at 124.

¹⁹⁹ Blazejewski Deposition 197.

²⁰⁰ Blazejewski Deposition 197.

²⁰¹ TYN0013981-TYN0013995 at 984.

²⁰² TYN0109807-TYN0109810 at 809.

²⁰³ Anderson Exhibit 26. The Bates number on this document is obscured.

104.

[REDACTED]

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[REDACTED]

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[REDACTED]

²⁰⁴ Shaw Deposition, 29.

²⁰⁵ Shaw Deposition, 29-30.

²⁰⁶ [REDACTED]

²⁰⁷ Shaw Deposition 94.

²⁰⁸ [REDACTED]

²⁰⁹ [REDACTED]

[REDACTED]

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107. [REDACTED]

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210 [REDACTED]

211 TYN0050847-TYN0050930 at 871.

212 [REDACTED]

²¹³ See Graphic Controls Corporation, Form 8-K, 10/30/1998 (stating that Graphic Controls Corporation was sold to a wholly-owned subsidiary of Tyco); Graphic Controls Corporation, Form 10-K, 3/31/1997, at 1 (stating that Graphic Controls acquired Devon in February 1996); <http://www.sageproducts.com/company/history.asp> (history of Sage stating that in 1999 Sage sold its sharps container product lines to Tyco); <http://www.covidien.com/covidien/pageBuilder.aspx?webPageID=161202&topicID=161270&xsl=xsl/2columnTemplate.xsl> (Tyco's website stating that Tyco acquired Sherwood Davis & Geck in 1998).

²¹⁴ See Sharps Disposal IMS 1996-2000.xls, Sharps Disposal IMS 2001-2005.xls. This data is more appropriate for this purpose than the 2007 data Tyco produced because it goes back farther in time and thus included more companies and gives a more accurate picture of the entry and exit into the sharps container market.

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2. Tyco's Demonstrated Power to Exclude Rivals

108. Tyco's market power is confirmed by direct evidence that it actually exercised that power to exclude rivals. Standard antitrust economics shows that firms that are able to exclude rivals from competing to win business have monopoly and market power. The reason is that, absent monopoly or market power, a firm's attempts to exclude rivals would be unavailing because the buyers would simply switch to purchasing from a rival firm. In contrast, buyers may not be able to switch from a firm that has monopoly or market power, giving the firm the ability to impose exclusionary conditions on its buyers that can adversely affect rivals.

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²¹⁵ See Table 1.

²¹⁶ TYN0004234-TYN0004235 at 235.

²¹⁷ TYN0109696-TYN0109697 at 696.

[REDACTED]

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[REDACTED]

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3. Tyco's Demonstrated Power Over Price

112. The direct evidence of Tyco's power over pricing also confirms Tyco's monopoly power. The ability to increase prices above competitive levels by restraining output is a hallmark of monopoly power. Thus, monopoly power can be defined as the ability to raise prices above competitive levels.²²² This means evidence that Tyco can restrict its output and raise prices above competitive levels shows it has monopoly power.

²¹⁸ See *infra* ¶123.

²¹⁹ TYN0382434-TYN0382465 at 444 (stating that contract pricing is tiered to promote compliance).

²²⁰ See *infra* ¶¶130, 131, 133.

²²¹ See *infra* ¶¶132, 134.

²²² ELHAUGE & GERADIN, GLOBAL ANTITRUST LAW & ECONOMICS 260 (Foundation Press 2007) ("Another common definition ... is that market power is the power to price above competitive levels. This definition may be more apt for antitrust purposes because it posits a more competitive baseline world where prices would be lower if some diminishment of competition were prevented."); *id.* at 261 ("A final definition ... is that market power is the power to constrain total market output in order to raise market prices and profits. This definition focuses less on whether prices are above some baseline than on the causal connection between defendant output decisions and market price levels. If a defendant's output is a sufficiently small share of the market, or rivals would expand or enter quickly to make up for any constraint in defendant output, then the defendant lacks the requisite market power. If the contrary is true, then a defendant output restriction would predictably increase not only defendant prices but rival prices as well.").

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[REDACTED]

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[REDACTED]

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²²³ This is calculated using Tyco and BD's sales and cost data.

²²⁴ Biosystems Profit and Loss Statements, SRCL00100Natchitoches 11.29.07.

²²⁵ TYN0137253.

²²⁶ TYN0001312-TYN0001314 at 312.

²²⁷

[REDACTED]

²²⁸ TYN0142063-TYN0142065 at 064.

²²⁹

[REDACTED]

[REDACTED]

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[REDACTED]

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[REDACTED]

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[REDACTED]

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231 Herbert Deposition 136.

232 Herbert Deposition 222.

233 Blazejewski Deposition 47, 59-60.

234 Romano Deposition 159.

235 DeLuca Deposition 207.

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[REDACTED]

[REDACTED]

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117. [REDACTED]

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237 [REDACTED]

238 TYN0010661-TYN0010869 at 779.

239 [REDACTED]

240 [REDACTED]

241 [REDACTED]

III. TYCO EXCLUSIONARY AGREEMENTS AND THE SUBSTANTIAL FORECLOSURE THEY CAUSED

118. Tyco entered into exclusionary agreements with both GPOs and buyers. As I show below, these contracts substantially foreclosed both markets.

A. Tyco's General Policy of Entering into Exclusionary Contracts With GPOs and Hospitals

119. Tyco had a general policy of entering into exclusionary agreements. These exclusionary agreements fall into two categories: (1) sole source contracts that barred GPOs from offering brokerage services to rivals, and (2) exclusionary agreements with buyers (either brokered through GPOs or entered into directly) that restricted buyers to purchasing a low percentage from rivals. The first set of contracts foreclosed the market for GPO brokerage services to rival sellers of sharps containers. The second set of contracts foreclosed the market for selling sharps containers to end-users.

120. If the resulting foreclosure from the aggregate effect of Tyco's contracts in either market is substantial, then either type of foreclosure on its own is sufficient to anticompetitively raise prices in the sharps container market. That is, as a matter of antitrust economics, if either substantial foreclosure of the GPO brokerage service market or substantial foreclosure of the market for selling sharps containers to end-

²⁴² TYN0103040-TYN0103042 at 042.

²⁴³ TYN0111767-TYN0111769 at 768.

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users is shown, then Tyco's conduct will likely have an anticompetitive effect on rivals' ability to compete in selling sharps containers, which injures buyers by causing Tyco's market power and thus its prices to be higher than they would be in the but-for world. These two types of foreclosures are independent of the other in the sense that one of these foreclosures can exist even if the other does not. Further, the effects of these two foreclosures are cumulative, meaning that the adverse effect from both types of foreclosure can be greater than the effect only one type would have. Both types of foreclosure have an adverse impact on prices in the sharps container market.

1. Exclusionary Agreements with GPOs

121. Tyco implemented its general policy of entering into exclusionary agreements in the GPO brokerage service market by entering into sole-source contracts with GPOs. Sole-source contracts foreclosed rivals from access to GPO brokerage services because they limited GPOs to brokering contracts only for Tyco's sharps containers. This foreclosure in the GPO brokerage services market resulted in higher prices in the sharps container market by forcing rivals to use less efficient means of brokering contracts to sell sharps containers. I explain the terms of Tyco's specific contracts with GPOs and measure the foreclosure that they cause in section B below. Here, I discuss more generally Tyco's policy of entering into those contracts and the anticompetitive effect that these types of contracts were designed to have.

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[REDACTED]

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²⁴⁸ TYN0057183-TYN0057545 at 239.

²⁴⁹ TYN0020687-TYN0020689 at 688.

²⁵⁰ TYN0158482-TYN0158484 at 482.

²⁵¹ TYN0080225-TYN0080250 at 230.

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[REDACTED]

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125. [REDACTED]

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253 [REDACTED]

²⁵⁴ Mirani Exhibit 17. There is no Bates number on the version of this document I have.

255 [REDACTED]

256 [REDACTED]

[REDACTED]

126.

[REDACTED]

2. Exclusionary Agreements with Buyers

127. Tyco also had a policy of entering into exclusionary contracts with buyers that forced those buyers to make a high share of their purchases from Tyco or else suffer pricing penalties. I discuss below in section C the specific terms of these contracts, which also measures the aggregate foreclosing effect that these exclusionary contracts have. Here, I discuss more generally Tyco's policy of entering into these types of agreements and how Tyco recognized that these agreements had an exclusionary effect.

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[REDACTED]

²⁵⁷ TYN0023216-TYN0023254 at 231, 237.

²⁵⁸ [REDACTED]

²⁵⁹ [REDACTED]

²⁶⁰ See TYN0021205-TYN0021216 at 211.

[REDACTED]

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[REDACTED]

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[REDACTED]

²⁶¹ See *infra* ¶209.

²⁶² See Part III.C (describing the terms of these contracts).

²⁶³ See Part III.C (describing the terms of these contracts).

[REDACTED]

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[REDACTED]

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²⁶⁴ TYN0021205-TYN0021216 at 208.

²⁶⁵ TYN0021205-TYN0021216 at 208.

²⁶⁶ [REDACTED]

²⁶⁷ TYN0012636-TYN0012718 at 701 (“It’s Your Thang” presentation).

²⁶⁸ [REDACTED]

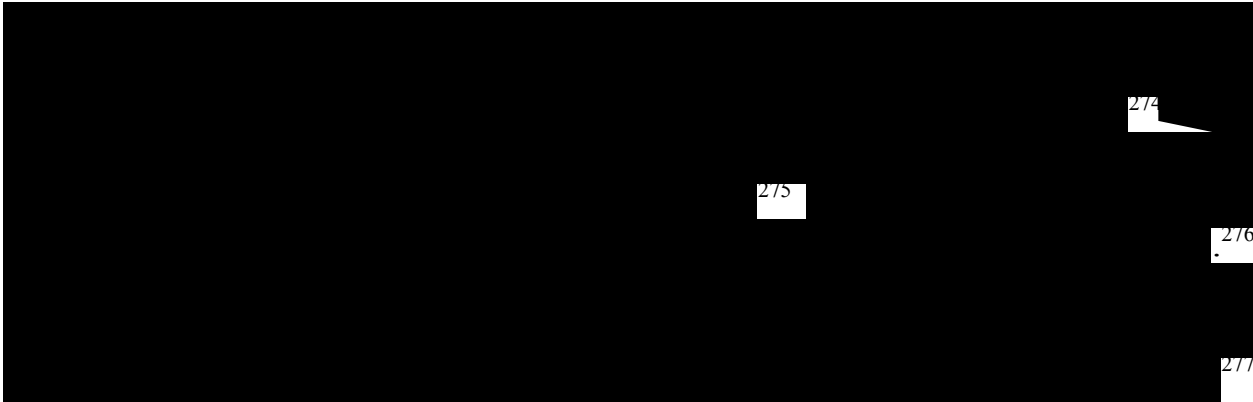
²⁶⁹ Anderson Deposition 455.

²⁷⁰ TYN0026584-TYN0026596 at 591.

²⁷¹ TYN0066431-TYN0066432 at 431.

²⁷² TYN0009126-TYN0009127 at 126.

²⁷³ [REDACTED]



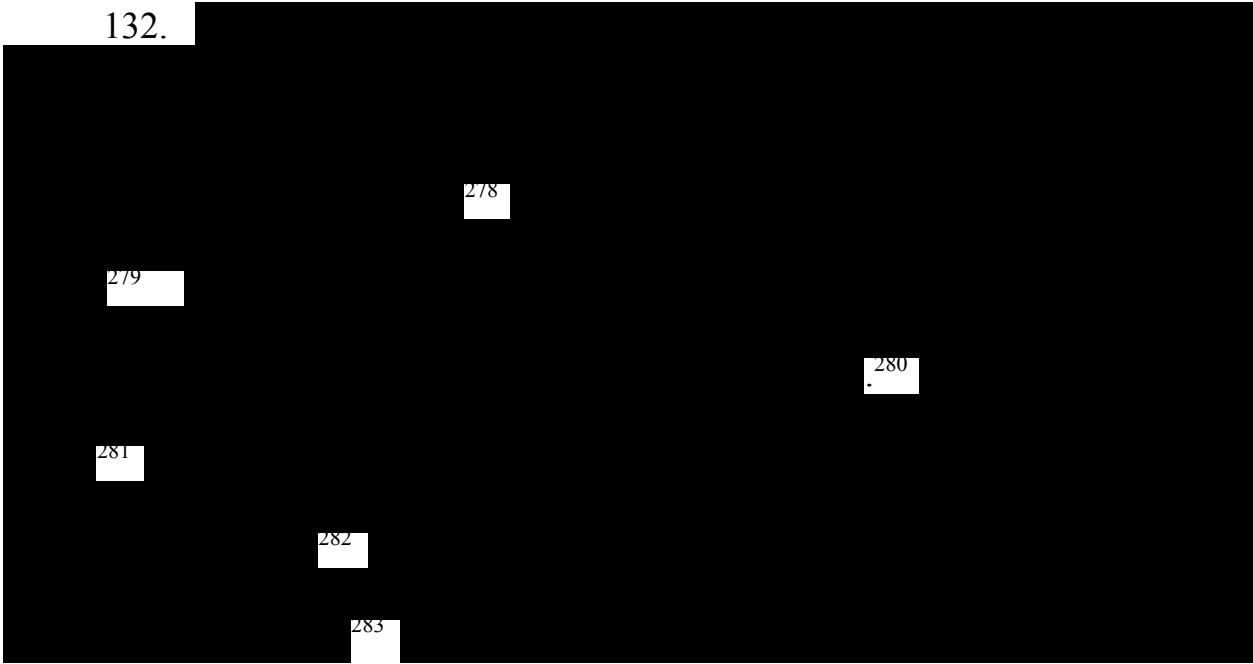
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²⁷⁴ TYN0184396-TYN0184399 at 397.

²⁷⁵ TYN0009009.

²⁷⁶ TYN0004234-TYN0004235 at 234.

²⁷⁷ See <http://www.stericycle.com/products.html/> (showing that Stericycle provides sharps containers and in addition listing that Stericycle sells soap, exam gloves, gauze, and medical waste kits, but not other medical products Tyco bundles); <http://www.danielsinternational.com/us/index.cfm?section=2&category=13> (Daniels webpage called “Other Daniels Products”, listing only a product called “Bladesmart”, which transfers scalpels and other sharps in an operating room, and “Securesmart”, which is essentially a sharps container that is made out of steel).

²⁷⁸ TYN0109807-TYN0109810 at 809-10.

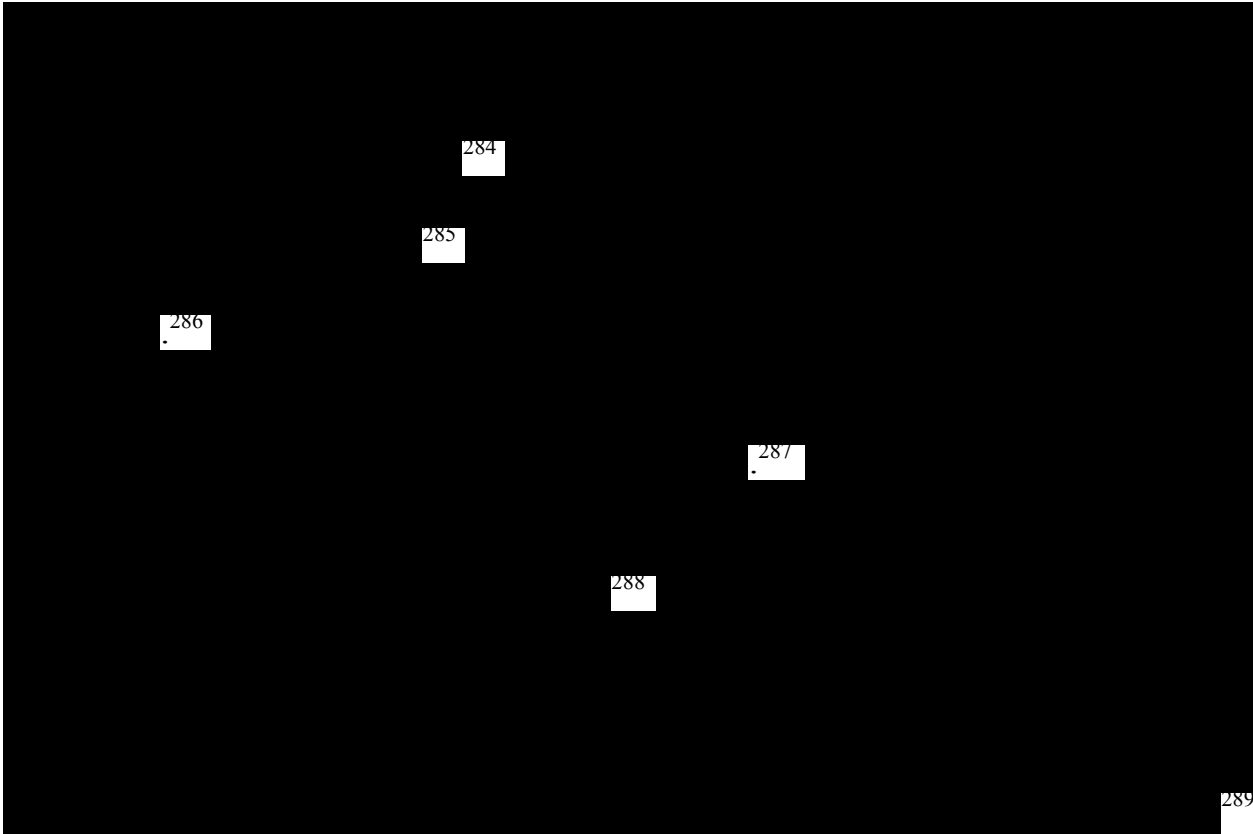
²⁷⁹ TYN0010052-TYN0010054 at 052.

²⁸⁰ TYN0064208-TYN0064211 at 209-10.

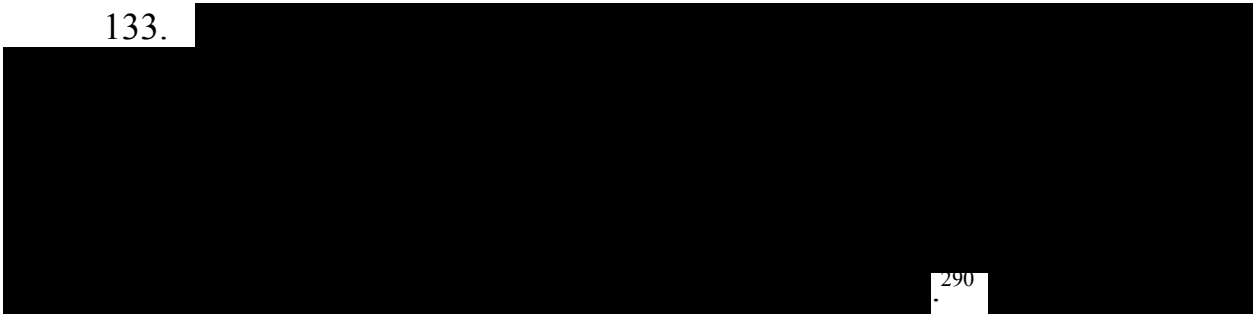
²⁸¹ TYN0064208-TYN0064211 at 209.



²⁸³ TYN0229971-TYN0229979 at 979.



133.



²⁸⁵ TYN0045544-TYN0045545 at 544, 546; TYN0187714-TYN0187716 at 714; TYN0185586; TYN0009221-TYN0009222 at 221.

²⁸⁶ TYN0213752-TYN0213754 at 753.

²⁸⁷ TYN0184423 TYN0184424 at 423.

²⁸⁸ TYN0142478. The name of the buyer is not given in this document.

²⁸⁹ TYN0229556-TYN0229558 at 557.

²⁹⁰ TYN0017296-TYN0017314 at 311. I previously investigated and opined on the exclusionary effect of BD's contracts in various markets involving needles and syringes in the *Retractable Technologies* case.

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²⁹¹ TYN0097196.

²⁹² TYN0109347-TYN0109387 at 347.

²⁹³ TYN0043918-TYN0043920 at 920.

²⁹⁴ TYN0060657-TYN0060660 .

²⁹⁵ TYN0066431-TYN0066432 at 432; TYN0066405-TYN0066409 at 406-07.

²⁹⁶ TYN00008445-TYN0008446.

²⁹⁷ TYN0225528; TYN00225536.

²⁹⁸ TYN0147583-TYN0147586 at 585.

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²⁹⁹ TYN0110282-TYN0110286 at 282.

³⁰⁰ TYN0084075.



B. Share of GPO Brokerage Services Market Foreclosed

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These contracts foreclosed Tyco's sharps container rivals from accessing GPO brokerage services offered by these GPOs. By excluding rivals from these contracts, Tyco deprived them of the most efficient means of brokering sales of sharps containers. Table 3 summarizes the agreements that Tyco had with the various major GPOs over time. This information agrees with the information in the declaration of Tyco's expert from the class certification stage about Tyco's exclusionary contracts with GPOs, except that I include information about contracts with reusable manufacturers in classifying a contract as sole-, dual-, or multi-source, while Tyco's expert did not.³⁰¹ There thus appears to be no real dispute about the terms of the exclusionary contracts.

³⁰¹ Ordover Declaration Exhibit 5.

because one of Tyco's rival had access to that contract, even though those contracts had the effect of excluding all other rivals.

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141. The exclusionary effect of these GPO contracts is not altered by the fact that many are nominally terminable by the GPO.³⁰⁴ The reasons are twofold. First, the contracts were not freely terminable because terminating them required incurring significant penalties. A GPO could only terminate if it was willing to terminate the entire contract, and thus suffer both lower administrative fees and higher product prices for its members.³⁰⁵ Second, as described in Part I and as emphasized by the economic literature, the terminability of exclusionary contracts is economically

³⁰³ See IX AREEDA, ANTITRUST LAW 375, 377, 387 (1991) (20% foreclosure is presumptively unreasonable; XI HOVENKAMP, ANTITRUST LAW 152, 160 (1998) (20% foreclosure and an HHI of 1800 is presumptively unreasonable). Here, Tyco's approximately 60% market share itself means that the HHI in the market will be over 3600. If Hovenkamp's HHI of 1800 requirement refers to the HHIs in the foreclosed market, that is, in GPO brokerage services, then the HHI would be 2200 using the figures in Table 1, still above the 1800 threshold. HHIs are calculated by squaring the market share of each firm in the market, adding them together, and then multiplying by 10,000.

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³⁰⁵ See *supra* n.304 (citing the termination clauses in each GPO agreement and showing that all refer to the entirety of the agreement with the GPO).

irrelevant to assessing their anticompetitive effects, for the same reasons that the voluntariness of entering into the contracts is economically irrelevant to assessing whether such exclusionary contracts are anticompetitive.³⁰⁶ The same externality problem that gives GPOs perverse incentives to enter into harmful exclusionary agreements will give those GPOs incentives to stay in them even if they are terminable, because any benefits produced by reducing marketwide foreclosure would mostly be shared with other GPOs or with buyers. Thus, even if the exclusionary agreements were terminable, that would not alter the incentives of each GPO to comply with them despite the net anticompetitive harm they create for buyers. Thus, the terminability of these contracts does not alter the foreclosure or the anticompetitive effects such foreclosure inflicts on rival competitiveness and on marketwide prices.

142. Table 4 reports the share of Tyco and market sales going to buyers purchasing under sole-source Tyco GPOs. These figures are lower than the foreclosure of the GPO brokerage services market because these figures include all sharps containers sales in the denominator, regardless of whether or not they were made through GPO brokered contracts.

TABLE 4: [REDACTED]		
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]


³⁰⁶ See *supra* ¶26(d); Einer Elhauge, *Defining Better Monopolization Standards*, 56 STAN. L. REV. 253, at 340-42 (2003).



C. Share of Sharps Container Market Foreclosed

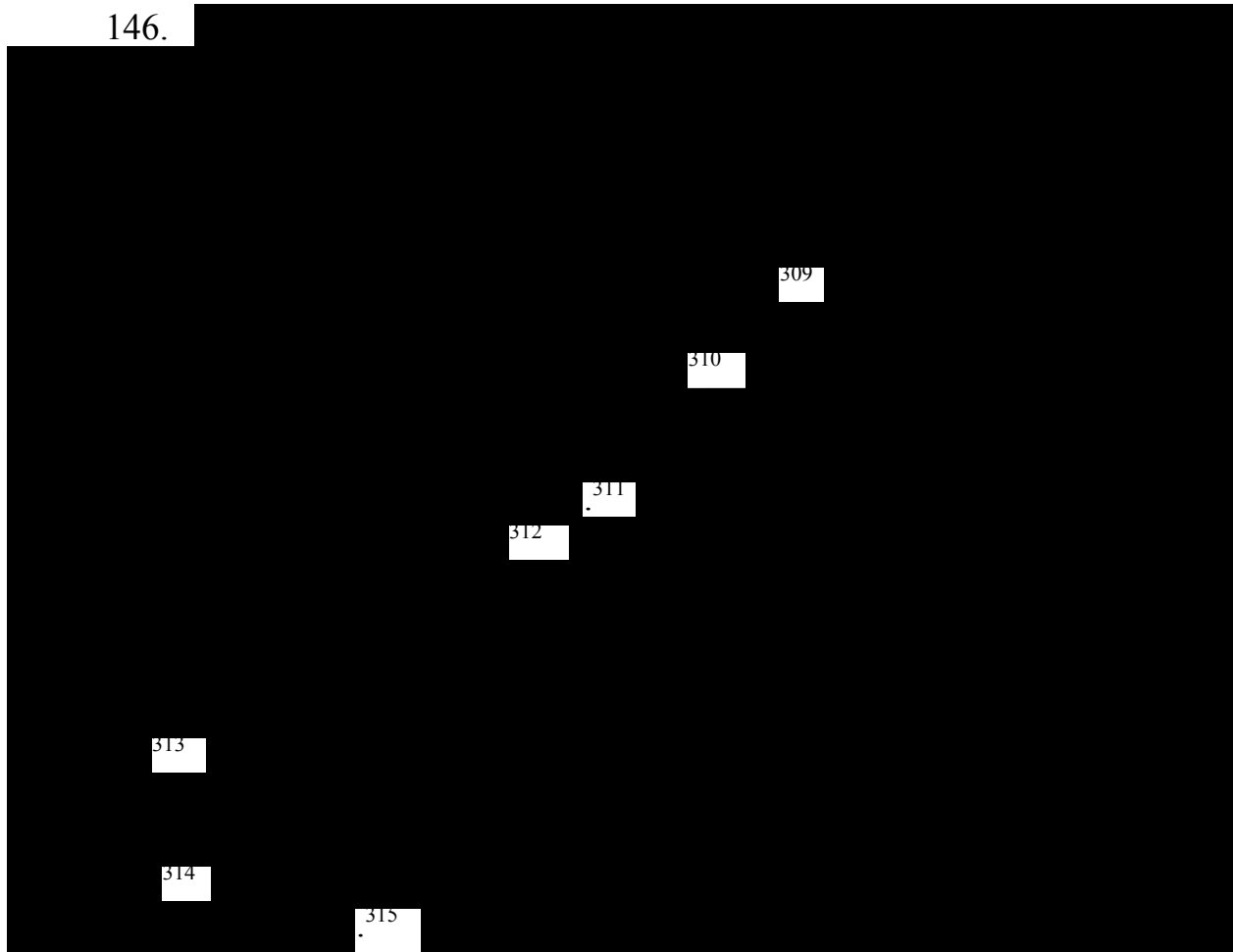
143. Tyco entered into exclusionary loyalty contracts with buyers. Many of these contracts were brokered by GPOs, but others were entered into individually by Tyco with hospital systems, individual hospitals, or other large buyers. The GPO-brokered agreements generally required buyers to purchase a certain share of their sharps containers from Tyco to obtain the best price. The contracts that were not brokered by GPOs sometimes had share-based requirements, but also used tailored volume-based requirements to achieve the same result as an exclusionary share-based contract. Tyco's contracts also often bundled the sale of sharps containers with the sales of other products, imposing penalties on buyers who did not purchase a high share across a wide range of products from Tyco.

1. Exclusionary Tyco-Buyer Contracts That Were Brokered by GPOs

144. Because many of the contracts with buyers were standardized contracts brokered by GPOs, I list those standardized terms below in Table 5. (More details on these contracts are provided in Appendix A.) In total, these standard GPO-brokered contracts cover  of Tyco's sharps container sales, and thus they are essential to calculating foreclosure. In addition, Tyco had many contracts with individual buyers that were not brokered by GPOs, which I analyze below. Note that the description of the standardized GPO-brokered contracts given in Table 5 largely matches the one from the class certification report of Tyco's expert, and thus there seems to be no real dispute about the terms of the relevant contracts.³⁰⁷

³⁰⁷ See Ordoover Declaration Exhibit 5.

penalties on buyers, while the higher tiers have a share-based commitment requirement. Table 5 shows the level of share-based commitment buyers must make to avoid any pricing penalties under these standardized GPO contracts.³⁰⁸



³⁰⁸ Some of the GPO contracts require buyers to meet set volume requirements that are not listed in the table to access the highest tiers of a contract, on top of committing to make a high share of purchases from Tyco.

³⁰⁹ TYN0022590-TYN0022606 at 591.

³¹⁰ TYN0000986-TYN0001088 at 1010.

³¹¹ TYN0001089-TYN0001209 at 1091, 1109.

³¹² TYN0002075-TYN0002104 at 094.

³¹³



³¹⁴ TYN0000807-TYN0000842 at 839 (letter of agreement in 2000 contract between Tyco and HSCA).

³¹⁵ TYN0106251-TYN0106318 at 317.

[REDACTED]

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³¹⁶ TYN0000766-TYN0000795 at 777 (2002 contract); TYN0001973- TYN0002002 at 993 (2005 contract).

³¹⁷ TYN0000306-TYN0000319 at 310; TYN0000410-TYN0000448 at 421.

³¹⁸ TYN0001640-TYN0001692 at 643.

³¹⁹ Amerinet0001853 [REDACTED]

³²⁰ Amerinet 1261- Amerinet 1327 at 305.

³²¹ Amerinet 1261-Amerinet 1327 at 323, 325.

³²² 2AMERINET0678-2AMERINET0691 at 680.

³²³ [REDACTED]

[REDACTED] 324
[REDACTED] 325
[REDACTED] 326

148. [REDACTED] 327
[REDACTED] 328
[REDACTED] 329
[REDACTED] 330

³²⁴ It is irrelevant that the GPO contracts with Tyco gave GPOs a nominal right to terminate the GPO-Tyco contracts because those contracts covered GPO obligations to provide brokerage services rather than buyer obligations to buy sharps containers. Those Tyco-GPO contracts gave neither GPOs nor buyers any right to terminate the Tyco-buyer contracts that obligated buyers to buy a high percentage of sharps containers from Tyco.

³²⁵ [REDACTED]

³²⁶ *See supra* ¶126(d).

³²⁷ [REDACTED]

³²⁸ [REDACTED]

³²⁹ *See supra* ¶132.

³³⁰ [REDACTED]

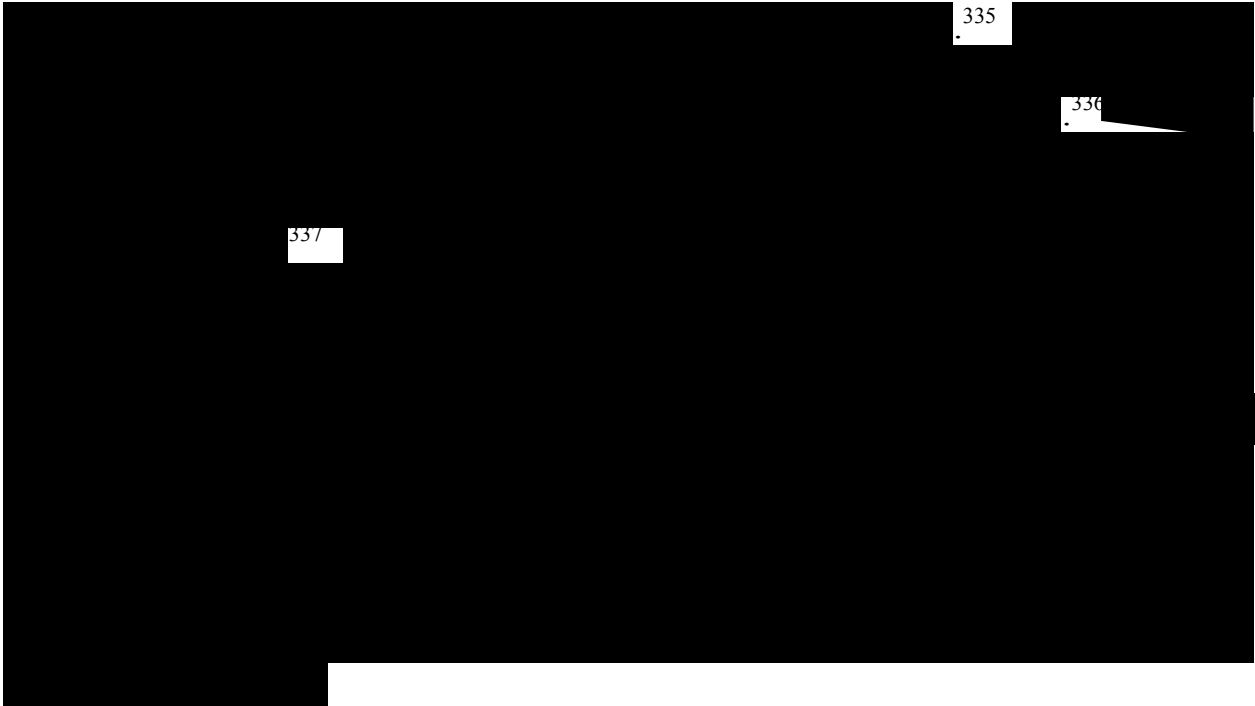
instead offered Novation members the Tyco Enhancement Program, which continued

[REDACTED]

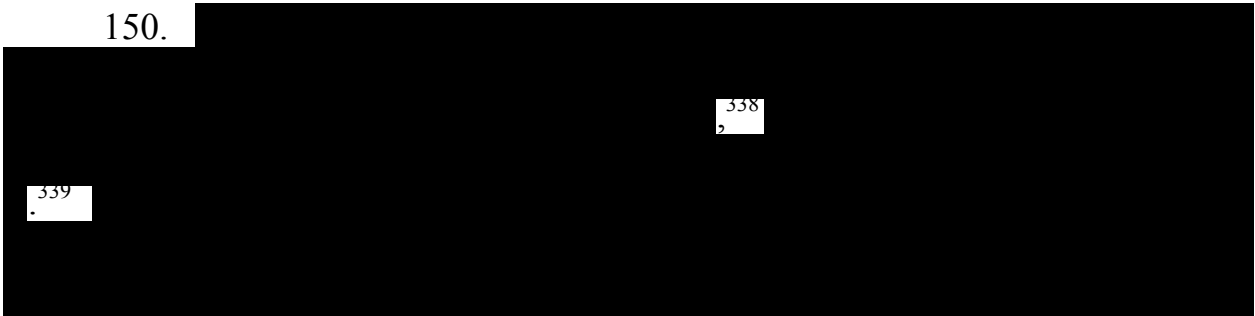
149. [REDACTED]

[REDACTED]

³³⁴ TYN0098777-TYN0098781 at 777.



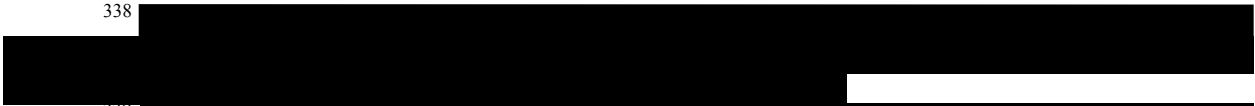
2. Exclusionary Tyco-Buyer Contracts That Were Not Brokered by GPOs



³³⁵ TYN0151088-TYN0151090 at 089.



³³⁷ TYN0052931-TYN0052932 at 931.



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152. In addition to the Tyco Value Program, Tyco also entered into other exclusionary individual contracts with a number of buyers that were not brokered by GPOs, though many were with hospitals that already had GPO-brokered contracts with Tyco and then transitioned into an individual contract. Although I have not found

³⁴⁰ See TYN0393447-TYN0393451 at 448-449; TYN0393452-TYN0393457 at 454; TYN0052805-TYN0052811 at 805; TYN0102439-TYN0102597 at 447-448; TYN0132966-TYN0132967.

³⁴¹ See TYN0052805-TYN0052811 at 807.

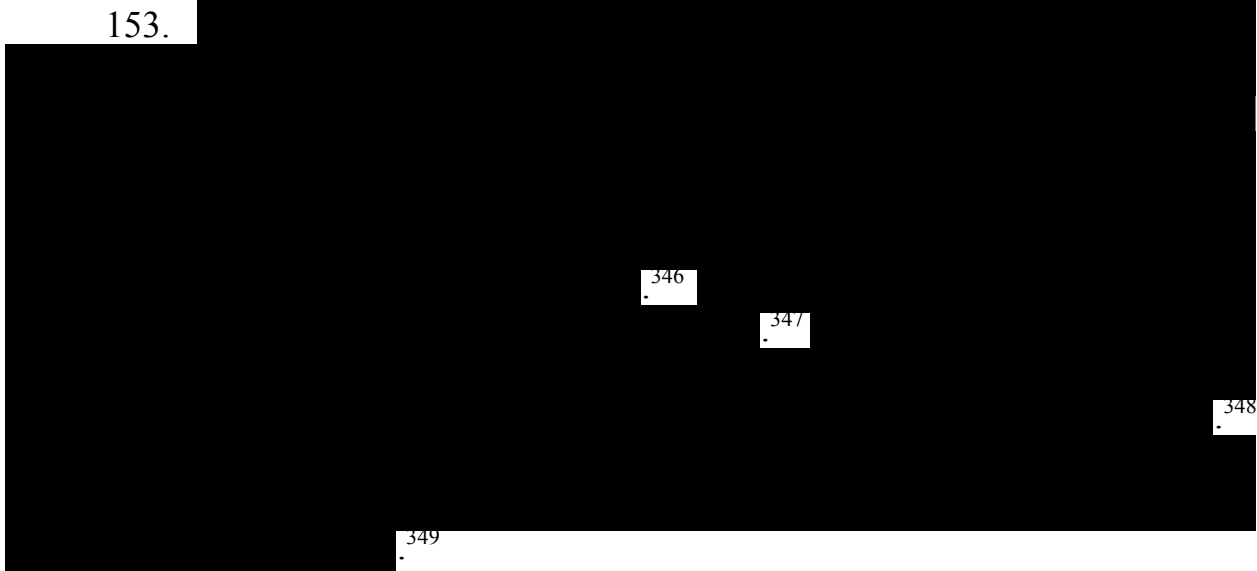
³⁴² See *supra* ¶128; *infra* ¶209.

³⁴³ See TYN0052805-TYN0052811 at 807 (stating rebate is paid annually).

³⁴⁴ See TYN0052805-TYN0052811 at 809.

in my discovery review every individual contract that is reflected in Tyco's sales data – and, indeed, I cannot even confirm that Tyco has produced all the relevant individual contracts – my staff has reviewed every individual contract that is available, which cover many individual buyers in the market.³⁴⁵

153.



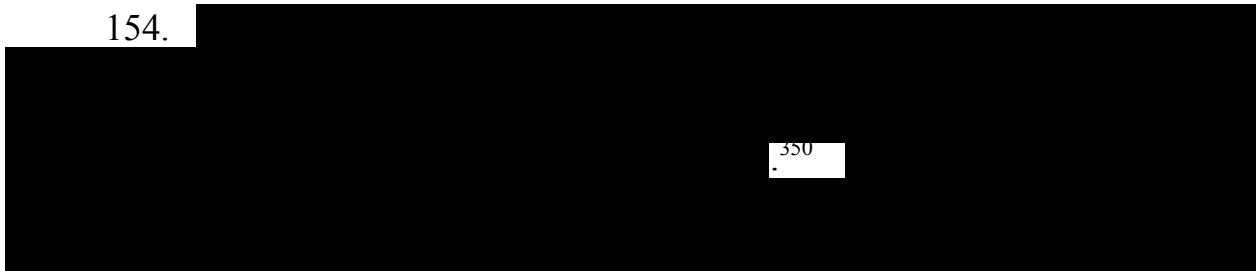
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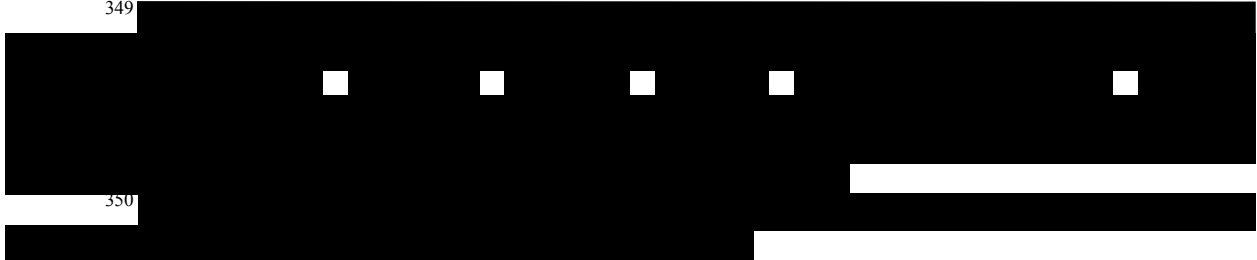
³⁴⁵ My staff has reviewed over 100 contracts with individual buyers or with non-major GPOs. This number includes multiple contracts relating to some buyers, but does not appear to be a complete record of all the contract with these buyers. Tyco's sales data suggests that there are over 500 other non-GPO brokered contracts I do not have. Thus, there are many contracts outstanding that Tyco appears to have not produced.

³⁴⁶ TYN0340111-TYN0340132 at 113.

³⁴⁷ TYN0340111-TYN0340132 at 114.

³⁴⁸ TYN0340111-TYN0340132 at 122.

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[REDACTED] 351
[REDACTED] 352
[REDACTED] 353
[REDACTED] 354
S.

155. [REDACTED]
[REDACTED] 355
[REDACTED] 356
[REDACTED] 357
[REDACTED] 358

³⁵¹ TYN0340589-TYN0340608 at 591.
³⁵² TYN0340589-TYN0340608 at 591-92.
³⁵³ TYN0340589-TYN0340608 at 598.

³⁵⁴ [REDACTED]
[REDACTED] 355
[REDACTED] 356
[REDACTED] 357
[REDACTED] 358
[REDACTED] [REDACTED] [REDACTED] [REDACTED]

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³⁶⁰ See TYN0284763-TYN0284769.

³⁶¹ See TYN0490103-TYN0490117.

³⁶² See TYN0084118(UR)-TYN0084119(UR).

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3. *Measuring the Market Share Foreclosed by Tyco-Buyer Exclusionary Contracts*

159. Having identified the terms of Tyco's contracts with buyers, I then assessed whether buyers under those contracts were restricted by Tyco's contracts.

³⁶³ See TYN0284763-TYN0284769.

³⁶⁴ See ELHAUGE & GERADIN, *GLOBAL ANTITRUST LAW AND ECONOMICS* 624-25 (Foundation Press 2007); XI HOVENKAMP, *ANTITRUST LAW* ¶1807b, at 116 (1998) (“[A]ntitrust policy should not differentiate between the manufacturer of widgets who explicitly imposes exclusive dealing on its dealers and the manufacturer who gives such dealers a discount or rebate for dealing exclusively in the manufacturer’s widgets.”); *supra* ¶26(b).

³⁶⁵ See *supra* ¶26(b).

³⁶⁶



³⁶⁷ See *supra* ¶26(d).

To determine whether a buyer was restricted, I had my staff first examine which contract and tier in that contract the buyer purchased through. I treated any contract and tier that required a buyer to commit to purchase a certain share of sharps containers from Tyco as restricted. Typically, the commitment requirements in both GPO-brokered contracts were between 80%-95%.³⁶⁸ I also treated as restricted any buyer that was forced to designate Tyco as its “prime vendor” or where the buyer had to sign a letter of commitment, even if the contract did not specify a precise commitment level that had to be met, because these contracts plainly require the buyer to commit to purchasing sharps containers from Tyco, and thus limited the buyer’s ability to switch its purchases to Tyco’s rivals.³⁶⁹ I conservatively did not treat any buyers under the HPG contract from December 2005 forward as restricted, because this contract conditioned rebates on the purchase level of all that GPO’s members, rather than on the purchase levels of individual buyers.³⁷⁰

160. At this point, I limit my measurement of marketwide foreclosure to the foreclosure caused by Tyco’s standardized contracts brokered by GPOs and do not consider the additional foreclosing effect created by Tyco’s contracts with individual buyers that were not brokered by GPOs. This is for two reasons. First, Tyco has not produced the vast majority of individual contracts. Thus, any analysis I performed involving individual contracts would be incomplete. Second, Tyco has not produced information about the rebates paid on sharps containers under these contracts. Without this information, for many of the individual contracts I am unable to conclusively determine whether the buyer in fact abided by the restrictive conditions imposed upon it by Tyco. Thus, I do not include individual contracts in the analysis below. This does *not* mean that these contracts do not have an exclusionary effect. To the contrary, the terms of these contracts are likely to have a large anticompetitive effect both because they impose tailored-volume-based commitments on buyers and because they bundle the sales of sharps containers with the sales of a number of other

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³⁷⁰ This calculation is conservative because, to the degree that HPG was able to control the purchases of buyers to get the GPO as a whole to meet Tyco’s tailored-volume-based requirements, those buyers were restricted.

products. However, given the current incomplete state of information on these contracts, it makes sense to wait for Tyco to produce the additional information, and then analyze these contracts when more complete information about them is made available. If Tyco continues not to produce more complete information, then I may have to analyze them as best I can using the incomplete information and appropriate assumptions. I reserve the right to modify my report and foreclosure figures when it becomes clear whether more complete information on these individual contracts will or will not be provided.

161. Lacking more complete information on these individual contracts, I for now drop them from both the numerator and the denominator of my foreclosure calculations. Treating all these buyers as unforced by Tyco's contracts would unduly bias my analysis against finding harm because the vast majority of the individual contracts that my staff has reviewed do have exclusionary terms, as described above. Conversely, treating them all as restricted might somewhat overstate foreclosure because some of these contracts may not have restrictive terms, although in fact the vast majority of individual contracts that were produced in fact do have exclusionary terms. Although it may well understate the actual foreclosure, I thus at this point simply exclude these individual contracts from both the numerator and the denominator of the foreclosure calculations.

162. For the standard GPO-brokered contracts that I was able to analyze, I had my staff use indicators in the sales data to determine which contract buyers purchased through. Similarly, my staff used indicators in Tyco's sales data to determine which tier of the contracts a buyer purchased through.³⁷¹ This gave me a list of restricted buyers. For buyers where the sales data indicated that they had different restricted statuses within a month – either because of a data error or because they switched their restricted status – I conservatively treated all those purchases as being unrestricted. This is conservative, because it reduces the amount of sales I treat as restricted while the true figure may be higher. If, for example, a buyer switched its restricted status mid-month or if Tyco's sales data wrongly indicated that some of a buyer's purchases were not restricted when in fact the buyer was restricted by Tyco's exclusionary contracts, this method would understate the true amount of foreclosure.

163. After determining the subset of buyers that were restricted, I then examined whether each restricted buyer was in fact compliant with whatever

³⁷¹ To the degree some contracts do not list the tiers that the purchases go through, then my calculations will be conservative because they will not classify those purchases as going to a tier.

restrictive condition Tyco imposed.³⁷² I did this by having my staff manually match the names of buyers in the sales data produced by Tyco, BD, and Daniels, the only three manufacturers to provide this information.³⁷³ If a restricted buyer purchased an amount of sharps containers from BD or Daniels that would make it non-compliant under the restrictive agreement imposed by Tyco, I classified that buyer as restricted but un-foreclosed and did not count those buyers' purchases from Tyco in the numerator of my foreclosure calculation.³⁷⁴ This is conservatively biased against finding harm because exclusionary contracts continue to have a foreclosing effect even on non-compliant buyers. That is, while non-compliant buyers may be willing to make some purchases from one of Tyco's rival and get away with it, they may be reluctant to make more purchases for fear that Tyco will impose pricing penalties in retaliation. Other than this adjustment to ensure that buyers are in fact compliant with the restrictive conditions, I treat all other restricted buyers as foreclosed by Tyco's exclusionary contracts, and treat all unrestricted buyers as un-foreclosed.

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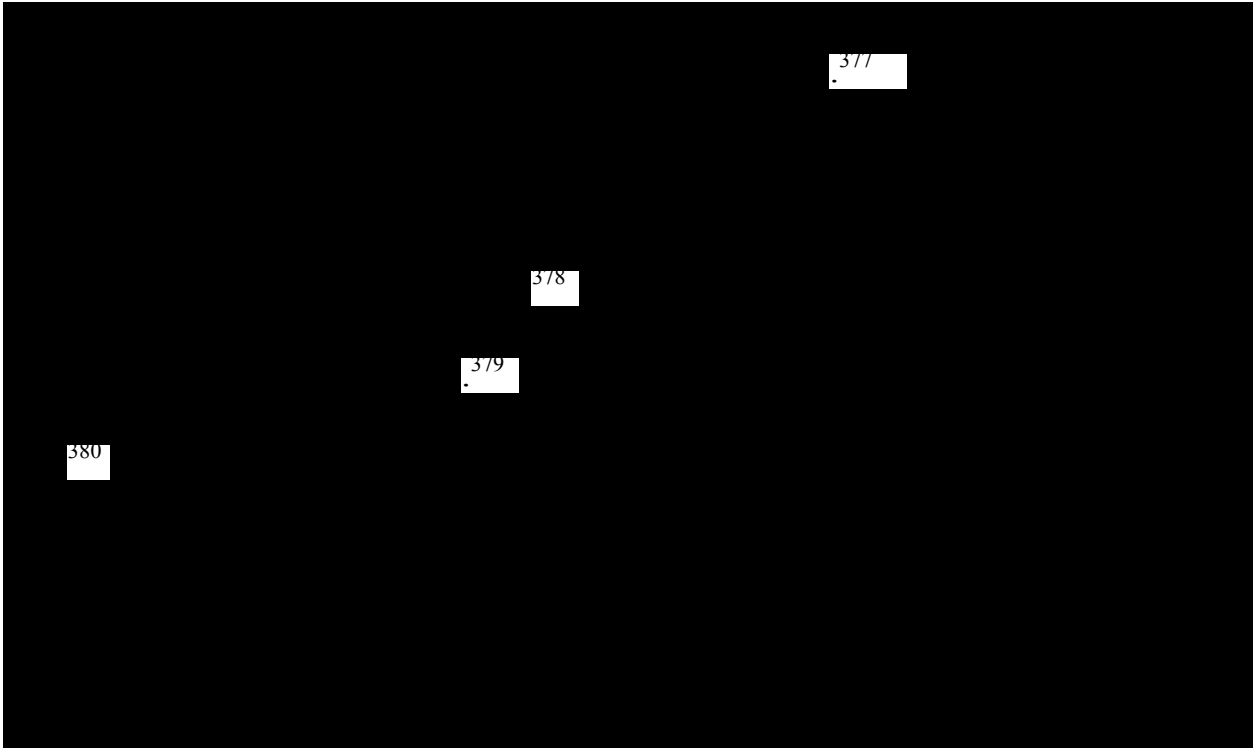
³⁷² See Full committed volume v33.do (performing this operation).

³⁷³ Stericycle produced a limited amount of sales data on December 14 that related to buyers who showed up in both Tyco's sales database and in a list of customer names Stericycle produced. I have not had an opportunity to review this data, but will supplement my analysis as appropriate once I have done so.

³⁷⁴ For buyers purchasing under a share-based contract, I simply compared whether the share of purchases they made from Tyco exceeded the share-based requirements Tyco imposed on them. If it did not, I then asked whether the buyer would be compliant with a lower tier of their contract. If it would be compliant with the requirements of the lower tier, then I treated as foreclosed the amount of purchases needed to reach that lower level of compliance and any purchases above that amount as un-foreclosed. If there was no lower level of compliance or if the buyer did not qualify for the lower level of compliance, then I treated all the buyer's purchases as un-foreclosed if they did not meet the requirements of the restrictive agreement imposed by Tyco.

³⁷⁵ See Full committed volume v33.do (performing this operation).

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³⁷⁸ A manual matching of all Tyco, BD, and Daniels buyers is used to calculate these figures. *See* Exclusivity v1 (calculating exclusivity); Merge all firms v11.do (using this manual match to merge the firms together). This program calculates the percentage for each company for each year and then results are the average across each year from 2003 to 2006. I start this analysis in 2003 because prior to that point, BD used a different system to keep track of its sales and that system used different customer numbers and my staff has not yet performed a manual match with those earlier customers. I end this analysis in 2006 because that is when the BD sales data ends. The results do not meaningfully differ for any one year, so my conclusion is not sensitive to the specific years I include.

³⁷⁹ This figure is calculated from 2004-2007.

³⁸⁰ [Redacted]

165. Together, these contracts foreclosed a substantial share of the relevant market. Table 6 reports the share of Tyco's sales made to foreclosed buyers. I start this and the following tables in Oct. 2001, when the class period begins, and end them in May 2007, when the data produced by Tyco in this matter ends.

³⁸¹ As noted above in footnote 374, I do not assume buyers standardize who are non-compliant with the tier indicated in Tyco's data but are compliant with a lower tier under the same contract. The reason is that these buyers are affirmatively non-compliant, and thus they have demonstrated that they are not standardizing.

TABLE 6: SHARE OF TYCO SHARPS CONTAINER SALES TO BUYERS FORECLOSED BY CONTRACTS RESTRICTING THEIR PURCHASES	
Year	Share of Tyco Sales Foreclosed by Contracts that Restricted Buyer Purchases
Oct. 2001- Dec. 2001	50.19%
2002	55.03%
2003	61.21%
2004	64.17%
2005	63.97%
2006	67.44%
Jan. 2007-May 2007	73.29%

This table shows that between 50.19% and 73.29% of Tyco’s sales made in the sharps container market occurred under exclusionary contracts. This illustrates how pervasive these restrictive contracts were and how important they were to Tyco’s business. Exhibit 6 illustrates these figures.

166. Table 7 then reports what share of the total sharps container market is foreclosed by Tyco’s exclusionary contracts with buyers. For this table, I calculate the foreclosure by multiplying the share of sales Tyco makes to foreclosed buyers (from Table 6) times Tyco’s market share (from Table 1). This gives the total marketwide foreclosure resulting from these exclusionary contracts. Thus, for example, if 60% of Tyco’s sales go to foreclosed buyers and Tyco has a 70% market share, the foreclosure of the whole market will be: $60\% * 70\% = 42\%$.

TABLE 7: SHARE OF SHARPS CONTAINER MARKET FORECLOSED BY TYCO CONTRACTS THAT RESTRICTED BUYER PURCHASES	
Year	Share of Market Foreclosed By Tyco Contracts That Restricted Buyer Purchases
Oct. 2001-Dec. 2001	32.47%
2002	35.91%
2003	38.56%
2004	37.94%
2005	36.73%
2006	37.62%
Jan. 2007-May 2007	39.40%

This table shows that, even if one ignores the additional foreclosing effect of Tyco’s contracts with GPOs, Tyco’s contracts with buyers alone foreclosed between 32.47%-39.40% of the sharps container market. These levels of foreclosure represent substantial foreclosure. In every year, they are above the 20% foreclosure level that standard antitrust economics presumes to be unreasonable.³⁸² Exhibit 7 illustrates these figures.

D. Share of Buyers For Which Free Competition Was Foreclosed by Either or Both Types of Contracts

167. Both GPO contracts and share-based contracts foreclosed free competition by rivals to sell sharps containers to buyers. But GPO contracts and share-based contracts covered groups of buyers that were only partially overlapping. Free competition for some buyers was foreclosed by a restrictive contract, but not a sole-source GPO contract, such as those buyers purchasing through exclusionary contracts brokered by a GPO that did not have a sole-source contract with Tyco. For these buyers, their own contract with Tyco directly restricted their ability to buy from Tyco rivals. Free competition for other buyers was foreclosed by a sole-source GPO

³⁸² See IX AREEDA, ANTITRUST LAW 375, 377, 387 (1991) (20% foreclosure is presumptively unreasonable; XI HOVENKAMP, ANTITRUST LAW 152, 160 (1998) (20% foreclosure and an HHI of 1800 is presumptively unreasonable). Here, Tyco’s approximately 60% market share itself means that the HHI in the market will be over 3600.

contract but not a restrictive contract with the buyer, such as those buyers purchasing through the access tier of a sole-source GPO. Rival competition for the business of these buyers was impaired because Tyco's sole-source GPO contracts raised rival sales and contracting costs by preventing these buyers from purchasing rival products through the GPO they used. Finally, free competition for some buyers was foreclosed by both a sole-source GPO contract and a contract that Tyco used to impose restrictive terms on the buyer. While competition was impaired most for those buyers, it was also impaired for buyers covered by only one of the exclusionary agreements.

168. In Table 8, I present the share of Tyco's sales for which free competition is foreclosed by either or both a restrictive buyer contract or a sole-source GPO contract, and calculate the overall market foreclosure share.

TABLE 8: SHARE OF TYCO'S SALES AND MARKET SALES FOR WHICH FREE COMPETITION WAS FORECLOSED BY EITHER OR BOTH CONTRACTS RESTRICTING BUYER PURCHASES OR TYCO'S SOLE-SOURCE GPO CONTRACTS		
Year	Tyco Foreclosure Share	Market Foreclosure Share
Oct. 2001-Dec. 2001	67.08%	43.39%
2002	65.84%	42.97%
2003	71.34%	44.95%
2004	73.61%	43.52%
2005	81.29%	46.68%
2006	82.01%	45.75%
Jan. 2007-May 2007	88.47%	47.57%

Table 8 shows that Tyco's contracts that restricted buyer purchases or sole-source GPO contracts foreclosed free competition for between 65.84-88.47% of Tyco's sales. Table 8 also shows that free competition for between 42.97-47.57% of total marketwide sharps container sales was foreclosed by either or both exclusionary agreements. Exhibit 8 illustrates these results.

169. The fact that free competition for these sales was foreclosed by Tyco's contracts does not mean that those buyers who do not have either type of contract are unaffected by Tyco's conduct. To the contrary, all buyers in the market were

adversely affected by that conduct, because the overall market foreclosure increased marketwide prices by impairing the competitiveness of Tyco rivals.

IV. THE ANTICOMPETITIVE IMPACT OF THE EXCLUSIONARY CONDUCT

A. The Effect of Foreclosure on Rival Sales

170. Tyco's exclusionary contracts and resulting substantial foreclosure had a large effect on rival sales and distorted the choices that buyers would have made in the but-for world without those contracts. This is important for two reasons. First, it shows that rivals' sales were diminished, which is a necessary condition for two of the three ways in which foreclosure can cause anticompetitive harm that were described in Part I. Second, it rebuts any claim that these exclusionary contracts have no effect. This claim is also rebutted by all the evidence described above that shows Tyco highly valued these types of exclusionary contracts, viewed obtaining them as essential to its business plan, and believed that they excluded rivals.

171. **1. Direct Evidence from Rivals that Tyco's Contracts Had an Exclusionary Effect.** One source of evidence that shows the distorting effect Tyco's exclusionary contracts had is found in the experience of reusables trying to sell their sharps containers to buyers that bought through a restricted GPO and/or had share-based or bundled agreements with Tyco. Specifically, some buyers refused to purchase reusable containers because they were not on their GPO contract, and other buyers refused to purchase reusable products because they were already bound to Tyco's share-based contracts and buying off that contract would incur pricing penalties. This experiential evidence confirms that Tyco's agreements in practice directly influenced the purchasing decisions made by specific buyers and deprived rival sharps container manufacturers of sales that they could have made in the but-for world.

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³⁸³ Skinner Deposition 189.

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³⁸⁴ Skinner Deposition 193.

³⁸⁵ Skinner Deposition 189-193; 205-208. The deposition incorrectly spells “BroMenn” as “Bro-Mann”.

³⁸⁶ Skinner Deposition 191-92.

³⁸⁷ Skinner Deposition 194.

³⁸⁸ Skinner Deposition 192.

³⁸⁹ Skinner Deposition 191.

³⁹⁰ Skinner Deposition 206.

³⁹¹ Skinner Deposition 213

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³⁹² Skinner Deposition 213-14.

³⁹³ Skinner Deposition 215.

³⁹⁴ Skinner Deposition 218-19.

³⁹⁵ DI_01100069-DI_01100070.

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³⁹⁶ DI_01101880.

³⁹⁷ E-mail from Wyatt Knowles to Hank Barnett, Oct. 19, 2004, Plaintiffs' Internal Identification Number STER079252.

³⁹⁸ E-mail from Wyatt Knowles to Hank Barnett, Oct. 19, 2004, Plaintiffs' Internal Identification Number STER079252.

³⁹⁹ E-mail from David Adkins to Alyssa Pickles, July 12, 2006 Plaintiffs' Internal Identification Number STER194270.

⁴⁰⁰ E-mail from Monica Walker to Scott Nickels and Mike Goonewardene, Oct. 19, 2004, Plaintiffs' Internal Identification Number STER079286.

⁴⁰¹ E-mail from Steve Veit to Charlie Alutto et al., March 9, 2007, Plaintiffs' Internal Identification Number STER 195804.

⁴⁰² E-mail from Mike Goonewardene to Brian Bissell et alt., Feb. 9, 2005, Plaintiffs' Internal Identification Number STER095546.

⁴⁰³ *See supra* ¶132.

178. All of this evidence shows that the presence of Tyco exclusionary contracts had a direct effect on the sales of Tyco's rivals' sales. The experience of Daniels and Stericycle shows that they were unable to sell to many buyers who had exclusionary contracts with Tyco or who bought through GPOs that did, even if those buyers preferred the reusable product. Thus, in the but-for world without Tyco's GPO contracts and exclusionary contracts with buyers, Daniels and Stericycle would have been able to gain these additional sales. Given the presence of economies of scale in this market and under standard economic theories that show pricing discretion is related to market share, this means that Tyco's pricing discretion would be less and that marketwide prices for sharps containers would be less.

179. **2. Simultaneous Comparisons Demonstrate Adverse Effect of Tyco's Contracts on Rivals' Sales.** To demonstrate the impact that Tyco's exclusionary contracts have had on Tyco's rivals, I perform simultaneous comparisons of how rivals performed at buyers who were burdened by Tyco's exclusionary contracts versus those that were not. This method controls for exogenous variables other than contract status that might alter rivals' performance and market shares over time, because it looks at shares in two segments of the market at the exact same moment in time. Specifically, I performed four sets of comparisons as I compared the share of sales of Tyco's rivals at (1) restricted versus unrestricted buyers, (2) at buyers that bought through sole-source GPOs and those that did not, (3) at buyers who bought through both types of contracts versus those who did neither, and (4) at buyers who bought through either type of contract versus those who did neither. The only companies that I have data on are Tyco, BD, and Daniels, and thus they are, naturally, the firms I use in my analysis of shares. I limit my comparison to 2003-Oct. 2006, because that is the period for which BD has produced data and for which I have a manual match between Tyco and BD's buyers.⁴⁰⁴ Rivals' shares in the two market segments were measured by dividing the dollars sold by Daniels and BD by the dollar volume sold by Tyco, BD, and Daniels together at each set of buyers. In each comparison that I performed, I found that Tyco's rivals performed far worse at buyers restricted by buyer contracts or that purchased through sole-source GPOs.

⁴⁰⁴ I do not use BD's data before 2003 because BD switched its database and customer numbering system at that point, and my staff only performed a manual match of Tyco customers to BD customers for the data after 2003. BD did not provide a concordance between the numbers of buyers from before 2003 and after 2003. Although it appears to be possible to match the pre-2003 BD data to Tyco's data, such manual matching is a time-consuming process, and I only recently discovered that BD's customer numbers were inconsistent over time and thus my staff has not had an opportunity to perform this match. If BD produces a concordance between its data sets or if my staff manually matches the pre-2003 data, I will supplement my analysis as appropriate. BD did not produce any data after October 2006.

180. First, I examined how rivals performed at buyers who were restricted versus unrestricted by Tyco's contracts. All of Tyco's sales were classified as going to restricted or unrestricted buyers according to the analysis above, and Daniels and BD sales were classified as going to restricted or unrestricted buyers based on a manual matching my staff performed of both Daniels and BD customers with Tyco's customer list. Any BD or Daniels customers that did not match with Tyco's customer list I assumed was unrestricted by Tyco's share-based contracts. In this analysis, contrary to the foreclosure analysis, I did not re-classify hospitals that purchased a significant share from a rival as unforeclosed, because I wanted to make my calculations conservative by biasing them against finding Tyco's conduct caused anticompetitive harm.⁴⁰⁵ This analysis found that rivals performed significantly better at unrestricted buyers than at restricted ones.

It shows that Tyco's rivals do significantly better where Tyco does not have such contracts, winning between 22 to 207 times more market share in the unrestricted segment.

181. Second, I examined the impact sole-source GPO contracts had on the sharps container sales of Tyco's rivals. GPOs were categorized as being sole-source based on the information given in Table 3 above. Then, the manual match of customers between Tyco, BD, and Daniels was used to match the sales of rivals to buyers who bought through Tyco's sole-source GPO contracts and to buyers who bought through Tyco's non-sole-source GPO contracts. Indicators in BD's data were also used to classify buyers who bought through BD's GPO contracts. Any sales that were made to buyers who did not purchase through a GPO contract were excluded from this comparison. For buyers who in a single month purchased through multiple GPOs with different sourcing types, all of their sales were treated as going through the most restrictive GPO (e.g., a buyer with both sole- and dual-source purchases would have all purchases classified as sole-source). This approach is conservative because to the degree buyers were able to buy outside a sole-source GPO, including those purchases and their matched purchases from rivals as occurring under a sole-source GPO contract will increase rivals' share of sales in the segment with the contracts. Similarly, if a buyer made some purchases through a GPO and some not through a GPO, all their purchases in that month were treated as going through a GPO. Tyco's

⁴⁰⁵ To confirm that this approach is conservative, I also ran the comparisons using foreclosed versus unforeclosed buyers only rather than restricted versus unrestricted buyers. In all twelve of the twelve annual observations in the three comparisons that involve restrictive contracts, the gap between the burdened and unburdened market is smaller using restricted buyers rather than foreclosed buyers, making the comparison conservative. The gap is smaller by up to 3.93%. The results thus confirm that my approach of using restricted rather than foreclosed buyers in my comparisons is conservative and understates the harm that Tyco's contracts cause.

rivals perform significantly better at buyers that bought through a GPO but not through a sole-source GPOs than at buyers that bought through a sole-source GPO.

[REDACTED] This comparison shows that Tyco's rivals do 8 to 141 times better at buyers not using Tyco's sole-source GPO contracts.

182. Given that GPO contracts and exclusionary contracts with buyers are two independent reasons why rivals would be less able to sell to buyers burdened by those contracts, I also compare the share of rival sales at buyers that both buy under a sole-source GPO contract and that have an exclusionary contract with Tyco versus the share of rival sales at buyers that buy under a non-sole-source GPO contract and do not have such an exclusionary contract. [REDACTED]

[REDACTED] It shows that Tyco's rivals do 18 to 215 times better in the segment without Tyco's contracts.

183. I also look at how rivals perform at buyers that are burdened with either a sole-source GPO contract or a restricted contract versus those that have neither, meaning those without a restricted contract who buy under either a dual-source GPO contract or who have no GPO contract at all. [REDACTED]

[REDACTED] shows that buyers do 26 to 211 times better in the unburdened group. [REDACTED] confirms what all the other exhibits show, that rivals do significantly worse when Tyco's exclusionary contracts are present than they do at unburdened buyers.

184. To demonstrate that these comparative differences are the result of the contracts buyers are burdened with rather than caused by the specific traits of Tyco's rivals, I also compare Tyco's sales at buyers that have restrictive contracts with BD or that purchase under BD's GPO contracts versus those that do not. If Tyco does worse at buyers that have restrictive contracts or GPO contracts with BD, then that shows it is the contracts that drive buyers' purchasing decisions, not any traits specific to Tyco's rivals. To perform this comparison, essentially the same methodology is used for BD as was used to determine the restricted and GPO status of Tyco's buyers. For GPO status, indicators in BD's data are used. For restricted status, buyers are treated as restricted if there are restrictive terms for the GPO tier that it purchases through. The tier is determined by first using indicators in BD's data to assign buyers to the appropriate tier, but because those were incomplete, these tiers were then supplemented with the contract tiers one can infer from the prices each buyer paid BD

given the terms of the available GPO-brokered contracts.⁴⁰⁶ I do not have information on individual contracts BD had with buyers, and thus include only the standardized contracts brokered by GPOs in my analysis.

185. [REDACTED]

[REDACTED] It shows that Tyco does 9 to 14 times better at buyers that are not restricted by BD. [REDACTED]

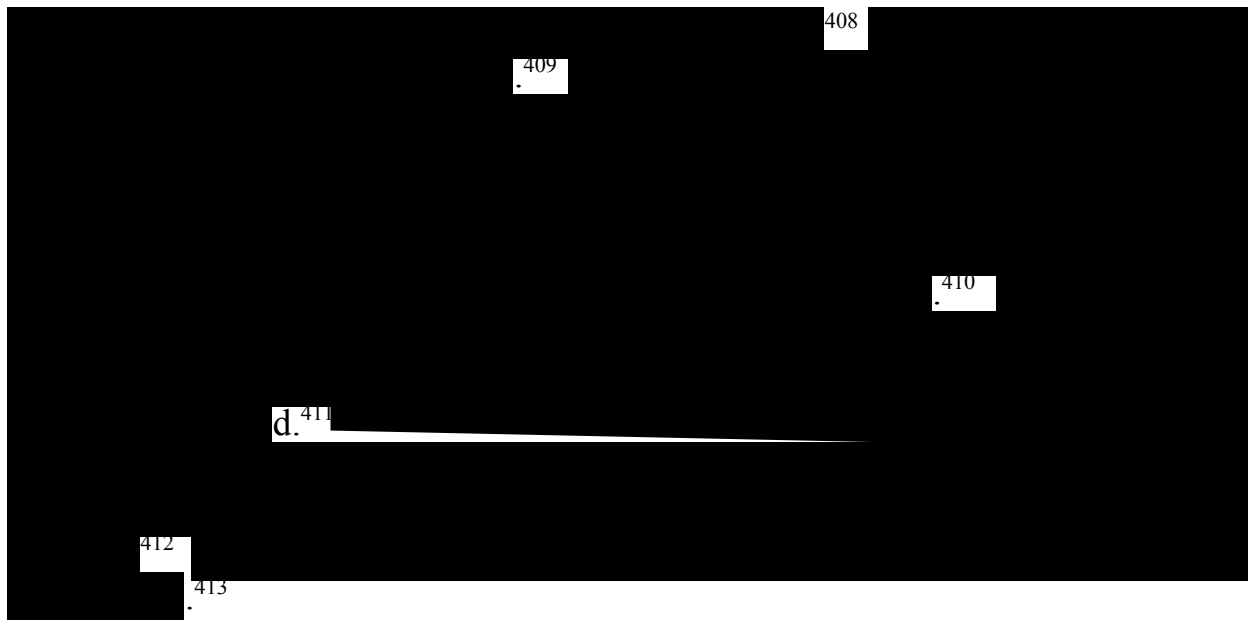
[REDACTED] It shows Tyco does 11 to 12 times better at buyers without a sole source contract. Note that because BD lost its sole-source status at Broadlane in 2004, this comparison only covers two years. [REDACTED]

[REDACTED]⁴⁰⁷ It also shows that Tyco does 12 times better at buyers without BD contracts. Exhibit 16 then shows Tyco's share versus BD at buyers who have either a restrictive contract with BD or purchase under a sole-source BD contract versus buyers who do neither. It shows that Tyco does 9 to 14 times better in the unburdened portion. These comparisons all demonstrate that the performance of Tyco's rivals at buyers burdened by Tyco's exclusionary contracts cannot be explained away simply as resulting from the traits of those rivals or their products, because these types of contracts clearly impair Tyco as well, even though the contracts were imposed by one of the very rivals Tyco excluded.

186. [REDACTED]

⁴⁰⁶ In the discovery, my staff found only pricing terms for BD's GPO-brokered contracts through Novation, Premier, and Broadlane, and thus those were the three GPO-brokered contract terms I used to infer whether buyers were restricted based on the prices buyers paid BD. These GPO-brokered contracts had pricing for multiple restrictive tiers. My staff manually entered the pricing information in these contracts for each tier into a spreadsheet, and then a computer program compared the actual pricing of each buyer to the pricing listed in these contracts to assign each buyer to the appropriate restrictive tier. *See* BD contract prices v2.do (generating these price lists); Full committed volume v33.do (importing these prices lists and matching them with the merged sales data from BD and other buyers).

⁴⁰⁷ [REDACTED]



187. All of these simultaneous comparisons *underestimate* the total loss of sales suffered by Tyco’s rivals due to the exclusionary conduct, because they do not take into account the fact that marketwide foreclosure impaired the efficiency of rivals by preventing them from reaching their economies of scale or using the lowest cost method of sales and contracting, and thus suppressed rival sales even in the unforeclosed segment of the market. But for the marketwide foreclosure, rivals could have achieved more economies of scale and lower sales and marketing costs, and thus achieved a higher market share than they actually earned in the unforeclosed market. The rivals also would have had lower production costs on all their sales in the but-for world without those the exclusionary agreements. And without the marketwide foreclosure, the sharps container rivals could have achieved learning curve economies sooner and achieved greater brandname recognition, which would have led to higher sales. In short, all of these comparisons are highly conservative because they ignore a crucial part of the harm that results from the marketwide foreclosure caused by Tyco contracts. But even so, these comparisons still clearly demonstrate that Tyco’s rivals have been deprived of sales.

⁴⁰⁸ TYN0026584-TYN0026596 at 337; TYN0028297-TYN0028378 at 591.

⁴⁰⁹ TYN0036985-TYN0037031 at 017.

⁴¹⁰ NP/Nov001719-NP/Nov001727 at 719.

⁴¹¹ TYN0108368-TYN0108369 at 368; TYN0013981-TYN0013995 at 987; TYN0134660-TYN0134683 at 681.

⁴¹² CON-NAT 0003611-CON-NAT 0003624 at 613.

⁴¹³ TYN0134660-TYN0134683 at 681.

188. **3. Longitudinal Comparisons Demonstrate Adverse Effect of Tyco's Contracts on Rivals' Sales.** The exclusionary effect that Tyco's contracts had on rivals' sales can also be demonstrated by looking at the available data about how rivals' sales changed over time as Tyco's contracts changed.

189. The exclusionary effect of sole-source GPO contracts is illustrated by comparing rivals' share of sales at Novation [REDACTED]

[REDACTED]⁴¹⁴ I present the comparison for Novation because it is the only GPO that went multi-source by adding BD in addition to the major reusable manufacturers to contract. Consorta added Stericycle and Daniels in late 2006, but I only have data for Daniels, and thus comparisons involving purchase changes at Consorta will not be as informative as this Novation comparison. Premier did not add reusables until June 2007, and I have no data from that period.⁴¹⁵

190. Further, one can perform regressions with monthly dummy variables that control for changes over time to compare the performance of rivals at buyers that are burdened by Tyco's exclusionary GPO contracts or restrictive buyer contracts versus those that are not. This analysis was done by regressing the rivals' market shares relative to Tyco – which was calculated as Daniels sales plus BD sales divided by Daniels sales plus BD sales plus Tyco's sales – against a variable that takes on the value 1 if the buyer is burdened by an exclusionary contract with Tyco and that takes on the value 0 if the buyer is not burdened by such a contract, along with dummy variables for each year. In this regression, each buyer with a separate Tyco customer number is treated as a separate observation. A logarithmic regression rather than a linear regression was used because I do not expect that the rivals' market share will change by the same number of percentage points regardless of the rivals' starting market share. A logarithmic regression, on the other hand, plausibly assumes that the rivals' market share changes multiplicatively. This analysis shows that rivals perform

414 [REDACTED]

415 Note that Stericycle produced some limited data on December 14, 2007. I have not yet had an opportunity to evaluate this data. Once I do, I will update my analysis as appropriate.

significantly better at buyers that were not burdened by Tyco's exclusionary contracts than at those that were.

191. These regressions have been performed for the same four sets of comparisons used in the simultaneous comparisons above. These regressions were performed in two ways: (1) looking at all buyers who fell into each group, and (2) looking at only buyers who fell into each group but switched from being in the burdened segment to being in the unburdened segment, or vice-versa. For example, the second set of regressions includes only those buyers who switched from being restricted by Tyco's exclusionary contracts to being unrestricted by Tyco's exclusionary contracts during the relevant period, or vice-versa. The results of these regressions show how much rivals' market share is depressed by the presence of exclusionary contracts.⁴¹⁶ If the result were -50%, for example, then that would mean that a rivals who had a 40% share among unrestricted buyers would have only a 20% share (that is, 50% less than 40%) among restricted buyers.

192. Table 9 illustrates the findings from these regressions.

⁴¹⁶ The coefficients that result from the regression are in natural logarithms. To convert them to percentage terms, one must raise the constant e to the coefficient and subtract 1. The logarithmic regression $\ln y = c + bx + \epsilon$, where x is a dummy variable indicating the burdened/unburdened segments, is equivalent to $y = \exp(c)\exp(bx)\exp(\epsilon)$. When x goes from 0 to 1, the rival's market share, y , is multiplied by $\exp(b)$. Then, because $\exp(0)$ equals 1, one must subtract 1 to get the percentage change in the rivals market share as their restricted status goes from 0 to 1.

TABLE 9: HOW MUCH LOWER RIVAL MARKET SHARE IS AT BUYERS BURDENED WITH TYCO'S EXCLUSIONARY CONTRACTS		
	All Buyers	Only Buyers Who Have Switched
Sole Source v. Not Sole Source	-40.63%*	-20.60%*
Restricted v. Unrestricted	-78.30%*	60.35%*
Restricted and Sole Source v. Neither	-47.60%*	-31.18%*
Restricted or Sole Source v. Neither	-72.23%*	-40.83%*

* Statistically significant at 5% level.

193. **4. No Alternative Explanation for Rivals' Differential Performance.** My analysis thus far has not found a good alternative explanation for the rivals' differential performance both longitudinally and simultaneously. If and when Tyco offers explanations other than foreclosure that it claims can explain why Daniels and BD's aggregate sales and overall market share increased after GPO contracts became less exclusionary, and after buyers switched from being restricted to being unrestricted, as shown in the regressions performed above, then I will examine those alternative explanations at that time. Likewise, if and when Tyco offers explanations other than foreclosure that it claims can explain why Daniels and BD performed relatively better in buyers that were not burdened with Tyco's contracts than at those who were, then I will examine those explanations and consider whether they provide a better explanation for this observed difference than the adverse effects of Tyco's exclusionary agreements does.

194. **5. Selection Bias Does Not Drive Comparison Results.** One potential objection to these comparisons is that one might claim they suffer from selection bias, meaning that, for example, a buyer who prefers Tyco's product will naturally choose to purchase Tyco's product instead of a rivals' product, and thus a comparison of how rivals perform in the restricted and unrestricted segments of the market might capture the effect of this preference in addition to the effect of the contract. But selection bias cannot explain away the evidence that Tyco's contracts had an exclusionary, anticompetitive effect on its rivals, for several reasons.

195. First, selection bias cannot explain the regression results that are reported above showing how rivals perform at Tyco customers who are and are not burdened by exclusionary contracts and have switched their status over time. These regressions look at the same buyers over time and compare how those same buyers perform when they are and are not burdened by these contracts. These regressions cannot be explained by selection bias because the buyers are the same.

196. Second, selection bias cannot explain why BD and Daniels increased their share of sales at Novation after the Novation sole-source contract ended. Whether a Novation buyer prefers Tyco, BD, Daniels, or some other rival should not be affected by whether Novation had a sole-source contract with a particular firm, because in either case the same products are offered. Instead, any increase in BD and Daniels's share after the end of the sole-source contract is due to the end of Tyco's sole-source contract, which freed buyers to purchase from Tyco's rivals.

197.



198. Fourth, the simultaneous comparisons I perform involving GPO contracts are not subject to selection bias. A buyer's choice to belong to a GPO or to adopt its contracts will generally not be determined by the GPO's policies on a single type of product, such as sharps containers. Rather, buyers will join a GPO and use its programs because of the range of products and contracts a GPO offers. This buyer unwillingness to switch GPOs is illustrated by the evidence that shows there were numerous hospitals that wanted to buy Daniels's product, but could not, because they were restricted by Tyco's GPO programs – in particular, through Novation's Opportunity programs – that encompassed many other products.

199. Fifth, the claim that selection bias drives all of the observed effects hinges on the notion that buyers will choose to buy from Tyco regardless of the contract Tyco offers those buyers and that the contracts do not affect whether the buyer purchases from Tyco or not. But if this were the case, then Tyco would have no reason to charge lower prices to compliant buyers. Similarly, Tyco would not have incentives to pay GPOs higher administrative fees for sole-source agreements unless those contracts affected buyer purchases. In fact, Tyco does both. These types of payments would only be economically rational if Tyco thought that its contracts caused buyers to purchase more from Tyco than they would have bought in the but-for world without the exclusionary terms. Thus, the very structure of Tyco's exclusionary contracts themselves rebut the claim that selection effects explain the differences shown in these comparisons.

B. Effect of Substantial Foreclosure on Monopoly Power

200. The above-noted substantial market foreclosures have enhanced and/or maintained Tyco's market share above the levels that would have obtained without the challenged contracts. This results in anticompetitive harm and higher prices in the sharps container market for three reasons described in greater depth in Part I above.⁴¹⁷ First, it results in higher prices to the degree that rivals are deprived of market share that takes away valuable economies of share that they could have obtained in the but-for world without Tyco's contract. Second, it results in higher prices to the degree that rivals are made less efficient by being deprived of the most efficient means of brokering sales because this will raise rivals' costs. This anticompetitive harm can arise even if rivals have not been deprived of any sales or market share. Third, substantial foreclosure will result in higher prices if rivals are anticompetitively deprived of market share and have non-infinite elasticities of supply, because standard economic models show that a dominant firm's pricing power is directly related to the dominant firm's market share. This will be true even if rival efficiency is not impaired or its costs are not raised, but the effects from depriving rivals of market share are even greater if their efficiency is impaired or their costs are raised.

201. Here, the evidence recounted above shows that there are substantial economies of scale in producing sharps containers and that Tyco's smaller rivals have

⁴¹⁷ I also discussed the economic theory of why substantial foreclosure causes adverse effects in depth in my class certification declaration and incorporate that analysis by reference here. *See* Elhaug Declaration ¶¶28-32.

not achieved all their economies yet.⁴¹⁸ The data from Tyco, BD, and Stericycle confirm the presence of economies of scale. [REDACTED]

[REDACTED].⁴¹⁹ Testimony from Tyco [REDACTED] and Tyco's own documents further confirm the presence of economies of scale.⁴²⁰ The evidence also suggests Daniels recognized the presence of economies of scale in this market.⁴²¹ All of this implies that by foreclosing rivals and reducing their sales and market share, that Tyco has prevented its rivals from obtaining the economies of scale.

202. One can also infer that rivals' costs were raised by being foreclosed from access to GPO brokerage services. I have not yet found in the available discovery a specific quantification of the degree to which these costs were raised. [REDACTED]

[REDACTED].⁴²² The same effect is illustrated by BD and Daniels's increased share at Novation after the Tyco sole-source contract there ended. It is also illustrated by the regressions discussed above comparing rivals' market shares to buyers that bought through GPOs that were and were not barred from brokering sales by Tyco rivals. Further, the fact that both Stericycle and Daniels pursued GPO contracts suggests that they believed having those GPO contracts would make it cheaper for them to broker contracts.

203. Finally, the evidence shows that rivals' elasticity of supply is non-infinite, which means that Tyco depriving rivals of market share will increase Tyco's pricing power under standard antitrust economics. Tyco's sharps container rivals have less than infinite elasticity of supply because they cannot expand their output instantaneously to meet all the needs in the market if Tyco increased its price. As a general matter, the sharps container market has high barriers to entry and expandability that make it implausible to believe that rivals could instantaneously increase their sales to fulfill the entire the needs of the market.⁴²³ More specifically,

⁴¹⁸ See *supra* ¶¶96-104.

⁴¹⁹ See *supra* ¶¶100-102.

⁴²⁰ Blazejewski Deposition 197; [REDACTED]

⁴²¹ See *supra* ¶102.

⁴²² See *supra* ¶¶172-74 [REDACTED]

⁴²³ See *supra* Part II.C.1.

the small size of current rivals makes it implausible to believe they could fill the whole market. BD produces only approximately one-half of the sharps containers Tyco does, and it is thus implausible to believe that BD could immediately double its output to meet all the market needs without building additional capacity, hiring new employees to manufacture and sell their product, or the like. Similarly, reusable manufacturers at their peak market share as a whole had a market share that was approximately only one-fourth of Tyco's, so it is implausible to believe that they could instantaneously quadruple their output without substantial investments. Reusables also have additional barriers to expansion, because providing reusable service not only requires additional manufacturing and salespeople, as do disposables, but also requires the reusable firm to have enough plants, trucks, and drivers to service every buyer. Reusable firms also need to obtain permits from state and local governments to haul medical waste, which are not likely to be granted immediately.

204. Further, even if one believed contrary to fact that rivals could expand instantaneously to supply the full needs of the market, buyers would incur switching costs in changing the sharps containers that they currently purchase. This is because they have hardware installed that is specific to the sharps containers they already use, not to mention staff familiarity with the current sharps containers as well as familiarity and comfort with their current supplier in providing the vital service of disposing of sharps.⁴²⁴ In other words, there are switching costs that prevent customers from immediately switching to purchase their sharps containers from Tyco's rivals in response to price increases. Thus, some customers would not immediately switch to Tyco's rivals even if rivals were able to supply them. All of this means increasing Tyco's market share will increase its pricing power due to the fact that rival supply elasticity is non-infinite.

205. Even if one were to reject all of the above evidence that shows Tyco's conduct had an anticompetitive effect on rivals, as a matter of standard antitrust economics, such an effect could be inferred even without direct evidence. As a matter of antitrust economics, one can infer likely anticompetitive effects from a substantial market foreclosure share when coupled with the absence of any redeeming procompetitive efficiencies. Here, substantial market foreclosure exists for the reasons indicated above, and procompetitive efficiencies are absent in this case, as I discuss below.

⁴²⁴ See *supra* ¶105.

206. Inferring harm from substantial foreclosure and the absence of procompetitive efficiencies makes economic sense for at least two reasons. One is that it is often difficult to demonstrate harm directly, yet economic theory predicts that such harm is likely. For example, foreclosure could have prevented rivals from entering the market. In this case, there would be little or no evidence of the harm other than the presence of the substantial foreclosure itself. Or foreclosure could have prevented rivals from gaining their efficiencies, but it may be difficult to assess exactly what those rivals' efficiencies would have been in the but-for world, because rivals have never had an opportunity to expand their production. In these cases, if one did not infer harm from substantial foreclosure, then one would wrongly underestimate the existence of or amount of harm caused by exclusionary conduct. A second economic reason for inferring harm from the presence of substantial foreclosure and the absence of procompetitive efficiencies is that businesses can be assumed to be economically rational. A dominant firm like Tyco would not invest its resources to secure numerous exclusionary contracts unless by doing so it derived some benefit from those contracts. Here, the absence of any procompetitive efficiencies associated with these contracts means that the only benefit Tyco could have gained from these contracts would be the benefit arising from the anticompetitive exclusion of rivals that increases Tyco's market power.

C. Lack of Redeeming Efficiencies

207. The analysis above indicates these exclusionary agreements have significant anticompetitive effects. Thus, absent procompetitive efficiencies that are passed on to customers and are large enough to offset these anticompetitive effects, these agreements must on balance be anticompetitive and inefficient as a matter of antitrust economics. I have not seen any evidence of procompetitive efficiencies arising from Tyco's contracts in this case, although Tyco in its opposition to class certification proffered two alleged justifications that are red herrings.

208. In opposing class certification, Tyco and its experts claimed that its contracts are procompetitive because they provide volume efficiencies.⁴²⁵ This claim is flawed for the reasons I articulated in my reply declaration on class certification,

⁴²⁵ Ordover Declaration ¶56 (“[A] commitment to buy a large volume will allow for the negotiation of lower prices”); *id.* at ¶57 (“[B]ecause the GPO is attempting to consolidate the voluntary purchases of independent entities, it needs to attract volume.... A mechanism that encourages both large and small health-care providers to participate is crucial to the efficient aggregation of volume through the GPO”).

and I have seen no evidence to change my opinion on this issue.⁴²⁶ Tyco never explains why it would use *share*-based contracts to achieve *volume*-based efficiencies, when it could instead use *volume*-based contracts to achieve *volume*-based efficiencies. Nor does Tyco ever explain how it promotes volume-based efficiencies to give a buyer that bought \$1,000 of sharps container exclusively from Tyco a better price than one that bought \$100,000 of sharps containers from Tyco but also bought \$30,000 from Daniels, as Tyco's share-based contracts would. Further, if Tyco's claim is that Tyco's contracts provide volume-based efficiencies to buyers, then Tyco's position is even more clearly flawed because Tyco would not need to structure its contracts to induce GPOs or individual buyers to purchase a large volume from Tyco if doing so gave the buyers an efficiency benefit, because if it did, buyers would already have incentives to purchase significant volumes from Tyco.

209. True, Tyco does occasionally use volume requirements in its contracts, but these volume requirements are either (1) tailored to the individual volume that buyers purchased in the prior period, or (2) coupled with share-based requirements. Both types of contracts are exclusionary. Start with tailored volume-based contracts. As discussed above, even though these contracts nominally appear to be volume-based, they are functionally equivalent to share-based commitments because the volume-based requirement is unique to each individual buyer. A true volume based discount would, in contrast, give the same discount for the same volume to different buyers.⁴²⁷ The tailored volume-based discounts do not do this and would give a better price to a buyer that bought \$1,000 in sharps containers from Tyco every year than to a buyer who bought \$130,000 in sharps containers from Tyco one year but then bought \$100,000 from Tyco and \$30,000 from Daniels the next year.

210. Nor are contracts that couple share-based and volume-based requirements unobjectionable. While volume requirements may serve procompetitive efficiencies standing on their own, they do nothing to alter the exclusionary effect of the share-based requirements that Tyco used in conjunction with the volume-based requirements. For example, in some standardized GPO contracts, Tyco required buyers to both comply with share-based requirements and meet volume-levels to get the best pricing. Those share-based requirements excluded rivals by preventing the buyers from freely switching their volume to a rival, and the presence of an additional

⁴²⁶ See Elhauge Reply Declaration ¶44.

⁴²⁷ ELHAUGE & GERADIN, *GLOBAL ANTITRUST LAW & ECONOMICS* 632 (Foundation Press 2007) (“[V]olume-based efficiencies support only volume-based discounts that are uniform in the sense that every buyer can get the same discount if it buys the same volume.”).

volume requirement does nothing to change this. If anything, the fact that Tyco used volume and share-based requirements together shows that share-based requirements in general did not serve volume-based efficiencies. If share-based requirements did so, there would be no need for Tyco to combine share-based and volume-based conditions in its contracts, because contracts with only share-based requirements would achieve the same efficiencies.

211. Tyco and its experts also offer the claim that GPOs are efficient as a procompetitive benefit in their opposition to class certification.⁴²⁸ But this is not at all a justification for Tyco's exclusionary contracts with GPOs, and thus is a complete red herring, as I explained in my reply declaration on class certification issues.⁴²⁹ The issue here is not whether GPOs are efficient, but rather whether efficiencies are advanced by the exclusionary terms in Tyco's contracts with GPOs and buyers. On that crucial issue, Tyco and its experts provide no evidence that Tyco's exclusionary terms are procompetitive. Nor have I seen any evidence in my review of the case materials to suggest that the exclusionary terms used in Tyco's GPO contracts are procompetitive. In fact, GPOs *are* extremely efficient. This is part of the reason why it is highly anticompetitive for Tyco to foreclose rivals from access to GPO brokerage services. In other words, the concession by Tyco's expert that GPOs are highly efficient in fact supports the claim that Tyco's conduct has anticompetitively harmed buyers.

212. Tyco's expert seems to think otherwise because he believes that GPOs would not exist if exclusionary agreements did not exist.⁴³⁰ But this has no basis in theory or fact. There is no reason to believe that GPOs would stop brokering contracts if they did not have exclusionary deals with Tyco or if those brokered contracts did not have exclusionary terms in them. In fact, in the instant case, GPOs have continued to broker contracts even after multiple reusable companies have been added to the GPO contract, proving that GPOs will broker contracts even without sole-source agreements. Further, the GPOs have brokered contracts with reusables that do not contain exclusionary terms such as share-based requirements, showing that they are both able and willing to broker contracts with buyers that are not themselves exclusionary.⁴³¹ Tyco's expert's claim that GPOs and their efficiencies would not

⁴²⁸ Ordover Declaration ¶¶54-57.

⁴²⁹ Elhauge Reply Declaration ¶¶42-43.

⁴³⁰ Ordover Declaration ¶¶54-57, 86.

⁴³¹ *See, e.g.* [REDACTED]

exist without Tyco's exclusionary conduct thus is not only theoretically baseless, but it is also directly refuted by the actual behavior of GPOs adding reusable sharps containers to their contracts.

213. Nor have I found any other mention at all of procompetitive efficiencies for the challenged agreements in my review of the discovery in this case, let alone the type of concrete evidence that quantifies those efficiencies and shows they are passed on to buyers. This type of concrete evidence would be required to offset the anticompetitive effects that the evidence suggests exist here and that standard antitrust economics infers from substantial foreclosure. Therefore, I conclude that the challenged agreements are anticompetitive and inefficient. If Tyco later offers additional procompetitive efficiency justifications for its conduct, I will examine them and consider whether they are persuasive and sufficient to change my conclusions.

CONCLUSION

214. I conclude that the relevant market includes all sharps containers. In this market, Tyco has had monopoly power throughout the relevant period, as indicated by its high market share coupled with entry barriers, its power over prices, and its power to exclude rivals. Tyco has abused this market power to enter into two types of exclusionary agreements: (1) agreements with GPOs that foreclose rivals from accessing GPO brokerage services; and (2) agreements with buyers that foreclose rivals from selling sharps containers to buyers. The first set of agreements have substantially foreclosed the GPO brokerage services market, and the second has substantially foreclosed the sharps container market. The experience of rivals competing in the sharps container market demonstrates that these contracts have impaired their sales. The direct evidence also shows that this substantial foreclosure has caused anticompetitive effects. Further, under standard antitrust economics, even if there were not the direct evidence of harm from Tyco's conduct, a net anticompetitive harm can be inferred from the presence of substantial foreclosure and the absence of any redeeming efficiencies. Here, I have found no evidence of procompetitive efficiencies. I conclude that Tyco's exclusionary contracts have anticompetitively raised prices and harmed buyers.

STATEMENT OF PUBLICATIONS, PRIOR TRIAL AND DEPOSITION TESTIMONY, & COMPENSATION

I. Publications

My publications from the last 10 years are listed on my CV, which is attached as Exhibit A.

II. Trial and Deposition Testimony

Within the past four years, I have provided deposition testimony in *Retractable Technologies v. Becton Dickinson* on January 23, 2004; *Masimo v. Tyco* on March 30-31, 2004 and October 2, 2006; *Spartanburg Regional Healthcare System v. Hillenbrand Industries* on September 16, 2004 and August 9, 2005; *Applied Medical Resources v. Ethicon* on August 11, 2005; *Rochester Medical Corporation v. C.R. Bard* on December 4-5, 2006 and May 31, 2007; *Louisiana Municipal Employees' Retirement System v. Crawford* on February 9, 2007; *Amgen v. F. Hoffman La Roche* on May 25, 2007; and *NCAA v. White* on October 22, 2007. I also testified at trial in *Masimo v. Tyco* on March 1-2, 2005; in *Applied Medical Resources v. Ethicon* on July 27-28, 2006, and August 22, 2006; and in *Amgen v. F. Hoffman La Roche* on December 7, 2007.

III. Compensation.

I am being compensated at a rate of \$850 per hour for my work on this case.

Exhibit 1:

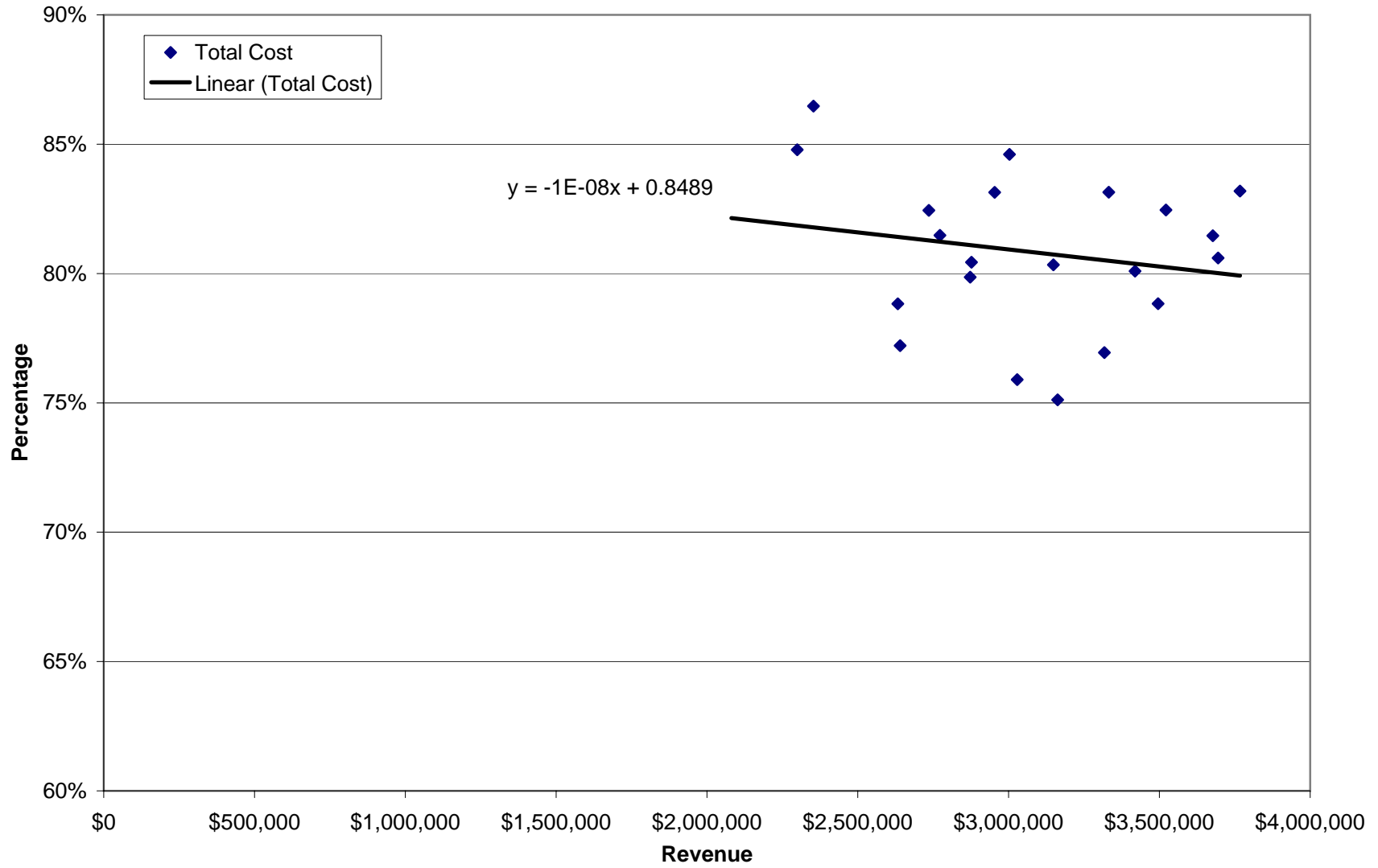


Exhibit 2:

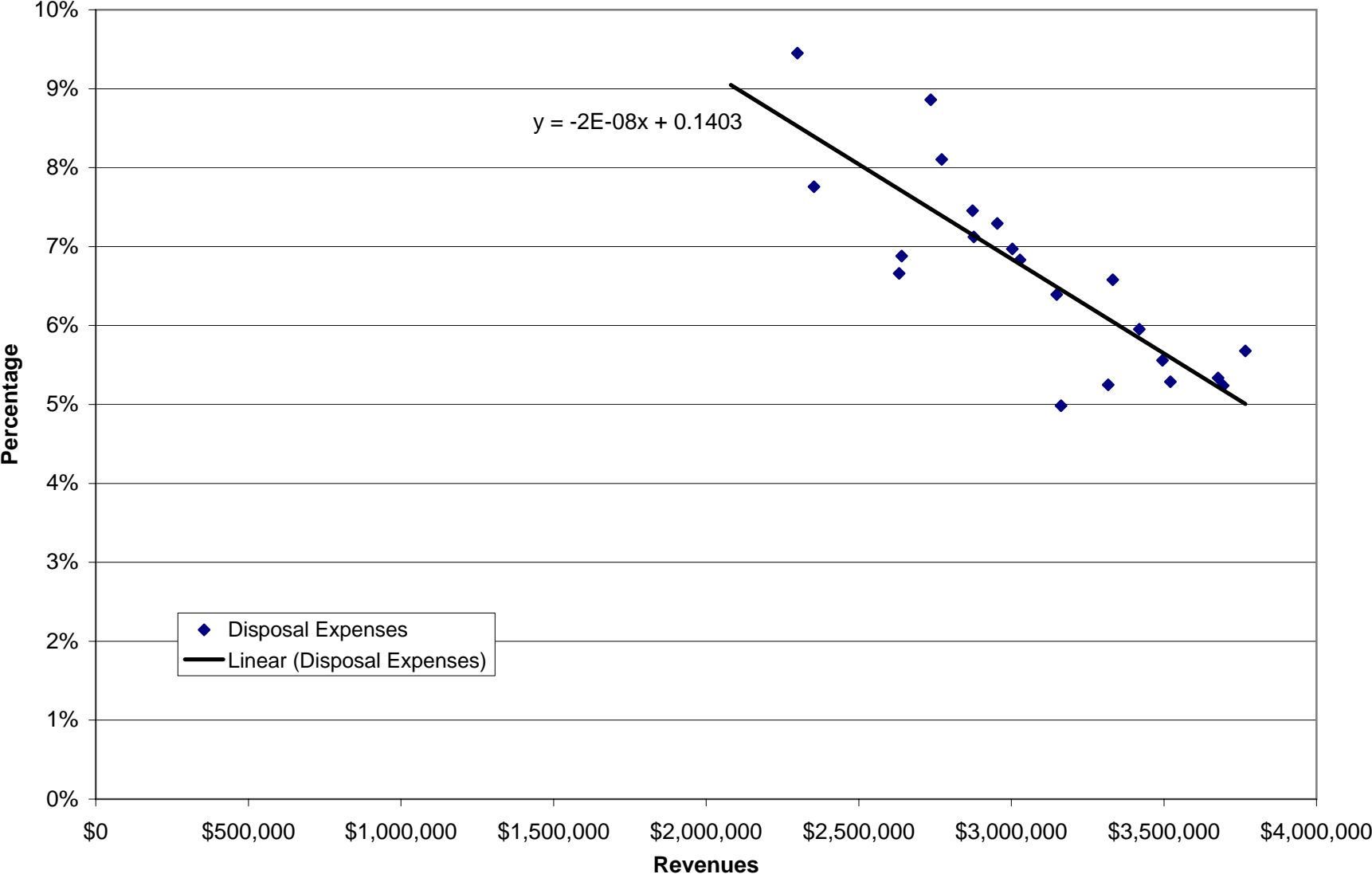
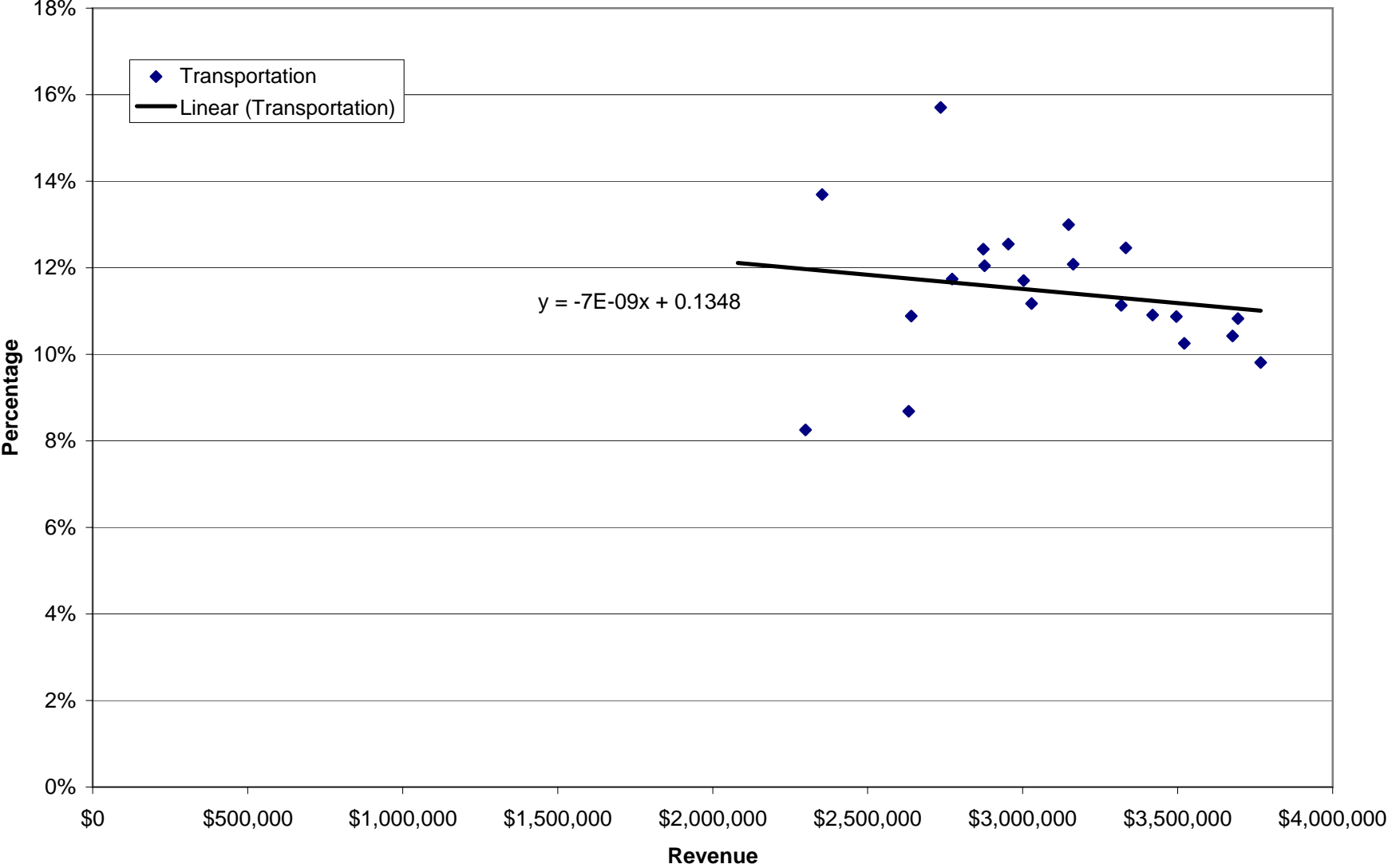


Exhibit 3: [Redacted]



**Exhibit 4: Share of GPO Brokerage Market Foreclosed
by Tyco's Sole Source Contracts**

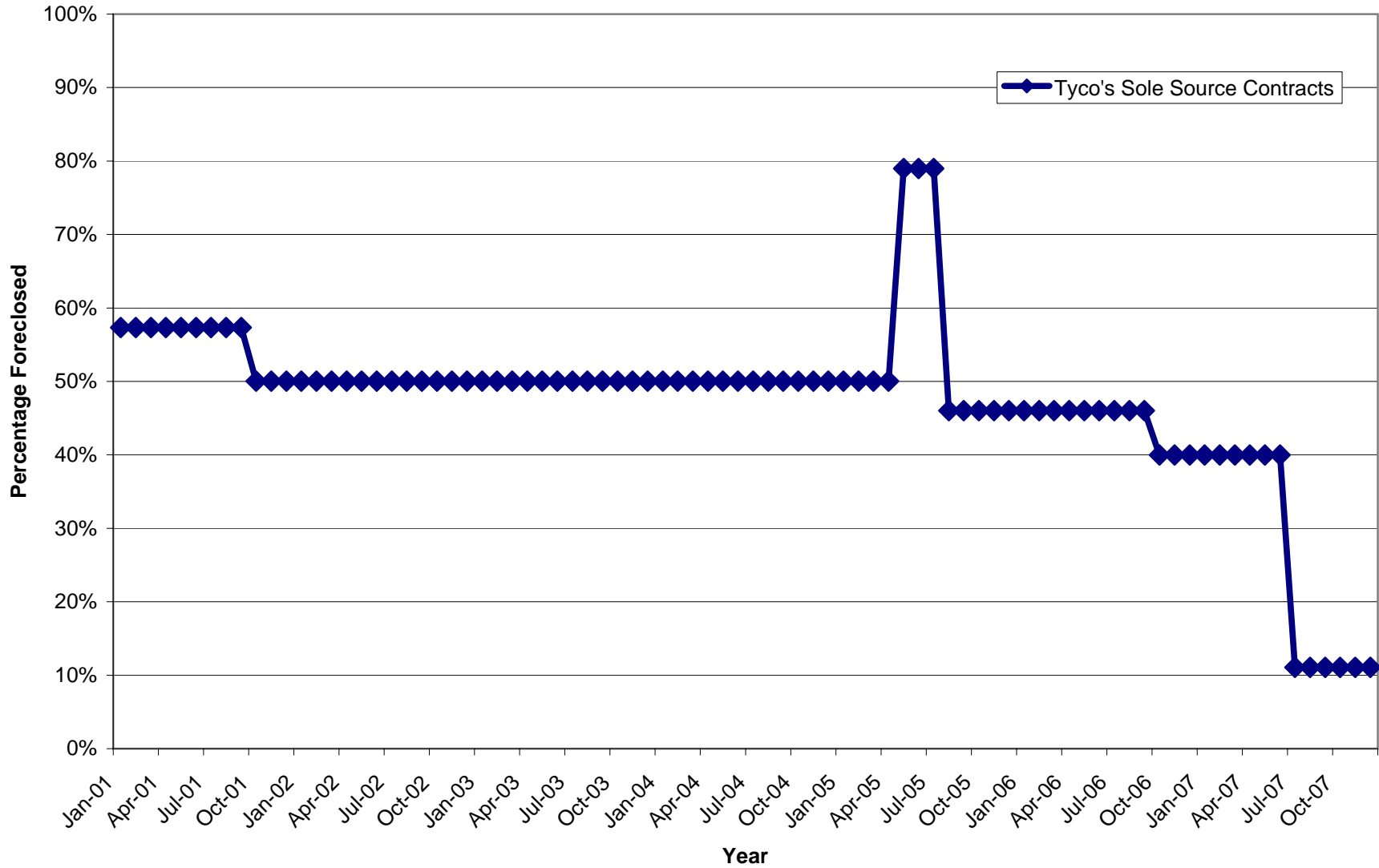


Exhibit 5: Share of Sales of Sharps Containers Made to Buyers Purchasing Under a Tyco Sole-Source GPO Agreement

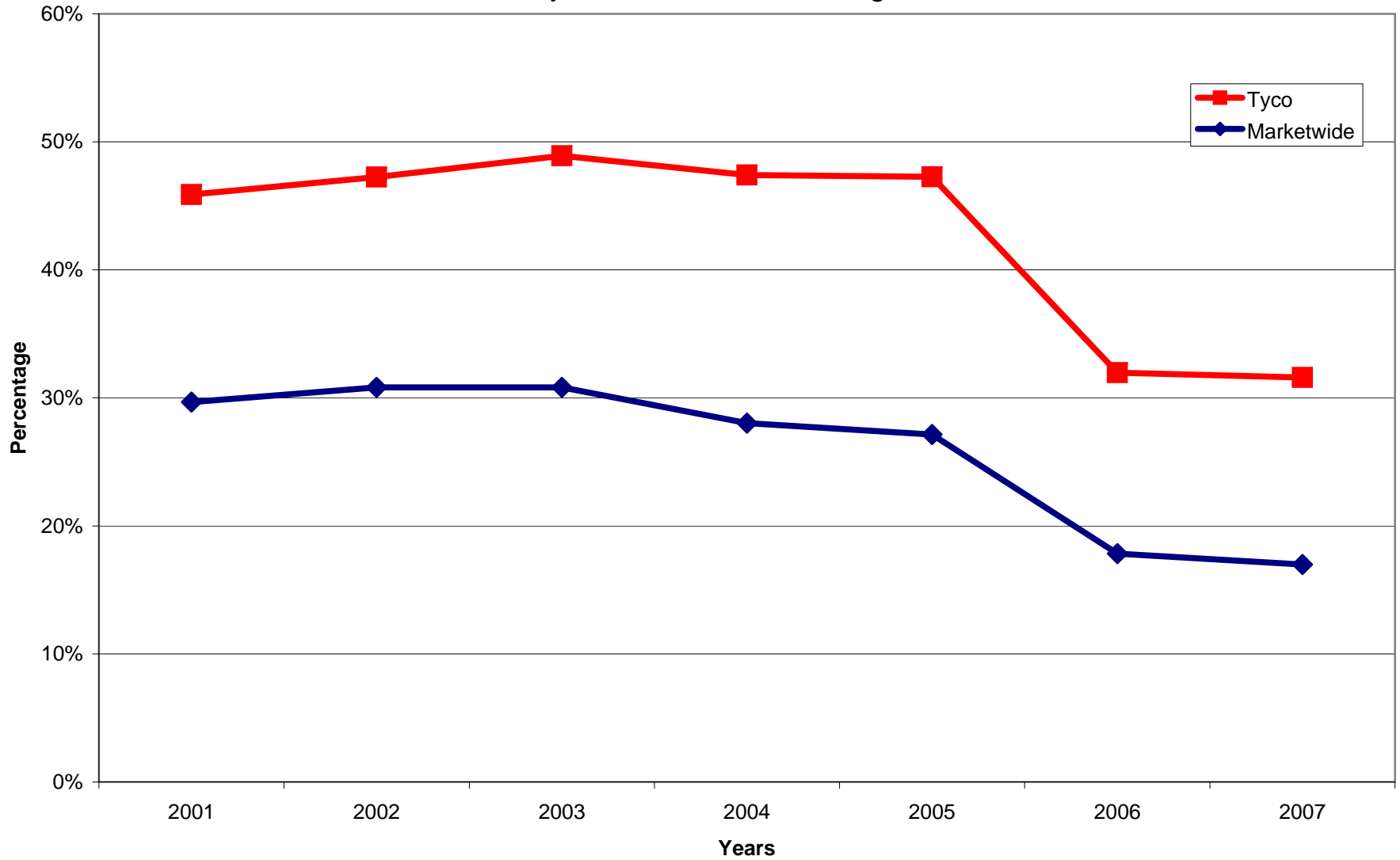


Exhibit 6: Tyco's Share of Sales of Sharps Containers to Buyers Foreclosed by Tyco's Exclusionary Contracts with Buyers

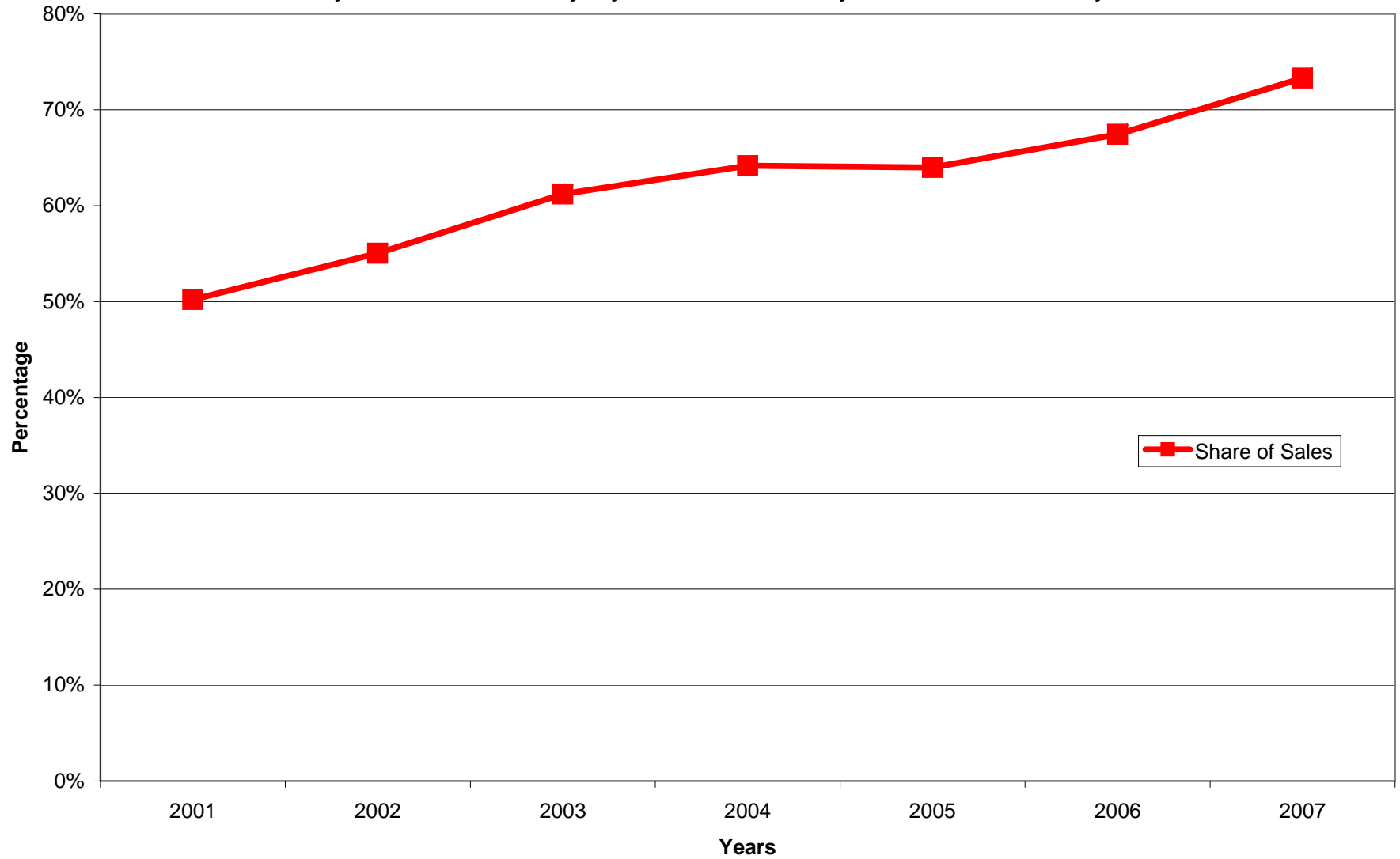


Exhibit 7: Marketwide Foreclosure of Sharps Container Market
Caused by Tyco's Exclusionary Contracts with Buyers

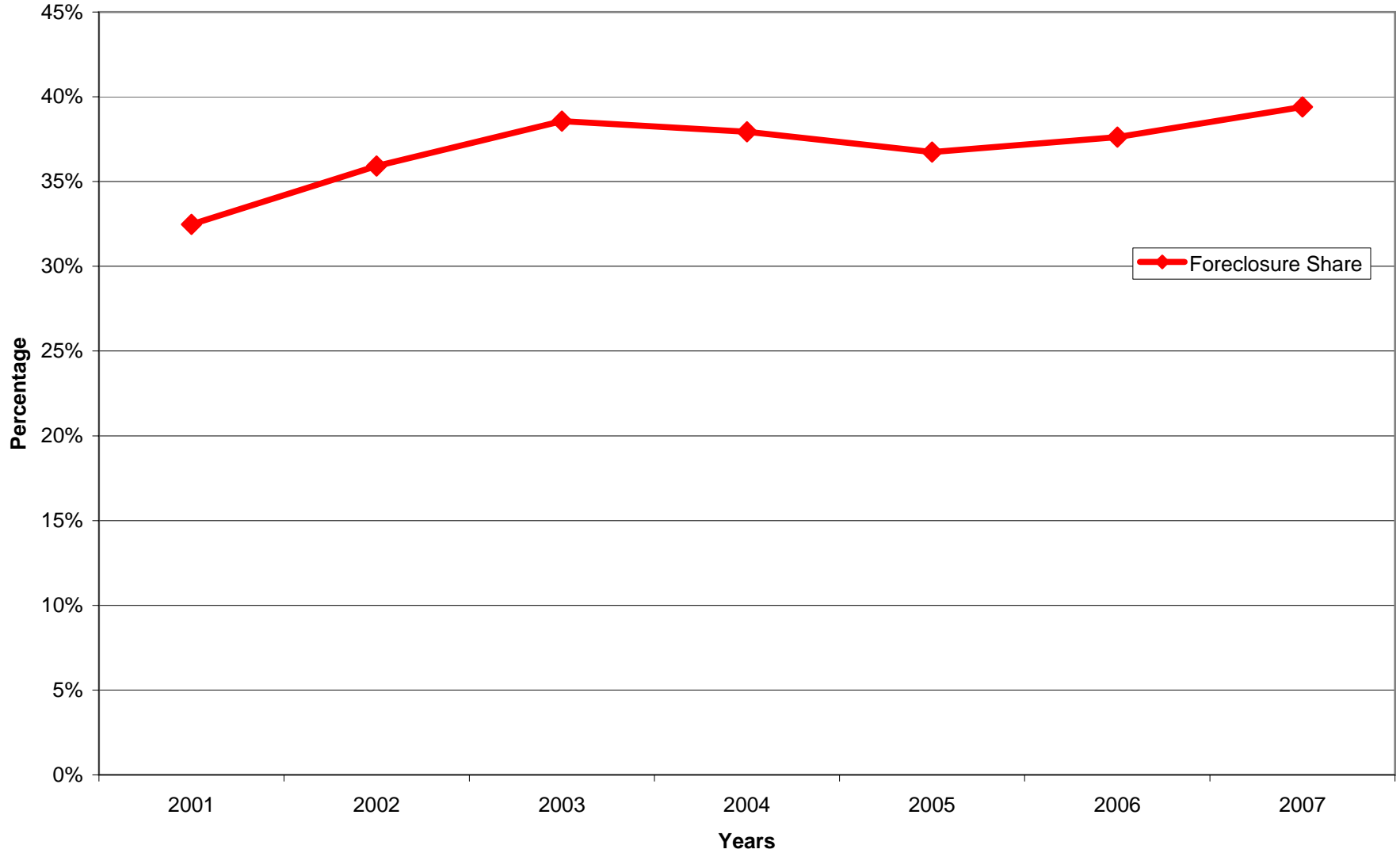


Exhibit 8: Share of Sales Where Free Competition Was Foreclosed by Either Tyco's Exclusionary GPO Contracts or Tyco's Exclusionary Contracts with Buyers

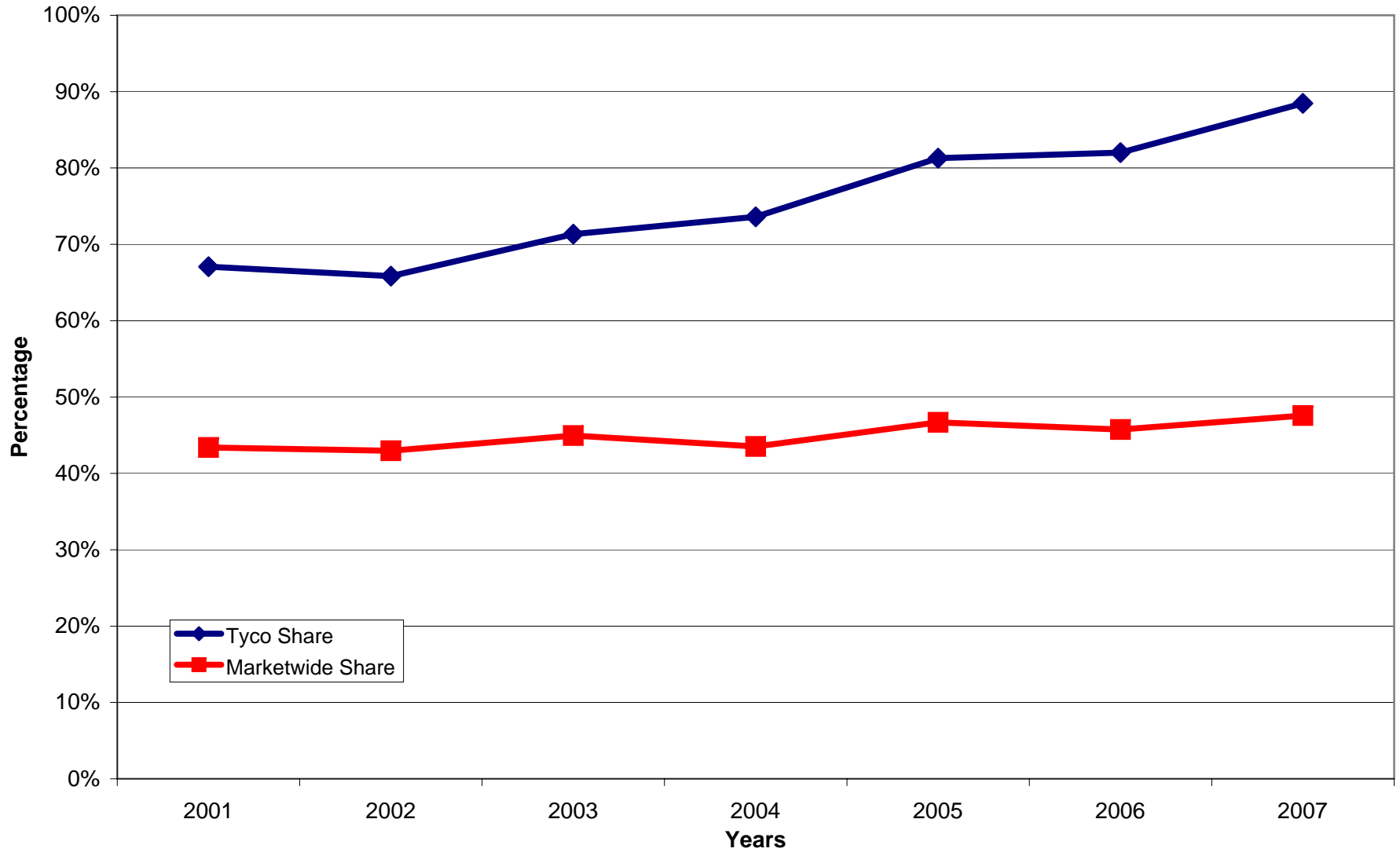


Exhibit 9: Daniels and BD Share of Sales at Buyers
Restricted by Tyco's Exclusionary Contracts with Buyers and Not

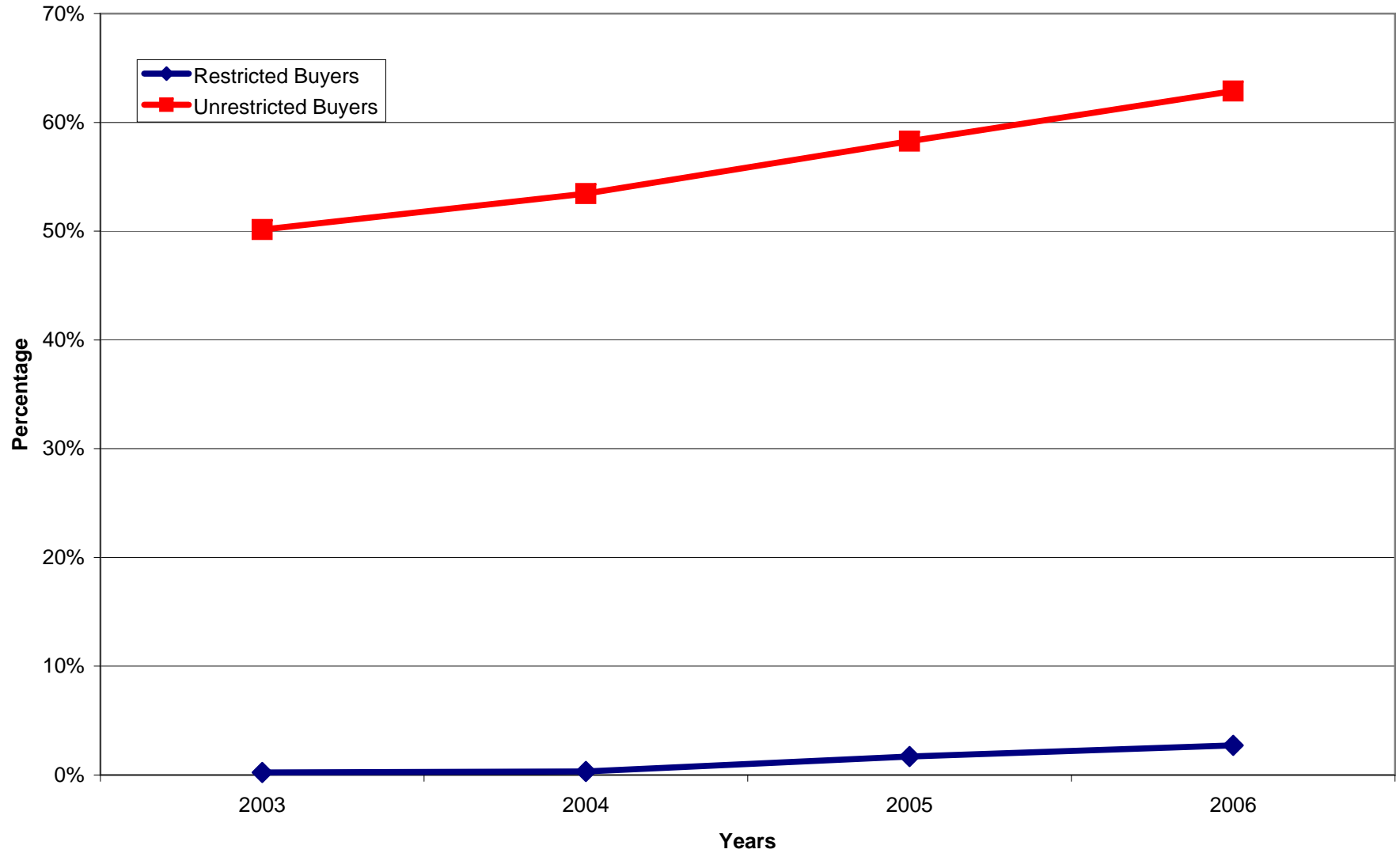


Exhibit 10: Daniels and BD Share of Sales at Buyers Purchasing Under Contracts Brokered by Sole-Source Tyco GPOs Versus Not

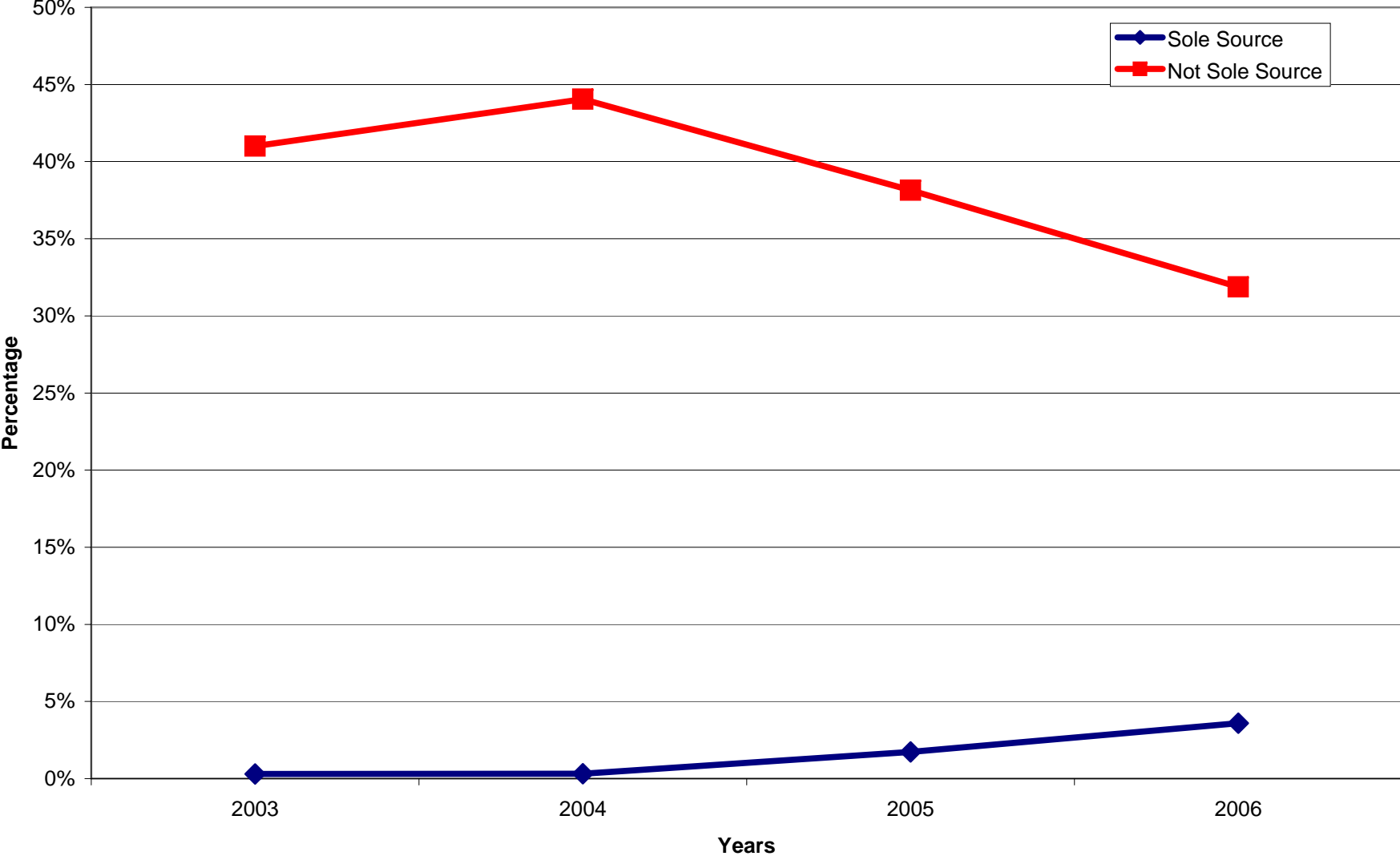


Exhibit 11: Daniels and BD Share of Sales at Buyers that are Restricted by Tyco And Buying Under a Sole-Source Tyco GPO Contract Versus Buyers Burdened with Neither

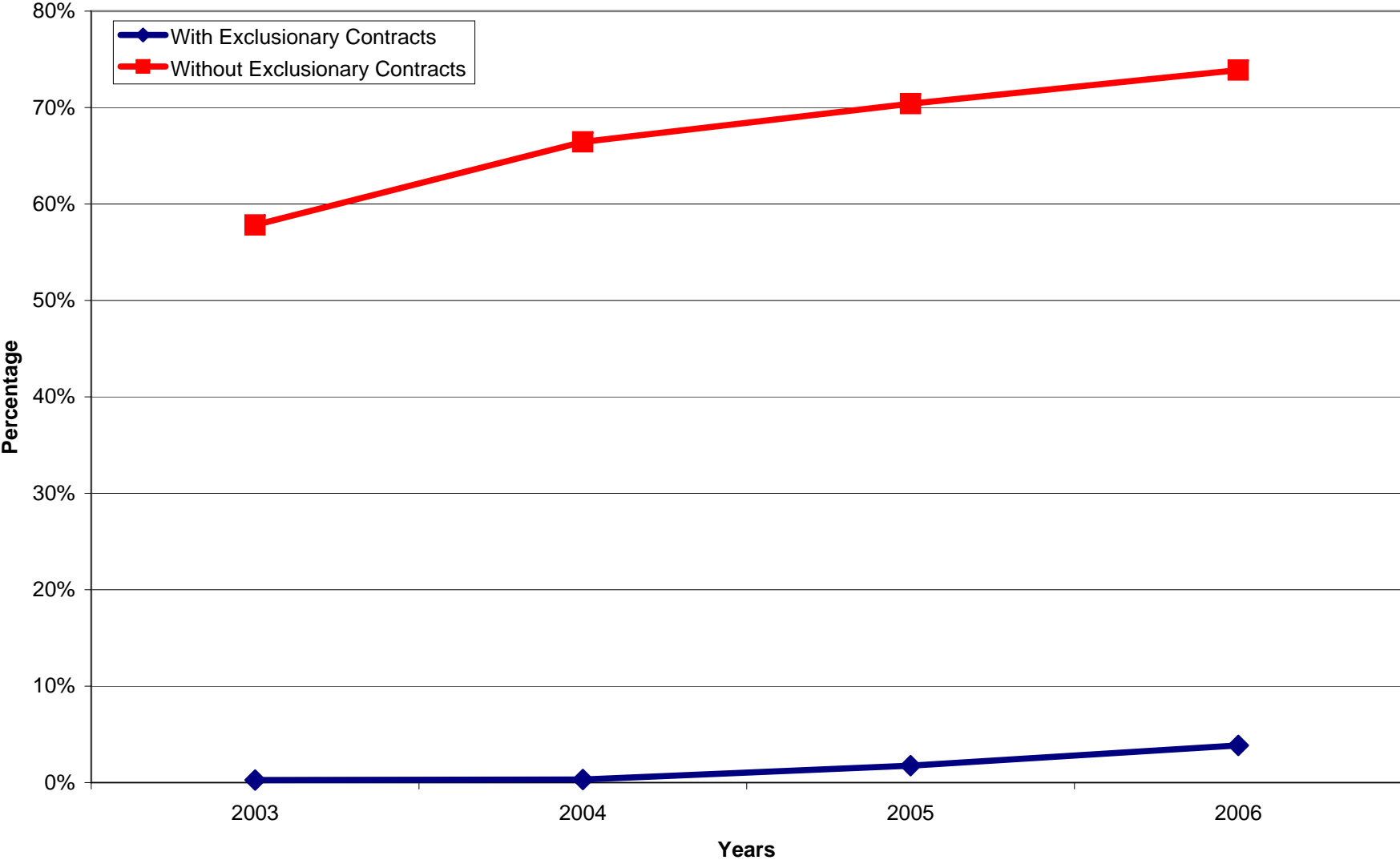


Exhibit 12: Daniels and BD's Share of Sales at Buyers that are Restricted by Tyco or Buying Under a Sole-Source Tyco GPO Contract Versus Buyers Burdened with Neither

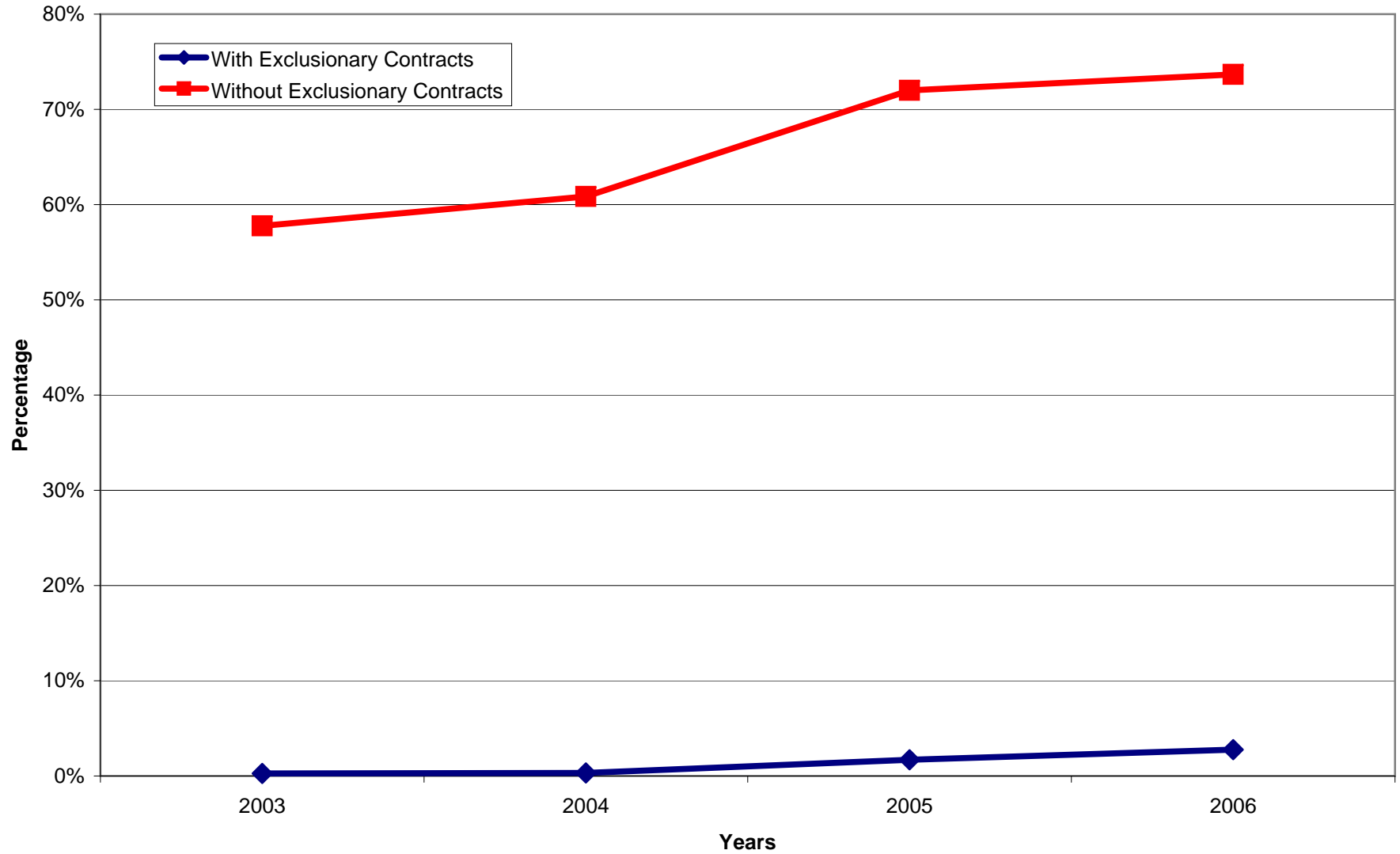


Exhibit 13: Tyco Share of Sales at Buyers Restricted by
BD's Contracts with Buyers and Not

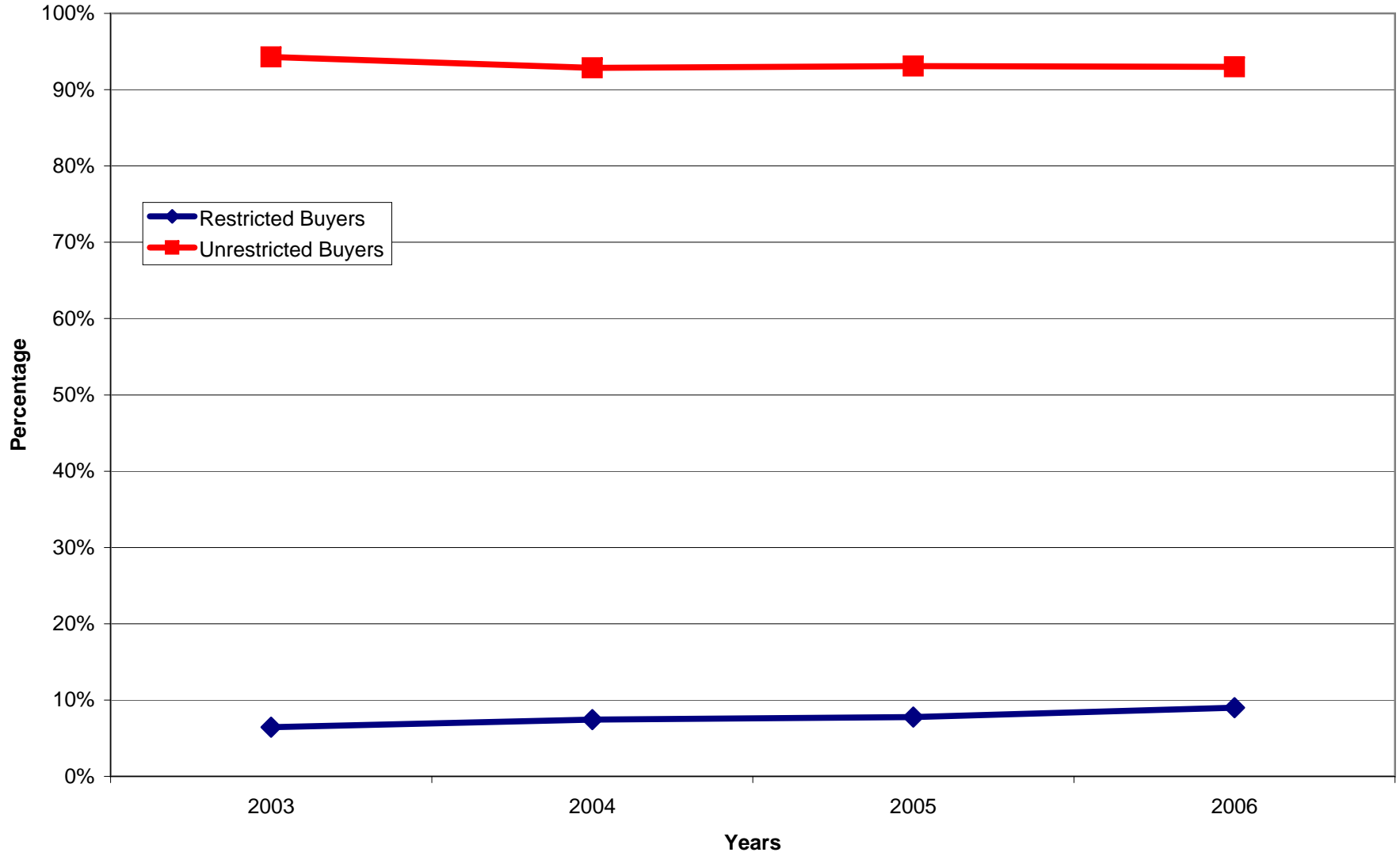


Exhibit 14: Tyco Share of Sales at Buyers Purchasing Under Contracts
Brokered by a Sole-Source BD GPO and Not

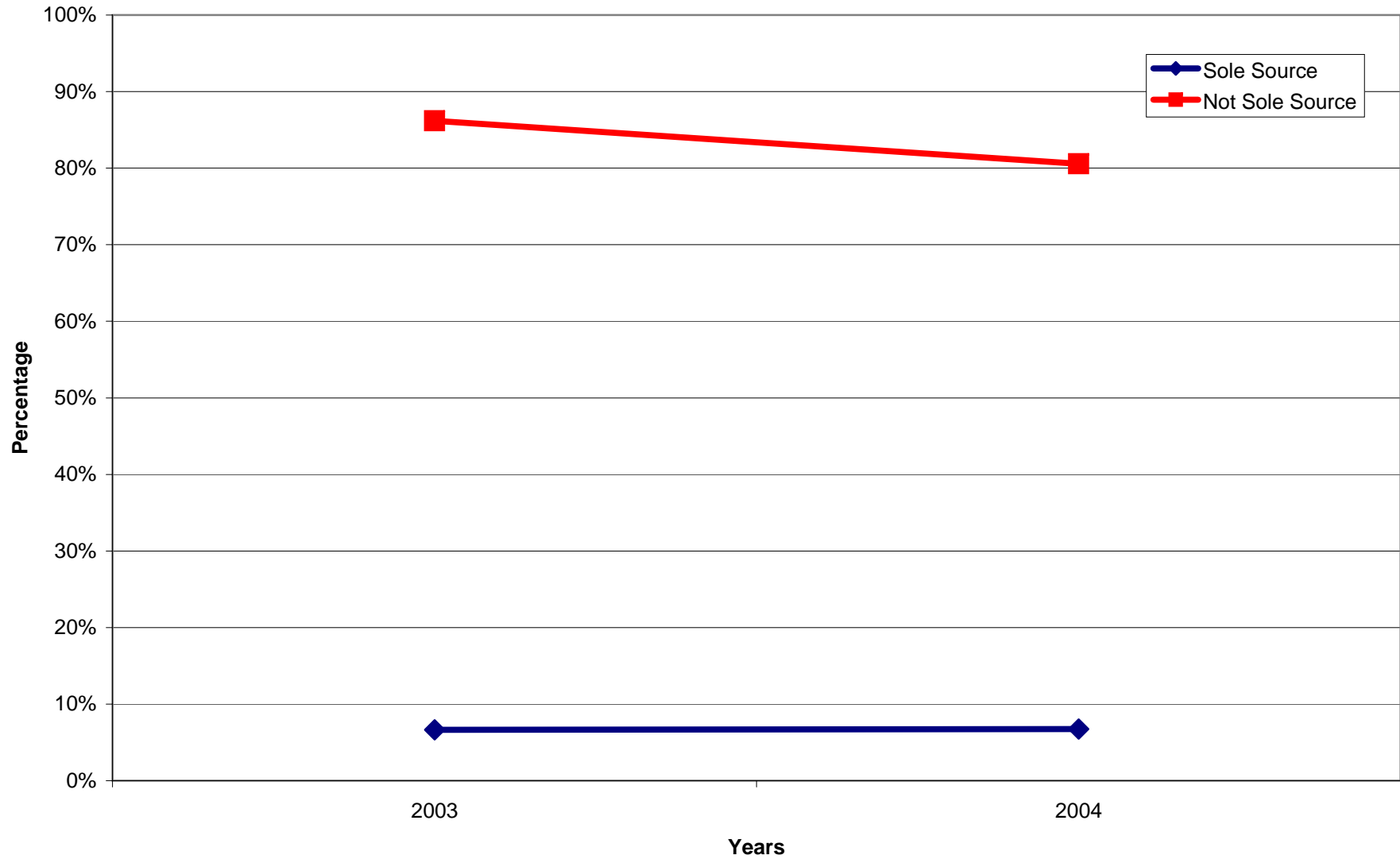


Exhibit 15: Tyco Share of Sales at Buyers that are Restricted by BD And Buying Under a Sole-Source BD Contract Versus Buyers Burdened by Neither

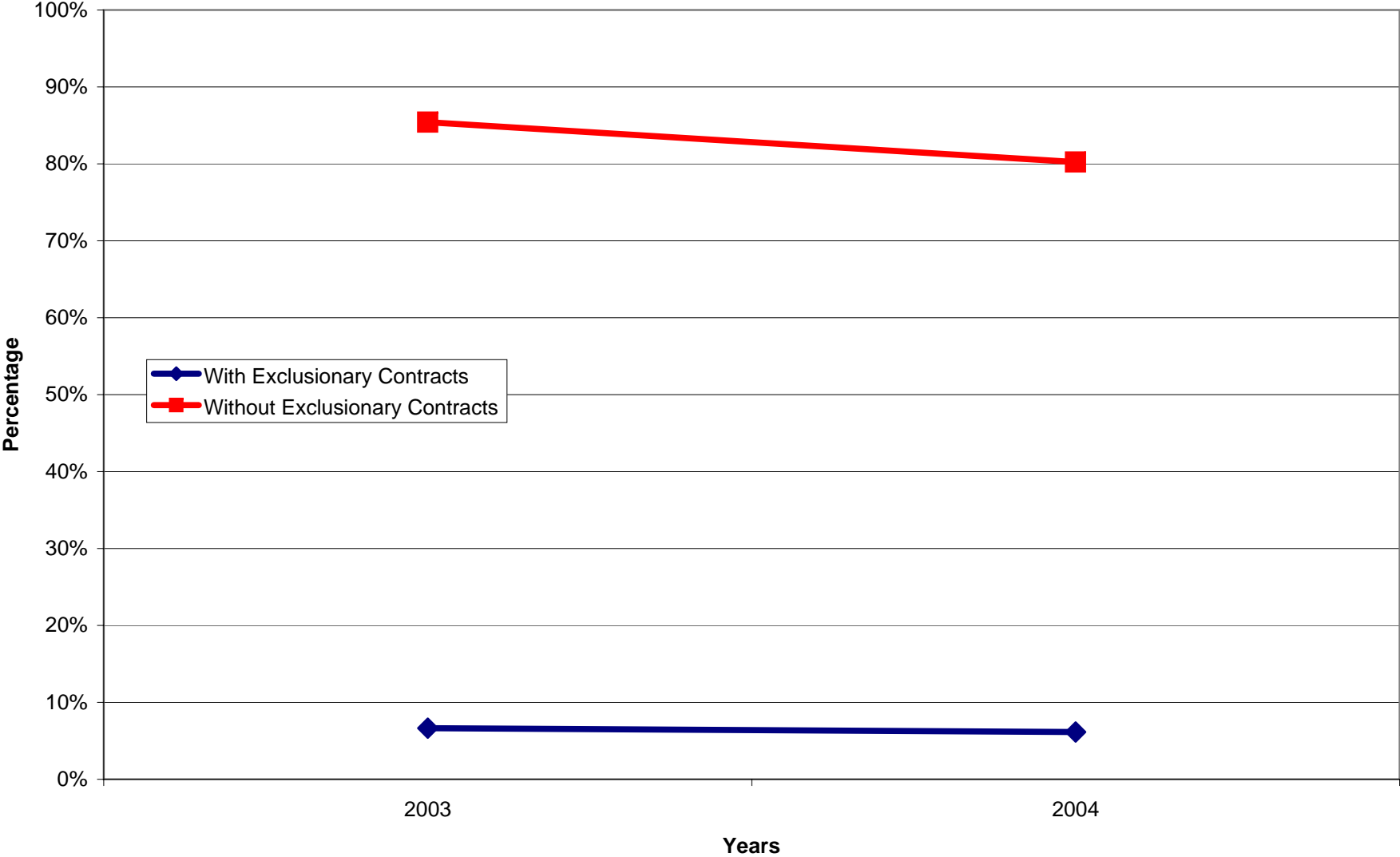


Exhibit 16 Tyco Share of Sales at Buyers that are Restricted by BD's Contracts with Buyers Or Buying Under a Sole-Source BD Contract Versus Buyers Burdened by Neither

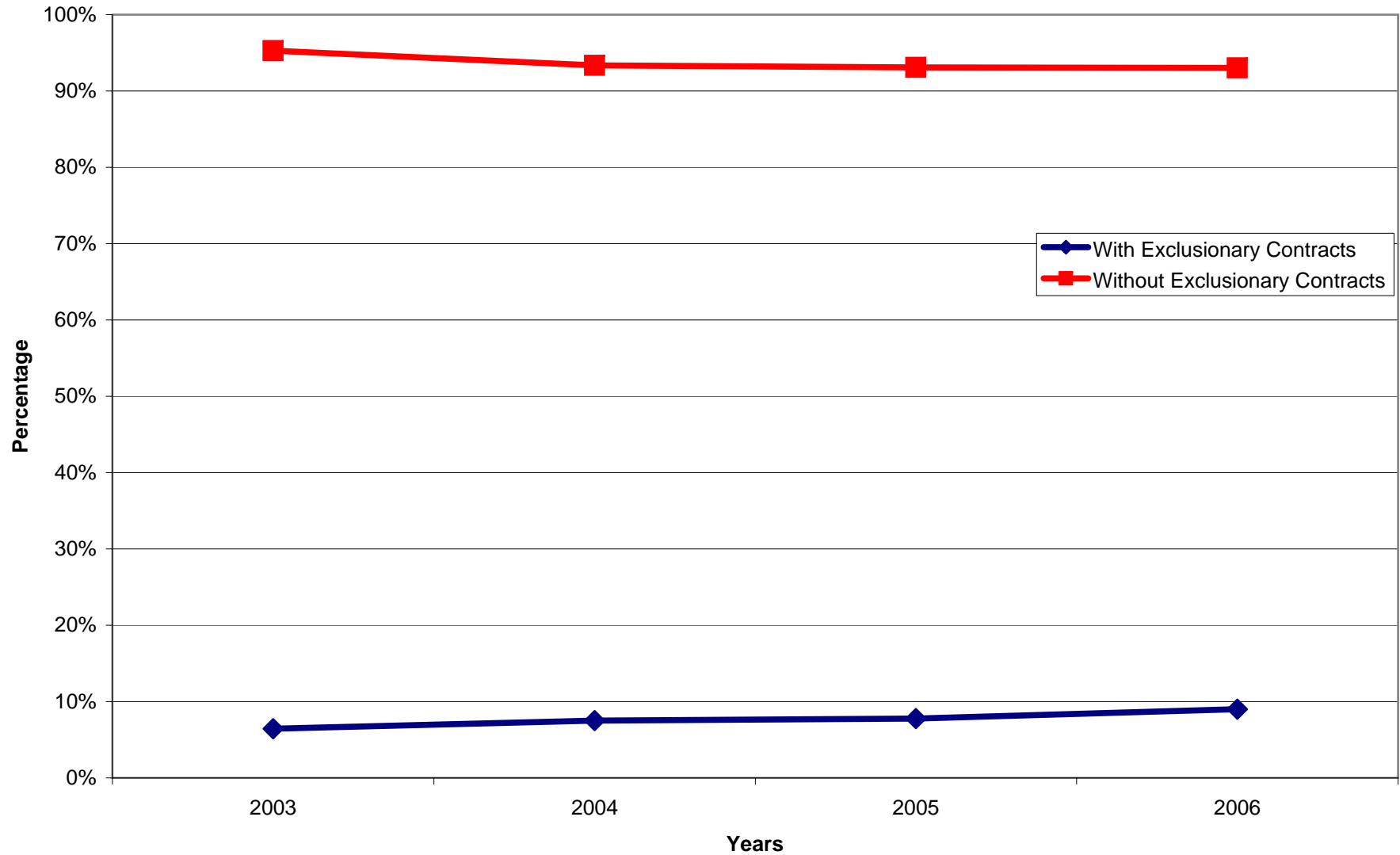
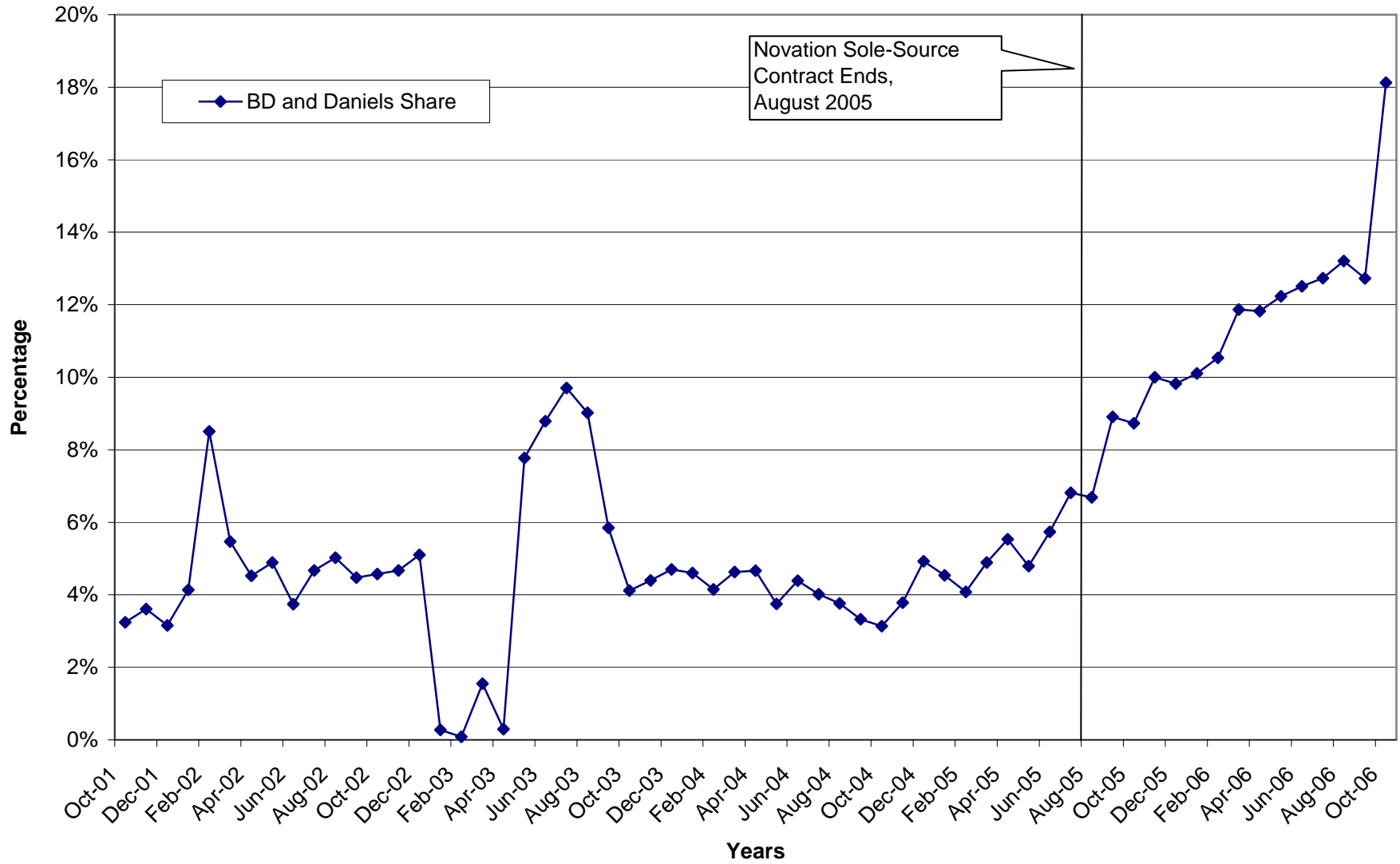


Exhibit 17: Daniels and BD Share of Sales at Novation



APPENDIX A

Exhibit A

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Books

ELHAUGE & GERADIN, GLOBAL ANTITRUST LAW & ECONOMICS (Foundation Press 2007).

ELHAUGE & GERADIN, GLOBAL ANTITRUST LAW & ECONOMICS (Supplement Foundation Press 2007).

ELHAUGE & GERADIN, GLOBAL COMPETITION LAW & ECONOMICS (Hart Publishing 2007).

AREEDA, ELHAUGE & HOVENKAMP, VOL X, ANTITRUST LAW (Little, Brown 1996).

ELHAUGE, STATUTORY DEFAULT RULES (forthcoming Harvard University Press).

ELHAUGE, CONTRACTUAL DEFAULT RULES (forthcoming Foundation Press).

Academic Articles

Elhauge, *Harvard, Not Chicago: Which Antitrust School Drives Recent Supreme Court Decisions?*, 3

- Elhauge, *Can Health Law Become a Coherent Field of Law?*, 41 WAKE FOREST L. REV. 365 (2006).
- Elhauge, *Sacrificing Corporate Profits in the Public Interest*, 80 N.Y.U. LAW REVIEW 733 (2005).
- Elhauge, *Corporate Manager's Operational Discretion to Sacrifice Corporate Profits in the Public Interest*, in ENVIRONMENTAL PROTECTION AND THE SOCIAL RESPONSIBILITY OF FIRMS 13-76 (Bruce Hay, Robert Stavins, & Richard Vietor eds., 2005).
- Elhauge, *Defining Better Monopolization Standards*, 56 STANFORD LAW REVIEW 253 (2003).
- Elhauge, *Why Above-Cost Price Cuts to Drive out Entrants Do Not Signal Predation or Even Market Power – and the Implications for Defining Costs*, 112 YALE LAW JOURNAL 681 (2003).
- Elhauge, *Preference-Estimating Statutory Default Rules*, 102 COLUMBIA LAW REVIEW 2027 (2002).
- Elhauge, *Preference-Eliciting Statutory Default Rules*, 102 COLUMBIA LAW REVIEW 2162 (2002).
- Elhauge, *The Lessons of Florida 2000*, 110 POLICY REVIEW 15 (Dec 2001 -Jan 2002).
- Elhauge, *What Term Limits Do That Ordinary Voting Cannot*, CATO POLICY ANALYSIS, No. 328 (Dec. 16, 1998), <http://www.cato.org/pubs/pas/pa-328es.html>.
- Elhauge, *Are Term Limits Undemocratic?*, 64 U. CHIC. L. REV. 83 (1997).
- Elhauge, Lott & Manning, *How Term Limits Enhance the Expression Of Democratic Preferences*, 5 SUPREME COURT ECON. REV. 59 (1997).
- Elhauge, *The Limited Regulatory Potential of Medical Technology Assessment*, 82 VA. L. REV. 1525 (1996).
- Elhauge, *Allocating Health Care Morally*, 82 CALIF. L. REV. 1449 (1994).
- Elhauge, *Toward a European Sale of Control Doctrine*, 41 AM. J. COMP. LAW 627 (1993).
- Bundy & Elhauge, *Knowledge About Legal Sanctions*, 92 MICH. L. REV. 261 (1993).
- Elhauge, *The Triggering Function of Sale of Control Doctrine*, 59 U. CHIC. L. REV. 1465 (1992).
- Elhauge, *Making Sense of Antitrust Petitioning Immunity*, 80 CALIF. L. REV. 1177 (1992).
- Bundy & Elhauge, *Do Lawyers Improve the Adversary System? A General Theory of Litigation Advice and*

Its Regulation, 79 CALIF. L. REV. 313 (1991).

Elhauge, *Does Interest Group Theory Justify More Intrusive Judicial Review?*, 101 YALE L.J. 31 (1991).

Elhauge, *The Scope of Antitrust Process*, 104 HARV. L. REV. 667 (1991).

Media Publications

1. "Term Limits: Voters Aren't Schizophrenic," Wall Street Journal, A-16 (March 14, 1995).
2. "Medi-Choice," The New Republic, 24 (November 13, 1995).
3. "Microsoft Gets an Undeserved Break," The New York Times, A21 (June 29, 1998).
4. "The Court Failed My Test," The Washington Times, A-19 (July 10, 1998).
5. "Foul Smoke," The Washington Post, A15 (August 4, 1998).
6. "The Real Problem with Independent Counsels," The Washington Times, A19 (Jun 30, 1999).
7. "The New "New Property," San Francisco Chronicle (Nov. 6, 2000).
8. "Florida's Vote Wasn't 'Irregular,'" Wall Street Journal (Nov. 13, 2000).
9. "Bush v. Florida," New York Times, A31 (Nov. 20, 2000).
10. "Competition Wins in Court," New York Times, (June 30, 2001).
11. "A Smart Move on Microsoft," Boston Globe (Sept. 11, 2001).
12. "States Should Seek More From Microsoft," San Francisco Chronicle (Nov. 6, 2001).
13. "State Made The Right Call On Microsoft," The Hartford Courant (Nov. 9, 2001).
14. "Florida 2000: Bush Wins Again!," Weekly Standard (November 26, 2001).
15. "Despite What the Critics Say, it Wasn't a Bag Job," Boston Globe (March 3, 2002).
16. "Soft on Microsoft," The Weekly Standard (March 25, 2002).
17. "Rewire This Circuit," The Wall Street Journal, A26 (Sept. 17, 2003).

Harvard Committees

Chair, Harvard Law School Lateral Appointments Committee (1998-99), Member (2003-05).

Member, Harvard University Standing Committee on the Degree of Doctor of Philosophy in Health Policy (1996-99, 2006-07).

Member, Harvard University Internal Advisory Board for the Interfaculty Initiative in Health Policy (1996-99).

Member, Harvard Law School Lecturers and Visitors Committee (1996-98).

Past Academic Positions

1988-95 Professor of Law, Boalt Hall, University of California at Berkeley

1995 Visiting Professor of Law, Univ. of Chicago Law School

1994 Visiting Professor of Law, Harvard Law School

1993 Visiting Olin Faculty Fellow, Yale Law School

1991-92 Visiting Scholar in Europe at the Karolinska Institute, the Centre for Health Economics, the Rockefeller Foundation Study Center, Cambridge University, the European University Institute and the University of Florence

Clerkships

1987-88 Clerk for Justice William J. Brennan, Jr., United States Supreme Court

1986-87 Clerk for Judge William A. Norris, U.S. Court of Appeals for the Ninth Circuit

1986 Clerk for U.S. Solicitor General's Office, Washington, D.C.

Bar Admissions: Massachusetts, Pennsylvania, United States Courts of Appeals for the Fourth and Ninth Circuits, Supreme Court of the United States.

CONSULTING WORK

Expert Consultant

President, Legal Economics LLC.

Past Senior Expert at Criterion Economics LLC.

Past Special Employee to FTC on antitrust issues.

Testifying Expert on Antitrust Economics in *Amgen v. F. Hoffman La Roche*, concerning erythropoietin-simulating agents (ESAs) and white blood cell simulators (WBCs) pharmaceutical markets.

Testifying Expert on Antitrust Economics in *Applied Medical Resources v. Ethicon, Inc.*, concerning sutures, trocars, and GPO markets.

Testifying Expert on Antitrust Economics in *Masimo Corp. v. Tyco Health Care Group*, concerning oximetry products and GPO markets.

Testifying Expert on Antitrust Economics in *Rochester Medical v. Bard*, concerning catheter and GPO markets.

Testifying Expert on Antitrust Economics in *Retractable Technologies, Inc. v. Becton Dickinson*, concerning syringes and GPO markets.

Testifying Expert on Antitrust Economics in *Spartanburg v. Hill-Rom*, a class action concerning hospital beds and GPO markets.

Testifying Expert on Antitrust Economics in *Louisiana Municipal Police Employees' Retirement System v. Crawford*, concerning merger in the pharmacy benefit manager market.

Testifying Expert on Antitrust Economics in *Natchitoches Parish Hospital v. Tyco*, a class action concerning sharps containers and GPO markets.

Testifying Expert on Antitrust Economics for Intel before the EC on microprocessor markets.

Testifying Expert on Antitrust Economics for AmBev before the EC and Brazilian antitrust authorities on beer market.

Testifying Expert on Antitrust Economics for 1-800-Contacts before the FTC on OSI-CooperVision merger and agreements restraining distribution by nonprescribing retailers.

Testifying Expert on Antitrust Economics in *In Re Cardizem CD Antitrust Litigation*, concerning patents and pharmaceuticals.

Testifying Expert on Antitrust Economics regarding the *B.F. Goodrich-Coltec* Merger, concerning the aerospace industry.

Testifying Expert on Antitrust Economics regarding the *Alcoa-Reynolds* Merger, concerning the aluminum industry

Expert Consultant on Antitrust Economics to National Cable Television Association on Internet Access

Bills before Congress and Interactive Television Inquiry before FCC.

Expert on Antitrust Economics for Royal Caribbean for proposed mergers of Princess with Royal Caribbean and Carnival, concerning the cruise industry.

Expert on Antitrust and Health Care Economics for the Medical Device Manufacturers Association, producing Report to U.S. Senate and Statement to FTC/DOJ regarding exclusionary agreements between medical device suppliers and Group Purchasing Organizations and their hospitals.

Expert on Antitrust and Statutory Interpretation testifying before the New Jersey legislature testifying for Yankees Entertainment & Sports Network, LLC, regarding cable access legislation.

Confidential Expert for various clients on issues of antitrust and/or corporate law and economics involving many other industries, including advertising, airlines, agriculture, cigarettes, computers, contact lenses, electronic commerce, food, express mail, financial markets, hospitals, hotels, insurance (health and auto), Internet software and technology, medical services, metals, petfood, pharmaceuticals, real estate brokerage services, retail, telecommunications, television, ticket brokering, vacation packages, and wireless telephony.

Legal Cases

Legal counsel for plaintiffs in *Credit Suisse v. Billing* before the Supreme Court.

Legal counsel for Verizon in *Verizon v. Trinko* before the Supreme Court.

Lead counsel representing the Florida House of Representatives on legal issues concerning the Presidential election litigation in Florida in 2000, including representing the House before the U.S. and Florida Supreme Courts in *Bush v. Gore*. Co-authored two amicus briefs for Florida Legislature before the U.S. Supreme Court and one before the Florida Supreme Court.

Counsel representing Democratic voters in amicus brief on constitutional review of partisan gerrymandering in *Vieth v. Jubelirer*.

In Ninth Circuit: Lead counsel to California Secretary of State in *Bates v. Jones*, successfully winning 9-2 en banc decision overturning panel decision that had ruled California's legislative term limits

unconstitutional. Successfully opposed certiorari before U.S. Supreme Court.

In Fourth Circuit: Lead counsel to antitrust plaintiffs in *VVL v. Grace*.

In federal district court: Antitrust counsel representing plaintiff in *API v. Granite*.

In numerous federal appellate and district courts: Antitrust counsel representing health trust funds in cigarette litigation.

In federal district court: Antitrust counsel for plaintiff in *BayState v. Amtrak*.

In federal district court: Counsel advising California of State Bill Jones in *Porter v. Jones*, concerning claims that Jones could not constitutionally enforce regulations prohibiting vote buying against websites allowing voters to trade votes for Gore and Nader.

In federal district court: Filed Tunney Act comments on behalf of the public interest opposing proposed settlement in *United States v. Microsoft*.

EDUCATION

Harvard Law School

J.D., June 1986

Awards

Fay Diploma -- for graduating first in class

Sears Prize -- Second Year -- to top two students in class

Sears Prize -- First Year -- to top two students in class

Activities

Harvard Law Review, Articles Office Co-Chair

Class Marshal

Author: *Modes of Analysis: The Theories and Justifications of Privileged Communications*, 98 HARV.

L. REV. 1471-1500 (1985).

Harvard College

B.A., June 1982

Graduated in three years, majoring in Biochemical Sciences. GPA 3.9

PERSONAL

Born of Argentinian immigrants in New York City. Live with wife and 3 children in Newton, Massachusetts.

Exhibit B

EXPERT DECLARATION OF EINER ELHAUGE

Redacted version at Docket No. 53

Exhibit C

REPLY EXPERT DECLARATION OF EINER ELHAUGE

Redacted version at Docket No. 69